SECTION 7 WETLANDS, WATERCOURSES, WILDLIFE AND FISHERIES

A. Introduction

Throughout the Project development process, the Applicant has been in correspondence with MDEP, Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Natural Areas Program (MNAP), Maine Department of Agriculture Conservation and Forestry (MDACF), U.S. Army Corps of Engineers (USACE), and U.S. Fish and Wildlife Service (USFWS). All agency communications received from MDIFW and other State agency staff are provided in Exhibit 7-1. In addition, information was reviewed and incorporated into field surveys from publicly available information from Maine Beginning with Habitat[4] maps and USFWS Information, Planning, and Consultation (IPaC) System database[5]. Results of the USFWS IPaC database review are provided as Exhibit 7-2. Highlights of Agency communications include the following:

- Due to seasonal restrictions for conducting camera trap surveys for Canada lynx (*Lynx canadensis*), the USFWS Maine Field Office was contacted in January 2021 to get guidance and feedback on Canada lynx surveys, which commenced February 5, 2021. No Canada lynx were detected in the Study Area.
- In a letter dated March 2, 2021, MDIFW provided preliminary comments noting that the Project would have minimal impacts on Deer Winter Areas (DWAs), but recommended conducting surveys for bat winter habitat, avoiding Inland Waterfowl and Wading Bird Habitat (IWWH), conducting vernal pool surveys, and leaving 100-foot undisturbed vegetative buffers along streams.
- On February 24, 2021, MDACF identified the presence of Prime Farmland Soils and Soils of Statewide Importance within the Study Area. Impacts to Prime Farmland Soils and Soils of Statewide Importance were reviewed by a licensed soil scientist and are approximately 3.7% of the total Project Area (See Section 9 Unusual Natural Areas and Exhibit 9-3).
- On March 8, 2021, MNAP identified the presence of the state threatened red-stemmed gentian (*Gentiana rubricaulis*) adjacent to the Study Area. No RTE species were identified within the Project Study Area (See Section 9 Unusual Natural Areas and Exhibit 9-1).
- Members of the Project team held a virtual meeting with agency representatives from MDEP, MDIFW, and MNAP on April 29, 2021, to introduce the Project; review the status of desktop assessments, fieldwork, and agency correspondence; discuss planned studies; discuss permitting and scheduling; and gather agency input. USACE and USFWS were unable to attend but correspondence with these federal agencies continued via email to discuss potential wetland impacts, USACE jurisdiction, the status of Canada lynx surveys, and northern long-eared bat (*Myotis septentrionalis*) surveys.
- On June 1, 2021, a *Northern Long-eared Bat Summer Presence/Absence Work Plan* was submitted to USFWS, which was approved that same day. No northern long-eared bats were detected in the Study Area and the survey report was submitted to USFWS on May 11, 2022, with concurrence from USFWS on May 13, 2022.
- On June 1, 2022, and July 26, 2023, the Project team held virtual pre-application meetings with MDEP, MDIFW, and MNAP to present the conceptual and revised Project design, discuss Project natural resource and wildlife habitat impact avoidance and minimization, and review general impact mitigation

[4] Maine Department of Inland Fisheries and Wildlife (MDIFW). 2003. Beginning with Habitat. Available online at: https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/index.html.

[5] U.S. Fish and Wildlife Service (USFWS). 2020. Information for Planning and Consultation. Available online at: https://ecos.fws.gov/ipac/.

recommendations including but not limited to wildlife-friendly fence design, native plantings for wildlife and pollinators, and the development of a wildlife habitat fragmentation compensation plan.

B. Wetlands

Wetlands were delineated in accordance with the USACE *1987 Wetland Delineation Manual* (USACE 1987[6]), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement Version 2* (USACE 2012[7]) (Regional Supplement); and in accordance with criteria in the NRPA Chapter 310, Wetlands and Waterbodies Protection Rules. Wetlands of Special Significance (WOSS), regulated under the NRPA 38 M.R.S. §§ 480-D, were evaluated in accordance with the criteria described in NRPA, Chapter 310, Section 4(A).

Tetra Tech conducted surveys for wetlands within an approximately 1,611-acre area (Figure 7-1) during 2021 and 2023. The Study Area shifted slightly over the course of Project planning to accommodate changes to the Project layout. The Study Area encompasses all areas associated with the proposed development design including solar arrays, roads, 34.5 kV collection system, collector and Interconnection substations, 115 kV generation lead transmission line, and maintenance building and other appurtenant facilities.

Results of the wetland and waterbody delineations are briefly summarized below. Further details of wetland resources identified within the Study Area, as well as relevant data forms, are provided in the Natural Resources Survey Report (Exhibit 7-3).

The Study Area is located within three watersheds, including the Lemon Stream-Black Stream, Black Stream, and Great Moose Lake watersheds. The western access route along Burrill Woods Road near the intersection with Steam Mill Road is located within Lemon-Black Stream Watershed. The central portion of the Study Area is located within Black Stream Watershed. The eastern access route along Burrill Woods Road is in the Great Moose Lake Watershed. A perennial tributary to the East Branch Black Stream flows south through a large wetland complex on the eastern side of the Study Area and joins East Branch Black Stream south of the Study Area. The mainstem of the East Branch Black Stream crosses Burrill Woods Road. Three ephemeral streams originating in wetlands or narrow drainages also cross Burrill Woods Road along the eastern access route and flow south. Several short ephemeral streams are in the northwest portion of the Study Area and generally flow west or southwest out of the Study Area toward Black Stream.

Portions of the Study Area have been affected by disturbances caused by normal forest management activities. Impacts from the more recent forestry practices are observed as tire ruts, cleared and regenerating vegetation, as well as compaction and disturbance of topsoil. As is common in many areas throughout Maine, non-wetland areas with shallow water tables that are subject to this level of disturbance, develop some wetland characteristics over time but do not always meet the definition of regulated wetlands. These areas can be found throughout the Study Area within logging landings and skidder paths.

The existing network of roads represents another human-caused disturbance that disrupts the natural flow of water within and between wetlands and watercourses in the Study Area. Water passes through culverts and flows within ditches created by road construction and maintenance. Due to these past disturbances, there are ditches within the Study Area that convey water but are not subject to regulation as a wetland or watercourse.

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[6] United States Army Corps of Engineers (USACE). 1987. Environmental Laboratory. United States Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87 1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 100 pp.

[7] USACE. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble, and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Tetra Tech worked with the Applicant to modify the Project design based on the results of natural resource surveys, to avoid and minimize wetland impacts to the extent practicable. This process is described in more detail below in Section H Alternatives Analysis. Some Project impacts to wetlands are unavoidable. Proposed wetland impacts total 120,910 square feet of conversion of palustrine forested wetlands (PFO) to palustrine scrub-shrub (PSS) and palustrine emergent (PEM) wetlands to mitigate shading impacts (30,401 square feet) and manage the utility line safety zone under the Gen-Tie (90,509 square feet). 16,412 square feet of the Gen-Tie conversion impacts are WOSS due to their proximity within 25 feet of one of 4 streams further described in Section D below. There will be no direct impacts i.e., fill placed or disturbance therein of any freshwater wetlands. In addition, there will be no temporary impacts associated with construction matting within any freshwater wetlands. [*Note: The Project will manage an additional 129,910 square feet of PFO wetlands by selectively removing taller trees periodically for shade management. All managed PFO wetland areas will be maintained in a condition consistent with the definition of a forested wetland pursuant to §480-B (2-C) and the Vegetation Management Plan (VMP) (see Exhibit 10-1). Managed PFO wetland areas are not considered impacts since they will be maintained in a constant PFO wetland condition for the lifetime of the Project and no compensation for these areas are proposed.*] All proposed wetland impacts, and wetland management areas are illustrated in Figure 7-2 and summarized in Table 7-1. Construction clearing limits have been minimized to the maximum extent practicable. USACE paired plot forms and a photographic log of all aquatic resources that are proposed to be impacted by the Project are provided in Exhibits 7-4 and 7-5 respectively.

C. Wetlands Functions and Values Assessment

In accordance with Chapter 310 (Wetland and Waterbodies Protection Rules), Tetra Tech completed a wetlands functions and values assessment to evaluate the loss of wetland functions and values because of the proposed wetland impacts associated with the Project. The wetlands were evaluated using the USACE New England District's Highway Methodology Workbook[8].

All the wetlands proposed to be impacted by the Project have been previously disturbed through construction of roads and/or timber harvesting practices. These resources generally score low in the functions and values assessment, with each resource having only one or a few functions and values.

Several of the wetlands that are proposed to be impacted are small, isolated areas that do not contain features that support wetland functions and values of the larger landscape, such as presence of listed species, connection to streams or other resources, or unique qualities. The abundance of larger and more diverse wetlands within the watershed surrounding the Project Area limits the functions and values these resources provide at the landscape level. The principal functions and values for the wetland impacted by the Project generally include wildlife habitat and sediment/toxicant retention.

PFO wetland communities within the Study Area are the most common wetland community and represent approximately 79% of the wetland cover types. The remaining wetland community is represented as 21% PSS wetlands. There are no PEM or unconsolidated bottom wetlands present within the Study Area. Function-Value Evaluation Forms for each wetland cover type are provided as Exhibit 7-6. Function-Value Evaluation Forms for each impacted wetland are available upon request.

[8] USACE, New England District. 2015. The Highway Methodology Workbook Supplement. Wetland Functions and Values. April 6, 2015.

Table 7-1 Summary of Wetland Impacts.

Wetland ID	Shade Management Conversion Clearing (square feet)	Overhead Transmission Line Conversion Clearing (square feet)	PFO Managed Wetland Areas (square feet)	Permanent Alteration (square feet)	Temporary Construction Mats (square feet)	WOSS	Cowardian Classification[1, 2]	Primary Functions & Values	Secondary Functions & Values	Previously Impacted	Impact Description
W01DS	0	0	0	0	0	Yes	PSS	Wildlife habitat	Groundwater recharge, flood flow alteration, sediment/toxicant retention, nutrient removal, production export, and sediment/shoreline stabilization	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W02EI	0	0	22,286	0	0	No	PFO	Wildlife habitat	Flood flow alteration, sediment/toxicant retention, nutrient removal, and production export	Yes	PFO Managed Wetland-Selective tree removal of mature trees greater than 20 feet in height
W05EI	0	0	8,119	0	0	No	PFO	Wildlife habitat	Production export	Yes	PFO Managed Wetland-Selective tree removal of mature trees greater than 20 feet in height
W06DS	3,854	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Shade management - PFO conversion to PEM/PSS
W07DS	0	0	12,467	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention and production export	Yes	PFO Managed Wetland-Selective tree removal of mature trees greater than 20 feet in height
W07EI	0	0	53,956	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Shade management - PFO conversion to PEM/PSS
W08DS	2,574	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention and production export	Yes	Shade management - PFO conversion to PEM/PSS
W08SG	0	0	0	0	0	Yes	PSS	Flood flow alteration	Sediment/toxicant retention, nutrient removal, production export, and wildlife habitat	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W09DS	0	0	3,506	0	0	No	PFO	Wildlife habitat	Flood flow alteration, sediment/toxicant retention, nutrient removal, and production export	Yes	PFO Managed Wetland-Selective tree removal of mature trees greater than 20 feet in height
W09SG	0	0	0	0	0	No	PSS	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W10DS	4,026	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Shade management - PFO conversion to PEM/PSS
W10EI	0	0	1,376	0	0	No	PFO	Flood flow alteration	Sediment/toxicant retention, production export, and wildlife habitat	Yes	Shade management - PFO conversion to PEM/PSS
W10SG	0	9,994	0	0	0	Yes	PFO	Flood flow alteration	Sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W11DS	4,674	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Shade management - PFO conversion to PEM/PSS

Wetland ID	Shade Management Conversion Clearing (square feet)	Overhead Transmission Line Conversion Clearing (square feet)	PFO Managed Wetland Areas (square feet)	Permanent Alteration (square feet)	Temporary Construction Mats (square feet)	WOSS	Cowardian Classification[1, 2]	Primary Functions & Values	Secondary Functions & Values	Previously Impacted	Impact Description
W12SG	0	65,968	0	0	0	Yes	PFO	Flood flow alteration	Groundwater recharge, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W13DS	4,883	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export.	Yes	Shade management - PFO conversion to PEM/PSS
W13SG	0	0	15,610	0	0	No	PFO	Wildlife habitat	Production export	Yes	PFO Managed Wetland-Selective tree removal of mature trees greater than 20 feet in height
W14DS	0	0	12,591	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export	Yes	Shade management - PFO conversion to PEM/PSS
W18DS	10,390	0	0	0	0	No	PFO	Wildlife habitat	Sediment/toxicant retention, nutrient removal, and production export.	Yes	Shade management - PFO conversion to PEM/PSS
W18SG	0	773	0	0	0	Yes	PFO	Flood flow alteration	Sediment/toxicant retention, nutrient removal, and wildlife habitat.	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
W19EI	0	13,774	0	0	0	Yes	PFO	Flood flow alteration	Ground water recharge, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat	Yes	Overhead Transmission Line Safety Zone -PFO conversion to PEM/PSS
Total Wetland Impact (square feet)	**30,401**	**90,509**		**0**	**0**	**120,910**					

1 – PFO = palustrine forested; PEM = palustrine emergent; and PSS = palustrine scrub-shrub.
2 – Cowardin, L.M., V. Carter, F.C. Golet, and E.T. Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. December 1979. 142 pp.

Proposed construction activities within the Project Area will involve clearing and the conversion of PFO/PSS wetland to PSS/PEM wetlands. The conversion of PFO wetlands to PSS/PEM wetlands for shade management and transmission line maintenance—generally creates and maintains permanent early successional communities with different functions and values than forested communities. Habitat functions would be altered with some species benefiting and others not. For example, habitat for arboreal species would be diminished while habitat for early successional species would be enhanced. In Maine and in the northeast where the landscape is dominated by forests[9], the creation of early successional habitat generally promotes species diversity, stem density, annual growth and decomposition, and increased layering of vegetation. Forage, cover, and habitat values for wildlife species are different in early successional communities with increased herbaceous forage, soft mast, grass and sedge seeds, tubers, flowering plants, and cover[10]. Although the removal of capable species reduces shading and hard mast production and reduces or eliminates winter cover for some species, overall, in a densely forested region, converting forested areas to shrub and emergent communities can increase habitat diversity. In Maine, several Species of Greatest Conservation Need as identified in Maine's Wildlife Action Plan, require early successional habitat. These include, but are not limited to, American woodcock (*Scolopax minor*), brown thrasher (*Toxostoma rufum*), Canada warbler (*Cardellina canadensis*), prairie warbler (*Setophaga discolor*), Canada lynx, spotted turtle (*Clemmys guttata*), and eastern box turtle (*Terrapene carolina carolina*). All these species have the potential to benefit from early successional habitat in or near the Project Area [11].For wetlands found near streams, the production export and cycling of nutrients to the stream ecosystem via detritus may be enhanced by conversion from a PFO wetland to PSS/PEM wetlands. Dense shrub and herbaceous vegetation can slow the flow of water in streams and increase flood flow alteration functions, slowing and retaining sediments and nutrients (USACE, New England District 2015). Ecological production, diversity, stem density, annual growth, and decomposition will increase. This is a contribution to the local food chain and supports habitat values.

Harvesting timber for sale as lumber, cord wood, and pulp is provided by the initial conversion of PFO wetlands to PSS/PEM wetlands. Hunting will not be allowed within the Project's fenced areas, however, the hunting value of lands surrounding the Project will remain after clearing, as habitat for game species will still be present.

None of the functions or values provided by the PFO wetlands that will be managed or converted for shade management or the utility safety zone will be completely lost or severely diminished by the conversion to PSS/PEM wetlands.

D. Streams

A total of seventeen stream segments were identified within the Study Area. Further details of the streams identified within the Study Area, as well as relevant data forms, are provided in the Natural Resources Survey Report (Exhibit 7-2). A total of four streams are proposed to be impacted by the Project (Table 7-2). *[Note: STA04AR and STA05AR meet the definition of a river, stream or brook pursuant to the NRPA 38 M.R.S. § 480-B (9), however, the stream channels are isolated features that extend only a short distance from existing culverts under the Burrill Woods Road and do not directly connect to any tributaries higher or lower in the watershed. Impacts associated with these 2 streams are de minimis, however, have not been excluded from the stream impact calculations].* Each of the four impacted streams will require clearing associated with the installation of the Gen-Tie. There will be no direct alterations or instream work required. The utility line crossings will affect a combined 278 linear feet (Table 7-2) of the four impacted streams excluding existing impacts from the Burrill Woods Road and will meet the requirements to be permitted through a NRPA, Chapter 305 § 9 "Crossings (utility lines, pipes, and cables), which is being submitted concurrently with this application. All the utility line crossings will require the removal of trees within the riparian

[9] MDIFW. 2015. Maine's Wildlife Action Plan. Maine Department of Inland Fisheries and Wildlife, Augusta, ME.

[10] DeGraaf, R.M., M. Yamasaki, W.B. Leak, and A.M. Lester. 2005. Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region. University of Vermont Press. Burlington, VT.

buffer to support the utility line safety zone within the transmission line ROW. All areas within the ROW including PFO wetlands that are contiguous to the streams will be maintained at equal to or greater than shrub height in accordance with the VMP (see Exhibit 10-1). MDIFW recommends maintaining 100-foot undisturbed, forested buffers from the upland edge of all intermittent and perennial streams and any contiguous wetlands. Areas where such buffer characteristics are not achieved should be considered as resource impacts and appropriately mitigated. For determining resource impacts and mitigation needs, MDIFW recommends that any altered areas resulting in vegetation of less than forest canopy height but equal to or greater than shrub stage height are considered as 60% impact. Any areas of less than shrub stage height should be considered as 100% impact. The historical dimensions of roads and any bordering areas of vegetation management may be excluded from project impact and mitigation calculations. MDIFW further recommends that mitigation be provided at a ratio of 2:1. The amount of riparian buffer impact associated with the construction of the Project's Gen-Tie are illustrated in Figure 7-3 and summarized in Table 7-2. The Project will convert 1.84 acres of forested riparian habitat to shrub stage height or taller vegetation. Based on MDIFW recommendations, mitigation required at 60% of impacts is 1.10 acres.

Table 7-2 Stream Impacts.

Watercourse ID	Flow Regime	Linear feet of stream within ROW	Forested Riparian Buffer Impacts within ROW- 100 feet of stream and/or contiguous wetlands (acres)	Non-Forested Riparian Buffer Impacts within ROW - 100 feet of stream and/or contiguous wetlands (acres)
ST01AR	Perennial	83.24	1.15	0.00
ST04AR	Intermittent	66.07	0.00	0.76
ST05AR	Perennial	31.02	0.38	0.00
ST07AR	Perennial	97.81	0.45	0.19
Total		278.14	1.98	0.95

E. Vernal Pools and Potential Vernal Pools

Vernal pool surveys were completed by Tetra Tech biologists in April, May, and June 2021 in accordance with the criteria outlined in the Maine Association of Wetland Scientists Vernal Pool Technical Committee, Vernal Pool Survey Protocol[12].

There are twenty-two vernal pools or potential vernal pools identified within the Study Area. Most of the vernal pools identified within the Study Area are man-made vernal pools. These vernal pools are generally created by tire ruts and roadside ditches that cause water impoundments and provide conditions conducive to spring amphibian breeding activities.

All the vernal pools identified are located outside the project development area. Four vernal pools (VP01ML, ABA05EI, VP35EI, and VP08EI) are near the development area. VP01EI is characterized as a significant vernal pool (SVP). This vernal pool is naturally occurring and meets the egg mass count and hydroperiod criteria to be considered significant under MDEP NRPA Chapter 335, Significant Wildlife Habitat Rules[13]. VP01ML is located northeast of the western array cluster (Figure 7-2) and all Project development has been sited to avoid any impacts to the pool's critical terrestrial habitat (CTH) as defined in Significant Wildlife Habitat Rules. ABA05EI, VP35EI, and

[12] Maine Association of Wetland Scientists. 2014. Vernal Pool Survey Protocol. Maine Association of Wetland Scientists Vernal Pool Technical Committee. April 2014. 84 pp. Available online at:http://mainewetlands.org/s/Complete-MAWS-2014-VP-Survey-Protocol_v3_05142014-6zs7.pdf.

[13] MDEP. 2016. Chapter 335: Significant Wildlife Habitat. Rule Chapters for the Department of Environmental Protection, 06-096. Available at https://www.maine.gov/sos/cec/rules/06/096/096c335.doc.

VP08EI are naturally occurring and meet the egg mass count criteria to be considered significant but were not originally considered significant due to drying too early for species viability. Upon review by MDIFW these three vernal pools were determined to be "potentially Significant" due to the drought documented by NOAA in Central Maine for June and July 2021 making the dry down kick out date an "unrealistic metric" (Exhibit 7-7). ABA05EI is located northwest of the western array cluster and all project development has been sited to avoid any direct impact to the pool's CTH. Approximately 0.62 acres or 4.1% of the CTH associated with ABA05EI will be managed by periodically removing large trees that are greater than 6 meters in height for shade management. Any removal of trees from within the CTH will be completed in accordance with the NRPA, Chapter 335 § 9(C) Habitat Management standards for Significant Vernal Pools and the VMP (see Exhibit 10-1). Managed CTH areas are not considered impacts since they will be maintained in a constant condition consistent with MDEP Rules for the lifetime of the Project and permit or compensation for these areas are proposed. VP35EI is located central to the western array cluster and all development has been cited to avoid impacts to the pool's CTH. VP08EI is located adjacent to the Burrill Woods Road west of the Project Area. Burrill Woods Road will likely be used during construction and operation of the Project, however, no physical improvements to the road are planned and the existing forest cover within the CTH (94%) of VP08EI will not change because of the Project. Further details of the vernal pool resources identified within the Study Area, as well as relevant data forms for the Project, are provided in Exhibit 7-2. *[Note: As illustrated in Figure 7-4 "Significant Wildlife Habitat" the State MGIS data base identified SVP (ID4868) located outside the Project Study Area on the southwest side of the Project. No impacts are proposed to this SVP.]*

F. Wildlife and Significant Wildlife Habitat

This section describes development of the Project and potential effects on wildlife and wildlife habitat in the Study Area, and the Applicant's commitment to minimizing negative effects and enhancing positive effects. The effects of utility-scale PV solar projects on wildlife and wildlife habitat are largely understudied, especially in the northeastern United States[14,15]. The primary concerns about utility-scale PV solar development for wildlife agencies are habitat loss and habitat fragmentation. Positive and negative effects from utility-scale solar PV projects on general wildlife in the Study Area are discussed immediately below, and the results of agency-recommended wildlife field studies (northern long-eared bat presence/probable absence, bat winter hibernacula, Canada lynx, significant wildlife habitat [SWH]) and potential effects from the Project are described in subsections farther below. Based on consultation with MDIFW, rare mussels have not been documented in streams within the Study Area, and the streams are likely too small and too high in the watershed to provide suitable habitat for any of the three rare mussel species (Exhibit 7-1).

(1) Habitat Loss

Habitat loss is generally understood as the permanent conversion of a natural area to a space that has little to no value for supporting wildlife. Approximately 3.13 acres of habitat will be lost during the lifetime of the Project where forest is replaced with buildings, substations, and other structures such as inverters and transformers. Since the Project is required to be fully decommissioned upon the end of its useful life, there will be no permanent loss of habitat. Project areas not covered by buildings, etc. will be converted and maintained as young forests, shrubland, and grassland (early successional habitat) during the lifetime of the Project. Ground disturbance in the solar arrays will be limited to tree clearing, with stumping and grubbing conducted only where necessary. Topsoil will be left in place, which will preserve the soil profile, organic matter, seed bank, and spores that will support successful

[14] Renewable Energy Wildlife Institute (REWI). 2023. Solar Energy Interactions with Wildlife and Their Habitats: A Summary of Research Results and Priority Questions. Washington, DC. Available at www.rewi.org.

[15] Department of Energy (DOE). 2021. Solar Impacts on Wildlife and Ecosystems. Request for Information Response Summary. November 2021. Available at https://www.energy.gov/sites/default/files/2021-11/Solar%20Impacts%20on%20Wildlife%20and%20Ecosystems%20Request%20for%20Information%20Summary.pdf.

restoration after the Project is decommissioned. The Project will use native plant species during operations and restoration, which will provide forage and cover for wildlife including native pollinators.

Furthermore, the Project will maximize the continued use of the solar array fields areas for wildlife by installing wildlife-friendly fencing and breaking the solar array area into eight smaller fenced areas ranging in size from 54 acres to 280 acres with corridors between them to facilitate the movement of wildlife through the Project Area (Figure 7-4) *[Note: There is a ninth 1 acre fenced substation area at the POI*]. The Project will use 7-foot-tall wildlife-friendly fencing, which will be installed with the bottom edge of the fencing at heights of 6–12 inches off the ground to maintain existing terrestrial migration corridors for small to medium-sized animals. In addition, the fence will be installed with gates strategically located at various points around the perimeter of each array area which can be opened, if necessary, to allow release of large mammals that may become trapped within the fenced solar array fields. The Applicant will develop a protocol for the Project's operations and maintenance staff to regularly monitor the fenced areas to look for large animals that may inadvertently get inside the fence and ensure that they leave on their own. If animals become trapped or stressed, staff would notify MDIFW biologists for further guidance. In contrast, conventional fencing and/or fencing the entire Project Area within a single fence would create an obstacle that could physically prevent wildlife from passing through an area and has the potential to isolate populations and alter home ranges.

Wildlife species that have been documented in the Study Area that will be able to pass through or under wildlife-friendly fencing include bobcat (*Lynx rufus*), coyote (*Canis latrans*), fisher (*Pekania pennanti*), mink (*Neogale vison*), porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*), ruffed grouse (*Bonasa umbellus*), short-tailed weasel (*Mustela erminea*), and wild turkey (*Meleagris gallopavo silvestris*). Wildlife species documented in the Study Area that would have difficulty passing through or under the wildlife-friendly fencing include, black bear (*Ursus americanus*), moose (*Alces alces*), and white-tailed deer (*Odocoileus virginianus*) (Table 7-3). However, these larger species would be able to migrate through the Project using the corridors between the eight smaller fenced-in solar arrays, and they could forage on the browse along the fenced edges. For details about wildlife documented in the Study Area see Exhibit 7-9. Wildlife-friendly fencing will also allow the Project to function as a climate corridor as wildlife habitats and home ranges shift due to climate change[16]. In addition, some studies suggest that the shade under solar panels, may provide a cool, moist microclimate that might support amphibians and other species[17].

Table 7-3 Projected Ability of Wildlife to Move Through the Study Area

Common Name (*Scientific Name*)	Documented in Study Area[1]	Able to Pass Through or Under Wildlife-Friendly Fencing	Ability to use Corridors Between Solar Arrays
Black bear (*Ursus americanus*)	Yes	Unlikely	Yes
Bobcat (*Lynx rufus*)	Yes	Yes	Yes
Coyote (*Canis latrans*)	Yes	Yes	Yes
Fisher (*Pekania pennanti*)	Yes	Yes	Yes
Mink (*Neogale vison*)	Yes	Yes	Yes
*Moose (*Alces alces*)	Yes	Unlikely	Yes
Porcupine (*Erethizon dorsatum*)	Yes	Yes	Yes
Snowshoe hare (*Lepus americanus*)	Yes	Yes	Yes

[16] Maine Audubon. 2019. Best Practices for Low Impact Solar Siting, Design, and Maintenance. Available at https://maineaudubon.org/advocacy/solar/.

[17] REWI 2023.

Common Name (*Scientific Name*)	Documented in Study Area[1]	Able to Pass Through or Under Wildlife-Friendly Fencing	Ability to use Corridors Between Solar Arrays
Ruffed grouse (*Bonasa umbellus*)	Yes	Yes	Yes
Short-tailed weasel (*Mustela erminea*)	Yes	Yes	Yes
Wild turkey (*Meleagris gallopavo silvestris*)	Yes	Yes	Yes
White-tailed deer (*Odocoileus virginianus*)	Yes	Unlikely	Yes

*SGCN
1 – Documented during Canada lynx survey (See Exhibit 7-9).

Based on field observations and review of aerial photography, the existing habitat within the Study Area is primarily working forest that has been subject to logging and wood harvesting using a multi-aged silvicultural system, with patches of pine plantation. Plantation forests are not considered natural communities in Maine[18] and are generally characterized by a monoculture of a tree species, even-aged stands, even spacing between trees, high tree density, a lack of structural complexity, and increased disturbance regimes[19]. When compared to native forests, plantation forests typically have less species richness and diversity. Thus, the conversion of plantation forest to early successional habitat may be a net benefit for wildlife species. Based on review of aerial photography and correspondence with the landowner, approximately 164 acres (15%) of the Project Area is composed of plantation forest.

Forests that are logged and harvested, however, provide wildlife habitat through the alteration of forest structure and composition[20]. The Project would convert the shifting habitat provided by forestry to early successional habitat under managed succession. Almost 90% of Maine is covered in forest[21], but young forests compose only 7% of the forests in southern Maine and only 2% of the forests in northern Maine[22,23]. Additional studies would be needed, but the proportionately rarer habitats created and maintained by the Project have the potential to support multiple SGCN, including American woodcock, brown thrasher, Canada warbler, prairie warbler, Canada lynx, spotted turtle, and eastern box turtle.[24]

(2) Habitat Fragmentation

Habitat fragmentation occurs when roads, utility corridors, buildings, parking lots, houses, and timber harvesting activities (clearcuts, log yards and skid trails) change the previous landscape (temporarily or permanently) and cause a shift in habitat utilization[25,23]. These changes reduce blocks of habitat for area-sensitive species and create barriers

[18] Gawler, S. and A. Cutko. 2010. Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems. Maine Natural Areas Program, Maine Department of Conservation, Augusta, ME.

[19] Brockerhoff, E. G., Jactel, H., Parrotta, J. A., Quine, C. P., and J. Sayer. 2008. Plantation forests and biodiversity: Oxymoron or opportunity? Biodiversity and Conservation, 17(5). https://doi.org/10.1007/s10531-008-9380-x.

[20] MDIFW. 2015. Maine's Wildlife Action Plan. September 2015. Augusta, ME. Available at https://www.maine.gov/ifw/fish-wildlife/wildlife/wildlife-action-plan/index.html.

[21] Elliott, C., ed. 2008. Biodiversity in the Forests of Maine: Guidelines for Land Management. University of Maine Cooperative Extension Bulletin #7147. 167 pp.

[22] Maine Audubon. 2017. Forestry for Maine Birds: A Guidebook for Foresters Managing Woodlots "With Bird in Mind." Available at https://www.maineaudubon.org/wp-content/uploads/2017/12/FFMB-2017.pdf.

[23] MDIFW. 2015. Maine's Wildlife Action Plan. September 2015. Augusta, ME. Available at https://www.maine.gov/ifw/fish-wildlife/wildlife/wildlife-action-plan/index.html.

[24] Wildlife Management Institute (WMI). 2012. Under Cover: Wildlife of Shrublands and Young Forest. January 2012. Available at https://youngforest.org/sites/default/files/2023-03/under-cover.pdf.

[25] MDIFW. 2023. Maine Natural Areas Program: Maine's Wildlife Legacy. Available at https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/wildlife-legacy.html.

for some species that prevent them from breeding, feeding, accessing water, or finding shelter. The width of a road (including shoulders) or utility corridor and how wide of a canopy gap it creates determines whether it is a fragmenting feature and what species are affected. Habitat fragmentation often results in loss of interior habitat, increase in edge habitat, altered microclimate and hydrology, more invasive plant species, increased susceptibility of birds to brood parasitism, and new corridors for predators or new competitors[26]. Habitat fragmentation and increased edge tends to benefit some species, including white-tailed deer, ruffed grouse, American crows (*Corvus brachyrhynchos*), blue jays (*Cyanocitta cristata*), raccoons (*Procyon lotor*), and red squirrels (*Tamiasciurus hudsonicus*); but negatively affect other species. Table 7-4 includes species that may frequent the area and rely on large unfragmented blocks of forested habitat. Clearcuts can also temporarily fragment forested habitat, leading to increased edge habitat, decreased interior forest habitat, and the potential for increased predation and nest failure for ground-nesting birds[27]. However, common milkweed (*Asclepias syriaca*), the larval host plant of the monarch butterfly (*Danaus plexippus*), which is a candidate species for federal listing, thrives on forest edges. Field observations documented multiple populations of common milkweed on roadsides within the Study Area.

[26] Maine Audubon 2000.

[27] Manolis, J. C., Andersen, D. E., and F. J. Cuthbert. 2002. Edge effect on nesting success of ground nesting birds near regenerating clearcuts in a forest-dominated landscape. Auk, 119(4). https://doi.org/10.2307/4090226

Table 7-4 Contiguous Forest Requirements of Wildlife Species

Common Name (*Scientific Name*)	Contiguous Forest Needed (acres)**
Birds	
Barred owl (*Strix varia*)	200–900[1]
*Blackburnian warbler (*Setophaga fusca*)	>250[2]
*Black-throated blue warbler (*Setophaga caerulescens*)	>250[2]
*Black-throated green warbler (*Setophaga virens*)	>250[2]
*Chestnut-sided warbler (*Setophaga pensylvanica*)	>250[1]
Great-horned owl (*Bubo virginianus*)	2,000–8,000[3]
Northern goshawk (*Accipiter gentilis*)	640[1]
*Northern parula (*Setophaga americana*)	>250[2]
Ovenbird (*Seiurus aurocapilla*)	>250[2]
Pileated woodpecker (*Dryocopus pileatus*)	100–200[1]
*Scarlet tanager (*Piranga olivacea*)	>250[2]
*Wood thrush (*Hylocichla mustelina*)	>250[2]
Mammals	
American marten (*Martes americana*)	640–1,280[1]
Black bear (*Ursus americanus*)	2,000–8,000[3]
Fisher (*Pekania pennanti*)	4,000–13,000[1]
*Moose (*Alces alces*)	4,000–6,000[3]
White-tailed deer (*Odocoileus virginianus*)	150–7,500[1,4]

*SGCN
**The individual territories for a pair of birds may be very small but abundance of the species increases in larger forest patches. These acreage estimates account for the species home range, which includes the area typically used by an animal over the course of a year.
1 – Bryan, R.R. 2007. Focus Species Forestry: A Guide to Integrating Timber and Biodiversity Management in Maine. Third Edition. Published by Maine Audubon. Available at https://www.maineaudubon.org/wp-content/uploads/2017/03/MEAud-FocusSpeciesForestry.pdf.
2 – Maine Audubon. 2017. Forestry for Maine Birds: A Guidebook for Foresters Managing Woodlots "With Bird in Mind." Available at https://www.maineaudubon.org/wp-content/uploads/2017/12/FFMB-2017.pdf.
3 – DeGraaf, R.M., M. Yamasaki, W.B. Leak, and A.M. Lester. 2005. Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region. University of Vermont Press. Burlington, VT.
4 – Depends on region and snow conditions

The Project avoids and minimizes habitat fragmentation by utilizing existing roads and by siting the Project in an area where fragmentation and the shifting mosaic of forest management already exists. The Project will primarily use 8.7 miles of existing roads, and the Gen-Tie will consist of 2.5 miles of overhead lines that will be collocated with the existing Burrill Woods Road. Approximately 5.5 miles of new 12-foot and 0.4 miles of new 20-foot secondary roads to provide access to the solar arrays and substations will be completely within the fenced solar array areas, and the 7.8 miles of collector lines will generally be buried within the solar array clusters. The Project's siting takes advantage of forestlands that have been previously harvested, including clearcut areas, ruderal forests, and plantation forests. Clearcuts temporarily fragment habitat by reducing interior forest habitat and increasing edge habitat until the forest regenerates; ruderal forests tend to support more opportunistic and generalist species but have less value for area sensitive species; and, as described above, plantation forests typically have less species richness and diversity compared to native forests. The Project would create edge habitat that would last for the lifetime of the Project, but

it might reduce direct mortality for birds and other wildlife caused by logging, especially if the logging is performed during the breeding season for birds and bats.

The Hartland Solar Project, when compared to the recently permitted Three Corners Solar Project, will have less of an impact on wildlife habitat fragmentation due to existing fragmenting features and low pre-construction habitat quality. According to Beginning with Habitat's (BwH's) *Conservation and Connectivity Planning Resources*[28], the Project's solar arrays (which encompasses the new roads and collector lines described above) would be constructed in an area that includes five "Undeveloped Habitat Blocks" (BwH blocks) ranging in size from 967 acres (FID 5537) to 6,375 acres (FID 5529, Table 7-5, Figure 7-4). The data presented in the BwH maps is intended for planning purposes only and does not represent a field verified evaluation of the habitat block areas and their value for wildlife. For the purposes of determining the impacts of the Project on habitat fragmentation it is important to recognize that the habitat block areas are already fragmented and smaller than what is currently mapped. Ostensibly, the Project will reduce FID 5537 by 29%, FID 5528 by 3%, FID 5526 by 5%, FID 5538 by 15%, and FID 5529 by 3% (Table 7-5, Figure 7-4). Based on field observations and review of aerial photography, the BwH blocks do not account for the existing transmission line that bisects FID 5528 and FID 5538, and recent logging activity including clearcuts and the new logging access roads that already fragment all five of the BwH blocks. The impacts to FID 5528, 5526, and 5529 are de minimis and largely affect previously harvested areas, ruderal forests, and plantation forests. Likewise, FID 5538 also includes large areas of clearcuts both within and outside of the Project Area, new unaccounted for logging roads, and plantation forests. FID 5537 will have the largest percentage reduction, but it is also the smallest block and already impacted by its location at the intersection of Burrill Woods Road and Munn Flat Road, where some residential development occurs.

In comparison, MDIFW stated that the Three Corners Solar Project would result in significant fragmentation of a nearly 15,000-acre forest block, with significant habitat value, potentially disrupting lifecycles, and movement patterns of wildlife over previously contiguous habitat areas. The solar array area for the Three Corners Solar Project, which received approval from MDEP In Department Licensing decision#L-29746-TH-A-N/L-29746-PS-B-N/L-29746-DP-C-N/L-29746-L6-D-N/L-29746-VP-E-N/L-29746-IW-F-N/L-29746-DW-G-N on July 29, 2022, is situated in a BwH block of 14,688 acres (FID 5127), which is more than double the size of the largest BwH block impacted by the proposed Project, and reduces the size of that block by approximately 855 acres (6%). Prior to the development of the Three Corners Project, FID 5127 was the single largest BwH block between southern Maine and Bangor, north to Dover Foxcroft, but excluding the Western Maine Mountains. In addition, the generator lead line for the Three Corners Solar Project fragments an additional 10,338-acre BwH block to the south. *[Note: The Three Corners generator lead line also passes through three additional BwH blocks that are 2,507, 1,232, and 760 acres].*

[28] MDIFW. 2023. Beginning with Habitat Maps: Interactive Map Viewers. Available at https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/maps/index.html.

Table 7-5 Reduction in Undeveloped Habitat Blocks

BwH "Undeveloped Habitat Block" (FID[1])	BwH "Undeveloped Habitat Block" (undeveloped acres)[2]	Proposed Development Area within Block (developed acres)[3]
5537	967	277
5528	1,683	47
5526	1,978	100
5538	2,839	419
5529	6,375	191

1 – Feature Identification. FIDs are used here since the BwH GIS data does not otherwise assign unique codes to undeveloped habitat blocks.
2 – Does not account for existing transmission lines or recent logging activity, including clearcuts and the creation of new logging access roads.
3 – Does not account for recent logging activity, including clearcuts and the creation of new logging access roads.

The pre-construction habitat quality of the Hartland Solar Project Area has low value to wildlife due to active logging and wood harvesting, existing fragmenting features like roads and utility transmission lines. Adjustments made to the design of the Project to actively avoid natural resources based on agency consultation, desktop review, and field studies and designing the Project with wildlife friendly fencing and travel corridors between array areas to facilitate movement of small and large mammals through the Project Area have avoided and minimized project impacts to the previously impacted habitat area. In contrast, the Three Corners Solar Project impacted or had the potential to impact habitat for Yellow lamp mussel (*Lampsilis cariosa*, State Threatened), tidewater mucket (*Leptodea ochracea*, State Threatened), brook floater (*Alasmidonta varicosa*, State Threatened), eastern ribbon snake (*Thamnophis sauritus*, Special Concern), and great blue heron (*Ardea herodias*, Special Concern). In addition, the Three Corners Solar Project occurs within the BwH Unity Wetlands Focus Area, which is considered significant because of species and habitats associated with riparian areas[29]. The Hartland Solar Project is not sited within a BwH focus area. A direct comparison of the Hartland Project and the Three Corners Project is provided in Table 7-6.

The Hartland Solar Project avoids and minimizes habitat fragmentation by siting the Project in an area of smaller forest blocks already bisected by existing roads, logging, and wood harvesting. The impacted area generally has low value for wildlife, nonetheless, the Applicant is proposing to further mitigate any perceived impacts to wildlife by installing wildlife friendly fencing to allow free movement of small mammals through the Project Area and breaking the solar arrays areas up into smaller fenced areas that will provide travel corridors for larger mammals to move through the Project Area.

[29] MDIFW. 2024. Unity Wetlands. Beginning with Habitat Focus Areas of Statewide Ecological Significance. Available at https://www.maine.gov/dacf/mnap/focusarea/unity_wetlands_focus_area.pdf.

Table 7-6 Hartland Solar Project – Three Corners Project Habitat Impact Comparison

Project/Resource Value	Hartland Solar Project	Three Corners Project
Largest BwH Block Impacted	6,375 acres	14,688 acres
Second Largest BwH Block Impacted	2,839 acres	10,338 acres
BwH Focus Area	Not located in a BwH Focus Area	Located within the BwH Unity Wetlands Focus Area
Developed Area	3.13 acres	22.79 acres
Fenced Solar Array Area	989 acres	681 acres
Gen-Tie Length/acres	2.5 miles/16 acres - collocated with Burrill Woods Road	5.2 miles/71 acres-new ROW
Conversion of existing managed forest land	1,130 acres	926 acres
Direct Wetland impact	No direct wetland impacts	23,197 square feet (0.53 acres)
WOSS Impacts	16,412 square feet (0.38 acres) of conversion	17,055 square feet (0.39 acres) of fill and 245,308 square feet (5.63 acres) of conversion
Wetland conversion Impacts	120,910 square feet (2.78 acres)	811,242 square feet (18.63 acres)
Temporary wetlands Impacts	No temporary wetland impacts	60,548 square feet (1.39 acres)
Direct stream Impacts	No direct stream impacts	No direct stream impacts
Temporary stream impacts	No temporary stream impacts	4 Streams with temporary mat crossings for construction
Riparian Buffer Impacts	4 streams within the Gen-Tie ROW/278 linear feet [Note: 2 of the 4 streams meet the definition of a river, stream or brook pursuant to the NRPA 38 M.R.S. § 480-B (9), however, the stream channels are isolated features that extend only a short distance from existing culverts under the Burrill Woods Road and do not directly connect to any tributaries higher or lower in the watershed. Impacts associated with these 2 streams are de minimis.]	7 streams within the Gen-Tie ROW/825 linear feet including Fifteen Mile Stream
SVP within Solar Array & Gen-Tie	No SVP's impacted	7 SVP's Impacted by clearing for shading an/or Gen-Tie safety zone.
Deer Wintering Areas	6 acres of Indeterminant -value DWA impacted by Gen-Tie (Impacted DWA does not meet MDIFW Criteria)	69.9 acres of disturbance within moderate-value DWA

Project/Resource Value	Hartland Solar Project	Three Corners Project
Inland Waterfowl and Wading Bird Habitat	No IWWH within Project Area	Gen-Tie intersects with 530 linear feet of IWWH.
RTE Species	No RTE Species within Projects limit of disturbance *[Note: Mapped occurrences of rare plants or plant communities in the Project vicinity include red-stemmed gentian (Gentiana rubricaulis).]*	No RTE Species within Projects limit of disturbance *[Note: Mapped occurrences of rare plants or plant communities in Project vicinity include Silver Maple Floodplain Forest, Unpatterned Fen, Wild Garlic (Allium canadense), MacGregor's Rye, Swamp White oak, and Barren Strawberry.]*
Bats	Bat survey conducted in 2021: presence confirmed for big brown bat (*Eptesicus fuscus*), eastern red bat (Lasiurus borealis), hoary bat (Lasiurus cinereus), silver-haired bat (*Lasionycteris noctivagans*), and little brown bat (*Myotis lucifugus*). No suitable bat hibernacula within 10 miles	No bat surveys conducted No bat hibernacula survey conducted
Freshwater mussels	No rare mussel documented in the streams within the Project Area	Sebasticook River: Yellow lamp mussel (*Lampsilis cariosa)*, State Threatened), tidewater mucket (*Leptodea ochracea*, State Threatened), and brook floater (*Alasmidonta varicosa*, State Threatened)
		Fifteenmile Stream: yellow lamp mussel (*Lampsilis cariosa*)
Great Blue Heron	No Great Blue Heron (*Ardea herodias*, Special Concern) rookeries within the Project Area	Gen-Tie located in an IWWH which contains an active rookery for great blue herons (*Ardea Herodias*; Special Concern).
Eastern Ribbon Snake	No Eastern Ribbon Snake (*Thamnophis sauritas)* within the Project Area	10 Eastern Ribbon Snake (*Thamnophis sauritas)* observed
Canada Lynx	No Canada lynx (*Lynx canadensis*) Presence	No lynx study conducted

(3) Wildlife Field Studies

As part of Project planning and informal consultation with the USFWS Maine Field Office, and recommendations from MDIFW, wildlife field studies were conducted in the Study Area for northern long-eared bat presence/probable absence, bat winter hibernacula, and Canada lynx.

Northern Long-eared Bat Presence/Probable Absence

Potential effects on northern long-eared bat and other bat species were evaluated. A summer bat acoustic survey was coordinated with the USFWS Maine Field Office and conducted in July 2021 in accordance with USFWS' 2021 *Range-wide Indiana Bat Summer Survey Guidelines for Indiana Bat and Northern Long-eared Bat*[30] (Exhibit 7-8). Northern long-eared bat was not detected, but the presence of five other bat species was confirmed, including big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and little brown bat (*Myotis lucifugus*). Little brown bat is a State-listed endangered species and big brown bat, eastern red bat, hoary bat, and silver-haired bat are considered State Species of Special Concern. Although little brown bat was confirmed, calls from this species composed less than 1% of total bat activity. Subsurface mines and caves are the primary habitat for little brown bat, and nearly all common forest types are considered secondary habitat. In Maine, locations of winter hibernacula and maternity roost trees for northern long-eared bat and other bat species are not publicly available. However, the USFWS has incorporated known northern long-eared bat locations into a determination key that allows project proponents to streamline review of projects for potential effects to the species. The determination key indicated that the Study Area does not overlap with an area for which USFWS currently has data to support the presumption that the northern long-eared bat is present. This result suggests that there are no known hibernacula within 10 miles and no known summer occurrences within 3 miles of the Study Area[31], and that activities within the Study Area are likely to have no effect on northern long-eared bats.

Bat Winter Hibernacula

A lack of information on current distributions of bat species in Maine makes it difficult to identify specific risks to bats [32]. According to the MDIFW Solar Energy Project General Resource Guidance and Recommendations (updated March 5, 2020), if there are no rocky features present on and within 250 feet of the Project Area then significant impacts to bat species because of a solar project are not expected[33]. Based on recommendations from MDIFW, a bat winter habitat analysis was performed via desktop review and field verification; however, no suitable habitat for overwintering bats was identified. In addition, the USFWS determination key process described above indicates that there are no known hibernacula within 10 miles and no known summer occurrences within 3 miles of the Study Area. Furthermore, tree clearing will occur in the winter to the maximum extent practicable; thus, potential impacts to northern long-eared bat and other tree-roosting bat species will be avoided.

As described above, constructing the Project will result in habitat conversion and fragmentation, but no permanent habitat loss. Plantation forests provide poor quality habitat for bats[34]; therefore, clearing of this forest is unlikely to affect bats. The shifting habitats provided by the current forestry management practices provide a mix of foraging, roosting, and migratory habitat. Conversion of these shifting habitats to young forests, shrubland, and grassland would continue to provide foraging and migratory habitat. Constructing the solar field will remove potential roosting habitat for the lifetime of the project but will also eliminate the possibility of forestry management activities clearing

[30] USFWS. 2021. 2020–2021 Range-wide Indiana Bat Summer Survey Guidelines.

[31] USFWS. 2023. Land-based Wind Energy Interim Voluntary Guidance for the Northern Long-Eared Bat (Myotis septentrionalis). 6 March. Available at https://www.fws.gov/library/collections/interim-wind-guidance-northern-long-eared-bat.

[32] MDIFW. 2015. Maine's Endangered and Threatened Wildlife. Available at https://www.maine.gov/ifw/docs/Maine%20ET%20List_2015-10-15.pdf.

[33] MDIFW. 2020. Solar Energy Project General Resource Guidance and Recommendations. Updated March 5, 2020. Available at https://www.maine.gov/ifw/programs-resources/environmental-review/guidance-documents.html.

[34] Federal Register / Vol. 80, No. 63 / Thursday, April 2, 2015 / Rules and Regulations

actual roost trees if logging occurs during the bat breeding season. A study conducted in southwest England (no bat species overlap with Maine) suggests that the activity level of some bat species was higher in open fields without solar panels, compared to fields with solar panels, but that the species richness of bats along field boundaries was not affected by solar panels[35]. Habitat conversion will likely favor bat species that are more adapted to open habitats, including big brown bat, silver-haired bat, and hoary bat. These species were already the dominant species detected during the acoustic study which aligns with trends observed in other studies demonstrating a drastic increase in the proportion of non-myotis recordings because of white-nose syndrome[36].

Canada Lynx

A Canada lynx camera trap and tracking survey was conducted from February 5, 2021, to April 29, 2021 (Exhibit 7-9). No Canada lynx were recorded during the survey and no incidental tracks of Canada lynx were observed. Absence does not necessarily mean that it is not possible for Canada lynx to occur within or pass through the Study Area, but it is unlikely that a persistent population occurs in the vicinity. Snowshoe hare, the main prey species for Canada lynx, were abundant. Canada lynx are dependent on high densities of snowshoe hare for survival[37,38] and therefore share common habitat preferences with snowshoe hare. Both species are associated with spruce-fir forests with dense understory to provide food and cover in deep snow conditions[39,40,41]. Forest type in central Maine transitions from hardwood to softwood dominated[42], where dense softwood stands, particularly following large clear cuts are more prevalent. In the Project vicinity softwood stands are present but tend to have a strong hemlock component and are more mature, a quality better suited for deer than snowshoe hare and Canada lynx. Habitat loss and fragmentation are the two primary concerns regarding impacts on Canada lynx which may be influenced by Project design and construction. Habitat loss related to Project development will likely be marginal in the context of the broader landscape and is driven by regional forest management practices and resulting patterns of softwood regeneration. It is likely that if habitats adjacent to the Study Area continue to support high densities of snowshoe hare, then Canada lynx will continue to utilize these areas. Several mitigation measures proposed as part of the Project would benefit Canada lynx, including the use of wildlife-friendly fencing with the bottom edge installed at heights of 6–12 inches off the ground to allow for the passage of small to medium-sized animals, restoring habitat using native plant species, and placing a riparian corridor into a conservation easement. These and other mitigation measures are described below in Section I Compensation.

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[35] Tinsley, E., Froidevaux, J. S. P., Zsebők, S., Szabadi, K. L., and G. Jones. 2023. Renewable energies and biodiversity: Impact of ground-mounted solar photovoltaic sites on bat activity. Journal of Applied Ecology, 60(9). Available at https://doi.org/10.1111/1365-2664.14474.

[36] Nocera, T., Ford, W. M., Silvis, A., and C. A. Dobony. 2019. Patterns of acoustical activity of bats prior to and 10 years after WNS on Fort Drum Army Installation, New York. Global Ecology and Conservation, 18. Available at https://doi.org/10.1016/j.gecco.2019.e00633.

[37] Krebs, C.J., R. Boonstra, S. Boutin, and A.R. Sinclair. 2001. What Drives the 10-year Cycle of Snowshoe Hares? The ten-year cycle of snowshoe hares–one of the most striking features of the boreal forest–is a product of the interaction between predation and food supplies, as large-scale experiments in the Yukon have demonstrated. AIBS Bulletin, 51(1), 25‑35.

[38] Harrison, D., Olson, S., Mallet, D., Fuller, A. and J. Vashon. 2013. Relationships among forest harvesting, snowshoe hares and Canada lynx in Maine. Cooperative Forestry Research Unit: 2012 Annual Report, p.79.

[39] Mowat, G., K. G. Poole, and M. O'Donoghue. 2000. Ecology of lynx in northern Canada and Alaska. Chapter 9 In Ruggiero, L.F., K. B. Aubry, S. W. Buskirk, et al., tech. eds. Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 pp.

[40] Fuller, A.K., D.J. Harrison, and J.H. Vashon. 2007. Winter habitat selection by Canada lynx in Maine: prey abundance or accessibility? Journal of Wildlife Management 71(6), 1980‑1986.

[41] Simons-Legaard, E.M., Harrison, D.J. and K.R. Legaard. 2016. Habitat monitoring and projections for Canada lynx: linking the Landsat archive with carnivore occurrence and prey density. Journal of Applied Ecology, 53(4), pp.1260‑1269.

[42] McCaskill, G., Morin, R., Moser, W. Maine Forests. 2016. Maine's Forests 2013.

Significant Wildlife Habitat

Figure 7-6 depicts mapped SWH in the vicinity of the Study Area. SWH areas include SVPs, Atlantic salmon (*Salmo salar*) habitat, IWWHs, and high and moderate value DWAs. *[Note: For illustrative purposes Figure 7-5 includes the location of four DWA's that are mapped as "indeterminant value" by MDIFW and therefore not considered SWH pursuant to the NRPA 38 M.R.S.* §480-B.10 §480-B.10.] SVPs are discussed in the *Vernal Pools* section, above, and Atlantic salmon is discussed in the *Fisheries* section, below. The Project was designed to avoid wildlife habitats, including both IWWHs and DWAs. The closest IWWH to the Project (Iwwh031372) is located approximately 300 feet south of the proposed access road (Burrill Woods Road), another (Iwwh032240) is located approximately 2,000 feet northeast of the Project's solar field, and a third (Iwwh201693) is located approximately 2,500 feet north of the access road. All three IWWHs are completely avoided by the Project.

Four DWAs are mapped within the vicinity of the Project (DWA#020271, DWA#020728, DWA#020729, and DWA#020849). These DWAs were mapped by MDIFW using aerial imagery and are considered by the agency to be of "indeterminant value" (MDIFW, personal communication, agency call February 22, 2021). A DWA survey was conducted from February 5, 2021, to April 2, 2021, to determine the value of the mapped DWAs (Exhibit 7-10). Survey results indicate that the forests within the Study Area lack mature softwood canopy closure and thus do not meet DWA criteria, and that primary winter corridors are not likely to be present in the Study Area during periods of deep snowpack. However, the forests within and surrounding the Study Area do support deer through the presence of renewed browse from periodic timber harvests, oaks, some softwood stands, various waterways, wetland complexes, and dense cover. Based on the timing of deer observations, it is likely functional DWAs do occur nearby but outside of the Study Area, and deer shift use into these areas during periods with deep snowpack and then back into the Study Area when the snowpack recedes. The Project completely avoids impacts to three of the mapped DWAs (DWA#020728, DWA#020729, and DWA#020849). The Project's Gen-Tie will be collocated adjacent to the existing logging road (Burrill Woods Road) and would impact approximately 6.03 acres (0.52 %) of DWA#020271 as further described within Table 7-7 and depicted in (Figure 7-7). The proposed impact area has already been impacted by the existing road and timber harvest activity in the area and any incremental impact from the Project is not expected to adversely impact the remaining habitat area. On balance, the Project will not have an adverse effect on any functioning DWA and the edge habitat and the young forests and shrublands (source of browse) created and maintained by the Project will provide a net benefit to the deer population within the Project Area.

Table 7-7. DWA Impact Area

Area Description	Acres
Disturbed (logging skid trails & landings)	1.51
Ruderal forest	2.57
Road (Burrill Woods Road)	1.95
Total	**6.03**

G. Fisheries

The Project Area occurs within the range of the federally listed endangered Gulf of Maine Distinct Population Segment of Atlantic Salmon in Maine. More specifically, a large portion of the Study Area overlaps with the Merrymeeting Bay Salmon Habitat Recovery Unit[43](Figure 7-5). The proposed Project does not include any direct

[43] National Oceanic and Atmospheric Administration. 2020. Atlantic Salmon Critical Habitat – Gulf of Maine DPS. NOAA Fisheries Available online at: https://www.fisheries.noaa.gov/resource/map/atlantic-salmon-critical-habitat-gulf-maine-dps.

impacts to streams within the development area. As described in Section D above and detailed in Table 7-2, impacts are limited to the removal of forest canopy within 1.84 acres of the riparian buffers for four streams crossed by the Project's Gen-Tie (STA01AR, STA04 AR, STA05AR & STA07AR). Impacted areas within the riparian buffers will be maintained at equal to or greater than shrub stage height in accordance with MDIFW recommendations for riparian buffer impact mitigation. *[Note: STA04AR and STA05AR meet the definition of a river, stream or brook pursuant to the NRPA 38 M.R.S. § 480-B (9), however, the stream channels are isolated features that extend only a short distance from existing culverts under the Burrill Woods Road and do not directly connect to any tributaries higher or lower in the watershed].*

H. Alternative Analysis

(1) Initial Phase of Utility-Scale Power Generation Station Development

The development of the Hartland Solar Project began with identifying suitable locations near high-voltage, three-phase transmission lines. The primary task in this phase involves conducting a power flow analysis to evaluate the transmission capacity and determine the safe limit for additional power injection into the chosen line. However, the project's feasibility is contingent on a detailed system impact study, which must receive approval from ISO-NE and the respective utility company. Due to uncertainties at this stage, it's common for the Applicant to explore multiple POIs, targeting different 115 kV transmission lines within the area of interest. This strategy provides flexibility and improves the chances of identifying an appropriate injection point for the power generation project.

Somerset County features several high-voltage transmission corridors extending from the Northeast and Northwest Territories towards the south. To find a viable construction site along these corridors, the Applicant conducted desktop due diligence and field surveys, assessing over 26,000 acres, including the proposed Project Area. Five potential solar array locations were evaluated based on publicly available data such as SWH, National Wetland Inventory (NWI), the National Hydrography Dataset (NHD), Natural Resources Conservation Service soil data, conservation lands, cultural and scenic resources, as well as field reconnaissance of wetlands and water bodies.

(2) Evaluation of Alternative Solar Facility Sites

Each of the five prospective solar array areas, situated within a 30-mile radius of the Hartland Solar Project, was selected for its proximity to 115kV transmission line corridors. The evaluation criteria included property characteristics, transmission infrastructure, natural resource constraints, and visual impacts. Each site was scrutinized for potential 'fatal flaws' that could impede development. The specifics of these areas are outlined below, summarized in Table 7-8, and illustrated in Figure 7-8.

Table 7-8. Prospect Overview

Prospect	County	Township	Capacity* (MW-AC)	Voltage	Property Area (acre)	Suitable Area (acre)	Distance	Direction
1	Somerset	Northwest Somerset	300	115	15128	5536	31.5	northwest
2	Somerset	The Forks	219	115	3682	1752	34	north
3	Somerset	Moscow	100		1688	882	22	north
4	Somerset	Madison	101	34.5	1443	806	12.5	west
Hartland	Somerset	Hartland	140	115	4679	1100		

*Based on land constraints

Alternative Prospect 1

Located approximately 31.5 miles northwest of the Hartland project, totaling approximately 5,536 acres suitable area within a 15,128-acre property. It is adjacent to a 115kV transmission line. This area is predominantly comprised of mixed working forests and is undeveloped. The topography of the area consists of relatively flat wetland complexes and moderate slopes. Prospect 1 requires an agreement with one landowner. Significant project visibility would be anticipated from nearby Burnt Hill and Stewart Mountain. Initial transmission load flow analysis showed limited available capacity. Prospect 1 was deemed an infeasible alternative due to transmission infrastructure constraints and high chance of visibility from surrounding vantage points.

Alternative Prospect 2

Located approximately 34 miles north of Hartland in The Forks, totaling approximately 1,750 acres within a 3,682-acre property. This area is predominantly comprised of mixed working forests and is largely undeveloped. The topography of the area consists of gentle to moderate slopes reaching a high point on Mosquito Mountain. Prospect 2 would require a single agreement with one landowner. The property is adjacent to a 115kV transmission line. Minimal NWI wetlands are mapped within Prospect 2. Initial power flow analysis revealed insufficient capacity on the transmission line. The project would be visible from Mosquito Mountain which is popular for hiking due to its panoramic views. Prospect 2 was deemed an infeasible alternative due to transmission infrastructure constraint and visibility impacts.

Alternative Prospect 3

Located approximately 22 miles north of Hartland in the Town of Moscow, totaling approximately 882 suitable acres within a 1,688-acre property. This area has multiple open areas and mixed forest. Part of the property includes abandoned structures that are suitable for redevelopment. The topography of the area consists of gentle slopes with no prominent hills. Prospect 3 would require an agreement with one landowner. The interconnection option is on-site. Due to the relatively flat surrounding topography and forested landcover, project visibility would likely be low. Prospect 3 was deemed infeasible due to insufficient transmission capacity and alternative development intentions by the landowner.

Alternative Prospect 4

Located approximately 12.5 miles west of Hartland in the Town of Madison, consisting of approximately 806 suitable acres within a 1,443-acre property. This area is comprised of mixed forests and existing open fields with adjacent developments. The topography of the area consists of relatively flat agricultural areas and upland forests interspersed with mapped streams. Prospect 3 requires an agreement with one landowner. The transmission line is about 2.1 miles west of the site, so a generation interconnection Gen-Tie would need to be constructed in an existing transmission corridor. Identified DWA and NHD streams are mapped within the area. Prospect 4 was deemed an infeasible alternative due to proximity to residential properties, visibility, and limited transmission infrastructure.

Alternative Prospect 5 (Proposed Project)

Located approximately 2 miles west of a 115kV transmission line in the Town of Hartland totaling approximately 1,100 acres within an over 4,600-acre property. This area is predominantly comprised of managed working forests and is undeveloped. The topography of the area is relatively flat with a light slope towards Burrill Hill. Prospect 5 requires an agreement with one landowner. The linear distance to the transmission line is approximately 2.5 miles and would not require major crossings. Identified DWA and IWWH present siting constraints but are primarily located at the periphery of Prospect 5. This prospect provides two large contiguous suitable areas. Due to the relatively flat surrounding topography and forested landcover, project visibility is low.

No Action Alternative

Opting not to proceed with the proposed solar array project, would leave the area in its current state, predominantly a working forest, without the introduction of a solar energy facility and Gen-Tie. However, this would mean missing

out on aligning with Maine's ambitious renewable energy goals. The state is on a path to reach 80% renewable energy by 2030, one of the most aggressive targets in the nation, aiming to reduce emissions and lessen reliance on imported fossil fuels. This target, established under LD 1494, reflects a significant increase from the previous 40% goal, with a long-term aim of achieving 100% renewable energy by 2050. Additionally, this choice would not aid in reducing emissions from other power sources, a key aspect of Maine's Renewable Portfolio Standard. Therefore, while the "no action" alternative avoids short-term construction impacts and long-term land clearing, it fails to support Maine's strategic shift towards renewable energy and mitigation of climate change impacts.

(3) Avoidance & Minimization

The Applicant has demonstrated a commitment to avoiding impacts on protected natural resource and wildlife habitats through meticulous planning, environmental study, and extensive consultations with environmental agencies. Detailed field surveys and data analysis have been conducted to identify sensitive areas, such as wetlands, streams, vernal pools, IWWH's and DWA's etc. The project team worked closely with the MDEP, MDIFW, and other relevant agencies to ensure that all potential critical habitats within and near the Project Area were identified and thoroughly evaluated for impacts from the Project.

The final Project layout went through several design configurations for the arrays and associated equipment with the goal of identifying the layout that meets the Project purpose with the least environmental impact. Avoidance and minimization efforts included the following:

- Using existing logging roads to the maximum extent practicable to reduce the amount of disturbance required and minimize overall new Project impacts.
- Installing the Collector within the array footprint and Project access roads to minimize the Project footprint.
- Fencing the array areas separately to avoid additional clearing impacts and provide corridors for wildlife movement through the Project Area.
- Siting the array area, Gen-Tie and other associated facilities to avoid ALL direct impacts to freshwater wetlands.
- Siting the array areas to avoid indirect wetland impacts to mitigate shading to the maximum extent practicable.
- Siting the array areas to avoid all direct and indirect impacts to three significant vernal pools depressions and their 250-foot CTH.
- Siting the array areas in a manner that allows for selective clearing only within one significant vernal pool CTH in accordance with the NRPA, Chapter 335 § 9(C) Habitat Management standards for Significant Vernal Pools to minimize the loss of forest canopy within the protected CTH.
- Siting the Project to avoid any direct impacts to streams and limiting stream impacts to safety zone clearing for the Gen-Tie within the riparian buffer of 4 streams. *[Note: STA04AR and STA05AR meet the definition of a river, stream or brook pursuant to the NRPA 38 M.R.S. § 480-B (9), however, the stream channels are isolated features that extend only a short distance from existing culverts under the Burrill Woods Road and do not directly connect to any tributaries higher or lower in the watershed. Impacts associated with these 2 streams are de minimis].*
- Siting the array areas to avoid the disturbance/removal of vegetation within in 100 feet of any stream or 100 feet of any wetlands contiguous with a stream in accordance with MDIFW riparian buffer impact recommendations to minimize the Projects effect on the riparian corridor.
- Siting the Project to avoid impacts to three Indeterminant value DWAs (DWAs (DWA#020728, DWA#020729, and DWA#020849) and limiting the Projects impact on a fourth indeterminant value DWA (DWA#020271) by collocating the project's Gen-Tie with Burrill Woods Road to minimize any perceived

impacts to indeterminant value DWA (DWA#020271). *[Note:* Forests within all four of the DWA's lack mature softwood canopy closure and thus do not meet MDIFW DWA criteria.]

- Implementing wetland clearing practices that minimize soil disturbance outside the array footprint and grading limits such as no grubbing in wetlands and clearing during dry or frozen conditions to the maximum extent practicable.
- Implementing vegetated buffer maintenance timing restrictions as outlined in the VMP.

These examples highlight the project's strong commitment to environmental stewardship. By prioritizing habitat conservation in its planning and execution, the project not only complies with regulatory standards but also contributes positively to the preservation of Maine's natural biodiversity. This approach serves as a model for balancing renewable energy development with the imperative to protect and sustain critical habitats.

(4) Conclusion

Prospects 1 through 4 were not selected for the solar array project due to various infeasibilities. Prospect 1, despite its suitable location and acreage, faced transmission infrastructure constraints and high visibility concerns. Prospect 2, located in an area with gentle slopes and minimal wetlands, was deemed unsuitable due to insufficient transmission line capacity and visibility from Mosquito Mountain. Prospect 3, featuring flat terrain and mixed forests, was ruled out because of inadequate transmission capacity and the landowner's alternative development intentions. Finally, Prospect 4, with its proximity to residential properties and a need for gen-tie construction, was not selected due to anticipated environmental and social impacts and limited transmission infrastructure. These factors collectively led to the dismissal of these sites in favor of a more suitable alternative.

Prospect 5 was selected for its optimal blend of feasibility and limited environmental and social impacts. Its large contiguous areas, coupled with minimal visibility and a manageable distance to the 115kV transmission line, made it the most suitable choice for the project.

I. Compensation

(1) Impact Summary

Wetlands

No direct wetland impacts are proposed. As detailed in Section B above, the Project proposes to convert 120,910 square feet of PFO wetlands to PSS wetlands. As detailed in Section C above, none of the functions and values provided by the PFO wetlands that will be converted to PSS wetlands for shade management or the utility safety zone will be severely diminished or completely lost by the conversion. The wetlands that are proposed to be impacted by the solar arrays and Gen-Tie are generally small, isolated areas and/or located along existing infrastructure that do not contain features that support the wetland functions and values of the larger landscape, and the abundance of larger and more diverse wetlands within the watershed surrounding the Project limit the value that these areas provide at the landscape level.

Streams & Riparian Buffers

As detailed in Section D above, the Project proposes to impact 1.84 acres of riparian buffer habitat for the construction and maintenance of the Gen-Tie safety zone. All impacted riparian buffer areas will be managed in accordance with the vegetation management guidelines contained in the VMP and will continue to function at a high level to protect water quality and stream habitat.

Significant Vernal Pools

As detailed in Section E above all direct impacts to SVP's including their CTH have been avoided. Indirect impacts to one SVP will be limited to selective cutting of trees for shade management that will be conducted in accordance with the NRPA, Chapter 335 § 9(C) Habitat Management standards for Significant Vernal Pools.

Inland Wading and Waterfowl Habitat

There will be no impacts to IWWH associated with the Project.

Deer Wintering Habitat

There will be no impacts to high or moderate value DWA's associated with the Project. The Project's Gen-Tie will be collocated with the existing Burrill Woods Road which passes through an indeterminant value DWA. A DWA Survey was conducted for the Project documents that the affected DWA and specifically the impact area lacks mature softwood canopy closure and thus does not meet MDIFW DWA criteria. Further the Gen-Tie is being collocated with an existing road to mitigate any potential adverse impacts.

Atlantic Salmon Habitat

There will be no direct impacts to any streams associated with the Project.

Habitat Fragmentation

According to BwH's *Conservation and Connectivity Planning Resources*[44], the Project's solar arrays (which encompasses the new roads and collector lines described above) would be constructed in an area that includes five BwH blocks ranging in size from 967 acres (FID 5537) to 6,375 acres (FID 5529, Table 7-3, Figure 7-4). These habitat blocks are undeveloped but subject to periodic logging and associated impacts under the current management regime. The impacts to FID 5528, 5526, and 5529 are de minimis and largely affect previously harvested areas, ruderal forests, and plantation forests. Likewise, FID 5538 also includes large areas of clearcuts both within and outside of the Project Area, unmapped logging roads, and plantation forests. FID 5537 will have the largest percentage reduction, but it is also the smallest block and already impacted by its location at the intersection of Burrill Woods Road and Munn Flat Road, where some residential development occurs.

(2) Compensation Plan

The Project is proposing to provide compensation for unavoidable impacts to natural resources and overall Project footprint impacts through the following mechanisms:

MDEP In-Lieu-Fee (ILF) Payment

In accordance with the NRPA 38 M.R.S. § 480-Z the Applicant proposes to contribute to the Maine Natural Resources Conservation Fund (MNRCF) in lieu of a permittee-responsible mitigation project to off-set all affected wetland functions and values for the 120,910*8 square feet (Shading =30,401 square feet, Gen-Tie safety zone =, 90,509 square feet) of conversion of palustrine forested wetlands (PFO) to palustrine scrub-shrub (PSS) and palustrine wet meadow (PEM) wetlands.* The ILF compensation fee was calculated using the current compensation rates and resource multipliers for Somerset County in accordance with the MDEP's ILF Fact Sheet, effective January 1, 2024, through December 31, 2025.

- Natural Resource Enhancement & Restoration Cost/sf = $5.05
- Average Assessed Land Value/sf = $0.06
- Resource Multiplier = 1 for all impacted wetland areas

In accordance with MDEP and USACE guidance the Applicant is proposing compensation for indirect impacts associated with shading at a rate of 50% and the Gen-Tie safety zone at a rate of 15%. A contribution in the amount of $147,050 will be provided prior to the MNRCF, prior to the commencement of Project construction.

Shading Impacts – 30,401 Square feet x ($5.05 + 0.06) x 1 x 50% = $77,675

Gen-Tie Safety Zone –90,509 Square feet x ($5.05 + 0.06) x 1 x 15% = $69,375

Total = $147,050

[44] MDIFW. 2023. Beginning with Habitat Maps: Interactive Map Viewers. Available at https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/maps/index.html.

Conservation Parcels

The Project is proposing two conservation parcels (Hartland Riparian Corridor Parcel and Spring Lake East Parcel) to compensate for overall Project footprint and natural resource impacts (Figures 7-9). Based on desktop analysis and field studies, the total conservation value of the two parcels far exceeds the natural resource values of the impacted area. The Hartland Riparian Corridor Parcel is high value as it consists of a variety of habitat types including upland, wetland, and stream; provides connectivity to other adjacent habitat such as IWWH and DWA to the north and south and through the Project Area; and contains a SVP as well as other vernal pools/amphibian breeding areas. This parcel is an important riparian corridor for wildlife and great care has been exercised in the development of the Project to avoid impacts to this area to maintain its integrity as an important feature for wildlife within the Project Area. The Spring Lake East Parcel is also a high value area which includes a variety of habitat types including upland, wetland, river and associated riparian areas; Appalachian-Acadian Rivershore Ecosystem; and contains known habitat for RTE species (Wood Turtle), IWWH, and a high-value DWA. The Spring Lake East parcel is also part of an important recreational area that is used on a regular basis by the public. The two parcels and their conservation values are described in more detail below and are compared with the Project impacts in Table 7-9:

Hartland Riparian Corridor Parcel: 225 +/- acres

- The Applicant proposes to protect this parcel through a deed restriction for the lifetime of the Project plus ten years. The deed restriction will contain language that restricts all future development but allows continued forest management consistent with the landowner's certification through the Sustainable Forest Initiative (SFI) forest management standards.
- Provides compensation, in combination with the Spring Lake East Parcel, for the Project footprint impacts.
- Provides compensation for riparian buffer impacts, totaling approximately 1.84 acres associated with the Project's Gen-Tie, through protection of approximately 84 acres of undisturbed riparian buffer area along approximately 5,450 linear feet of the shoreline of an unnamed tributary to East Branch Black Stream. *[Note: Riparian buffer area calculation includes all areas within 100 feet of the unnamed tributary and/or any contiguous wetlands.]* The protected riparian corridor area:
    - Supports multiple species of plants, wildlife, and their habitats.
    - Provides protection of a valuable travel corridor for wildlife in the vicinity of the Project.
    - Protects the water quality of the stream by filtering sediment and pollutants from upslope areas.
    - Enhances the aquatic environment by contributing woody debris (e.g., logs, branches) and nutrients (e.g., leaves, twigs, fruits, insects).
    - Regulates streamflow by dispersing, absorbing, and slowing the release of flood waters.
    - Recharges groundwater and provides discharge flows during periods of low stream flow.
    - Controls the temperature of the stream through shade, which supports coldwater fish and other aquatic species.
- Provides additional compensation for indirect impacts to freshwater wetlands over and above the contribution to the MNRCF, through protection of 16 acres of NWI wetlands outside the Project's Study Area and 76 acres (45 acres PFO and 31 acres PSS) of delineated wetlands within the Project's Study Area. The protected wetlands within 25 feet of the tributary are wetlands of special significance (WOSS).
- Provides compensation for SWH, through protection of the entire CTH of an SVP (VP01EI) and 10 non-significant vernal pool or amphibian breeding areas identified during the Projects vernal pool survey.
- Provides compensation, through protection of 6.3 acres of mapped indeterminant value DWA in the vicinity of the Gen-Tie.

- Provides protection for land located approximately 2.5 miles south of the Great Moose Lake Beginning with Habitat-Focus Area[45] which contains:
    - Rare Animals: Bald Eagle, Black Tern, Tidewater Mucket
    - Silver Maple Floodplain Forest
    - SWH: DWA and IWWH

Spring Lake East Parcel: 484 +/- acres

- The Applicant proposes to protect this parcel through a deed restriction for the lifetime of the Project plus ten years. The deed restriction will contain language that restricts future development within the parcel but allows for timber management consistent with the existing management plan entitled "A Strategy for Management of Deer Wintering Areas in Maine – A Collaborative Effort Between the Maine Department of Inland Fisheries and Wildlife & Plumb Creek Maine Timberlands, LLC.' Dated January 4, 2007, and Amended November 4, 2010.
- Provides compensation, in combination with the Hartland Riparian Corridor Parcel, for the Project footprint impacts.
- Provides compensation for riparian buffer impacts, totaling approximately 1.84 acres associated with the Project's Gen-Tie, through protection of approximately 484 acres of undisturbed riparian buffer area along 7,467 linear feet (1.41 miles) of the shoreline of the Dead River. *[Note: Riparian buffer area calculation includes all areas within 100 feet of the Dead River and/or any contiguous wetlands.]* The protected riparian corridor area:
    - Supports multiple species of plants, wildlife, and their habitats.
    - Provides a travel corridor for wildlife.
    - Protects the water quality of the stream by filtering sediment and pollutants from upslope areas.
    - Enhances the aquatic environment by contributing woody debris (e.g., logs, branches) and nutrients (e.g., leaves, twigs, fruits, insects).
    - Regulates streamflow by dispersing, absorbing, and slowing the release of flood waters.
    - Recharges groundwater and provides discharge flows during periods of low stream flow.
    - Controls the temperature of the stream through shade, which supports coldwater fish and other aquatic species.
- Provides additional compensation for indirect impacts to freshwater wetlands over and above the contribution to the MNRCF, through protection of 106 acres of NWI wetlands. Some of the NWI wetlands are within 25 feet of the Dead River and are classified as WOSS.
- Provides compensation for SWH, through protection of 132 acres of IWWH.
- Provides compensation, through protection of 142 acres designated as habitat for an RTE species (Wood Turtle).
- Provides protection, through deed restriction, of 7.73 acres of Moderate to Good Significant Sand & Gravel Aquifer (10–50 GPM).
- Provides protection of approximately 320 acres of mapped High Value DWA. This DWA area is currently managed by the landowner under a cooperative agreement with MDIFW. This Compensation Plan would secure the existing voluntary protection through a formal deed restriction.

[45] Focus Areas of Statewide Ecological Significance: Great Moose Lake. No date. Available at: great_moose_lake_focus_area.pdf (maine.gov)

- Provides protection of approximately 182 acres of mapped LUPC Zone P-FW: Fish and Wildlife Protection for the protection of wintering deer.
- Provides protection of approximately 44 acres or approximately 5,660 linear feet of recreation area used by Maine Huts and Trails.
- Provides protection of approximately 107 acres of lands designated as S4 Maine Natural Areas Program – Appalachian-Acadian Rivershore Ecosystem.
- Provides protection for lands directly adjacent to the Dead River Trail and Conservation Corridor managed by the Maine Bureau of Parks and Land.
- Provides protection for lands on the north side of the Dead River designated as the Western Maine CE and managed by the Maine Bureau of Parks and Lands.
- Provides protection for land located approximately 2.5 miles south of the Bigelow Mountain - Flagstaff Lake - North Branch Dead River Beginning with Habitat-Focus Area[46] which contains:
    - Rare Animals: Bald Eagle, Creeper, Peregrine Falcon, Rock Vole, Tomah Mayfly, Canada Lynx, Bicknell's Thrush.
    - Rare Plants: Alpine Blueberry, Alpine Sweet-grass, Appalachian Fir-clubmoss, Bigelow's Sedge, Boreal Bentgrass, Dwarf Rattlesnake Root, Fragrant Cliff Wood-fern, Lapland Diapensia, Lesser Wintergreen, Mountain Sandwort, Vasey's Pondweed.
    - Rare and Exemplary Natural Communities: Acidic Cliff Grassy Shrub, Marsh Heath, Alpine Ridge, Lower-elevation Spruce - Fir Forest, Montane Spruce - Fir Forest, Northern Hardwoods Forest, Red and White Pine Forest, Spruce - Northern Hardwoods Forest, Spruce Rocky Woodland Streamshore Ecosystem, Subalpine Fir Forest, Tall Sedge Fen, Unpatterned Fen Ecosystem.
    - SWH: DWA and IWWH

(3) Conclusion

Approximately one-third of Maine's native plant and animal species are vulnerable to the effects of climate change[47]. The net benefit of the Project for wildlife and wildlife habitat is positive as it is a step towards decarbonizing Maine's electricity supply, which will ultimately reduce the impacts of climate change on wildlife and wildlife habitats. In addition, developing the Project supports the national strategy for reducing the impacts of climate change on wildlife and their habitats.[48] The Applicant understands, however, that the actual value of utility-scale PV solar developments to wildlife and as wildlife habitat needs additional research. To account for the potential negative effects of fencing, habitat loss, and habitat fragmentation, the applicant has committed to installing wildlife friendly fencing, restoring disturbed habitat areas using native plant species following the guidance provided in Maine Audubon's Habitat Restoration and Native Planting for Solar Development[49] and providing additional protections well in excess of project impacts, through deed restrictions on two parcels which would benefit wildlife and wildlife

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[46] Focus Areas of Statewide Ecological Significance: Bigelow Mountain- Flagstaff Lake- North Branch Dead River. No date. Available at: bigelow_mountain_focus_area.pdf (maine.gov)

[47] Maine Audubon. 2019. Renewable Energy and Wildlife in Maine: Avoiding, Minimizing, and Mitigating Impacts to Wildlife and Habitat from Solar, Wind, and Transmission Facilities. November 2019. Available at https://maineaudubon.org/advocacy/renewable-energy/.

[48] DOE. 2022. The Inflation Reduction Act drives significant emissions reduction and positions America to reach our climate goals. Available https://www.energy.gov/sites/default/files/2022-08/8.18%20InflationReductionAct_Factsheet_Final.pdf.

[49] Maine Audubon. 2019. Habitat Restoration and Native Planting for Maine Solar Development: A Guide. Available at https://maineaudubon.org/advocacy/solar/.

habitat by restricting future development and ensuring that forestry management practices, if conducted, are performed in a manner that supports the unique wildlife habitat values of the protected parcels.

Table 7-9. Project Area and Compensation Parcels Resource Value Comparison

Project/Resource Value	Hartland Solar Project	Hartland Riparian Buffer Parcel	Spring Lake East Parcel
BwH Blocks	5 blocks ranging in size from 967 acres (ID #5537) - 6,375 acres (ID #5529)	2 blocks, 6,375 acres (ID #5529) and 2,839 acres (ID #5538)	1 block, 42,523 acres (ID #11539)
BwH Focus Area	Located approximately 2.5 miles south of Great Moose Lake Beginning with Habitat-Focus Area	Located approximately 2.5 miles south of Great Moose Lake Beginning with Habitat-Focus Area	Located 2.5 miles south of the Bigelow Mountain - Flagstaff Lake - North Branch Dead River Beginning with Habitat-Focus Area
Freshwater wetlands	120,910 square feet (2.78 acres) PFO Conversion	16 acres NWI, 76 acres delineated (45 acres PFO and 31 acres PSS)	106 acres NWI
Wetlands of Special Significance (WOSS)	0.38 acres	14 acres	99 acres
Riparian Buffer Impacts	278 linear feet of stream/1.84 acres of riparian buffer	5,450 linear feet/84 acres riparian buffer	7,467 linear feet/484 acres riparian buffer
Vernal Pools	No SVP's within Project Area	1 SVP, 10 VP/ABA	No VP data publicly available
Deer Wintering Areas	6 acres of Indeterminant -value DWA	6. 3 acres Indeterminant-value DWA	320 acres mapped high-value DWA
Inland Waterfowl and Wading Bird Habitat	No IWWH within Project Area	No IWWH within Comp Parcel	132 acres IWWH
RTE Species	No RTE Species within Project Area	No RTE Species within Comp Parcel	142 acres designated as habitat for RTE species (Wood Turtle)

Figures

- Figure 7-1 Project Study Area
- Figure 7-2 Proposed Aquatic Resources Impacts
- Figure 7-3 Riparian Buffer Impacts
- Figure 7-4 Wildlife Corridors
- Figure 7-5 Undeveloped Habitat Blocks
- Figure 7-6 Significant Wildlife Habitat Impacts
- Figure 7-7 DWA Habitat Impacts
- Figure 7-8 Solar Project Prospect Map

- Figure 7-9 Hartland Compensation Areas

Exhibits

- Exhibit 7-1 Agency Correspondence
- Exhibit 7-2 USFWS IPaC Database Report
- Exhibit 7-3 Natural Resources Survey Report
- Exhibit 7-4 USACE Paired Plots Forms
- Exhibit 7-5 Aquatic Resources Photographic Log
- Exhibit 7-6 Function and Values Summary Forms
- Exhibit 7-7 MDEP Vernal Pools Significance Letter
- Exhibit 7-8 NLEB Presence/Absence Survey Report
- Exhibit 7-9 Canada Lynx
- Exhibit 7-10 DWA Report

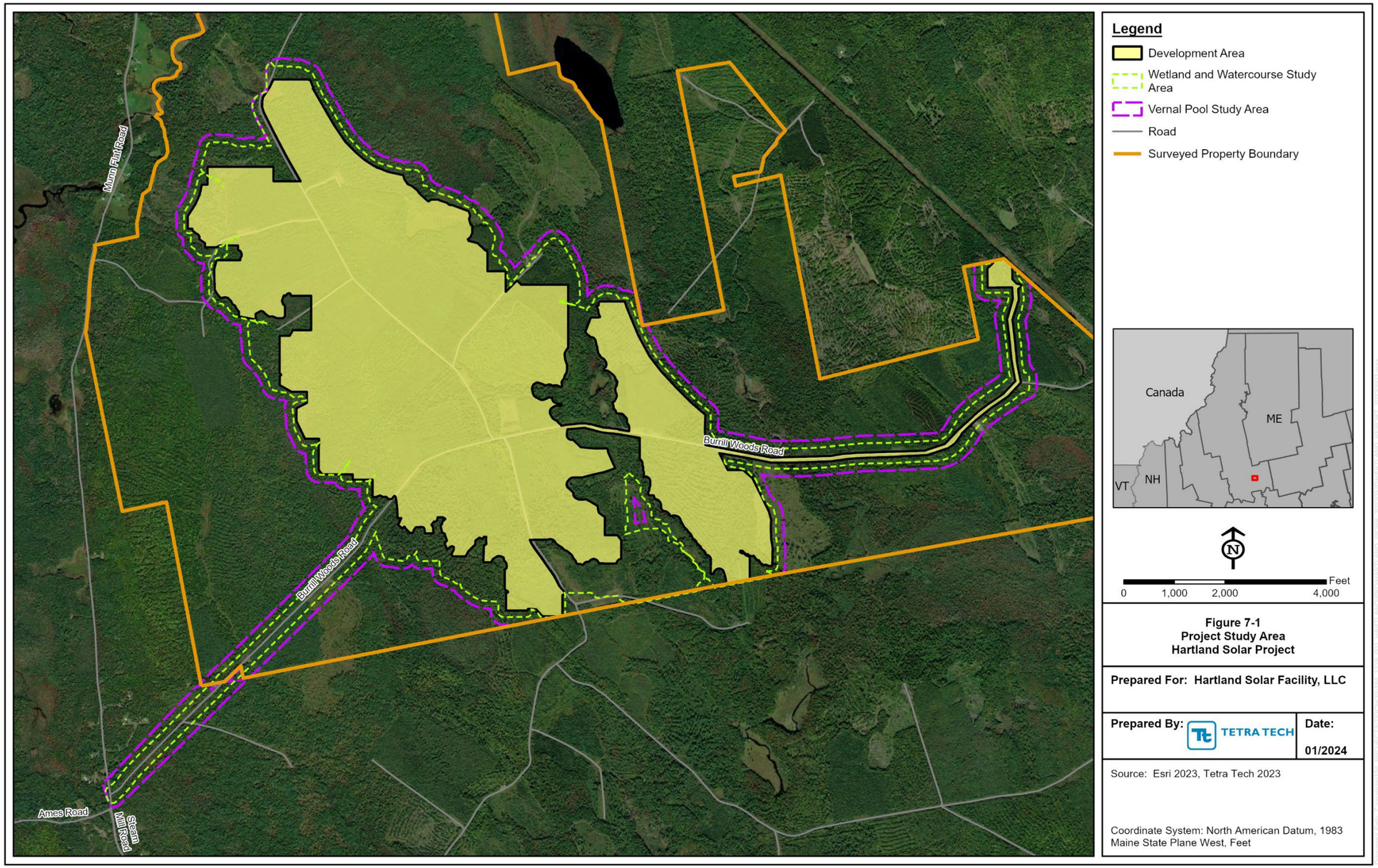


Figure 7-1 Project Study Area.

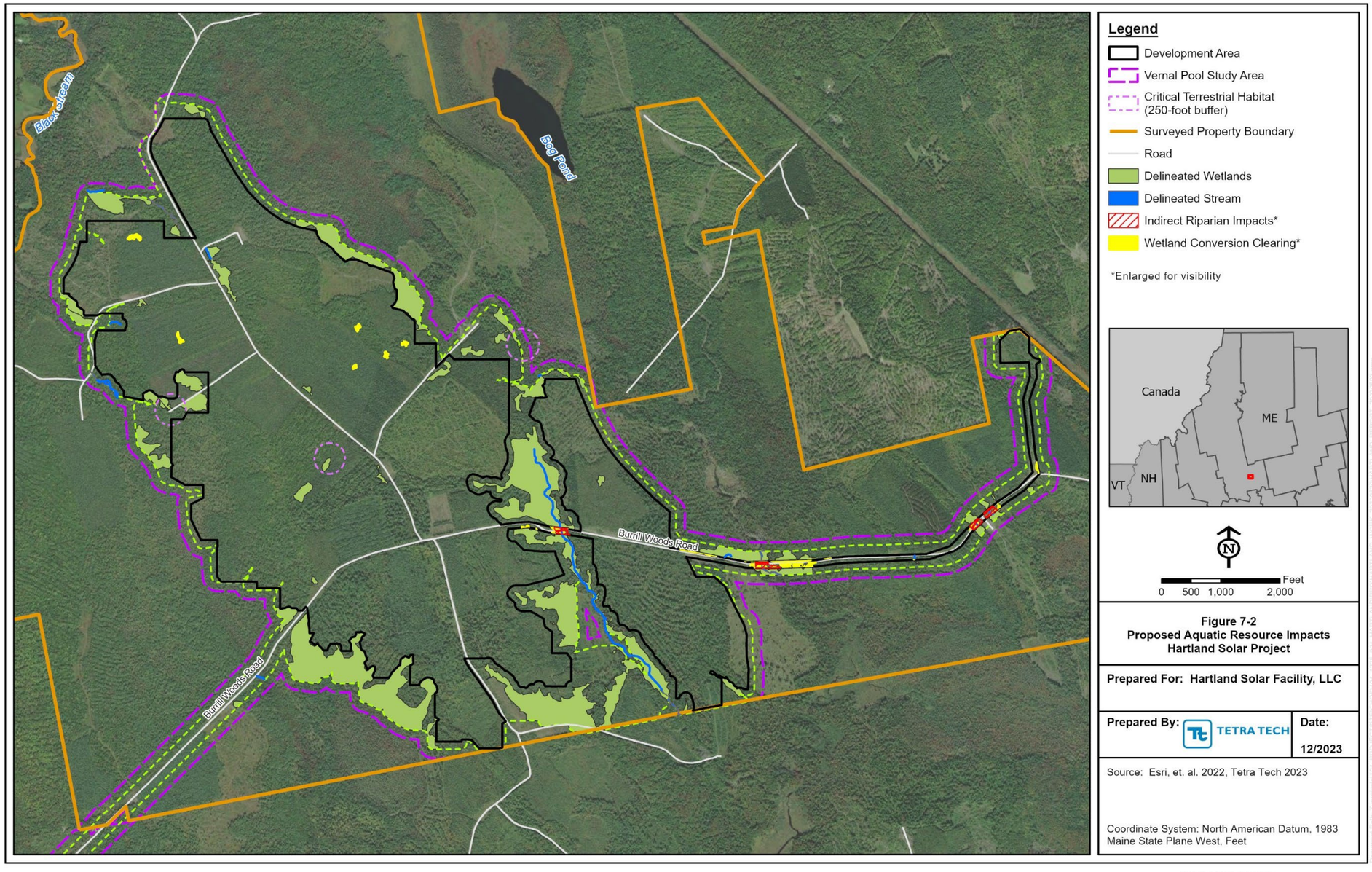


Figure 7-2 Proposed Aquatic Resources Impacts.

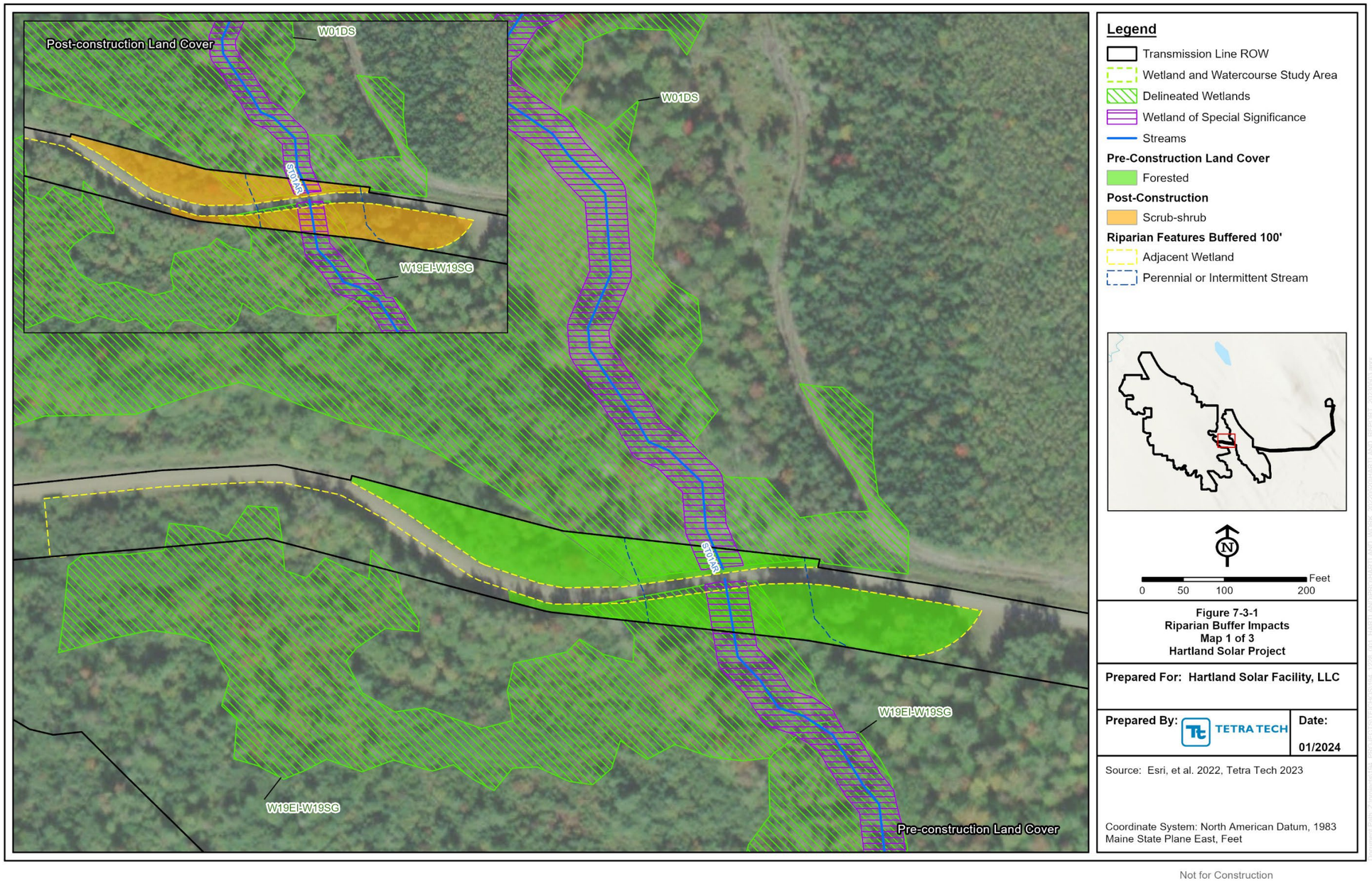
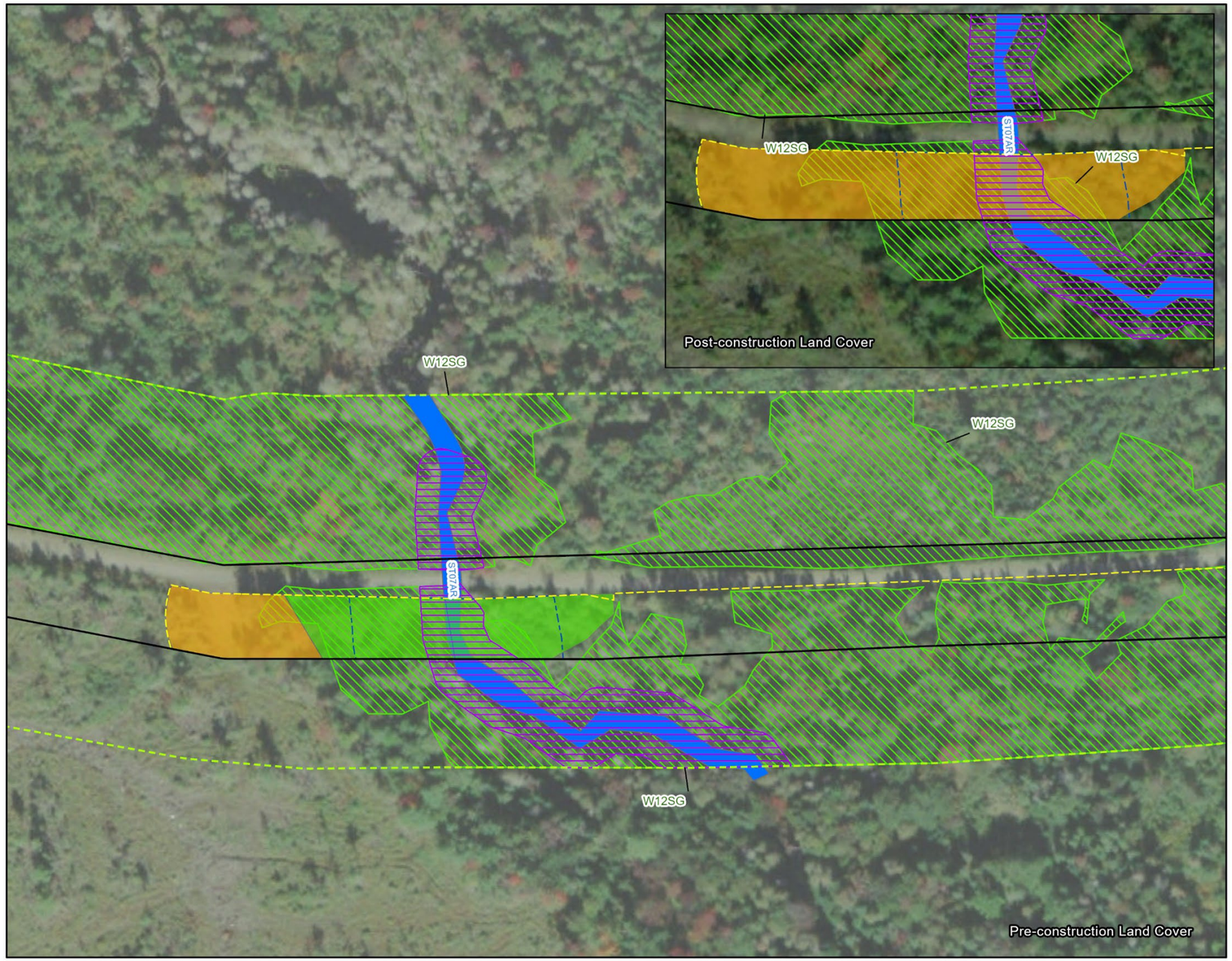


Figure 7-3 Riparian Buffer Impacts (Maps 1-3).



Legend

- Transmission Line ROW
- Wetland and Watercourse Study Area
- Delineated Wetlands
- Wetland of Special Significance
- Streams

Pre-Construction Land Cover

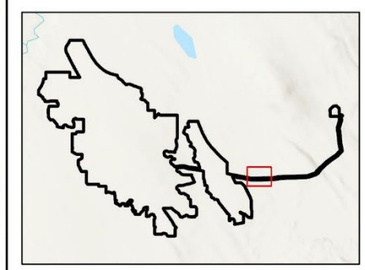
- Forested
- Scrub-shrub

Post-Construction

- Scrub-shrub

Riparian Features Buffered 100'

- Adjacent Wetland
- Perennial or Intermittent Stream



N

0 50 100 200 Feet

Figure 7-3-2
Riparian Buffer Impacts
Map 2 of 3
Hartland Solar Project

Prepared For: Hartland Solar Facility, LLC

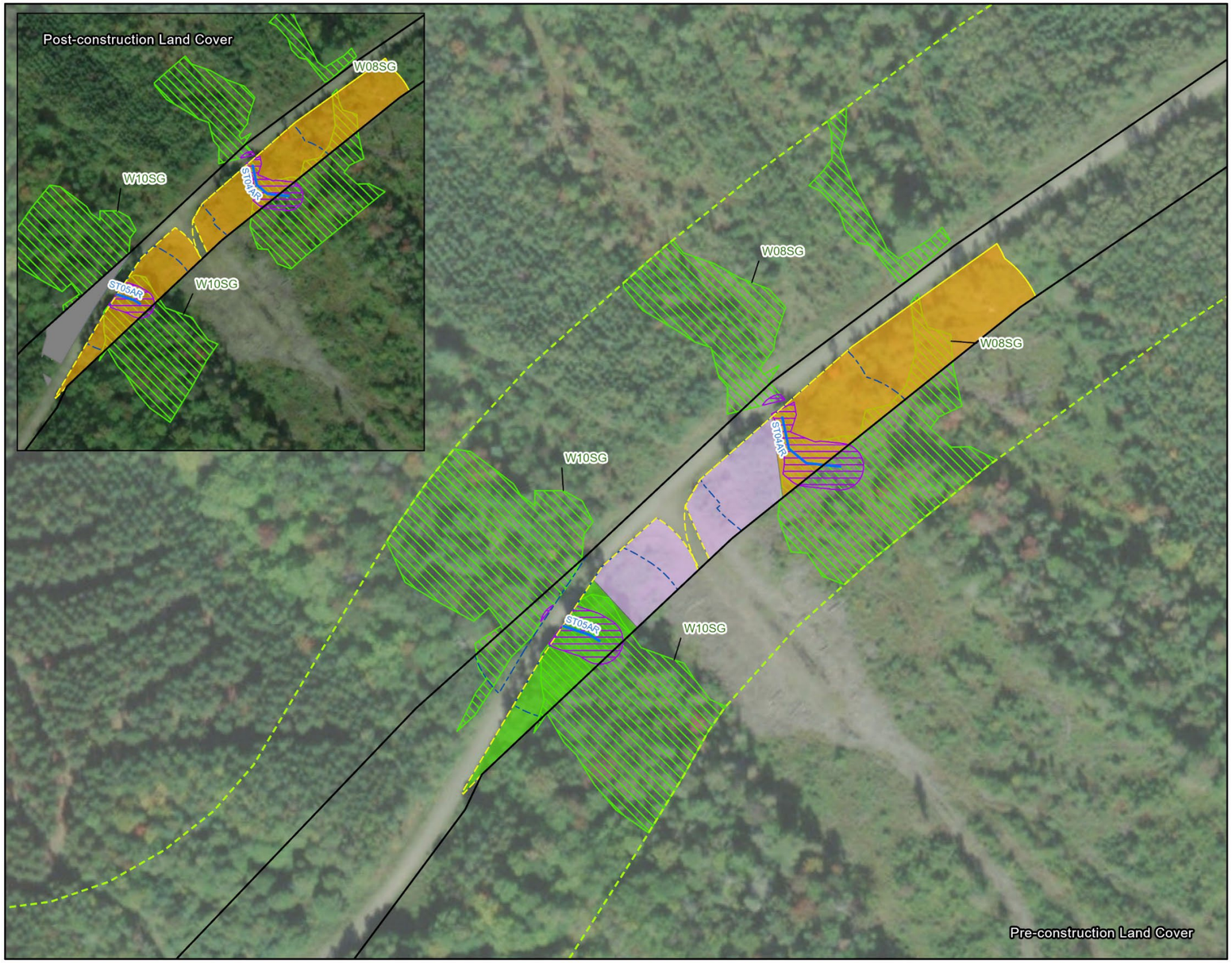
Prepared By: TETRA TECH

Date: 01/2024

Source: Esri, et al. 2022, Tetra Tech 2023

Coordinate System: North American Datum, 1983
Maine State Plane East, Feet

Not for Construction



Legend

- Transmission Line ROW
- Wetland and Watercourse Study Area
- Delineated Wetlands
- Wetland of Special Significance
- Streams

Pre-Construction Land Cover

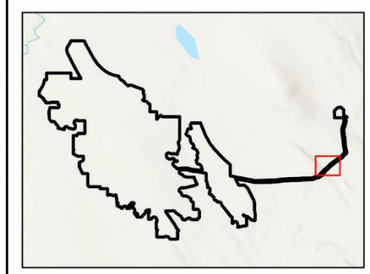
- Forested
- Disturbed (Logging yard/roads)
- Scrub-shrub

Post-Construction

- Scrub-shrub

Riparian Features Buffered 100'

- Adjacent Wetland
- Perennial or Intermittent Stream



N

0 50 100 200 Feet

Figure 7-3-3
Riparian Buffer Impacts
Map 3 of 3
Hartland Solar Project

Prepared For: Hartland Solar Facility, LLC

Prepared By: TETRA TECH

Date: 01/2024

Source: Esri, et al. 2022, Tetra Tech 2023

Coordinate System: North American Datum, 1983
Maine State Plane East, Feet

Not for Construction

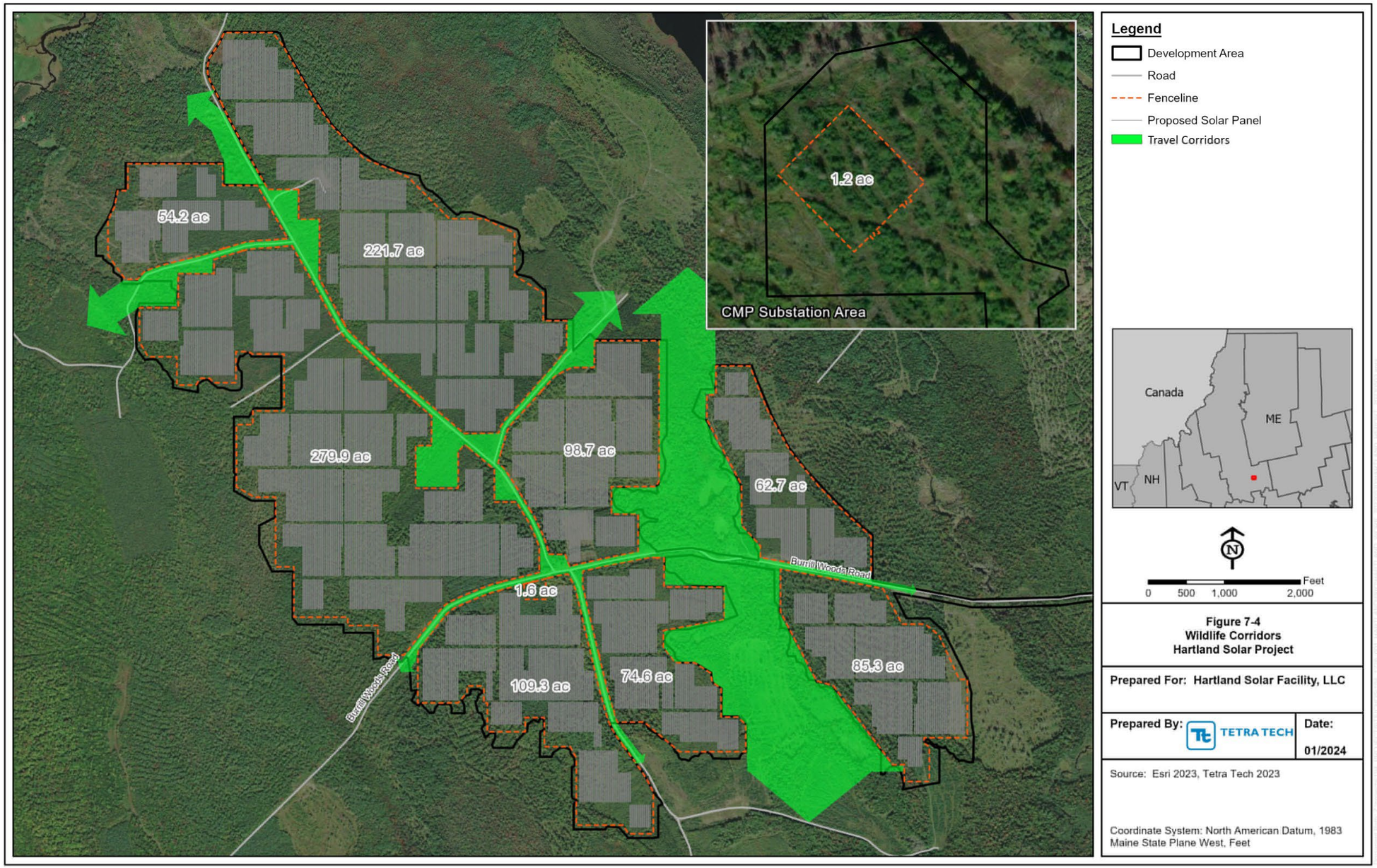


Figure 7-4 Wildlife Corridors.

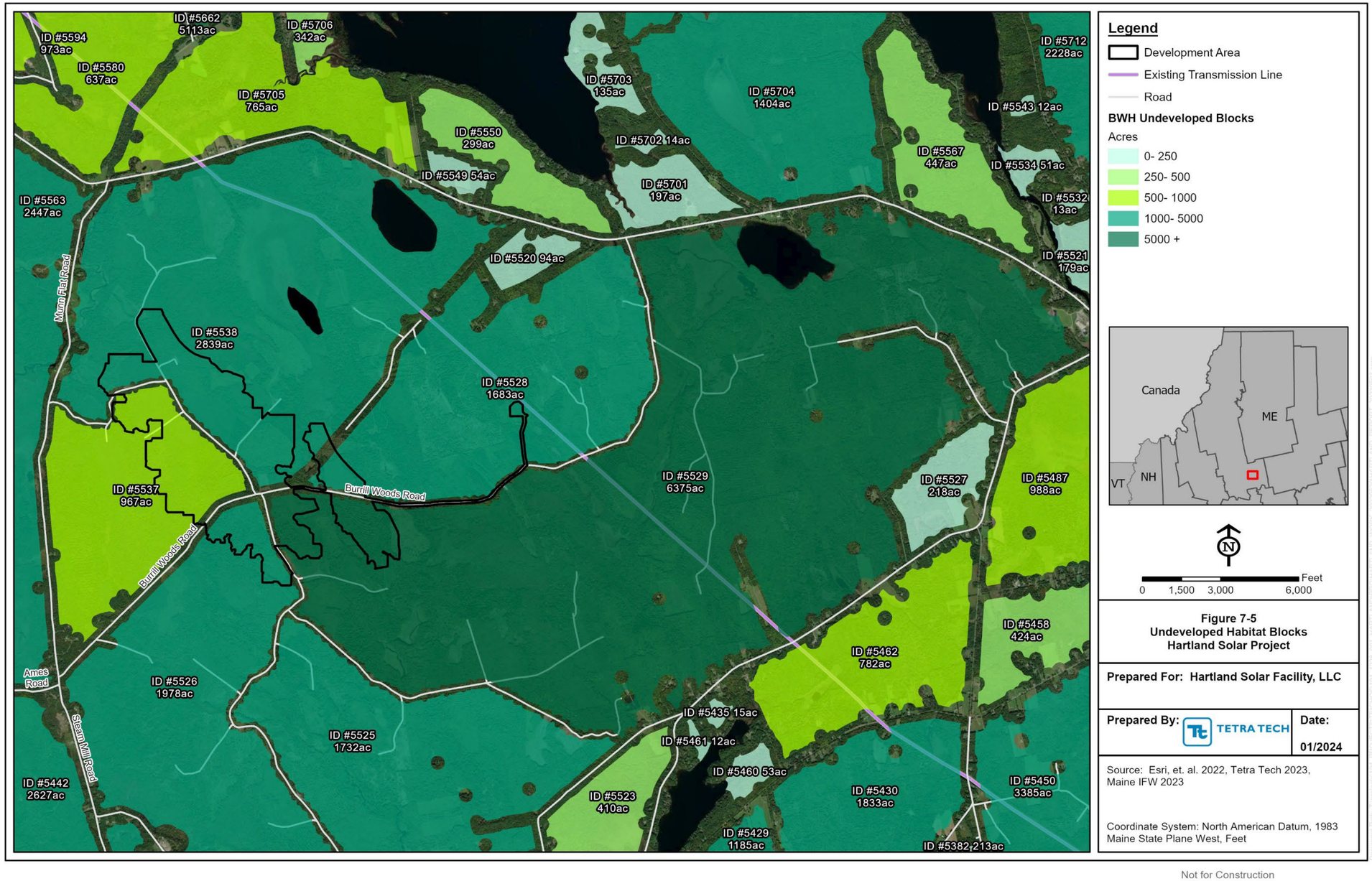


Figure 7-5 Undeveloped Habitat Blocks.

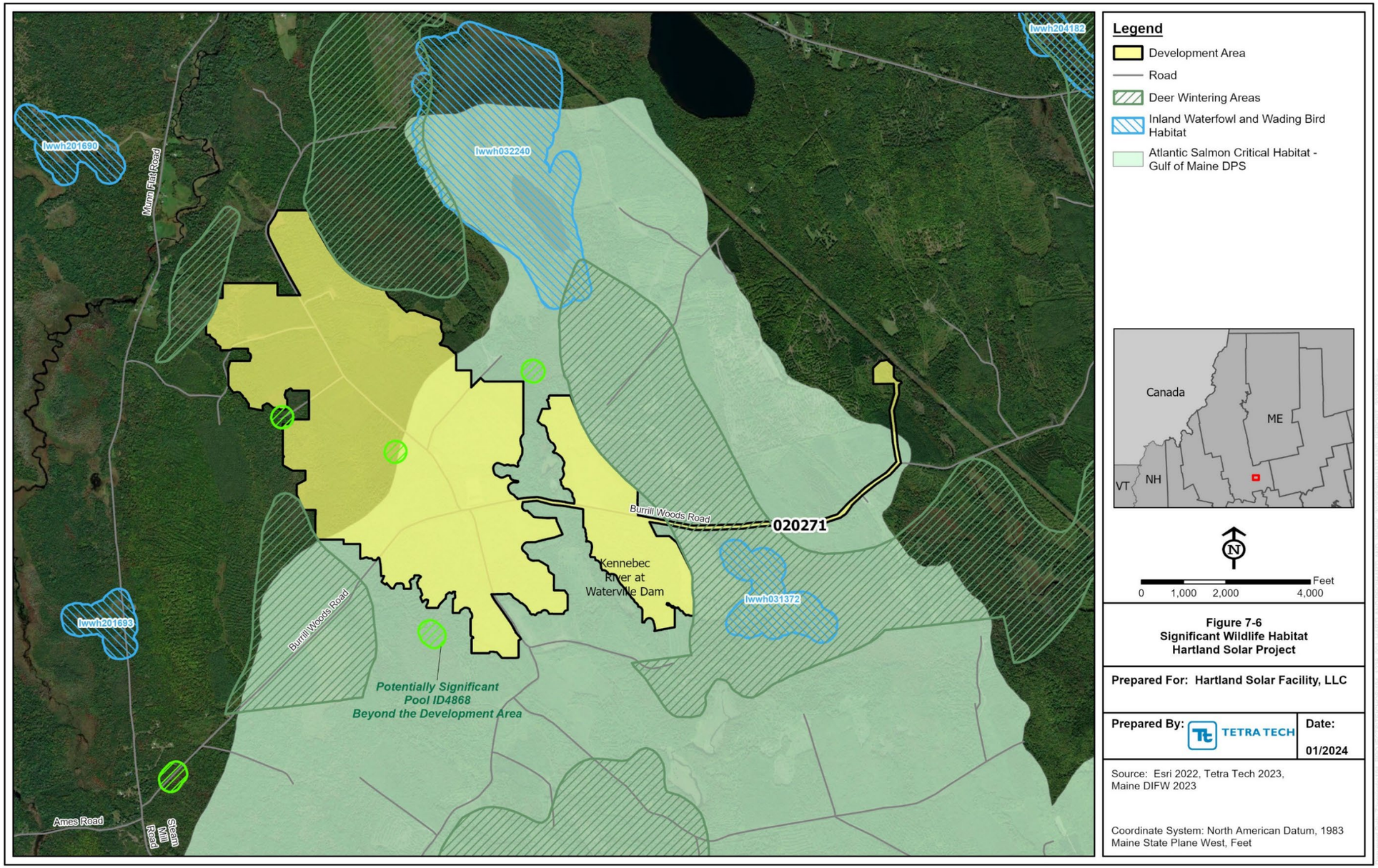


Figure 7-6 Significant Wildlife Habitat.

Figure 7-7 Deer Wintering Area Existing Conditions.

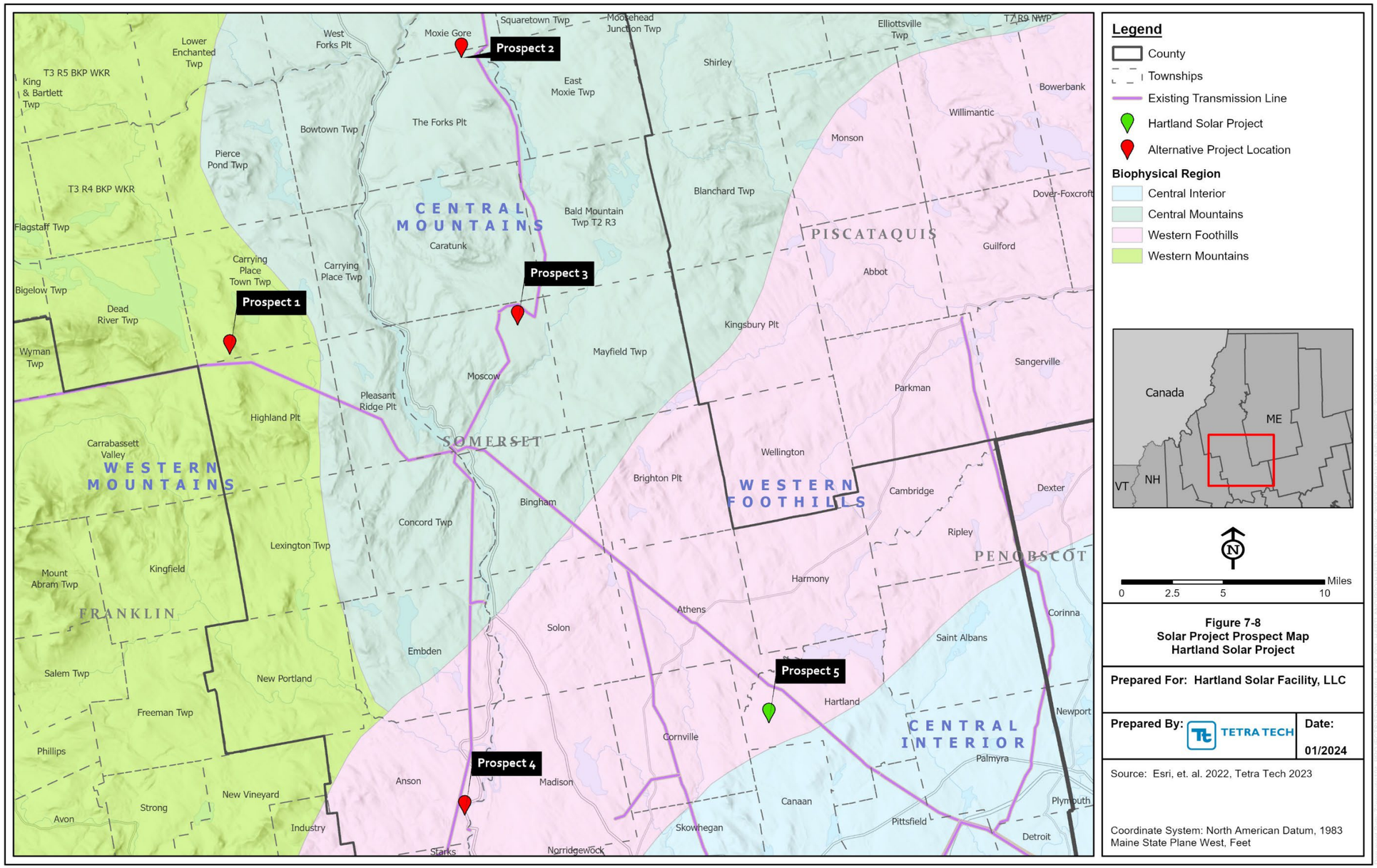


Figure 7-8 Solar Project Prospect Map.

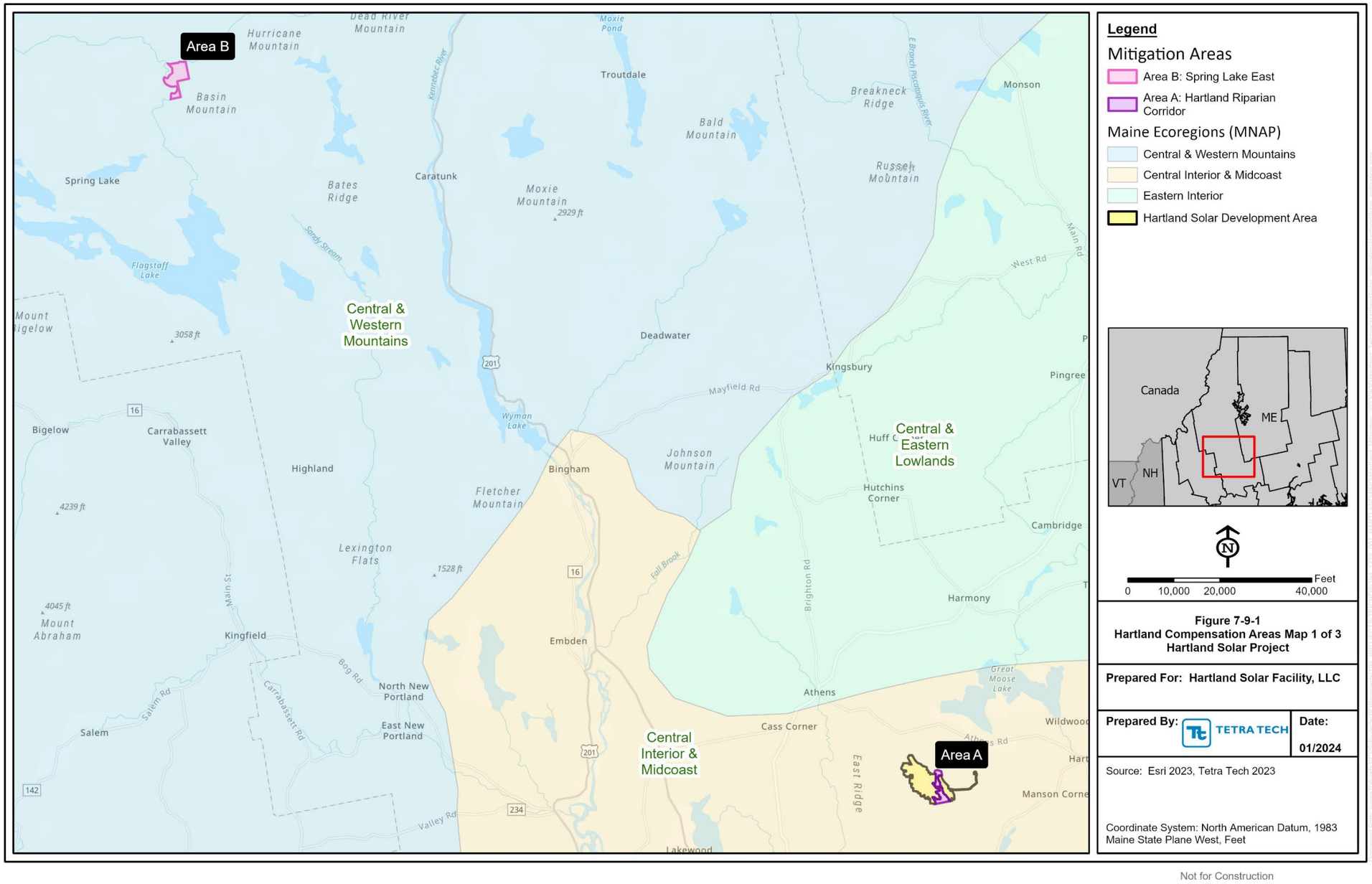
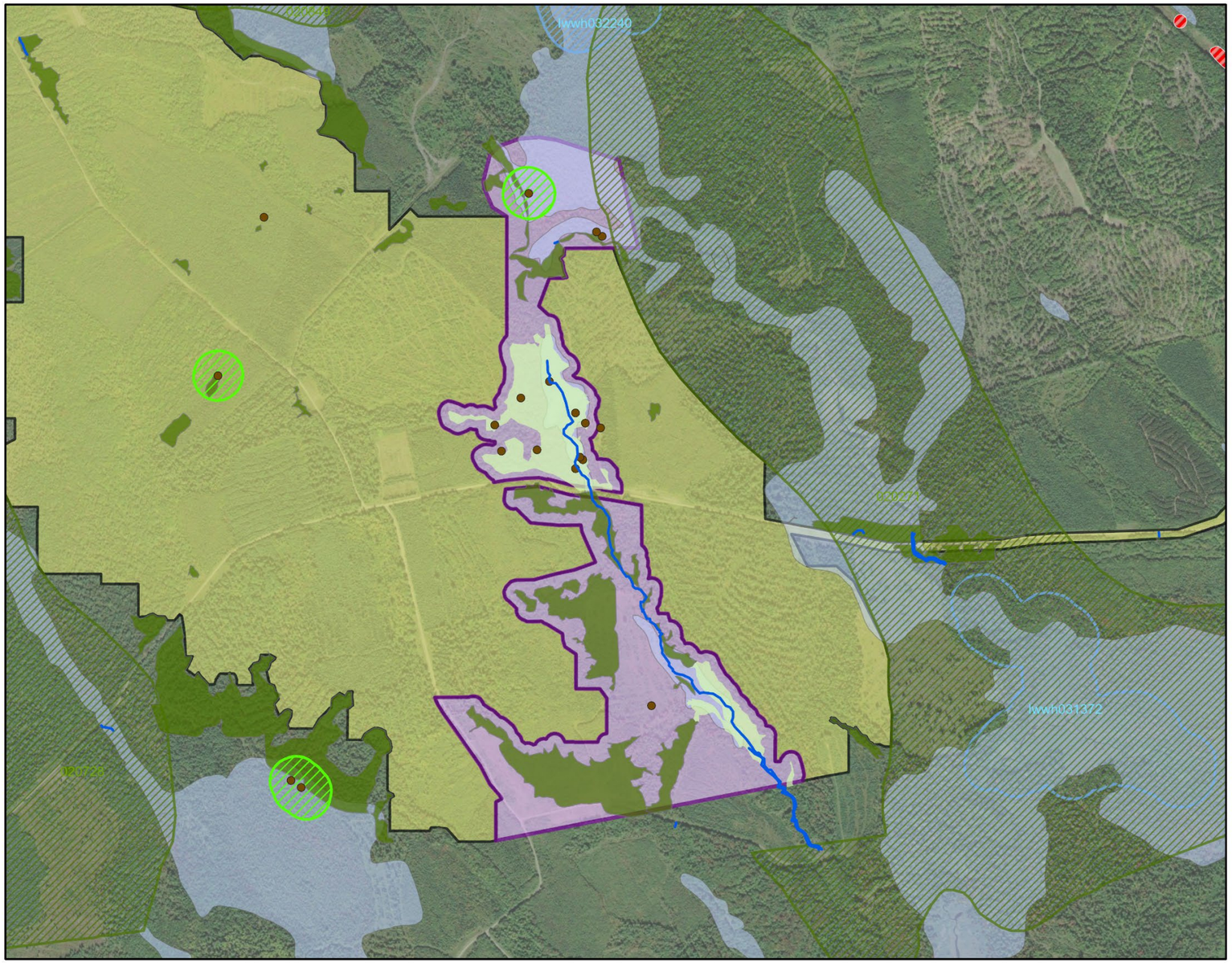


Figure 7-9 Hartland Compensation Areas (Maps 1-3).



Legend

Mitigation Areas

- Area A: Hartland Riparian Corridor
- Delineated Streams
- Vernal Pool Points (MDIFW)
- Significant Vernal Pools 250-foot buffer (MDIFW)

Delineated Wetland types

- Freshwater Forested
- Freshwater Scrub-Shrub
- NWI Wetlands
- Red Stemmed Gentian (MNAP)
- Deer Wintering Area (MDIFW)
- Inland Waterfowl Wading Bird (MDIFW)
- Hartland Solar Development Area

N

0 500 1,000 2,000 Feet

Figure 7-9-2
Hartland Compensation Areas Map 2 of 3
Hartland Solar Project

Prepared For: Hartland Solar Facility, LLC

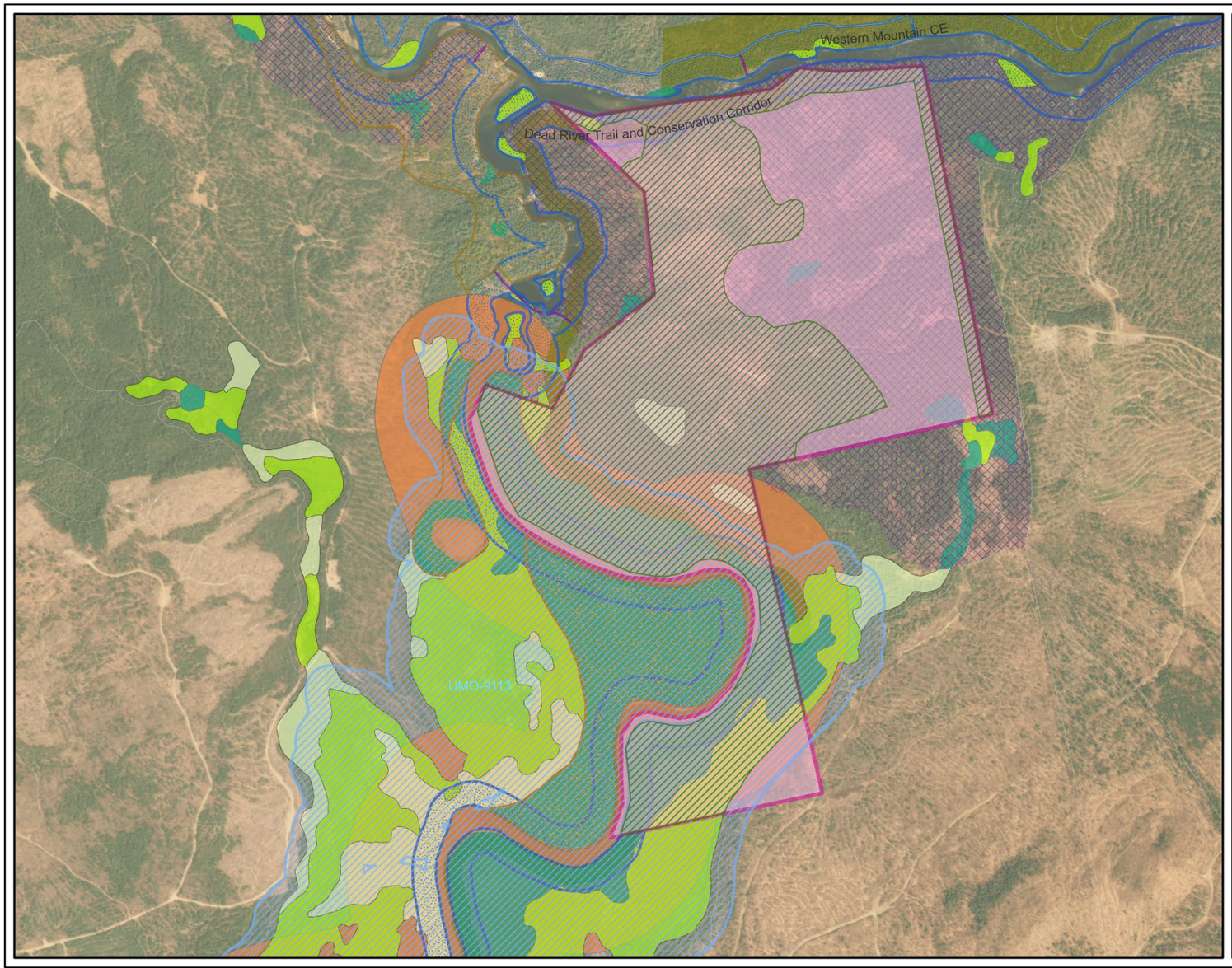
Prepared By: TETRA TECH

Date: 01/2024

Source: Esri 2023, Tetra Tech 2023

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction



Legend

Mitigation Areas

- Area B: Spring Lake East
- Spring Lake_DWA_Agreement Area (Approx)
- Inland Waterfowl Wading Bird
- Conserved Lands

Endangered Threatened Special Concern

- RARE ANIMAL-Wood Turtle

LUPC Zones

- M-GN: General Management
- P-FP: Flood Prone Area Protection
- P-FW: Fish and Wildlife Protection
- Recreation Protection
- P-SL1: Shoreland - 250' Protection
- P-SL2: Shoreland - 75' Protection
- P-UA: Unusual Area Protection
- P-WL1: Wetlands of Special Significance Protection
- P-WL2: Scrub-shrub Wetlands Protection
- P-WL3: Forested Wetlands Protection

N

0 500 1,000 2,000 Feet

Figure 7-9-3
Hartland Compensation Areas Map 3 of 3
Hartland Solar Project

Prepared For: Hartland Solar Facility, LLC

Prepared By: TETRA TECH

Date: 01/2024

Source: Esri 2023, Tetra Tech 2023

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

EXHIBIT 7-1 AGENCY CORRESPONDENCE

Agency Correspondence

MDEP

From:	Agius, Brad
To:	Damon, Jessica
Cc:	Dani Torcolacci
Subject:	Pre-Application Meeting Request
Date:	Tuesday, April 6, 2021 4:01:00 PM
Attachments:	MDEP_Pre_App_Request_Hartland 20210406.pdf

Dear Jessie,

On behalf of Strobus Solar, LLC (the Applicant), please find attached a letter to request a Site Law of Development Pre-Application meeting for the proposed Hartland Solar Project. To aid in the review, a site location map is included. Please let us when we you, or staff designee, are available for the Pre-Application meeting. We look forward to discussing the project in more detail. If you have any questions or require additional information regarding this request contact me directly.

Thank you for your time and attention,

--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

Tetra Tech | Complex World, Clear Solutions™

451 Presumpscot Street, Portland, ME 04103 | tetratech.com

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Please consider the environment before printing.

TETRA TECH

April 6, 2021

Jessica Damon
Project Manager
Bureau of Land Resources
Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

Sent via email: Jessica.Damon@maine.gov

Subject: Pre-Application Meeting Request

Dear Jessica,

On behalf of Strobus Solar, LLC (the Applicant) this letter is to request a Site Law of Development Pre-Application meeting with the Maine Department of Environmental Protection for the proposed Hartland Solar Project (Project) along Burrill Woods Lane in Hartland, Maine. Tetra Tech is supporting the Applicant, a wholly owned affiliate of Teichos Energy Inc. with the permitting of this project. This proposed solar photovoltaic commercial generation project will interconnect to Central Maine Power's existing transmission line (115 kV), via a new substation. The Project will create approximately 140 MW AC of generating capacity. To aid in the review, a Site Location map is attached.

The proposed project's limit of work would be approximately 1,388 acres on existing commercial forest land adjacent to Central Maine Power's existing 115 kV transmission line. Critical issues and desktop GIS constraints analyses have been completed and the project is being designed to avoid natural resource impacts.

Please let us know when you are available for the Pre-Application meeting. We look forward to discussing the project in more detail. If you have any questions or require additional information regarding this request, please contact me directly at (207) 991-2633 or brad.agius@tetratech.com.

Thank you for your time and attention.

Respectfully Submitted,

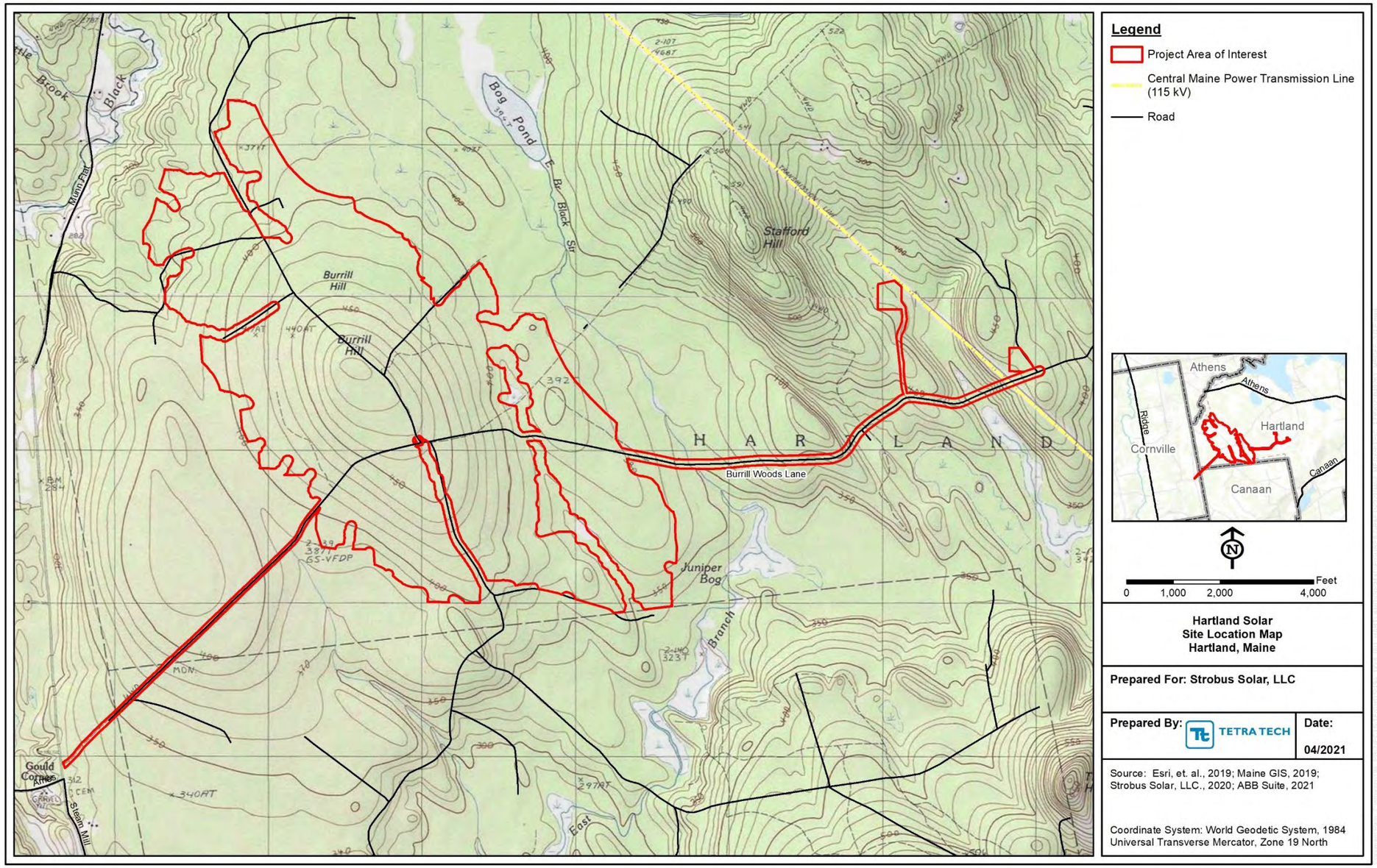
TETRA TECH, INC.

Brad Agius, Project Manager

Enclosure – Site Location Map

CC: Dani Torcolacci (Strobus Solar, LLC)

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Mobile 207-991-2633 www.tetratech.com



Not for Construction

Site Location Map: Hartland Solar – Hartland, Maine

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Mobile 207-991-2633 www.tetratech.com

Hartland Solar – MDEP Informational Meeting Agenda 4/29, 1pm ET

1. Brief Meeting Overview (Tt)
2. Introductions (Invitees) - Roles
    a. Teichos (TE)
        i. Dani
        ii. Jim
        iii. Vincent
        iv. Bryson
    b. Tetra Tech (Tt)
        i. Brad Agius
        ii. Jim Cassida
        iii. Kelly Waddle (Linda Rivard – alternate)
        iv. Derek Hengstenberg
    c. MDEP (Tt - > MDEP)
        i. Shannon Smith
    d. MDFIW (Tt -> MDIFW)
        i. Bob Stratton
        ii. John Perry
        iii. Becca Settele
        iv. Keel Kemper
    e. MNAP (Tt-> MNAP)
        i. Kristen Puryear
        ii. Lisa St. Hillarie
    f. Corps – unable to attend, PM will be Shawn Mahaney
    g. USFWS – unable to attend
3. Project Description and History (TE)
    a. Map Current Site (Tt: will provide/show)
4. Project to date
    a. CMP (TE - Vincent)
    b. Desktop Assessment
        i. Site Selection (TE-Vincent, Jim)
        ii. CIA (Tt)
        iii. Constraints (TT)
        iv. Site Iteration Maps (Tt: will provide/show)
    c. Agency Correspondence (Tt)
        i. Data Request MDIFW & MNAP
        ii. MDIFW – DWA call
        iii. USFWS – Lynx Work Plan
    d. Current Fieldwork (T)
        i. DWA
        ii. Lynx
        iii. Vernal Pools
5. Planned studies (Tt)
    a. Wetlands

    b. Soils
    c. Rare / Invasive Plant
    d. Bat Presence / Absence
    e. Cultural
    f. Visual
    g. Noise
    h. Topo/Boundary
    i. Civil Engineering
    j. Electrical Engineering
6. Project Permitting and Schedule (Tt)
    a. Site Law - December 2021, NRPA - TBD
    b. Federal TBD, February 2022
    c. Local February 2022
7. Construction Timeline (TE-DT) (Construction beginning in 2022 with COD in 2023)
8. Agency Input / Questions
9. Next Steps

Hartland Solar

Maine Department of Environmental Project (MDEP) Informational Meeting Minutes

April 29, 2021, 1-1:40 pm ET

<u>Attendees</u>

MDEP – Shannon Smith

Maine Department of Inland Fisheries and Wildlife (MDIFW) – Bob Stratton, Keel Kemper, Becca Settele

Maine Natural Areas Program (MNAP) – Kristen Puryear, Lisa St. Hilaire

Teichos Energy (TE) – Dani Torcolacci, Jim Voorhees, Vincent Hansen, Bryson Amaya

Tetra Tech, Inc. (Tt) – Brad Agius, Jim Cassida, Derek Hengstenberg, Linda Rivard

1. Brief Meeting Overview (Tt)
    a. Brad identified the Project name has changed (from Athens Solar to Hartland Solar) to better align with its location; goal of this meeting is to engage agencies early in the process, considering large Project size
2. Introductions (Invitees) - Roles
    a. TE
        i. Dani – introduced Teichos as a renewable energy developer, has staff dispersed throughout the country, she is based in Michigan
        ii. Jim – VP of development
        iii. Vincent – based in NYC; has a marketing role as well as Project origination
        iv. Bryson – works with the development team, provides permitting support
    b. Tt
        i. Brad Agius – Project Manager
        ii. Jim Cassida – Senior Advisor
        iii. Linda Rivard – Project support
        iv. Derek Hengstenberg – lead wildlife biologist
    c. MDEP
        i. Shannon Smith – MDEP PM for the Project, works out of MDEP Bangor office
    d. MDFIW
        i. Bob Stratton – Environmental PM, works out of MDIFW Augusta office
        ii. Becca Settele – works out of MDIFW Bangor office
        iii. Keel Kemper – Regulatory Wildlife Biologist, works in MDIFW region for the Project
    e. MNAP
        i. Kristen Puryear – MNAP Ecologist, part of ME Department of Agriculture, Conservation & Forestry
        ii. Lisa St. Hilaire – Environmental Review team member

f. United States Army Corps of Engineers (Corps) and United States Fish and Wildlife Service representatives were unable to attend, both local offices are very short-staffed
g. Corps PM will be Shawn Mahaney

3. Project Description and History (TE)
    a. Map of Current Site (screenshare of map)
4. Project to date
    a. Central Maine Power (CMP) (TE - Vincent)
        i. Working with CMP on interconnection; feasibility study is currently in progress, which will provide additional Project information once available
    b. Desktop Assessment
        i. Site Selection (TE-Vincent, Jim)
            1. Interaction with the landowner led to identification of this site as a potential location for the Project
            2. TE conducted their own internal analysis of site (public data review, evaluation of topography, evaluation of transmission interconnection); led to identification of site as suitable for a project of this size
        ii. CIA (Tt) – more detailed review of publicly available data, including state and federal natural resources info
            1. Constraints (Tt) – buffered out buildable area, using public data
        iii. Site Iteration Maps (screenshare)
            1. Revisions to layout, opted to not tie in to transmission line at north end of property due to presence of natural resources and mapped deer wintering areas (DWAs)
            2. Engaged with MDIFW early on regarding DWAs
            3. Moved panel arrays south, to where the proposed 140-megawatt Project is currently sited on approximately 1,388 acres
            4. Utilizing the existing road network, which should need minimal upgrades, as they are currently used by heavy trucks for logging
    c. Agency Correspondence (Tt)
        i. Data Request MDIFW & MNAP
        ii. MDIFW – DWA call
        iii. USFWS – Lynx Work Plan
    d. Current Fieldwork (Tt)
        i. DWA – field surveys completed
        ii. Lynx – field surveys completed
        iii. Vernal Pools – in progress
5. Planned studies (Tt)
    a. Wetlands – field work scheduled to be completed by mid- to late-summer; afterwards will plan on having a more detailed stormwater discussion with state agencies
        i. Goal of project is to completely avoid water resource impacts
    b. Soils

c. Rare / Invasive Plant – MNAP reviews identified red-stemmed gentian as having known occurrence along adjacent CMP transmission line
d. Bat Presence / Absence
e. Cultural
f. Visual
g. Noise
h. Topo/Boundary
i. Civil Engineering
j. Electrical Engineering

6. Project Permitting and Schedule (Tt)
    a. Site Law - December 2021, NRPA – TBD
        i. MDEP standard review time is 6 months, with possible extension to a total of 195 days (at MDEP discretion)
            1. **Action Item -** Shannon will inquire with other PMs on the potential for 6-month review period to be extended
    b. Federal TBD, February 2022
    c. Local February 2022
7. Construction Timeline - Construction anticipated to begin in 2022 with COD in 2023
    a. Dani – expect to start with site preparation in late 2022, with construction activities extending through 2023
        i. Expect to include pauses in construction activities, as needed, to account for spring/winter conditions
8. Agency Input / Questions
    a. Shannon – have you received any Town resistance, relative to a project of this size?
        i. Jim V. – TE is ready to initiate formal outreach to the Town upon conclusion of this call, as part of near-term planning and outreach activities
            1. Anticipate positive reception with Town of Hartland
    b. Bob – impressed that we have been able to complete avoidance resource impacts for a project of this size, this is very encouraging
        i. MDIFW provided Project reviews related to DWA and Inland Wading Bird and Waterfowl Habitat in February and March; also encouraging looking for potential bat habitat (i.e., talus slopes)
        ii. Pointed out that while information is mapped, it doesn't' represent a complete assessment of what is out there
        iii. Refer to MDIFW's Solar Project Guidance document, to implement recommended surveys and parameters
        iv. As results of studies become available, Bob is happy to conduct a more thorough review of potential Project impacts to fish and wildlife
            1. Jim C. - Project would interconnect to CMP line to the east along an existing access road (aboveground), which would cross mapped DWA

habitat; two potential substation locations are shown (for flexibility); however, Project will only include one substation

2. Brad also noted that no more than 100 feet along roadway would be needed for additional work
    a. Initial feedback from Keel on Project road crossing of DWA indicated this would not be a Project stopper (Keel)

c. Initial vernal pool observations? Brad – initial vernal pool results indicate presence of many amphibian breeding areas occur in skidder ruts located in upland areas (contain egg masses); however, generally these don't meet the vernal pool criteria; have documented some vernal pools that would fall under Corps regulation; currently completing round 1 of vernal pools surveys, with 2nd round visits scheduled to begin the week of May 10th

d. Kristen inquired about the next phase of survey work, including wetlands, rare plants, and invasive species surveys; provide more details
    i. Brad – focus of invasive species is to collect presence/absence information for the species identified as of most concern by MNAP; collection of planning level data, using 25-50-acre grid coverage
    ii. Kristen recommended we focus efforts on areas most likely to contain invasive species populations, such as roadsides, disturbed and open areas, log landing areas, near road culverts; may have more success with this strategic targeted approach; less likely to have invasive species infestations in core forest areas
    iii. Brad noted that observations will be made on invasive and rare plant populations observed during other survey efforts, and that the site will have been walked/observed many times throughout the multiple survey efforts that are planned
        1. Rare Plants – targeting two survey periods: mid-June and late August
    iv. Kristen agreed that gentian species likely to be flowering during these periods and that red-stemmed gentian isn't a species that is easily confused with other gentian species (if not in flower); avoiding impacts to wetlands would also minimize potential impacts to rare plant species
    v. Kristen requested to see results of rare plant surveys, once completed
    vi. Brad noted that Tt has several staff experienced in identification of red-stemmed gentian
    vii. Kristen inquired what our intentions were, in using the results of the rare and invasive plant survey results
        1. Jim C. indicated the survey results would be used to adjust layout if needed to avoid impact to any rare plants found, and also create an invasive species management plan that identifies measures to prevent spread and manage/control populations throughout construction and into operations; based on survey results, plan would be tailored to control of types and densities of invasives species observed

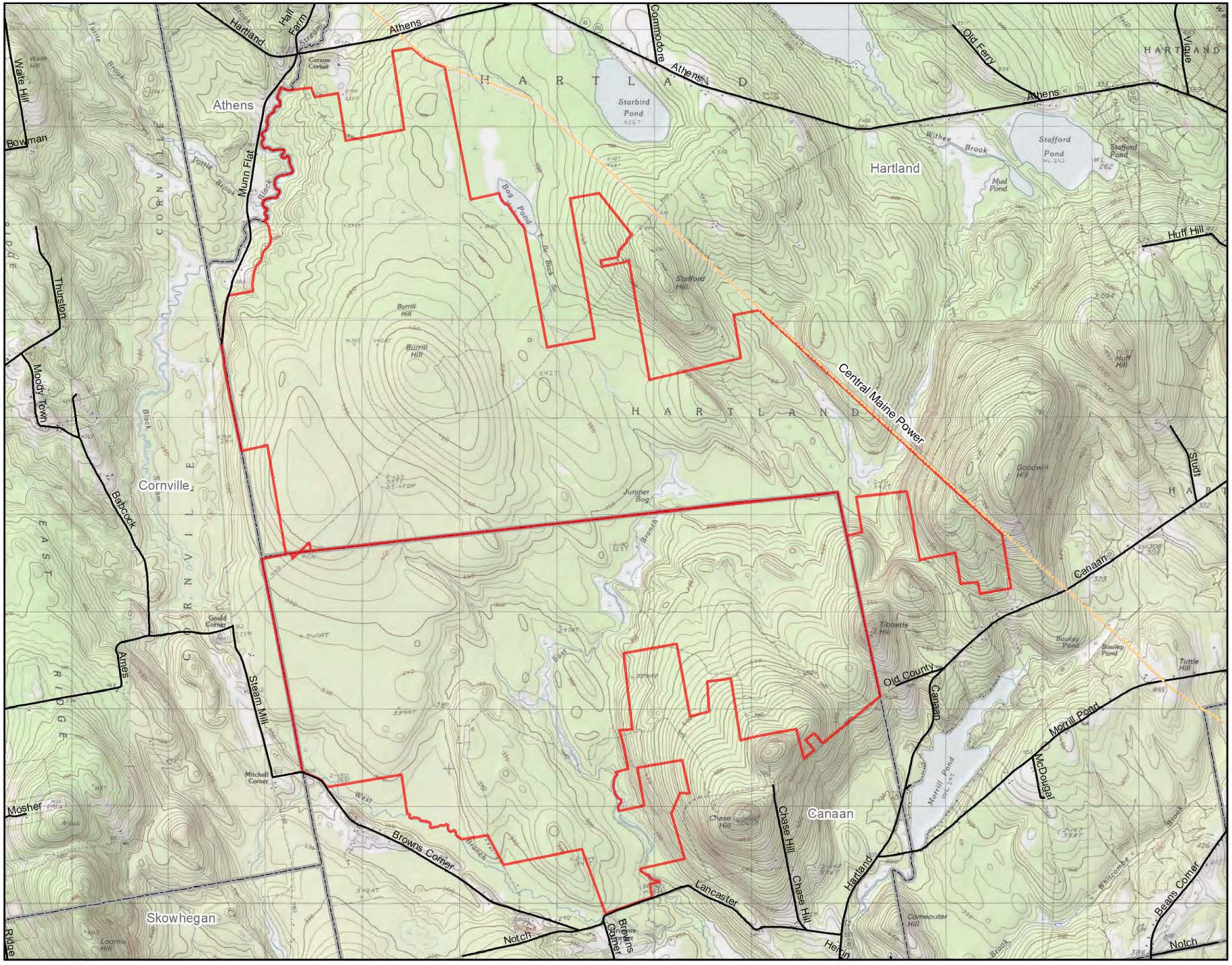
viii. Lisa reiterated that what they have mapped in their system isn't a complete representative of what is there; appreciates the survey efforts proposed; asked if we would coordinate with MNAP regarding recommended actions for invasives found (Nancy)

ix. Kristen indicated that Nancy (MNAP) can help to identify strategies for control, based on their reviews of other management plans/concepts

1. Project team will ask MNAP to review preliminary invasive species management plan during the pre-application period, to better enable us to provide MNAP with a plan that meets their expectations

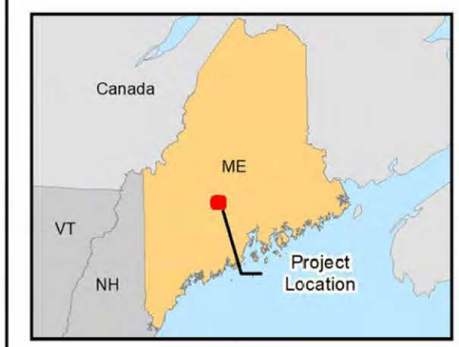
e. Bob noted that state agency reviews of projects of this size will have staff track review time spent on the Project, and fees related to this review would be forward to the Applicant

9. Next Steps



Legend

- Study Area
- Town Boundary
- Electric Transmission Line
- Road



N

0 0.25 0.5 1 Miles

Athens Solar
Canaan and Hartland, Maine

Prepared For: Strobus Solar, LLC

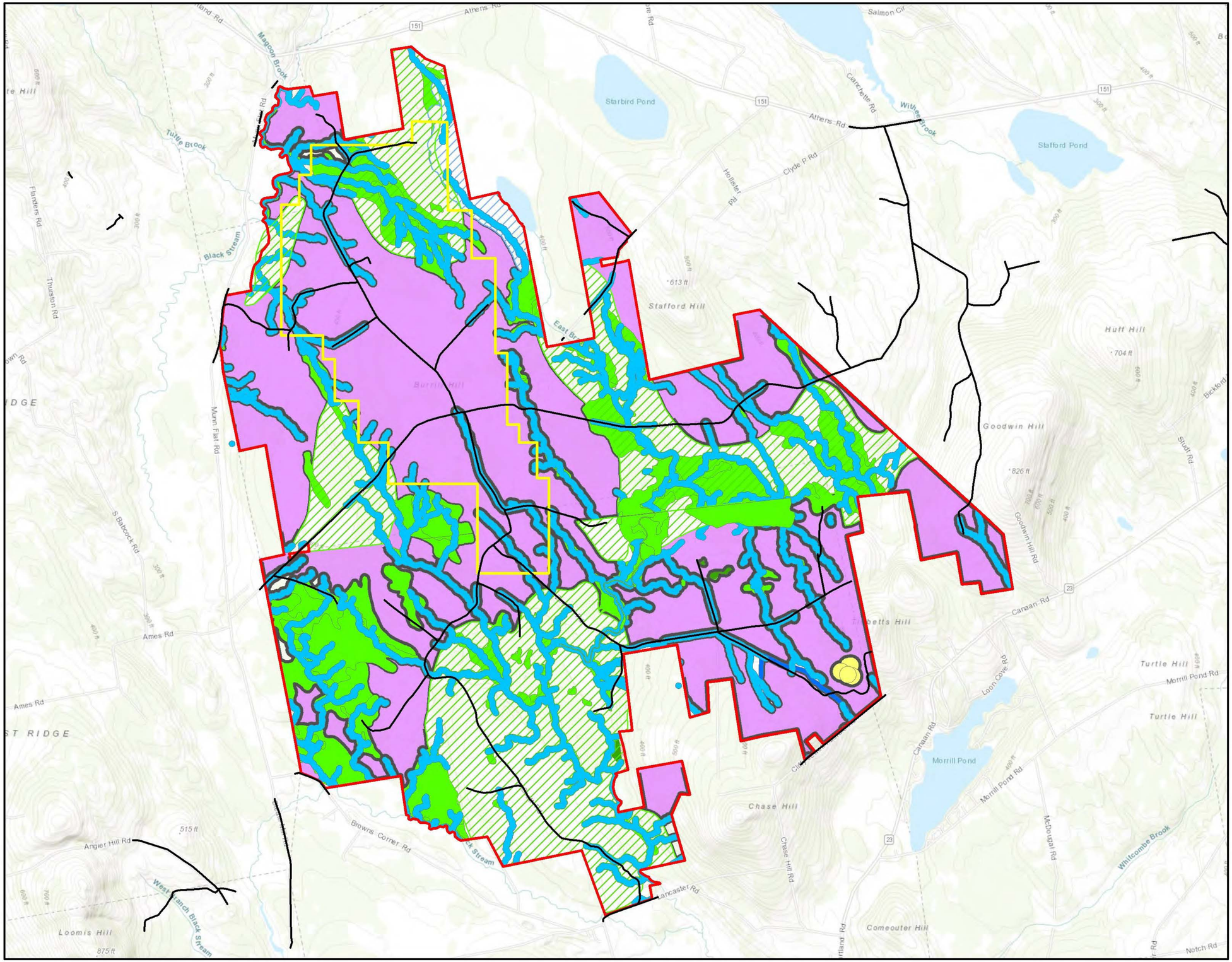
Prepared By: TETRA TECH

Date: 02/2021

Source: Esri, et. al., 2019; Maine GIS, 2019; Strobus Solar, LLC., 2020

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction



Legend

- Study Area
- Approximate Project Boundary
- Potential Buildable
- Road

Constraints

- Deer Wintering Area
- Inland Waterfowl and Wading Bird Habitat
- Desktop Wetland
- NWI Wetland
- Stream
- Potential Vernal Pool
- Shading Buffer - 50-100 ft
- Potential Vernal Pool Buffer - 250 ft
- Stream Buffer - 100 ft

N

0 0.25 0.5 1 Miles

Athens Solar
Canaan and Hartland, Maine

Prepared For: Strobus Solar, LLC

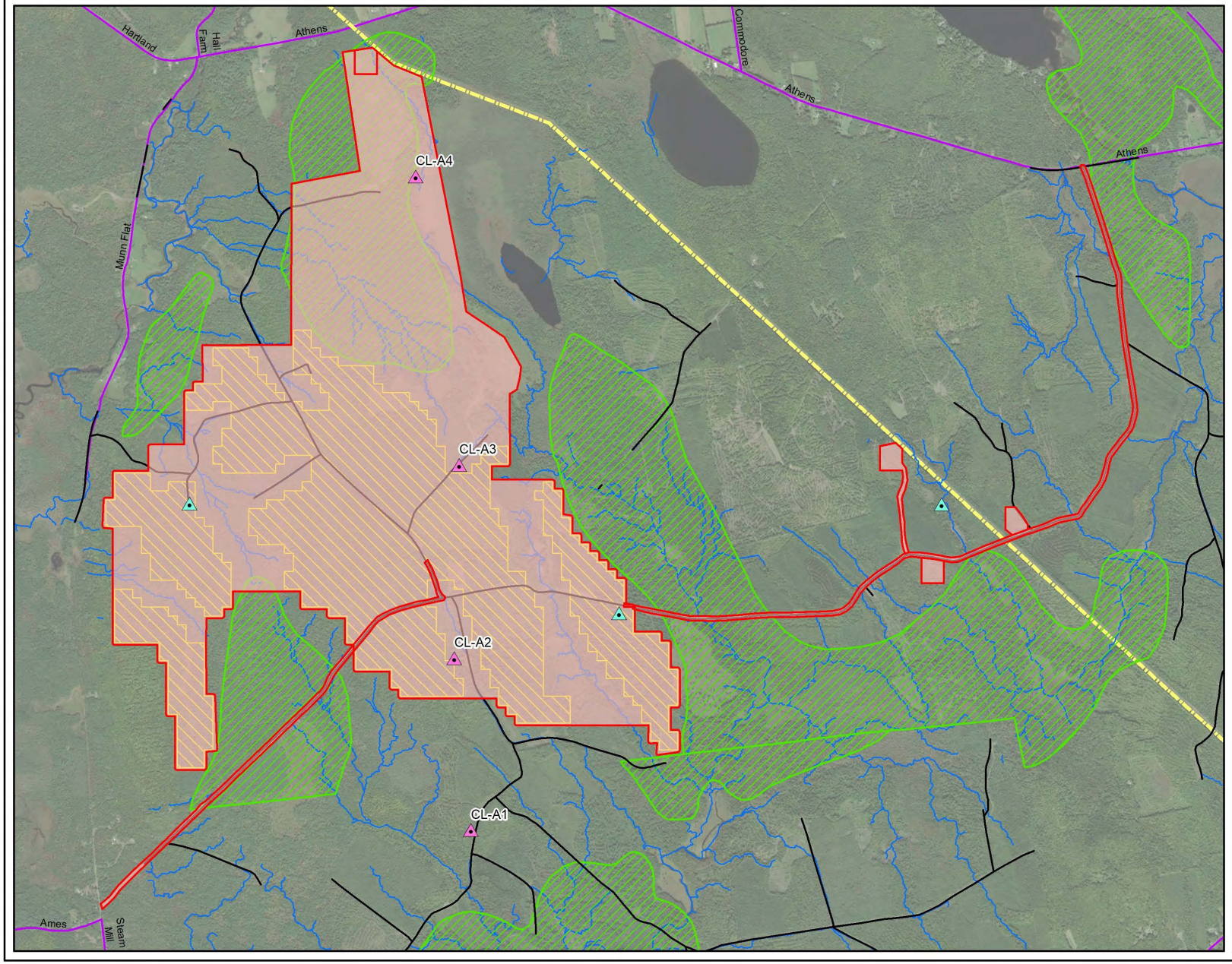
Prepared By: TETRA TECH

Date: 02/2021

Source: Esri, et. al., 2019; Maine GIS, 2019; Strobus Solar, LLC., 2020;

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction



Legend

- Study Area (20210219)
- Layout (20210211)
- Deer Wintering Area
- Road (MEDOT)
- Road
- Transmission Line
- Camera Location
- Additional Camera Location

N

0 0.25 0.5 1 Miles

Athens Solar
Canaan and Hartland, Maine

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: 02/2021

Source: Esri, et. al., 2019; Maine GIS, 2019; Strobus Solar, LLC., 2020;

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction

Legend

Project Area (1,388 acres)

Road

N

0 1,000 2,000 4,000 Feet

Hartland Solar
Hartland, Maine

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: 04/2021

Source: Esri, et. al., 2019; Maine GIS, 2019; Strobus Solar, LLC., 2020

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction

From: Agius, Brad
Sent: Friday, May 13, 2022 10:46 AM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: Hartland Solar Project - MEETING REQUEST

Hi Shannon,
It has been a year since we introduced the Hartland Solar project to you. We would like to have an another agency meeting to discuss the progress with the project as well as the delays with the ISO-NE interconnection. In addition we will have the final version of the design early next week and be able to present and discuss the effort to avoid and minimize impacts to wetlands and other natural resources. We would like to have your DEP stormwater engineer on the call too as we are working on the stormwater design and would like their input before starting the Class B soil surveys.

Do you know who the DEP stormwater engineer will be for the project and can you provide their email address?

Our Team is available Tuesday 5/24 at 2pm, for starters. Please let me know if that will work for you or if there are other days and times that week that would work better for you.

Thank you, and have a great weekend,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Tuesday, April 20, 2021 2:40 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: RE: Hartland Solar Project Introduction

That works.

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, April 20, 2021 2:33 PM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project Introduction

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon,
I heard back from the team and we are available next Thursday at 1pm ET to introduce the Hartland Solar Project. Please let me know if this time works for you and I'll set up a Teams call and invite the other agencies (Corps, USFWS, MDIFW and MNAP).
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Agius, Brad
Sent: Wednesday, April 14, 2021 9:50 AM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project Introduction

Hi Shannon,
Thank you for including your schedule. I completely understand. I'll check with the team members about earlier times in the day and get back to you soonest.
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Wednesday, April 14, 2021 8:58 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: RE: Hartland Solar Project Introduction

I have to pick my kid up from school at 3, except next week as it is school vacation. Can you do an earlier time in the day? I am free pretty much every day except the 28th.

--Shannon

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, April 13, 2021 2:44 PM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: Hartland Solar Project Introduction

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon,
Would you be available Tuesday 4/27 at 2pm instead? The Hartland Solar Project Team is available then. It would be nice not have you rushed if we need more than 45 minutes. If that day and time work, I will send a Teams invite and coordinate attendance from the other agencies. Please let me know if there are others at MDEP that should be included.
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Friday, April 9, 2021 11:51 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: RE: Pre-Application Meeting Request

Sounds great, and yes I am available April 20th, but only until 2:45pm.

Thanks,
Shannon

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Friday, April 09, 2021 11:47 AM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Pre-Application Meeting Request

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon,
Thank you for the quick response. I am working on fielding my team's availability. I am tentatively thinking Tuesday April 20th at 2pm, and will hopefully be able to confirm early next week. Are you available at that date and time? Teams is a great platform and I can set up the invite once we establish the date and time. We can screen share project maps in more detail that point and provide as much information as is available.

A clarification, this is a meeting to introduce the project to you and get feedback from you and other agencies for our project planning, avoid and minimize impacts and meet all requirements for approval. A formal Pre-Application meeting, as per Site Law requirements, would be better suited after completion of several field tasks being completed this spring and summer and design progression (e.g., vernal pool, wetland, soils, etc.).

I was planning to invite MDIFW, MNAP, Corps and USFWS to introduce the project to them as well at this meeting. The team and I look forward to working with you.

Have a great weekend,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Thursday, April 8, 2021 3:53 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: FW: Pre-Application Meeting Request

Hi Brad,
You can schedule the pre-application meeting with me. We have been using Microsoft Teams, does that work? If you have any questions about Stormwater Management, then I can see when Ken Libbey is available also, he does the SW reviews.

If you could, please add to your location map: MDIFW areas, any vernal pools, wetland areas, access roads and the areas with panels. Touch on any scenic character issues. Are there any visual buffers

between the proposed project and nearby residences. Any plantings/screened fencing?. What are the wetland impacts?

Thanks,

Shannon Smith, Project Manager
Maine Department of Environmental Protection
Bureau of Land Resources
Eastern Maine Regional Office - Bangor
(207) 215-7346
www.maine.gov/dep

From: Damon, Jessica <Jessica.Damon@maine.gov>
Sent: Thursday, April 08, 2021 7:20 AM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: FW: Pre-Application Meeting Request

Shannon,

Can you do this pre-application meeting?

Thank you!

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, April 6, 2021 4:02 PM
To: Damon, Jessica <Jessica.Damon@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: Pre-Application Meeting Request

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Dear Jessie,
On behalf of Strobus Solar, LLC (the Applicant), please find attached a letter to request a Site Law of Development Pre-Application meeting for the proposed Hartland Solar Project. To aid in the review, a site location map is included. Please let us when we you, or staff designee, are available for the Pre-Application meeting. We look forward to discussing the project in more detail. If you have any questions or require additional information regarding this request contact me directly.
Thank you for your time and attention,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Please consider the environment before printing.

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent on: Friday, June 3, 2022 7:25:34 PM
To: Agius, Brad <Brad.Agius@tetratech.com>; Smith, Shannon D <Shannon.D.Smith@maine.gov>; Jessica.Damon <Jessica.Damon@maine.gov>; Dawn.Hallowell@maine.gov; Dani Torcolacci <dtorcolacci@teichos.com>; Vincent Hansen <vh@teichos.com>; Kirk MacLearnsberry <kmaclearnsberry@teichos.com>; bpro <bpro@teichos.com>; Cassida, Jim <Jim.Cassida@tetratech.com>
Subject: Hartland Solar Questions with DEP

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting

Or call in (audio only)
+1 213-357-2812,,295424921# United States, Los Angeles

Phone Conference ID: 295 424 921#
Find a local number | Reset PIN

Learn More | Meeting options

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent on: Friday, June 3, 2022 7:03:40 PM
To: Agius, Brad <Brad.Agius@tetratech.com>; Jessica.Damon <Jessica.Damon@maine.gov>; Hallowell, Dawn <Dawn.Hallowell@maine.gov>
Subject: RE: Hartland Pre-App Slides

That works for all of us. Please also add Dawn Hallowell, thanks.

Shannon Smith, Project Manager
Maine Department of Environmental Protection
Bureau of Land Resources
Eastern Maine Regional Office - Bangor
(207) 215-7346
www.maine.gov/dep

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Friday, June 3, 2022 2:59 PM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>; Damon, Jessica <Jessica.Damon@maine.gov>
Subject: RE: Hartland Pre-App Slides

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon and Jessie,
The project team is available Tuesday, June 28 at 2pm to go over our Hartland Solar questions. Please let me know if that works for you and I'll send a meeting invite.
Thanks,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Friday, June 3, 2022 1:49 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Jessica.Damon <Jessica.Damon@maine.gov>
Subject: RE: Hartland Pre-App Slides

Ok, right now the last week in June is looking good.

Have a good weekend!

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Friday, June 3, 2022 1:47 PM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Cc: Damon, Jessica <Jessica.Damon@maine.gov>
Subject: RE: Hartland Pre-App Slides

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon,
I'll coordinate our availability and send some dates and times to Jessie and you for your consideration.
Have a great weekend,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Sent: Friday, June 3, 2022 1:05 PM

To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Jessica.Damon <Jessica.Damon@maine.gov>
Subject: RE: Hartland Pre-App Slides

Thanks Brad,
When you are ready we should have another meeting to discuss wetland compensation and any other questions you have.

Please include Jessica Damon.

Thanks,

Shannon Smith, Project Manager
Maine Department of Environmental Protection
Bureau of Land Resources
Eastern Maine Regional Office - Bangor
(207) 215-7346
www.maine.gov/dep

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, June 1, 2022 1:36 PM
To: Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: Hartland Pre-App Slides

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Shannon,
Attached please find a PDF of the Hartland Pre-App slides from the presentation today that you requested. We look forward to discussing the project further with you and getting clarification on the open questions on page 16.
Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Please consider the environment before printing.

Project Questions

1. Wetland Tree Trimming Maintaining 6 Meters is not Conversion
2. When is Wetland Conversion Applied
   a) Compensation (ILF)
   b) Functions & Values Assessment
3. Stream Clearing Guidance and Riparian Buffers
4. Federal Guidance on Bat Habitat
5. Guidance on Public Information Meeting, Virtual
6. Requirement for Pre-Submission Meeting

From:	Irvin, Emmy
To:	Agius, Brad
Subject:	Fwd: Vernal Pool results and IFW review
Date:	Tuesday, August 2, 2022 2:33:31 PM
Attachments:	EmmeraldIrvin.pdf

Hi Brad,

I just received this email from DEP with this attachment. I briefly looked at it on my phone and I think this is for Hartland vernal pools so figured you would want this asap.

Thanks!
Emmy

Get Outlook for iOS

From: DEP, DLRR Admin Support <DLRRAdminSupport.DEP@maine.gov>
Sent: Tuesday, August 2, 2022 11:17 AM
To: Irvin, Emmy <Emmy.Irvin@tetratech.com>
Subject: Vernal Pool results and IFW review

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Hello,

Attached are your Vernal Pool results and IFW review.

This electronic version is an Adobe Acrobat .pdf file. If you don't have the Adobe Acrobat Reader on your computer, you can click on this link to download the free reader.
http://www.adobe.com/products/acrobat/readstep2.html

Thanks!

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID #s 4864, 4867, 4870, 4871, 4872, 4873, 4874, 4875, 4876, 4877, 4880, 4881, 4882, 4883, 4884, 4878, 4879–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field surveys, it has been determined that the vernal pools identified above on the property of Weyerhaeuser are NOT SIGNIFICANT because either: 1. the features do not meet the definition of a vernal pool under the Significant Wildlife Habitat rules, 06-096 CMR 335(9) or 2. the vernal pools do not meet the biological standards for exceptional wildlife use of the Significant Wildlife Habitat rules, 06-096 CMR 335(9)(B). Therefore, activities within 250 feet of the pools are not regulated under the Natural Resources Protection Act (NRPA) unless there are other protected natural resources nearby such as streams or freshwater wetlands. I have attached a copy of the database printout that verifies the State's findings with respect to your surveys.

I want to also advise you that the pool areas on the property can be considered freshwater wetlands and therefore direct pool alterations may require permitting under the NRPA.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
207-941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

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PRESQUE ISLE, MAINE 04769
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JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID #s 4863, 4868, 4869–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field surveys, it has been determined that the vernal pools identified above on the property of Weyerhaeuser are POTENTIALLY SIGNIFICANT because either: 1. the entire pool was not surveyed, 2. the pool was surveyed outside the appropriate survey window for the year in question, or 3. the survey was lacking sufficient data to assess pool significance.

To ensure compliance with the Natural Resources Protection Act (NRPA) potentially significant vernal pools should be considered significant until an accurate assessment of the pool is completed. All areas on the property within 250 feet of significant or potentially significant vernal pool depressions, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335. It is suggested that further survey(s) are completed and data submitted that meet requirements for significance determination. With additional data the vernal pool may be reassigned as Not Significant or Significant and you will be notified accordingly.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID # 4866–Cornville

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field survey, it has been determined that the vernal pool identified above on the property of Weyerhaeuser is POTENTIALLY SIGNIFICANT because either: 1. the entire pool was not surveyed, 2. the pool was surveyed outside the appropriate survey window for the year in question, or 3. the survey was lacking sufficient data to assess pool significance.

To ensure compliance with the Natural Resources Protection Act (NRPA) potentially significant vernal pools should be considered significant until an accurate assessment of the pool is completed. All areas on the property within 250 feet of significant or potentially significant vernal pool depressions, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335. It is suggested that further survey(s) are completed and data submitted that meet requirements for significance determination. With additional data the vernal pool may be reassigned as Not Significant or Significant and you will be notified accordingly.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID # 4865–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field survey, it has been determined that the vernal pool identified above on the property of Weyerhaeuser is SIGNIFICANT. I have attached a copy of the database printout that verifies the State's findings with respect to our survey.

As a significant vernal pool, all areas on the Weyerhaeuser property within 250 feet of the vernal pool depression, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335.

The Department will ensure that the vernal pool's location and status is entered and mapped in the State's vernal pool database. Note that if the pool depression (only) crosses two or more property boundaries the abutter(s) are similarly subject to the requirements of the Natural Resources Protection Act and the Significant Wildlife Habitat rules.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4863 Twp: Hartland
Observer's ID: ABA05E1
UTM Coordinates of Pool Center: 452750 E, 4968957 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/15/2021 Additional Survey Dates: 05/11/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4864 Twp: Hartland
Observer's ID: ABA17CP
UTM Coordinates of Pool Center: 454932 E, 4967623 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4865 Twp: Hartland
Observer's ID: VP01ML
UTM Coordinates of Pool Center: 454564 E, 4969263 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: GREEN: SIGNIFICANT
IFW Comments: Pool provides significant breeding habitat for spotted salamanders.

IFW's Pool ID: 4866 Twp: Cornville
Observer's ID: VP08E1
UTM Coordinates of Pool Center: 451921 E, 4966376 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/14/2021 Additional Survey Dates: 05/12/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders and some habitat for wood frogs based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity. It is also unclear if this pool was formed from the abutting road or naturally occurring. Need additional photos of inlet/outlet and overview of pool to confirm.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4867 Twp: Hartland
Observer's ID: VP32EI
UTM Coordinates of Pool Center: 453777 E, 4967400 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021, 07/06/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria

---

IFW's Pool ID: 4868 Twp: Hartland
Observer's ID: VP33EI
UTM Coordinates of Pool Center: 453810 E, 4967377 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4869 Twp: Hartland
Observer's ID: VP35EI
UTM Coordinates of Pool Center: 453563 E, 4968696 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/23/2021 Additional Survey Dates: 05/12/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4870 Twp: Hartland
Observer's ID: VP39CP
UTM Coordinates of Pool Center: 454782 E, 4968511 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamander but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4871 Twp: Hartland
Observer's ID: VP43EI
UTM Coordinates of Pool Center: 453717 E, 4969199 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/29/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4872 Twp: Hartland
Observer's ID: VP138AR
UTM Coordinates of Pool Center: 454529 E, 4968610 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4873 Twp: Hartland
Observer's ID: VP140AR
UTM Coordinates of Pool Center: 454703 E, 4968560 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4874 Twp: Hartland
Observer's ID: VP14AR
UTM Coordinates of Pool Center: 454734 E, 4968527 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4875 Twp: Hartland
Observer's ID: VP142AR
UTM Coordinates of Pool Center: 454724 E, 4968410 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4876 Twp: Hartland
Observer's ID: VP143AR
UTM Coordinates of Pool Center: 454716 E, 4968418 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4877 Twp: Hartland
Observer's ID: VP144AR
UTM Coordinates of Pool Center: 454700 E, 4968382 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4878 Twp: Hartland
Observer's ID: VP146AR
UTM Coordinates of Pool Center: 454465 E, 4968441 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/22/2021 Additional Survey Dates: 05/01/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the vernal pool definition
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria. Pool also appears to be unnatural in origin (skidder ruts) and does not meet MDEP vernal pool criteria.

IFW's Pool ID: 4879 Twp: Hartland
Observer's ID: VP147AR
UTM Coordinates of Pool Center: 454445 E, 4968526 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/22/2021 Additional Survey Dates: 05/01/2021, 07/06/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the vernal pool definition
IFW Comments: Pool provides significant breeding habitat for spotted salamanders and some habitat for wood frogs; however, pool appears to be unnatural in origin (skidder ruts) and does not meet MDEP vernal pool criteria.

IFW's Pool ID: 4880 Twp: Hartland
Observer's ID: VP148AR
UTM Coordinates of Pool Center: 454579 E, 4968444 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4881 Twp: Hartland
Observer's ID: VP149AR
UTM Coordinates of Pool Center: 454622 E, 4968662 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4882 Twp: Hartland
Observer's ID: VP161AR
UTM Coordinates of Pool Center: 454797 E, 4969123 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4883 Twp: Hartland
Observer's ID: VP163AR
UTM Coordinates of Pool Center: 454778 E, 4969137 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/23/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4884 Twp: Hartland
Observer's ID: VP166AR
UTM Coordinates of Pool Center: 456840 E, 4968346 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/28/2021 Additional Survey Dates: 05/11/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamander but does not meet biological criteria.

From:	Cassida, Jim
To:	Smith, Shannon D; Stratton, Robert D; Libbey, Ken; Waddle, Kelly; Moyen, Matthew; Vincent Hansen; Jim Voorhees
Cc:	Swain, Elizabeth; Hallowell, Dawn; Perry, John; Juliet Browne; Ed McNamara
Subject:	RE: Hartland Solar Pre-App Meeting
Date:	Wednesday, July 26, 2023 7:40:55 AM
Attachments:	MDEP Meeting Civil Plans.pdf image001.png image002.png image003.png image004.png image005.png

---

Good morning.

Please find attached a pdf file with several Hartland Solar Project Plan sheet pages which we will be discussing with you at 2pm this afternoon.

Regards,

Jim

James Cassida | **Senior Program Director – Energy & Natural Resources**
Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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Please consider the environment before printing. Read more

-----Original Appointment-----
From: Cassida, Jim
Sent: Wednesday, July 12, 2023 5:12 PM
To: Cassida, Jim; Smith, Shannon D; Stratton, Robert D; Ken Libbey; Waddle, Kelly; Moyen, Matthew; Vincent Hansen; Jim Voorhees
Cc: Swain, Elizabeth; Hallowell, Dawn; Perry, John; Juliet Browne; Ed McNamara
Subject: Hartland Solar Pre-App Meeting
When: Wednesday, July 26, 2023 2:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

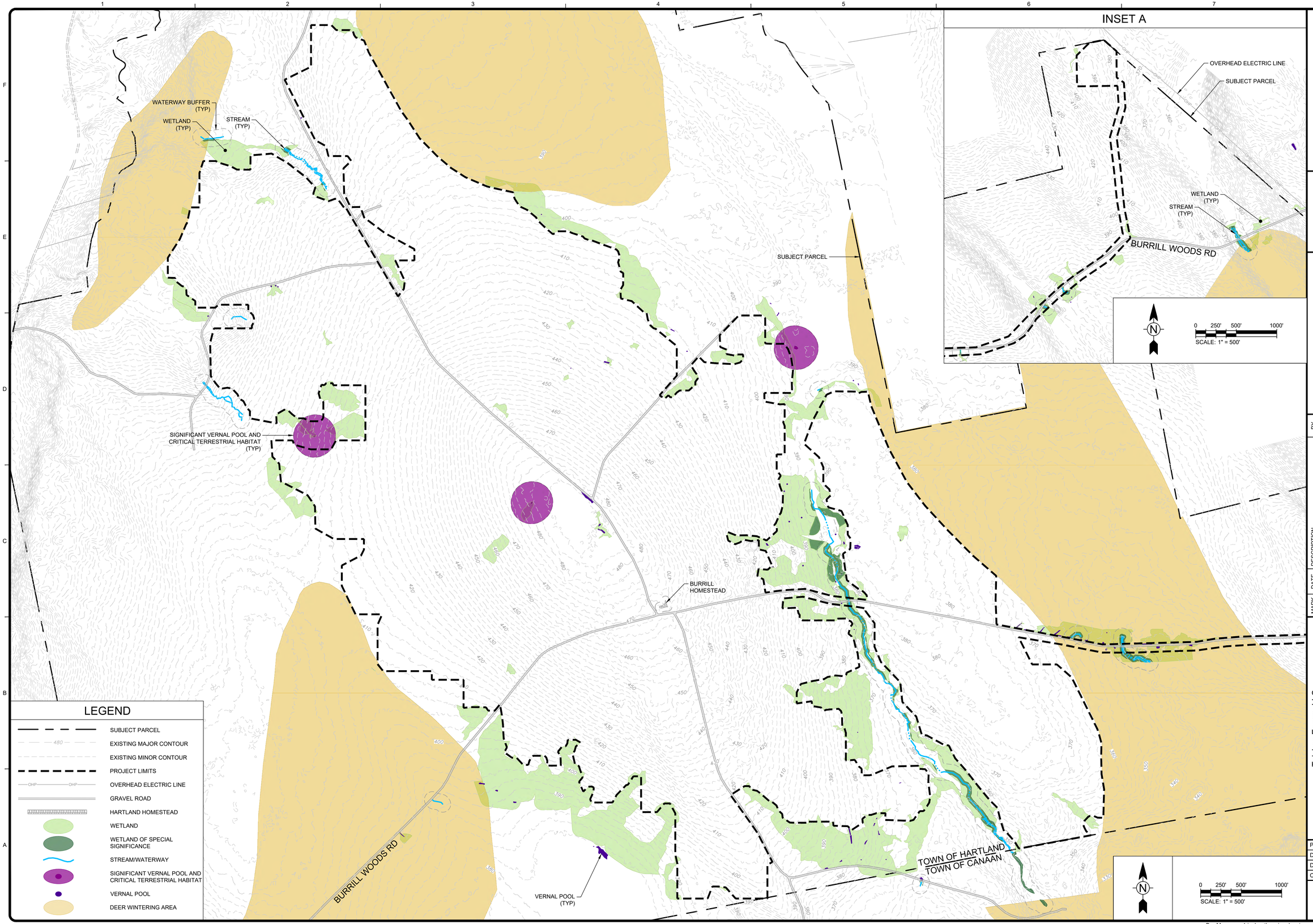
Meeting ID: 277 515 445 549
Passcode: wkyuKy
Download Teams | Join on the web

Or call in (audio only)

+1 213-357-2812,,60042597# United States, Los Angeles

Phone Conference ID: 600 425 97#
Find a local number | Reset PIN

Learn More | Meeting options



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100 Nickerson Road
Marlborough, MA 01752
Phone: (508) 786-2200 Fax: (508) 786-2201

MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC

Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Overall Existing Conditions Plan

PROJ:	143-67639-21004
DESN:	MWM
DRWN:	AHS
CHKD:	MWM

C-1

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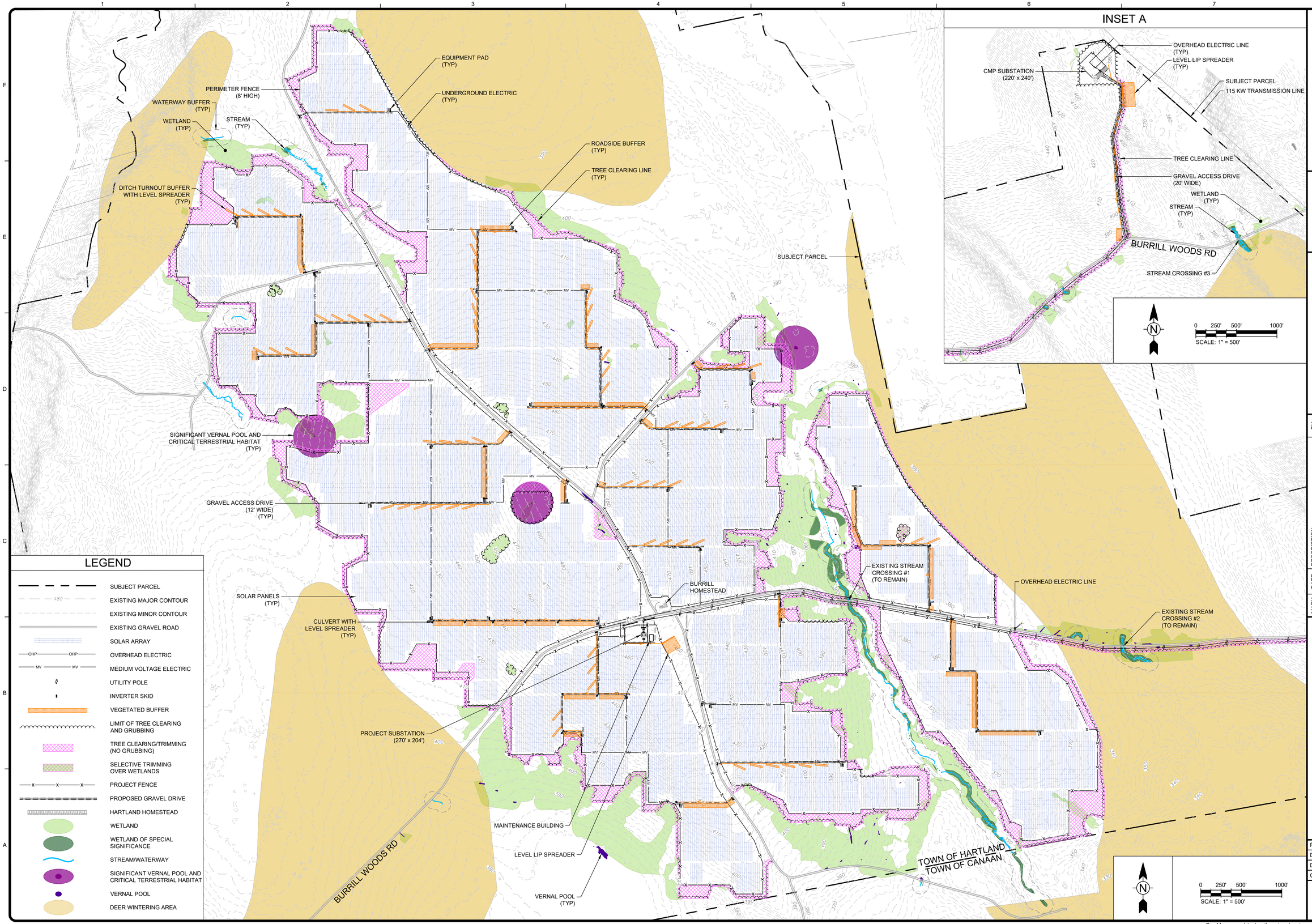
Bar Measures 1 inch, otherwise drawing not to scale

7/25/2023 3:28:08 PM - P:\67639\143-67639-21004\CAD\CONCEPTUAL\FIGURES\C-1 OVERALL EXISTING PLAN_FIGURE - COLOR.DWG - SZCZEPANEK, ALBERT



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www.tetratech.com
100 Nickerson Road
Marlborough, MA 01752
Phone: (508) 786-2200 Fax: (508) 786-2201

MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC

Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Overall Site Plan

PROJ:	143-67639-21004
DESN:	MWM
DRWN:	AHS
CHKD:	MWM

C-2

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

7/25/2023 3:30:25 PM - P:\67639\143-67639-21004\CAD\CONCEPTUAL\FIGURES\C-2 OVERALL SITE PLAN_FIGURE - COLOR (WITH TABLE).DWG - SZCZEPANEK, ALBERT

WETLAND (TYP)

INVERTER PAD (TYP)

CONVEYANCE SWALE (TYP)

SOLAR PANELS (TYP)

DITCH TURNOUT WITH LEVEL SPREADER (TYP)

GRAVEL ACCESS DRIVE (12' WIDE) (TYP)

UNDERGROUND ELECTRIC

TREE CLEARING LIMITS (TYP)

VERNAL POOL (TYP)

PERIMETER FENCE (8' HIGH) (TYP)

ROAD SIDE BUFFER (TYP)

EXISTING LOGGING ROAD

SIGNIFICANT VERNAL POOL AND CRITICAL TERRESTRIAL HABITAT

KEY PLAN

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20

LEGEND

- SUBJECT PARCEL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING GRAVEL ROAD
- SOLAR ARRAY
- OVERHEAD ELECTRIC
- MEDIUM VOLTAGE ELECTRIC
- UTILITY POLE
- INVERTER SKID
- VEGETATED BUFFER
- LIMIT OF TREE CLEARING AND GRUBBING
- TREE CLEARING/TRIMMING (NO GRUBBING)
- SELECTIVE TRIMMING OVER WETLANDS
- PROJECT FENCE
- PROPOSED GRAVEL DRIVE
- HARTLAND HOMESTEAD
- WETLAND
- WETLAND OF SPECIAL SIGNIFICANCE
- STREAM/WATERWAY
- SIGNIFICANT VERNAL POOL AND CRITICAL TERRESTRIAL HABITAT
- VERNAL POOL
- DEER WINTERING AREA

N

0 50' 100' 200'
SCALE: 1" = 100'

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100 Nickerson Road
Marlborough, MA 01752
Phone: (508) 786-2200 Fax: (508) 786-2201

MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC

Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Detailed Site Plan (Example)

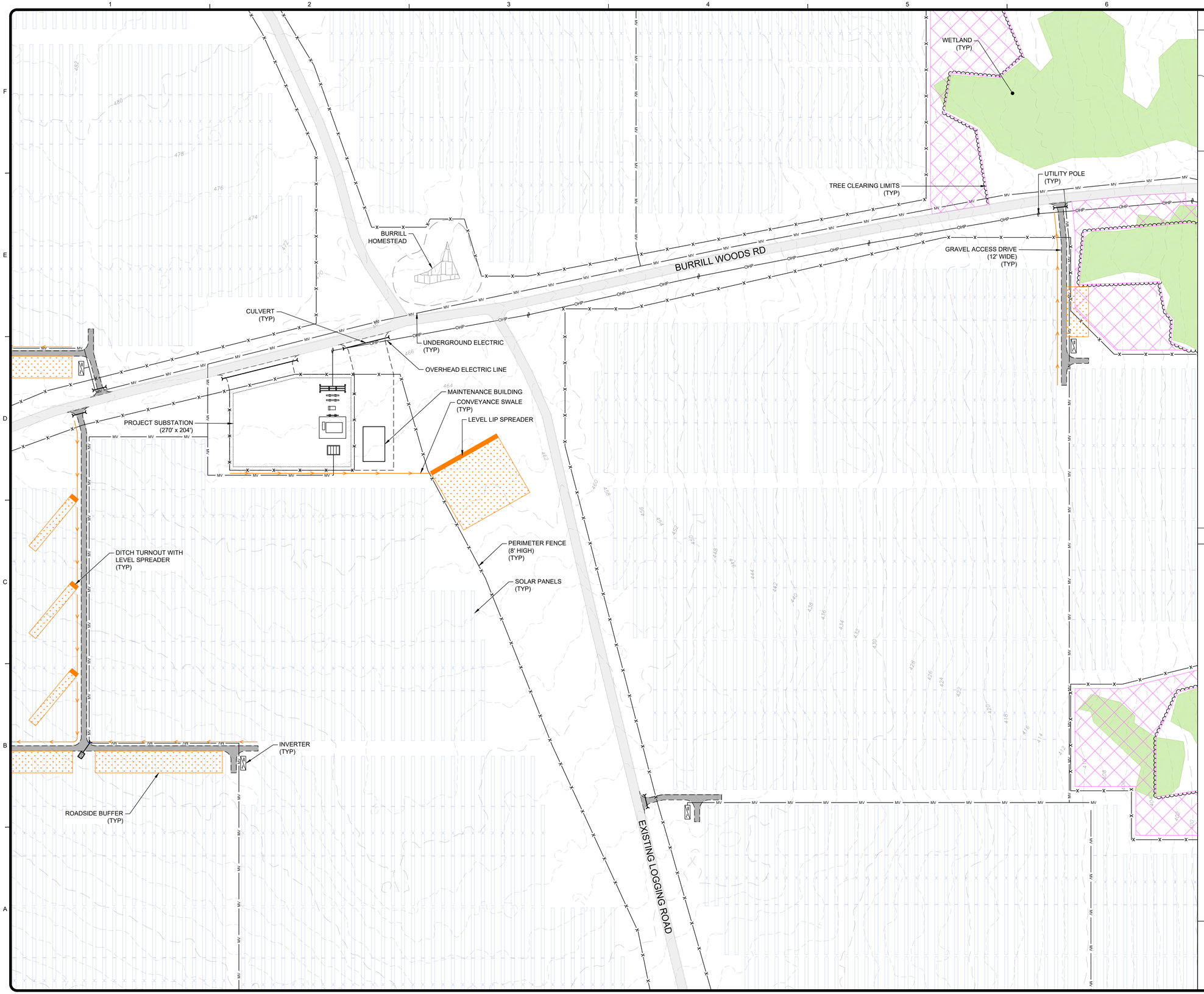
PROJ:	143-67639-21004
DESN:	MWM
DRWN:	NRK
CHKD:	MWM

C-5

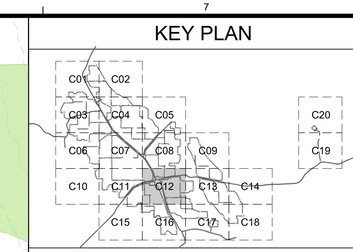
Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

7/25/2023 3:33:15 PM - P:\67639\143-67639-21004\CAD\CONCEPTUAL\FIGURES\C-5-14 LAYOUT, GRADING AND UTILITY - COLOR_RECOVER.DWG - SZCZEPANEK, ALBERT



KEY PLAN



LEGEND

- SUBJECT PARCEL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING GRAVEL ROAD
- SOLAR ARRAY
- OVERHEAD ELECTRIC
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- WETLAND OF SPECIAL SIGNIFICANCE
- STREAM/WATERWAY
- SIGNIFICANT VERNAL POOL AND CRITICAL TERRESTRIAL HABITAT
- VERNAL POOL
- DEER WINTERING AREA

N

0 50' 100' 200'
SCALE: 1" = 100'

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MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC
Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Detailed Site Plan (Example)

PROJ:	143-67639-21004
DESN:	MWM
DRWN:	NRK
CHKD:	MWM

C-12

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Bar Measures 1 inch, otherwise drawing not to scale

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EXISTING STREAM CROSSING #1 (TO REMAIN)

CONVEYANCE SWALE (TYP)

INVERTER PAD (TYP)

TREE CLEARING LMITS

SOLAR PANELS (TYP)

PERIMETER FENCE (8' HIGH) (TYP)

VERNAL POOL (TYP)

BURRILL WOODS RD

UTILITY POLE (TYP)

OVERHEAD ELECTRIC LINE

UNDERGROUND ELECTRIC (TYP)

GRAVEL ACCESS DRIVE (12' WIDE) (TYP)

ROADSIDE BUFFER (TYP)

EAST BRANCH BLACK STREAM

STREAM

WETLAND OF SPECIAL SIGNIFICANCE (TYP)

WETLAND (TYP)

KEY PLAN

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20

LEGEND

- SUBJECT PARCEL
- EXISTING MAJOR CONTOUR
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- EXISTING GRAVEL ROAD
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- OVERHEAD ELECTRIC
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- WETLAND
- WETLAND OF SPECIAL SIGNIFICANCE
- STREAM/WATERWAY
- SIGNIFICANT VERNAL POOL AND CRITICAL TERRESTRIAL HABITAT
- VERNAL POOL
- DEER WINTERING AREA

SCALE: 1" = 100'

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Marlborough, MA 01752
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MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC

Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Detailed Site Plan (Example)

PROJ:	143-67639-21004
DESN:	MWM
DRWN:	NRK
CHKD:	MWM

C-13

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Bar Measures 1 inch, otherwise drawing not to scale

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WETLAND OF SPECIAL SIGNIFICANCE (TYP)

WETLAND (TYP)

EXISTING STREAM CROSSING #2 (TO REMAIN)

VERNAL POOL (TYP)

BURRILL WOODS RD

OVERHEAD ELECTRIC LINE

UTILITY POLE (TYP)

STREAM (TYP)

TREE CLEARING LIMITS

SOLAR PANELS (TYP)

PERIMETER FENCE (8' HIGH) (TYP)

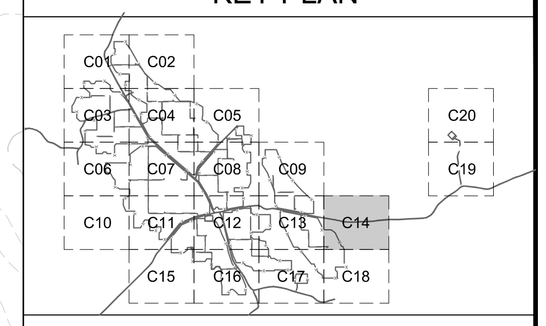
UNDERGROUND ELECTRIC

ROADSIDE BUFFER

GRAVEL ACCESS DRIVE (12' WIDE) (TYP)

INVERTER PAD (TYP)

KEY PLAN



LEGEND

- SUBJECT PARCEL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING GRAVEL ROAD
- SOLAR ARRAY
- OVERHEAD ELECTRIC
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- WETLAND OF SPECIAL SIGNIFICANCE
- STREAM/WATERWAY
- SIGNIFICANT VERNAL POOL AND CRITICAL TERRESTRIAL HABITAT
- VERNAL POOL
- DEER WINTERING AREA

0 50' 100' 200'

SCALE: 1" = 100'

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MARK	DATE	DESCRIPTION	BY

Teichos Energy LLC

Hartland Solar
Burill Woods Road, Hartland, Maine
Permit Drawings

Detailed Site Plan (Example)

PROJ:	143-67639-21004
DESN:	MWM
DRWN:	NRK
CHKD:	MWM

C-14

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Bar Measures 1 inch, otherwise drawing not to scale

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Agency Correspondence

MDIFW

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent on: Thursday, February 11, 2021 11:41:15 PM
To: IFWEnvironmentalreview@maine.gov
CC: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: Athens Solar: Significant Wildlife and Fisheries Resources Information Request
Attachments: MDIFW_Request_Athens_20210211.pdf (1.07 MB), Athens_AOI.zip (8.04 KB)

Dear Bob and review team,
On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Department of Inland Fisheries and Wildlife may have on sensitive wildlife or fisheries resources in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility. Please review the figure and identify any known or suspected locations of rare, threatened, or endangered wildlife, significant wildlife habitat, registered critical areas, or other significant natural resources within the outlined area associated with this proposed development. If you have any questions or require additional information regarding this request, please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.
Thank you for your time and attention,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

Tetra Tech | Complex World, Clear Solutions™
451 Presumpscot Street, Portland, ME 04103 | tetratech.com

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Please consider the environment before printing.

February 10, 2021

Bob Stratton
Environmental Program Manager
Maine Department of Inland Fisheries and Wildlife
284 State Street
Augusta, ME 04333

Sent via email: IFWEnvironmentalreview@maine.gov

Subject: Significant Wildlife and Fisheries Resources Information Request

Dear Bob and review team,

On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Department of Inland Fisheries and Wildlife may have on sensitive wildlife or fisheries resources in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly-owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility.

Please review the figure and identify any known or suspected locations of rare, threatened, or endangered wildlife; significant wildlife habitat; registered critical areas; or other significant natural resources within the outlined area associated with this proposed development. If you have any questions or require additional information regarding this request, please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.

Thank you for your time and attention.

Respectfully Submitted,

TETRA TECH, INC.

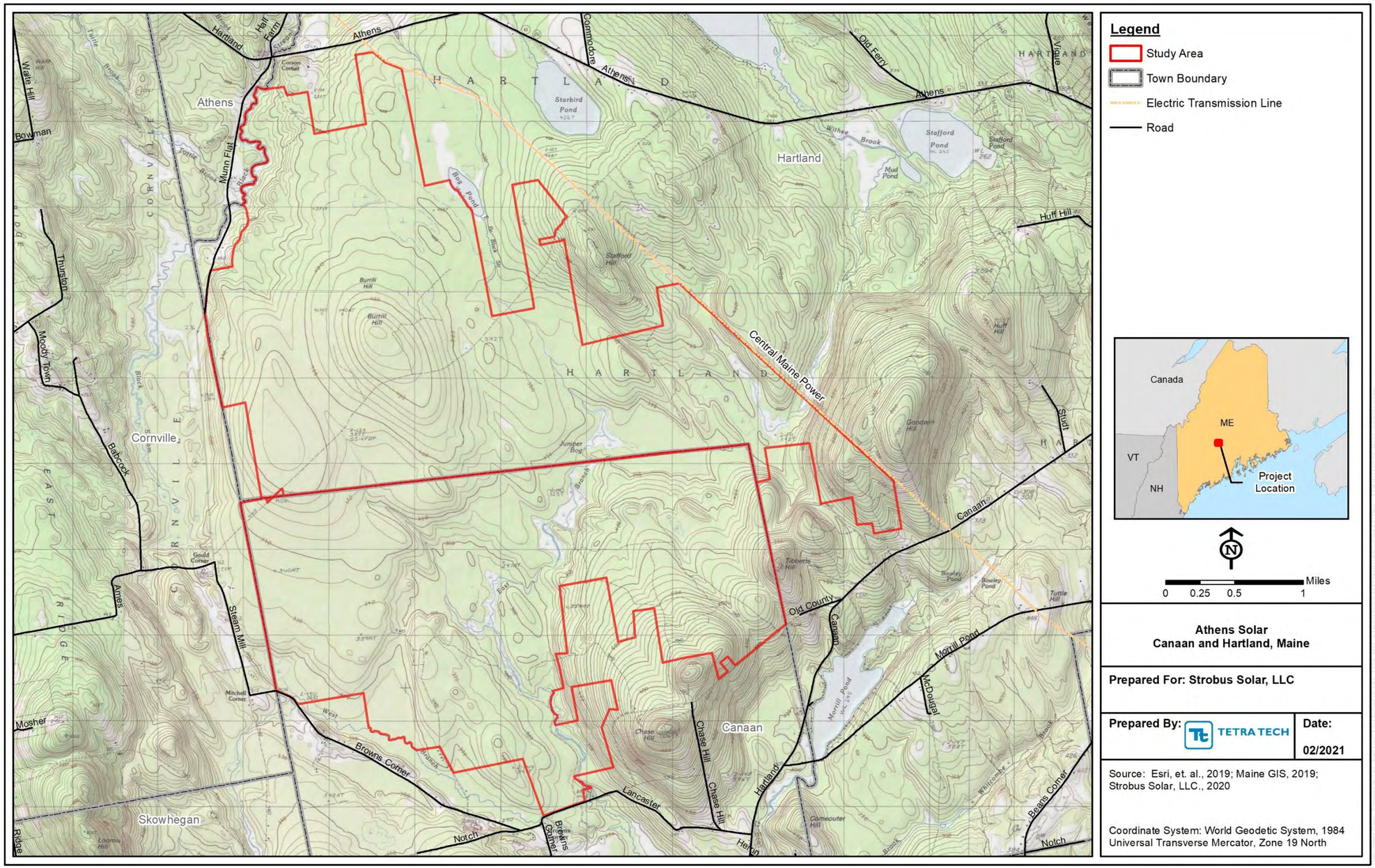
Brad Agius, Project Manager

Enclosure – Project Location Figure & Project Area Shapefile

CC: Dani Torcolacci (Strobus Solar LLC)

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Fax 207-879-9481 www.tetratech.com

TETRA TECH



Not for Construction

Project Overview: Athens Solar – Canaan and Hartland, Maine

Confidential Information. Do Not Distribute

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Fax 207-879-9481 www.tetratech.com

From: Kemper, Keel <Keel.Kemper@maine.gov>
Sent: Thursday, February 25, 2021 2:15 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: DWA

I doubt you would be in the position to ever do formal DWA survey's. However, we have been doing them since the 1990's. In fact I was first employed in 1988 and spent three winters surveying DWA's out of Ashland. While this information is a little dated, it is the protocols that we still use.

Thanks

Keel Kemper

G. Keel Kemper
Regional Wildlife Biologist
MDIFW
270 Lyons Road
Sidney, ME 04988
207-287-5369

-----Original Message-----
From: RICOH3054@maine.gov <RICOH3054@maine.gov>
Sent: Thursday, February 25, 2021 2:17 PM
To: Kemper, Keel <Keel.Kemper@maine.gov>
Subject: Message from "RNP002673BF548D"

This E-mail was sent from "RNP002673BF548D" (MP 3054).

Scan Date: 02.25.2021 14:16:32 (-0500)
Queries to: RICOH3054@maine.gov

From: Agius, Brad
Sent: Thursday, February 25, 2021 11:44 AM
To: Kemper, Keel <Keel.Kemper@maine.gov>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

Hi Keel,
Thank you for your input regarding the Athens Solar project on Monday. It was very helpful to know MDIFW does not have issue with the project regarding the adjacent DWAs as long as it stays out of the mapped habitat and sticking to using existing logging roads, with additional limited widening, currently bisecting the mapped indeterminant value DWA polygons.

Please forward a copy of the formal DWA survey protocol that we discussed for our reference purposes.

Your assistance is greatly appreciated,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Kemper, Keel <Keel.Kemper@maine.gov>
Sent: Friday, February 19, 2021 1:19 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

Yes, I am available…I have you on the calendar…KK

G. Keel Kemper
Regional Wildlife Biologist
MDIFW
270 Lyons Road
Sidney, ME 04988
207-287-5369

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Friday, February 19, 2021 1:14 PM
To: Kemper, Keel <Keel.Kemper@maine.gov>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Keel,
Would you be available Monday (2/22) at 2pm to discuss the project do a screen share of the proposed DWA studies?
Thank you, and have a great weekend.
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Kemper, Keel <Keel.Kemper@maine.gov>
Sent: Friday, February 19, 2021 9:05 AM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>; Agius, Brad <Brad.Agius@tetratech.com>
Cc: Perry, John <John.Perry@maine.gov>; Settele, Rebecca <Rebecca.Settele@maine.gov>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

Brad

Feel free to reach out to me for a discussion.

Thanks

Keel

G. Keel Kemper
Regional Wildlife Biologist
MDIFW
270 Lyons Road
Sidney, ME 04988
207-287-5369

From: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Sent: Thursday, February 18, 2021 5:05 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Kemper, Keel <Keel.Kemper@maine.gov>; Perry, John <John.Perry@maine.gov>; Settele, Rebecca <Rebecca.Settele@maine.gov>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

Hi Brad,

I think it would be wise to touch base with the regional biologist. Canaan and Hartland are in Region B and Keel Kemper (copied here) is the contact. Good luck, Bob.

Bob Stratton
Wildlife Biologist
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
Augusta, Maine 04333-0041
(207) 287-5659
mefishwildlife.com

Correspondence to and from this office is considered a public record and may be subject to a request under the Maine Freedom of Access Act. Information that you wish to keep confidential should not be included in email correspondence.

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, February 18, 2021 4:57 PM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Subject: RE: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Bob,
Thank you for the quick review. There are several mapped deer wintering areas (DWA) on the project parcels. We are in the process of initiating time sensitive critical winter tasks to determine resource avoidance and minimization. We feel it would be beneficial to have input from the MDIFW regarding our approach for the DWA surveys. Would you recommend we discuss this with your regional biologist? If so, can you please provide their contact information?

Thank you for your assistance,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Sent: Thursday, February 18, 2021 4:47 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Zeh, Sally <Sally.Zeh@Maine.Gov>; Cook, Christine R <Christine.R.Cook@maine.gov>
Subject: MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland

Good afternoon Brad,

Per your request, please find attached, MDIFW's determination of Maine-listed Endangered or Threatened species or their habitats for the proposed Strobus Athens Solar Project, Canaan and Hartland, pursuant to the Maine Public Utilities Commission's Distributed Generation Siting Attribute criteria. As noted within, this determination relates only to known information on Maine-listed Endangered or Threatened species and their habitats in relation to the proposed project site. This determination does not constitute a full environmental review of the proposed project and no assertions are being made in reference to any other fisheries, wildlife, or other natural resources typically of concern to MDIFW and which may or may not be present on or in the vicinity of the project site. If you require additional information, please contact IFWEnvironmentalreview@maine.gov.

Thank you, Bob.

Bob Stratton
Wildlife Biologist
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
Augusta, Maine 04333-0041
(207) 287-5659
mefishwildlife.com

Correspondence to and from this office is considered a public record and may be subject to a request under the Maine Freedom of Access Act. Information that you wish to keep confidential should not be included in email correspondence.

DEER WINTERING AREA AND TRAVEL CORRIDOR
3/11/92

Definition of deer wintering area and travel corridor

Travel Corridor: The location of the term in the law could be interpreted as either "deer travel corridor" or "travel corridor" in general. The report by Jones et al. (1988), from which the other significant wildlife habitat terms were derived, uses the term generally in discussing the riparian zone along aquatic habitat and its value to a variety of animals.

Travel corridor will not be defined at this time. Travel corridors may be defined in the future if a need exists to protect riparian areas beyond what is provided in shoreland zoning and the NRPA's other provisions.

Deer Wintering Area (DWA): Criteria already exist to define a deer wintering area that can be zoned in the LURC jurisdiction. The LURC criteria for establishing a P-FW deer wintering area are forest stands with at least 50% softwood (S&SH types), 35' in height and 50% crown closure, and supporting at least 20 deer per square mile. Documentation criteria are two surveys in 10 years, one of which must be a winter ground survey. LURC DWA's are not rated as low, moderate or high, however. The approach which will be used to qualify DWAs for designation as a significant wildlife habitat under NRPA differs from the LURC process.

For NRPA, a deer wintering area is defined as an area used by deer when the winter severity index exceeds 60, snow depth is greater than 12" in the open/hardwoods, and deer sinking depth exceeds 8 inches in the open/hardwoods (Appendix I). Areas containing nonforested wetlands, agriculture, development, and certain forest stands are excluded even if there is evidence of winter use by deer. The forest stands excluded are clearcuts(nonstocked), hardwood (H) types and stands predominated by Eastern larch (tamarack). The specific rules to exclude stands are discussed in the next section on mapping criteria. The proportion of winter shelter and non-shelter areas is also treated in the rating system.

Although deer may winter in locations that do not contain coniferous winter shelter, such as areas with steep slopes and southern exposures, wind swept areas, and certain agricultural fields during mild-to-moderate wintering conditions, conifer winter shelter areas are used almost exclusively under moderate-to-severe winter conditions.

Documentation requirements will follow the LURC criteria of 2 surveys in 10 years, one of which must be a ground check.

Unlike LURC requirements, spring ground surveys may be undertaken until the growth of new vegetation obscures the deer sign from the past winter. Before spring surveys can be conducted, however, "wintering conditions" must have occurred during the preceding wintering period.

Finally, this definition and the resulting mapping criteria and rating system will be employed statewide to designate DWAs as a significant wildlife habitat under the NRPA.

Survey Procedure

Since the rating of the DWA is so dependent on the ground survey, surveys will follow existing procedures, as revised, (Appendix II) and be standardized to meet minimum coverage criteria. Survey lines should be located to sample the entire DWA and overlap the expected boundaries derived from aerial surveys, historical information, and/or cover type. As a guide, coverage criteria are: (a) 5 chains of survey line conducted for each 10 acres of DWA, (b) survey lines separated by no more than 20 chains at widest point, and (c) survey lines within 10 chains of all boundaries. Prior to performing the evaluation, the survey(s) should be summarized on the NRPA DWA Winter Evaluation Worksheet (AppendixIV).

The conditions during which aerial and ground surveys are conducted will be standardized for season, snow conditions, and time after snowfall (Appendix III).

Mapping Criteria

Survey information on the occurence of deer under wintering conditions will be used to delineate the boundary of the DWA. The boundary of the DWA will be adjusted to exclude clearcuts, hardwood (H) types, agriculture, nonforested wetlands and stands predominated by Eastern larch, when they occur on the edge of the proposed DWA. Inclusions of clearcuts, nonforested wetlands, hardwood types, and stands predominated by Eastern larch will only be excluded if more than 10 acres in size. However, when agriculture and development occurs as inclusions within a DWA, these areas will be deleted by definition regardless of size.

The boundary of a DWA should follow type changes, other physical features (e.g., roads, trails, topography), distance from these features, or straight lines should be used to draw the boundary. In no case can the boundary of a DWA be extended more than 10 chains beyond a point for which deer use has been documented by means of a ground survey.

Evaluation Procedure

Deer wintering areas will be evaluated based on three criteria: quality of softwood shelter, intensity of deer use, and size (Appendix V). Information on quality of softwood shelter and intensity of deer use will be based only on those ground survey plots within the final boundary of the DWA being evaluated. The acreage of the DWA is determined after the final outline of the DWA has been drawn.

Quality of softwood shelter will be evaluated based on the proportion of ground survey plots in various habitat types. Forest habitat types are determined by stand composition, height class, and crown closure. Each plot receives a score of 3,2, or 1 depending on the predominant type. The score for this section of the rating system is an average obtained by summing the weighted value of all plots within the DWA boundary and dividing by the total number of plots.

Intensity of deer use is the most important criteria in rating deer wintering areas, but does not necessitate an estimate of deer numbers. The evaluation is made based on the percent of standard ground survey plots with recorded deer tracks, trails, beds, pellets or current browsing. Current browsing is recorded only when the intensity of browsing from the current winter period exceeds a minimum threshold (Appendix II). The score is assigned by category of (%) percent of plots with deer use (>75% =6, 50-75%=4, 25-49%=2, and <25%=0). DWA's with current browsing as the only deer sign will not be assigned a score until a survey with other deer sign is completed. Cut-offs were based on data from a number of LURC zoned DWAs and several DWA's inventoried in Region A. These cut-offs should be reviewed after the completion of adequate surveys using the new procedure.

The occurrence of past browsing, by itself, will not be a primary consideration in evaluating deer wintering areas as significant habitats. Evidence of past browsing, however, can be used to assist in determining the DWA boundary and as an indicator of the permanency of a DWA, and should be noted under the "Remarks" section of the DWA Field Survey Form (Appendix II). In addition, remarks concerning the browse species that are available and utilized, along with their level of browsing, can provide important information about the size of the deer population using the area, as well as provide insights into proper forest management strategies for the DWA.

The intensity of deer use criteria are winter driven and preclude spring surveying using these criteria. A second set of criteria for periods outside of wintering conditions will

be drafted by the Resource Assessment Section and evaluated prior to adoption.

Size was a much debated criteria but was finally included. Larger areas receive higher scores. The score for size is assigned by size category based on the final acreage of the DWA (non-shelter types removed as per mapping criteria) as follows: >300 acres = 3, 200-300 acres = 2, 100-199 acres = 1, and <100 acres = 0.

The final rating of the DWA is determined by summing the scores for the three criteria and assigning the rating as follows: 10-12 = high, 7-9.9 = moderate and 0-6.9 = low (Appendix V). The scoring is such that a DWA with low deer use (<25% of plots with deer sign) cannot be rated high or moderate. However, a regional biologist may recommend a rating change with justification, and approval by the Management Section Supervisor.

The survey, mapping and rating procedure when implemented would consist of the following steps:

1. Prepare the estimated outline of a candidate DWA based on deer use (e.g., flight, historical records), aerial photos and/or type map.

2. Conduct a ground survey of the candidate area using the standard DWA survey procedure with survey lines meeting the coverage criteria.

3. Adjust the DWA boundary using the survey and other information to remove nonconforming types and no deer use areas. Deer yard boundaries should extend no more than 10 chains beyond end of the survey.

4. Mark plots on the ground survey(s) which are within the revised boundary of the DWA in the left hand column of the revised survey form. Fill out the summary worksheet for all surveys to be used in the evaluation and attach to the rating sheet.

5. Perform the DWA rating procedure on the revised DWA boundary using deer use and forest type data from the summary worksheet of the survey(s) and size from the revised boundary. Areas with insufficient data should be assigned a rating of indeterminate.

Delisting Criteria

Delisting criteria for a regulated NRPA DWA have not been developed.

Summary

1.Deer wintering areas are defined as areas supporting deer at WSI>60 (>12" snow depth in open/hardwoods and >8" deer sinking depth) and meeting the softwood cover criteria (Appendix I). The criteria apply statewide.

2.Deer wintering areas will be mapped to exclude non-shelter types. Development and agriculture are excluded regardless of size and inclusions of other non-shelter types greater than 10 acres are excluded.

3.Boundaries of DWAs will be drawn using type changes, other physical features, and straight lines to allow their identification on the ground. Boundaries are not to be extended more than 10 chains beyond survey plots documenting deer use. Historic browsing resulting in brooming of browse species may aid in determining the extent of a boundary.

4.Deer wintering area surveys will be conducted using the standard ground documentation procedure (Appendix II) during wintering conditions (Appendix III). To assure WSI exceeds 60, snow conditions to conduct a winter suvey must be at least 14" of snow depth in the hardwoods/open and deer sinking depth of at least 10" when the deer sign being recorded was made. In addition, deer must be exhibiting 'yarding behavior' (e.g. use of trails). Results of the survey(s) will be summarized on the NRPA DWA Winter Evaluation Worksheet (Appendix IV).

5.Documentation criteria are two surveys in 10 years, one of which must be a ground survey. Survey line coverage will meet the criteria of 5 chains of survey line per 10 acres of DWA and survey lines no further apart than 20 chains.

6.Deer wintering areas will be rated based on intensity of deer use, quality of softwood cover, and size using the DWA Rating Form (Appendix V). DWA's with insufficient data will be rated indeterminate.

7.Similar criteria for evaluating deer use outside of wintering conditions (spring) will be developed.

Appendix I

Deer Wintering Areas
3/16/92

In winter, deer select habitats which minimize energy losses to thermal stress and restricted movement in snow cover. Ideally, habitats selected offer protection from wind, lowest available snow cover, and forage. These wintering areas, along with stored reserves of fat and protein, are essential to deer survival at the northern limit of the species' range. Use of high quality wintering habitat reduces weight loss in deer, which in turn reduces direct losses to malnutrition and predation, and minimizes subsequent fawn losses due to poor condition of does in late spring.

In Maine, deer wintering areas (DWAs) typically contain varying amounts of mature coniferous forest stands (shelter) interspersed with other forest types and openings which provide forage. Ideally, stands which provide shelter would be interconnected and highly interspersed with forage-producing types. Such an arrangement enables deer to move about freely in shelter stands while providing access to nearby forage supplies.

Deer use of DWAs is traditional in that specific sites may receive annual use by successive generations of deer. In some instances, continuous use of specific DWAs by deer (in wintering conditions) has been documented for 50-100 years. Wintering areas which receive traditional use of this nature tend to retain near-optimum shelter and foraging value over long periods of time. In contract, DWAs in which the shelter component has been severely reduced, tend to become depopulated by deer through increased losses to malnutrition and predation. Movement of large numbers of deer from shelter-damaged DWAs to alternate sites beyond their traditional wintering range is not commonly observed.

Deer begin to utilize wintering areas when snow cover in hardwoods and openings exceeds 10". At this snow depth, deer typically sink 6-9", thus causing higher energy demand for movement than would be required on bare ground. Occasionally, extreme low temperatures (< 0°F) will also cause deer to "yard up" in their preferred wintering areas without appreciable snow accumulation. A winter severity index (WSI) is used to monitor the combined effects of snow cover, sinking depth, and temperatures on wintering deer. Generally, deer use (but may not be entirely restricted to) DWAs when the WSI = 60 or greater. A WSI value of 60 is associated with at least 12" of snow cover, 8" of sinking depth by deer in snow, and "average" winter temperatures in the 10-25°F range. As sinking depth increases, deer progressively restrict their activities to the highest quality coniferous shelter (these areas have the lowest sinking depths). When deer sink > 18" in snow, they typically remain on

trails in the shelter portion of the DWA, and temporily abandon all other habitat types.

The area occupied by wintering deer varies with winter severity. When mobility is poor, deer occupy a minimal portion of their wintering habitat. Under more favorable conditions, they may travel widely, even far beyond the normal boundaries of the DWA. Since winter weather is highly dynamic over time, so too is the area which deer occupy within and beyond the DWA in response to variations in snow cover, sinking depth and temperature. Under typical yarding conditions, the amount of the land base occupied by wintering deer is only 5% to 15% of the area occupied during the summer and fall.

In some instances, steep south-facing slopes vegetated by hardwoods are utilized as wintering areas. The steepness of the terrain, and the southern aspect combine to minimize snow accumulation and wind chill.

Appendix II

SECTION 2.1 DWA Job No. II-708

DEER WINTERING AREA (DWA) FIELD SURVEY FORM - INSTRUCTIONS (REVISED FOR NRPA, 2/92)

Introduction:

A major objective of the field survey is to supplement previous information obtained from aerial observations and other sources. The survey route should be located to determine the extent of deer use both within and outside of previously recorded areas, particularly when two or more concentrations of deer, comparatively close together, have been recorded for a single drainage. The survey route should also be planned so that peripheral stands adjacent to the shelter area can also be observed, if such information is not otherwise available. In planning your work you should review your present documentation and determine your needs.

Office Procedure:

Obtain, or prepare a base map of adequate scale (1:24,000, etc.) showing the road networks and other prominent land features. Determine the most logical starting point and plot the survey route lightly on map. Local travel conditions and the need for specific information will be used to determine the length and exact location of the survey transect route. Field conditions may also dictate changes in route location. Aerial photographs and stereoscope should be utilized, if available, to make the field surveys more efficient. The travel route should cover major forest types and the final route location will be shown on the finished map.

Field Procedure:

Proceed to the predetermined starting point. Compass and pacing will be used to maintain a record of travel route and location of observations. Records of observation will be made for each 2-chain segment along the travel route. Forest types should be identified and deer signs should be recorded using the classification and coding on the DWA Winter Ground Survey form. Distance traveled should be recorded continuously from the starting point to the end of the survey regardless of changes in bearing of travel route. Snow depth and deer sinking depth should be recorded at the top of the DWA Winter Ground Survey Form. Where uniformity of forest type exists, observations may be combined for a group of segments to minimize duplication of recording effort.

A pellet group must consist of ≥30 pellets to be recorded as evidence of deer sign. This assessment will be made by ocular estimation.

Recordable evidence of current browsing along each 2-chain segment occurs when 4 out of 5 (80%) of all of the available stems and sprouts of the preferred browse species show current browsing that results in at least 50% of their available buds or coniferous leaves being utilized by deer. This assessment will be made by ocular estimation. Browse less than 2 feet or over 7 feet in height will not be recorded as available. The most common browse species available and utilized should be recorded under remarks. The observer should recognize that browse species utilized may be different from those which are most commonly available and should record them accordingly.

Evidence of historic browsing should be used as an indicator of the permanency of a DWA and should be noted under remarks. The abbreviation "Br"

followed by the number of years that evidence of browsing was noted may be used to save space; ex. Br-2 for browsing that occurred for 2 years prior to the survey.

Details of stand condition classification or site conditions such as approximate percent of fir in "S" types, age of recently cut-over lands, or aspect should be noted under remarks. Sites with shallow soils, very steep grades, rocky or ledgey ground, poor drainage, excessive blowdown, tree mortalities or overmature stands should also be noted.

The following abbreviations should be used to record deer sign:

P =	deer pellet groups	Bd =	deer beds
Tr =	deer tracks	Br =	current browsing
Tl =	deer trails	Br-n =	historic browsing (record under Remarks)

BROWSE SPECIES LEGEND[1]

SHRUBS

Striped Maple--Acer pennsylvanicum---Apen
Mt. Maple------A. spicatum----------Aspi
Viburnum-------Viburnum sp.----------Vibz
Dogwood--------Cornus sp.----------Corz
Honeysuckle----Lonicera sp.----------Lonz
Willow---------Salix sp.----------Salz
Raspberry------Rubus sp.----------Rubz
Witch-hazel----Hamamelis virginiana--Hvir
Elderberry-----Sambucus sp.----------Samz
Blueberry------Vaccinium sp.---------Vacz
Amelanchier----Amelanchier sp.-------Amez
Sweetfern------Comptonia peregrina---Cper
Cherries ------Purnus sp.----------Pruz
Beaked hazel---Corylus cornuta-------Ccor

EVERGREEN TREES

Balsam Fir----------Abies balsamea------Abal
Eastern Hemlock-------Tsuga canadensis----Tcan
Northern White Cedar--Thuja occidentalis--Tocc

HARDWOOD TREES

Apple ---------Malus pumila-----Mpum
Poplar sp.-----Populus sp.------Popz
Paper birch----Betula papifera--Bpap
Yellow birch---B. lutea---------Blut
Red Oak--------Quercus rubra----Qrub
Ash----------Fraxinus sp.-----Fraz
Red Maple------Acer rubrum------Arub
Sugar Maple----A. saccharum-----Asac

EQUIPMENT

Silva compass; or equivalent; Scale rule, tree and shrub identification manuals (if needed); 8 ft. steel tape, topographic map of area, and aluminum sheet holder.

OPTIONAL

Increment borer, abney level or clinometer diameter tape, 10-factor prism.

[1]Preferred browse species are indicated with bold type.

The Wildlife Division's DWA Winter Ground Survey Form should be used to document your findings (Attached).

A narrative summary of these winter ground checks should be prepared and the following outline may be used as a guide. This can be written on the back of the Survey Form.

1. Snow conditions - depth, deer sinking depth, degree of deer restriction, etc.
2. Summary of browsing intensity; past browsing evidence; species browsed, etc.
3. Distribution of tracks, trails and bedding sites.
4. Unusual conditions: relation to active timber harvesting operations; presence of blowdowns being used for feed; extreme cold periods, etc.
5. Summary of browse quality and availability.
6. Degree of deer use.

APPENDIX II

WILDLIFE DIVISION DWA WINTER GROUND SURVEY, Region___ Page____of____

DWA#_____Town(s)_____Date_____

Crew_____Snow Depth: Open____Cover____ Sinking: Open____Cover____

Were snowshoe hares? Rare Common Abundant Est. Number of Deer_____

Bobcat sign (tracks, kills, etc.) observed? Yes No Date last Snow >2"_____

LEGEND:

Deer Sign	Forest Type	Avg. Height	Crown Closure
Br=current browsing	S=75%+ conifers	1=0-34 feet	A=81-100%
P=pellet groups	SH=50-75% "	2=35-50 "	B=51-80%
Tr=deer tracks	H=75%+ hardwoods	3=50+ "	C=0-50%
Tl=deer trails	HS=50-75% "		
Bd=deer beds			

Ent'd_____
WSI>60_____

Starting Point(s):

In DWA?	Chains	Bearing T/M?	Forest Type	Deer Sign	Remarks

Revised 1/92

SECTION 1.0

JOB DESCRIPTION

State: Maine

Project Title: Big Game Project No: W-67-R

Study Title: Deer Study No: I

Job Title: DWA Aerial Inventory Job No: 221

Job Assignment: Wildlife Division

Job Objective: To determine the location of deer wintering areas in all Wildlife Management Units.

Procedures: Systematic flight coverage of all minor watersheds as established by the Maine Wetlands Inventory, 1969, within all biologists regions will be carried out during winter periods of deer concentration. Where terrain makes it more practical, flight lines will follow drainage patterns; otherwise, flight patterns will follow transects 1/2 mile apart and lines should be parallel to the drainage. Flight lines should be marked and numbered on flight maps prior to flights, any deviations from flight lines should be noted. Location of deer or deer activity observed will be plotted on these minor watershed flight maps prepared from 15 minute USGS topographic maps.

The location of actual deer sign observed should be delineated by shading the precise area, or by marking with a letter D. Also outline the general area that you feel (professional judgment) is the approximate deer wintering area boundary, but you should still indicate the exact area where deer sign was observed by either shading, or marking with a letter D. Where deer activity, or a major trail is clearly evident along a stream with no adjacent cover, or between units of cover through other forest types, indicate with a long dash line separated by the letter D (_____D_____D_____D_____). Where scattered deer tracks are observed, merely indicate with a letter D. Tracks that are not positively identifiable as deer, but are questionable, should be indicated by a letter T. Active or current timber harvests should be indicated with the letters AC.

For each flight the [redacted] inventory map will be labeled (rubber stamps to be furnished) with the name of pilot; observers; date; snow depth and deer sinking depth from latest recorded information; flight time from take off to landing; and area covered by specific lines or portions of watershed).

Flight maps will be preserved and filed numerically by watershed number.

Job Duration: October 1, 1975 to September, 1990

Schedule: January, February, March and April as wintering conditions permit. Watersheds will be re-inventoried at 5-year intervals in unorganized townships or/and as conditions permit in organized townships.

Appendix III

DWA Survey Guidelines
Wintering Conditions

Aerial Surveys

1. Minimum snow conditions: > 14" of snow and/or sinking depth > 10".

2. In general, flights should be done between January 1 and April 1 (avoid early and late winter flights).

3. After < 12" snowfall wait at least 24 hours to fly. After snowfall ≥ 12" wait at least 72 hours.

4. Keep doing surveys as long as above conditions exist.

5. Use common sense. Within the above guidelines, there may be exceptions. Deer must be exhibiting wintering behavior (e.g. using trails) before conducting surveys.

Ground Surveys

1. Snow conditions to define restrictive wintering conditions (see aerial surveys).

2. In general, ground surveys should be done between January 1 and April 15. Make sure deer use (Trails, tracks, beds, pellets and browsing) being observed occurred under restrictive wintering conditions. (Spring survey criteria will be developed for surveys after snow melt).

3. Time to wait after snowfall (see aerial surveys).

4. Keep doing surveys as long as deer tracks trails and beds made during the above conditions remain visible.

5. Use common sense. Within the above guidelines, there may be exceptions. Deer must be exhibiting wintering behavior (e.g. using trails) before conducting surveys.

Appendix IV

NRPA DEER WINTERING AREA
WINTER EVALUATION WORK SHEET

DWA#:_____ TOWN(S):_____

DATE:_____ PREPARED BY:_____

Survey date						Totals
Crew						
Total plots						
Plots in DWA						
# S plots						
# SH plots						
# HS plots						
# H plots						
# Non-conf.						
# Non-forest						
# Plots with deer sign						

Comments:

Appendix V
DWA Rating Sheet

DWA Name:_____DWA No._____

Town(s): _____

Counties: _____

MDIF&W Management Region(s): _____

Deer Management District(s): _____

USGS Map Reference(s): _____

Aerial Photo Map Reference(s): _____

Other Map Reference(s) _____

Area in LURC towns: _____

Area in Organized towns: _____

Summary of DWA Inventory Data:

Aerial Flight (date)	Ground Survey (date)
_____	_____
_____	_____
_____	_____
_____	_____

DWA Evaluation

I. Quality of shelter based on number of standard ground documentation survey plots. (Composition: S= Softwood, SH = Softwood Dominated Mixed Wood, HS = Hardwood Dominated Mixed Wood; Height: 3 = 75+', 2 = 35-50'; Crown Closure: A = 81-100%, B = 51-80%)

# of S3A, S3B, S2A, S2B plots	____	x 3 =	____
# of SH3A, SH3B, SH2A, SH2B plots	____	x 2 =	____
# of HS3A, HS3B, HS2A, HS2B plots	____	x 1 =	____
# nonconforming forest plots	____	x 0 =	____
# non-forest plots (wetlands, clearcut)	____	x 0 =	____
TOTAL	____		____

Score: Total type value/total # plots = ____

II. Intensity of Deer Use.

Based on the percent of standard ground documentation survey plots which record evidence of deer use (Tr, Tl, Bd, P and Br).

Plots w/deer use ____ Total Plots ____ % w/deer use ____

Winter Criteria (% of plots with deer use)	Spring Criteria	Score (circle one)
>75%	To be developed	6
50-75%		4
25-49%		2
<25%		0

III. Size of the DWA.

Estimated size: _____ acres.

Criteria	Score (circle one)
>300 acres	3
200-300 acres	2
100-200 acres	1
<100 acres	0

TOTAL SCORE (SUM OF I, II & III)_____

IV. Rating of DWA.

Score	Rating
10-12	High
7-9.9	Moderate
0-6.9	Low

NRPA DWA Rating:_____ (If different from above, explain).

From:	Stratton, Robert D
To:	Agius, Brad
Cc:	Zeh, Sally; Cook, Christine R
Subject:	MDIFW PUC ET Determination - Strobus Athens Solar Project, Canaan and Hartland
Date:	Thursday, February 18, 2021 4:47:33 PM
Attachments:	ERid4938_ERVerID5880_Strobus Solar, Athens.docx.pdf Topo_DOT_ERid4938_ERVerID5880.pdf

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Good afternoon Brad,

Per your request, please find attached, MDIFW's determination of Maine-listed Endangered or Threatened species or their habitats for the proposed Strobus Athens Solar Project, Canaan and Hartland, pursuant to the Maine Public Utilities Commission's Distributed Generation Siting Attribute criteria. As noted within, this determination relates only to known information on Maine-listed Endangered or Threatened species and their habitats in relation to the proposed project site. This determination does not constitute a full environmental review of the proposed project and no assertions are being made in reference to any other fisheries, wildlife, or other natural resources typically of concern to MDIFW and which may or may not be present on or in the vicinity of the project site. If you require additional information, please contact IFWEnvironmentalreview@maine.gov.

Thank you, Bob.

Bob Stratton
Wildlife Biologist
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
Augusta, Maine 04333-0041
(207) 287-5659
mefishwildlife.com

Correspondence to and from this office is considered a public record and may be subject to a request under the Maine Freedom of Access Act. Information that you wish to keep confidential should not be included in email correspondence.

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
284 STATE STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

JUDITH CAMUSO
COMMISSIONER

February 18, 2021

Brad Agius
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

RE: Proposed Strobus Athens Solar, Canaan and Hartland Solar Project; Endangered, Threatened Species, Habitat Determination

Dear Brad Agius:

I am writing in response to your request for a determination from the Maine Department of Inland Fisheries and Wildlife (MDIFW) on the potential for the above referenced project to result in adverse impacts to Maine-listed Endangered or Threatened species or their habitats, pursuant to the Maine Public Utilities Commission's Distributed Generation Siting Attribute criteria.

The Maine Endangered Species Act (MESA; 12 M.R.S §12801 et. seq.) identifies all inland fish and wildlife species that are listed as Endangered or Threatened in Maine and provides the Commissioner of MDIFW with the authority to implement MESA. Pursuant to MESA, listed species are afforded protection against activities that may cause "take" (kill or cause death), "harassment" (create injury or significantly disrupt normal behavior patterns), and other adverse actions. There is no comprehensive statewide inventory that includes all Endangered and Threatened species occurrences and habitats. Though many resources are included on data layers and resource maps, the completeness of these varies by species, habitat type, location, and previous survey efforts. Thus, such tools should be considered preliminary unless otherwise indicated by MDIFW. It is the applicant's ultimate responsibility to ensure that their actions do not result in take, harassment, or other adverse actions for Endangered or Threatened species, regardless of whether species occurrences or habitats have been previously identified and mapped.

MDIFW's determination for this proposed project site is indicated in the selection below:

☑ **Based on review of the information provided, current documentation and available information indicate no known adverse impacts to Maine-listed Endangered or Threatened species or habitats on the proposed project site or in the vicinity.**

☐ **Based on review of the information provided, current documentation and available information indicate no known adverse impacts to Maine-listed Endangered or Threatened species or habitats on the proposed project site. However, Maine-listed Endangered or Threatened species or habitats <u>have been documented in the vicinity</u> of the proposed project site and MDIFW recommends further investigations and surveys to enable a more definitive determination. Please contact MDIFW for further guidance and survey protocols.**

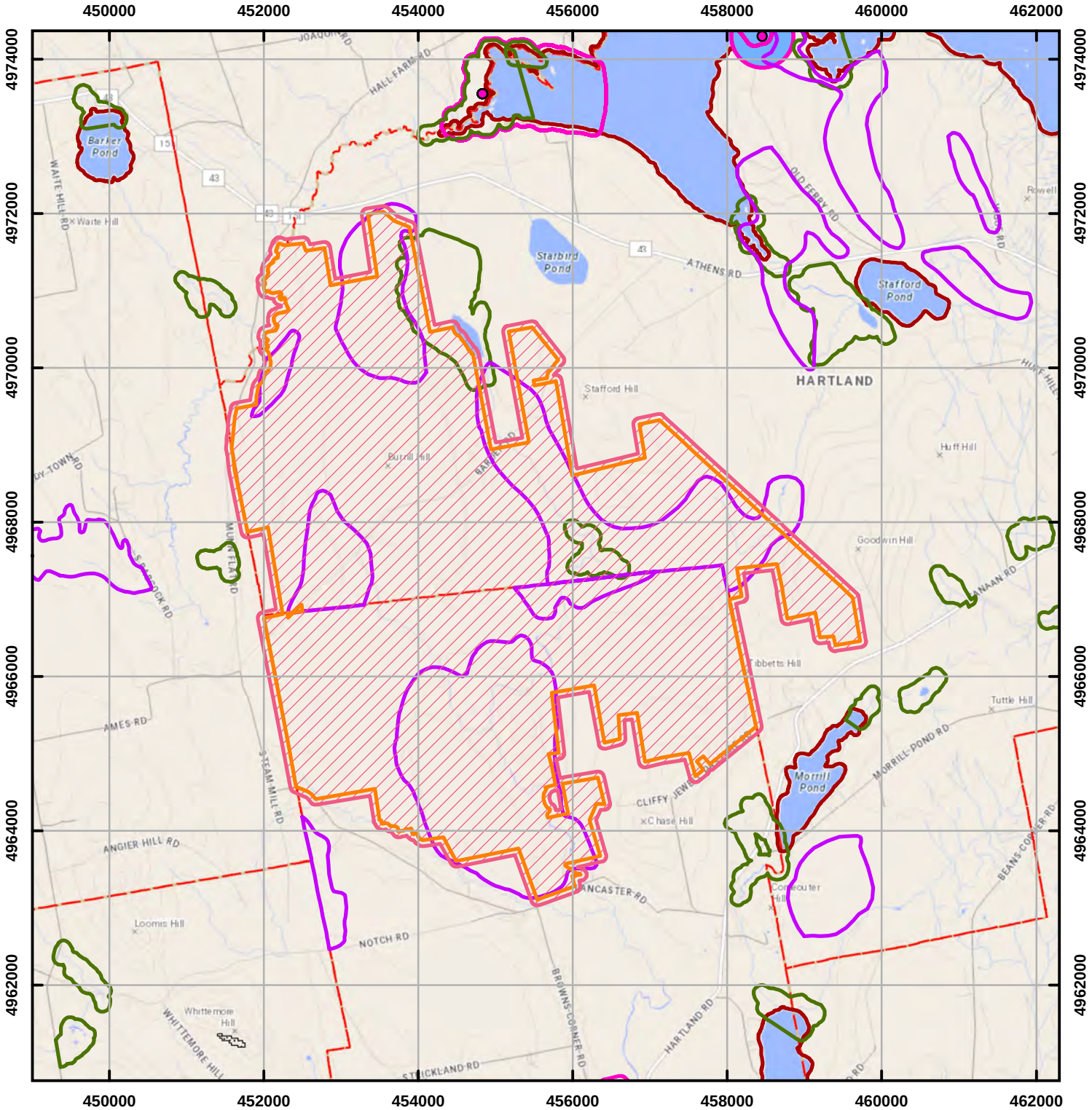
☐ **Based on review of the information provided, current documentation and available information indicate the <u>presence of Maine-listed Endangered or Threatened species or habitats</u> on the proposed project site.**

Please note that this determination relates only to known information on Maine-listed Endangered or Threatened species and their habitats in relation to the proposed project site. This determination does not constitute a full environmental review of the proposed project and no assertions are being made in reference to any other fisheries, wildlife, or other natural resources typically of concern to MDIFW and which may or may not be present on or in the vicinity of the project site. If you require additional information, please contact IFWEnvironmentalreview@maine.gov.

Sincerely,

Robert D. Stratton
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife

Cc: Sally Zeh, Christine Cook (MPUC)



Environmental Review of Fish and Wildlife Observations and Priority Habitats

Project Name: Strobus Solar, Athens (Version 2)

Miles

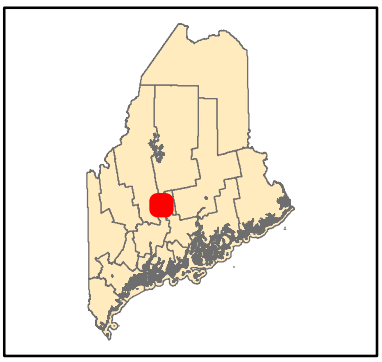
0 0.4 0.8 1.6 2.4 3.2

Projection: UTM, NAD83, Zone 19N

Date: 2/17/2021

Maine Department of Inland Fisheries and Wildlife

- ProjectPoints
- ProjectLines
- ProjectPolys
- ProjectSearchAreas
- Maine Cliff and Talus Areas
- Deer Winter Area
- LUPC p-fw
- Cooperative DWAs
- Seabird Nesting Islands
- Shorebird Areas
- Inland Waterfowl and Wading Bird
- 2008 Iwwh - Shoreland Zoning
- Tidal Waterfowl and Wading Bird
- Significant Vernal Pools
- Environmental Review Polygons
- Roseate Tern
- Piping Plover and Least Tern
- Aquatic ETSc - 2.5 mi review
- Rare Mussels - 5 mi review
- Maine Heritage Fish Waters
- Arctic Charr Habitat
- Redfin Pickerel and Swamp Darter Habitats - buffer100ft
- Special Concern occupied habitats - 100ft buffer
- Wild Lake Trout Habitats



From:	Settele, Rebecca
To:	Agius, Brad
Cc:	Perry, John; Stratton, Robert D
Subject:	RE: Athens Solar: Significant Wildlife and Fisheries Resources Information Request
Date:	Tuesday, March 2, 2021 10:14:22 AM
Attachments:	MDIFWResponse_ERid4938_ERVerID5879-FINAL.pdf Topo_ERid4938_ERVerID5879.pdf #BATS--Representative Photographs of Suitable Bat Rock-Roosting Areas.pdf

---

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Hi Brad,

Attached is MDIFW's response to the project in Athens. Please let me know if you have any questions.

Becca Settele
Wildlife Biologist
Maine Dept of Inland Fisheries & Wildlife
Wildlife Division
650 State St
Bangor ME 04401
Office (207)941-4438
Cell (207) 592-3846
mefishwildlife.com | facebook | twitter

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From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, February 11, 2021 6:41 PM
To: IFWEnvironmentalreview <IFWEnvironmentalreview@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: Athens Solar: Significant Wildlife and Fisheries Resources Information Request

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bob and review team,

On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Department of Inland Fisheries and Wildlife may have on sensitive wildlife or fisheries resources in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility. Please review the figure and identify any known or suspected locations of rare, threatened, or endangered wildlife, significant wildlife habitat, registered critical areas, or other significant natural resources within the outlined area associated with this proposed

development. If you have any questions or require additional information regarding this request, please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.
Thank you for your time and attention,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
284 STATE STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

JUDITH CAMUSO
COMMISSIONER

March 2, 2021

Brad Agius
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

RE: Information Request – Strobus Solar Project, Athens

Dear Brad:

Per your request received on February 12, 2021, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of Endangered, Threatened, and Special Concern species; designated Essential and Significant Wildlife Habitats; and inland fisheries habitat concerns within the vicinity of the *Strobus Solar* project in Athens. Until plans are finalized, our comments should be considered preliminary.

Please note this document does not fulfill the requirements of the Maine Public Utilities Commission's Distributed Generation Project Siting Attributes for solar energy projects. For solar projects seeking MDIFW's determination of potential impacts to Maine-listed Endangered or Threatened species or habitats pursuant to the MPUC process, please send a separate, clearly labeled request to: IFWEnvironmentalreview@maine.gov and a separate response will be provided.

Our Department has not mapped any Essential Habitats that would be directly affected by your project.

Endangered, Threatened, and Special Concern Species

Bats - Of the eight species of bats that occur in Maine, the three *Myotis* species are afforded special protection under Maine's Endangered Species Act (MESA, 12 M.R.S §12801 et. seq.): little brown bat (State Endangered), northern long-eared bat (State Endangered), and eastern small-footed bat (State Threatened). The five remaining bat species are designated as Species of Special Concern: big brown bat, red bat, hoary bat, silver-haired bat, and tri-colored bat. While a comprehensive statewide inventory for bats has not been completed, based on historical evidence, it is likely that several of these species occur within the project area during the fall/spring migration, the summer breeding season, and/or for overwintering. If the proposed project has a Federal nexus, either via funding or permitting, or if the project is not consistent with the USFWS "4(d) Rule", we recommend that you contact the U.S. Fish and Wildlife Service--Maine Fish and Wildlife Complex (Wende Mahaney, Wende_Mahaney@fws.gov, 207-902-1569) for further guidance on their perspective, as the northern long-eared bat is also listed as a Threatened Species under the Federal Endangered Species Act. The USFWS "4(d) Rule" provides guidance for protection of bat winter hibernacula and maternity roost trees for northern long-eared bats (see https://www.fws.gov/midwest/endangered/mammals/nleb/4drule.html). MDIFW Endangered Species Rules for bats (Chapter 8.06; see link at http://www.maine.gov/sos/cec/rules/09/137/137c008.docx) provide equivalent seasonal protection of maternity roost trees for any of the three state-listed bats, seasonally prohibits entry into subsurface winter

hibernacula, and has additional protections for tree removal within ¼ mile of subsurface winter hibernacula. At present, no maternity roost trees have been designated for protection.

In addition to traditional hibernacula like caves and old mines, recent findings indicate that *Myotis* and big brown bats may also overwinter in exposed rocky features. To date, Maine talus and rocky outcrop studies have focused on relatively exposed slopes with minimal canopy cover, although ongoing research has shown that bats use rocky areas under the forest canopy. Occupied talus slopes in Maine have consisted of variable rock sizes, ranging in size from softball-sized to car-sized boulders. Rock piles, rock ledges, and small vertical cracks in rocks (>1/2-inch-wide) create crevices that allow bats to access deeper cavities that provide protection for predators and suitable temperature and humidity conditions. Some species of bat, like the eastern small-footed bat, use rocky features year-round. A desktop GIS analysis does not indicate the presence of these features in your project area; however, not all talus and rocky features have been mapped statewide. Therefore, we advise that all areas of talus and rocky features of approximately 1,000 square feet or greater in size be documented on and within 250 feet of your project area, including smaller areas of rock piles and tailings (i.e., quarry spoils). See attached photographs for representative features—these photographs are not all-inclusive and should be used for guidance purposes only. Detailed photographs and coordinates should be submitted to MDIFW for review, and acoustic monitoring may be recommended to document occupancy. Alternatively, these features should be appropriately buffered commensurate with the size and layout of the project. If these features are not present in the project area, our Agency does not anticipate significant impacts to any of the bat species as a result of this project based on currently best available science.

Significant Wildlife Habitat

Deer Wintering Areas (DWAs) – The project search area intersects with a DWA. DWAs contain habitat cover components that provide conditions where deer find protection from deep snow and cold wind, which is important for overwinter survival. Per the plans you showed at our meeting on February 22, 2021, you stated that other than clearing associated with the widening of an existing access road, there will be no other clearing or development within the mapped DWAs in the project area. Based on this information, we anticipate minimal impacts to Deer Wintering Areas and over-wintering deer as a result of this project.

Inland Waterfowl Wading Bird Habitat (IWWH) – This project intersects with an IWWH, which is considered Significant Wildlife Habitat under Maine's Natural Resources Protection Act. These habitats provide important breeding, feeding, migration, staging, and wintering habitat for waterfowl and wading bird species. Both high and moderate value IWWHs include both the wetland complex and a 250-foot upland zone. We recommend that these resources be avoided, including no clearing within the 250-foot upland zone from the wetland edge.

Significant Vernal Pools - At this time, MDIFW Significant Wildlife Habitat maps indicate no known presence of Significant Vernal Pools in the project search area; however, a comprehensive statewide inventory for Significant Vernal Pools has not been completed. Therefore, we recommend that surveys for vernal pools be conducted within the project boundary by qualified wetland scientists prior to final project design to determine whether there are Significant Vernal Pools present in the area. These surveys should extend up to 250 feet beyond the anticipated project footprint because of potential performance standard requirements for off-site Significant Vernal Pools, assuming such pools are located on land owned or controlled by the applicant. Once surveys are completed, survey forms should be submitted to

our Agency for review well before to the submission of any necessary permits. Our Department will need to review and verify any vernal pool data prior to final determination of significance.

Fisheries Habitat

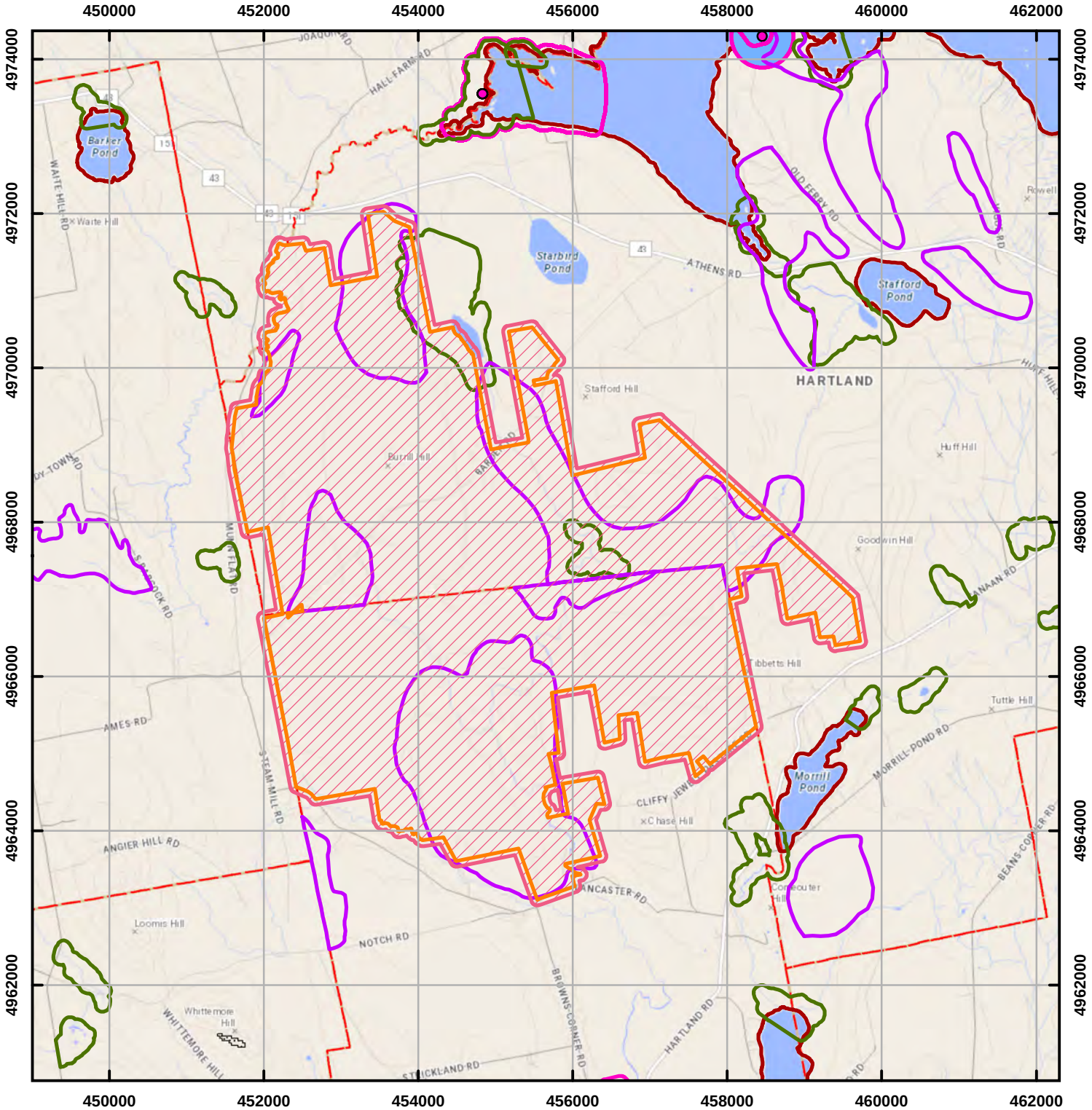
We recommend that 100-foot undisturbed vegetated buffers be maintained along streams. Buffers should be measured from the edge of stream or associated fringe and floodplain wetlands. Maintaining and enhancing buffers along streams that support coldwater fisheries is critical to the protection of water temperatures, water quality, natural inputs of coarse woody debris, and various forms of aquatic life necessary to support conditions required by many fish species. Stream crossings should be avoided, but if a stream crossing is necessary, or an existing crossing needs to be modified, it should be designed to provide full fish passage. Small streams, including intermittent streams, can provide crucial rearing habitat, cold water for thermal refugia, and abundant food for juvenile salmonids on a seasonal basis and undersized crossings may inhibit these functions. Generally, MDIFW recommends that all new, modified, and replacement stream crossings be sized to span at least 1.2 times the bankfull width of the stream. In addition, we generally recommend that stream crossings be open bottomed (i.e. natural bottom), although embedded structures which are backfilled with representative streambed material have been shown to be effective in not only providing habitat connectivity for fish but also for other aquatic organisms. Construction Best Management Practices should be closely followed to avoid erosion, sedimentation, alteration of stream flow, and other impacts as eroding soils from construction activities can travel significant distances as well as transport other pollutants resulting in direct impacts to fish and fisheries habitat. In addition, we recommend that any necessary instream work occur between July 15 and October 1.

This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance we recommend additional consultation with the municipality, and other state resource agencies including the Maine Natural Areas Program, Maine Department of Marine Resources, and Maine Department of Environmental Protection in order to avoid unintended protected resource disturbance.

Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

Becca Settele
Wildlife Biologist



Environmental Review of Fish and Wildlife Observations and Priority Habitats

Project Name: Strobus Solar, Athens (Version 1)

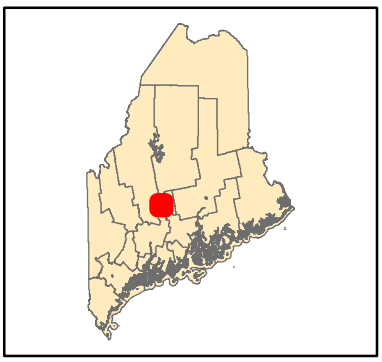
Maine Department of Inland Fisheries and Wildlife

0 0.4 0.8 1.6 2.4 3.2 Miles

Projection: UTM, NAD83, Zone 19N

Date: 2/17/2021

- ProjectPoints
- ProjectLines
- ProjectPolys
- ProjectSearchAreas
- Maine Cliff and Talus Areas
- Deer Winter Area
- LUPC p-fw
- Cooperative DWAs
- Seabird Nesting Islands
- Shorebird Areas
- Inland Waterfowl and Wading Bird
- 2008 Iwwh - Shoreland Zoning
- Tidal Waterfowl and Wading Bird
- Significant Vernal Pools
- Environmental Review Polygons
- Roseate Tern
- Piping Plover and Least Tern
- Aquatic ETSc - 2.5 mi review
- Rare Mussels - 5 mi review
- Maine Heritage Fish Waters
- Arctic Charr Habitat
- Redfin Pickerel and Swamp Darter Habitats - buffer100ft
- Special Concern occupied habitats - 100ft buffer
- Wild Lake Trout Habitats



<u>Representative Photographs of Suitable Bat Rock-Roosting Sites</u>

Prepared by the Maine Department of Inland Fisheries and Wildlife

Photographs are for guidance only and should not be considered all-inclusive.

Arrows indicate sites of rock-roosting bats.

Photographs used by permission: Paul R. Moosman, Jr., Department of Biology, Virginia Military Institute

JOURNAL
May 2016 -

MOOSMAN

From: Kemper, Keel <Keel.Kemper@maine.gov>
Sent on: Wednesday, May 18, 2022 3:21:03 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: RE: Hartland Solar DEP Pre-Application Meeting – 6/1 @11am

⚠ **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments. ⚠

I forward my invitation to a couple of others who may have interest. Nate Webb our Division Director and Ryan Robicheau our Wildlife Management Section supervisor, so I think I am all set

KK

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, May 18, 2022 11:18 AM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>; Perry, John <John.Perry@maine.gov>; Settele, Rebecca <Rebecca.Settele@maine.gov>; Kemper, Keel <Keel.Kemper@maine.gov>
Subject: Hartland Solar DEP Pre-Application Meeting – 6/1 @11am

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Dear Becca, Bob, John, and Keel,
I just sent you an invite to the Hartland Solar DEP Pre-Application Meeting on June 1st at 11am. Please let me know if there are other staff from your agency that should be invited. I look forward to providing you updates on the project, your input, and answering questions you may have.
Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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From: Agius, Brad <donotreply@tetratech.com>
Sent on: Wednesday, July 6, 2022 9:00:49 PM
To: jason.czapiga@maine.gov
CC: shannon.d.smith@maine.gov
Subject: Tetra Tech MFT: Hartland Solar - Vernal Pool Submittal

Tetra Tech Managed File Transfer

New Secure File Package is Available to Download until Thursday, 21 July

Hi Jason,

On behalf of Strobus Solar, LLC, Tetra Tech is submitting the data for the Maine State Vernal Pool Assessment for Hartland Solar Project. Due to the large file sizes they are being provided here for download. The files include a cover letter, data forms, map, photolog and shapefile. If you have any questions or require further information, please contact me via email at brad.agius@tetratech.com, or by phone, 207-991-2633 (cell), at any time. Please confirm receipt of this submittal.

Thank you,

--Brad

Brad Agius | Director – Renewable Energy
& Natural Resources, Northeast

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Please
consider the environment before printing.

This link will not work for anyone else. The secure file package is available until: **Thursday, 21 July.** After this date contact the sender.

Files attached to this message

Filename	Size
HartlandSolar_Vernal Pool CL_20220706.pdf	201 KB
HartlandSolar_Vernal Pool Forms_20220706.pdf	27.6 MB
HartlandSolar_Vernal Pool_Map_20220706.pdf	1.54 MB
HartlandSolar_Vernal Pool_Photolog_20220706.pdf	9.17 MB
HartlandSolar_VernalPool_20220706.zip	10.2 KB

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From:	Swartz, Beth
To:	Lin, Mao
Cc:	Stratton, Robert D
Subject:	Hartland Solar Follow-up
Date:	Wednesday, July 13, 2022 2:45:14 PM
Attachments:	image001.jpg image002.jpg

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Hi Mao,
So sorry to not get back to you sooner – it's been a busy couple weeks! Yes, I did have a chance to talk with Bob Stratton after you and I spoke. Although state-Threatened freshwater mussels are known to be present in a few waterbodies in the surrounding watershed (i.e., Sebasticook River, Wesserunsett Stream, Carrabassett Stream, Great Moose Lake), we do not have documentation of any of these species occurring in streams within the project area. And while streams within the project footprint have not been surveyed for mussels, it is my opinion that these streams are likely too small and high up in the watershed to be suitable habitat for any of the three species. Air photos further suggest the habitat likely does not offer much if any potential for listed species. Given also that the nearest connected stream occurrence for brook floater is ≥12 miles downstream on Carrabassett Stream, which the EB Black Stream drains into, these all add up to our conclusion that there is little to no risk to listed mussel species from the project as currently described. Consequently, we would not ask for a mussel survey on this project.

beth
~~~~~~

Beth I. Swartz, Wildlife Biologist
Reptile, Amphibian and Invertebrate Group
Maine Department of Inland Fisheries and Wildlife
106 Hogan Road, Suite 1 *(please note new street address)*
Bangor ME 04401
(207) 941-4476
mefishwildlife.com | facebook | twitter
PLEASE SUPPORT MAINE'S ENDANGERED & NONGAME WILDLIFE!
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From: Lin, Mao <Mao.Lin@tetratech.com>
Sent: Wednesday, July 13, 2022 9:40 AM
To: Swartz, Beth <Beth.Swartz@maine.gov>
Subject: Voice Mail (39 seconds)
~~~~~~

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi, Beth, this is Mel from Tetra Tech. I just wanted to follow up on our conversation a few weeks ago about whether or not you think you need to do muscle surveys for the project that we discussed and also whether or not you were able to talk about it with Bob Stratton. And maybe if any conclusions you give me a call back on teams or on my cell phone cell phone is 9176875838 or obviously e-mail is fine as well. Thanks, Beth. Hope you're doing well. Bye.

You received a voice mail from Lin, Mao at Mao.Lin@tetratech.com.

Job Title:	Sci.Environmental Scientist III.
Company:	CES
Work:	+1 207-358-2384
Mobile:	+1 917-687-5838
Email:	Mao.Lin@tetratech.com

Thank you for using Transcription! If you don't see a transcript above, it's because the audio quality was not clear enough to transcribe.

Set Up Voice Mail

Lin, Mao

From: Cassida, Jim
Sent: Wednesday, August 9, 2023 12:42 PM
To: Stratton, Robert D
Cc: Waddle, Kelly
Subject: RE: Hartland Solar Project

Bod, got your out of office message so understand that you are currently out of the office returning Thurs the 10th. I have a call with Teichos Thur at 1pm so if there is anyway we could have a quick call on Thur morning before that call I would greatly appreciate it.

Regards,

Jim

James Cassida | **Senior Program Director – Energy & Natural Resources**
Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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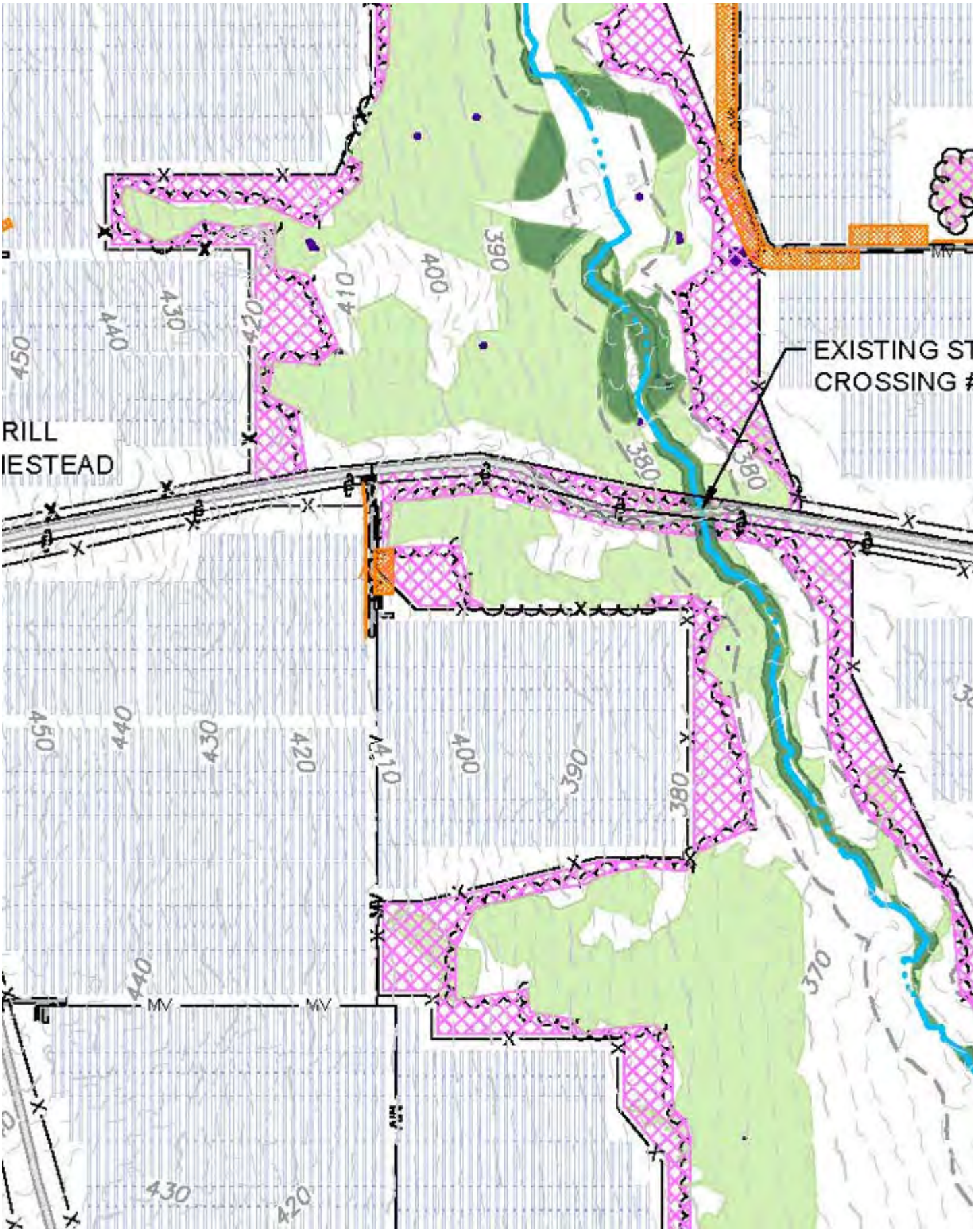
TETRA TECH

From: Cassida, Jim
Sent: Wednesday, August 9, 2023 12:34 PM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: Hartland Solar Project

Good afternoon Bob.

Do you have literally 5 minutes for a quick phone call to discuss the riparian buffer impact calcs associated with the snip below?


EXISTING ST
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RILL
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450
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370
MV

James Cassida | **Senior Program Director – Energy & Natural Resources**
Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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TETRA TECH

Lin, Mao

From: Cassida, Jim
Sent: Thursday, August 10, 2023 12:18 PM
To: Stratton, Robert D
Cc: Waddle, Kelly; Smith, Shannon D
Subject: RE: Hartland Solar Project

And to answer your question, no the PSS will likely not require any clearing but there will likely be some closed canopy forest within 100 feet of the edge of the PSS that will require conversion, still running those calcs.

Jim

James Cassida | **Senior Program Director – Energy & Natural Resources**
Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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TETRA TECH

From: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Sent: Thursday, August 10, 2023 11:51 AM
To: Cassida, Jim <Jim.Cassida@tetratech.com>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>; Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project

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Hi Jim,

I can't promise it based on the snapshot only, but we can consider it after review of more detailed resource information. Will the PSS even need clearing/maintenance of vegetation if pole placement provides for minimal line sag and maximum capable vegetation height?

Bob Stratton
Wildlife Biologist
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife
353 Water Street; 41 State House Station
Augusta, Maine 04333-0041
(207) 287-5659 office; (207) 592-5446 cell
mefishwildlife.com

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From: Cassida, Jim <Jim.Cassida@tetratech.com>
Sent: Thursday, August 10, 2023 9:19 AM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>; Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project

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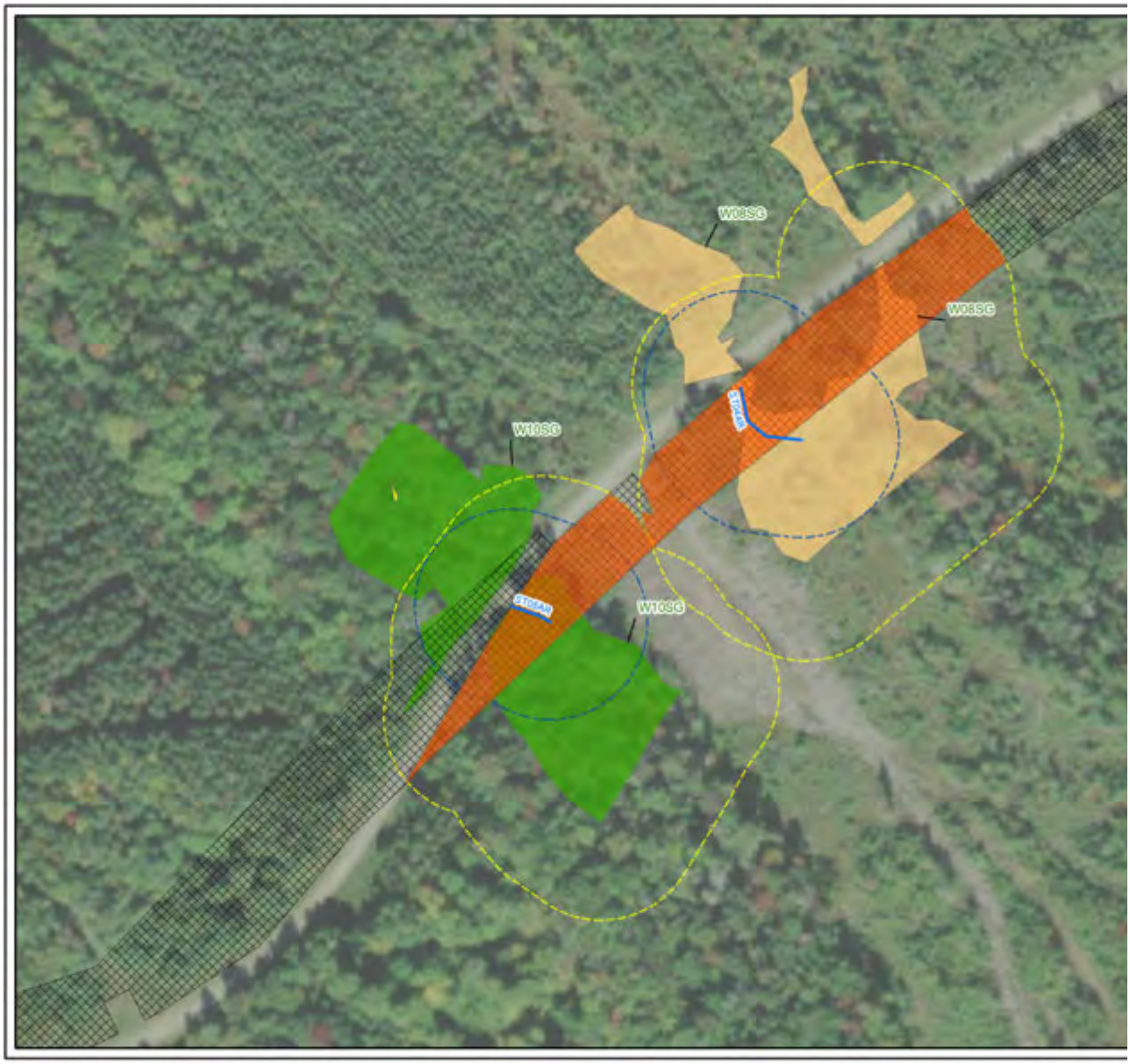
Thanks Bob!

The map below shows 2 short stream segments along the proposed utility line ROW. The stream channels begin at the existing culverts under Burrill Woods Road and are present for 75-100 feet or so before dissipating into a large wetland complex. There are no stream channels coming into the culverts on the opposite side of the road. The culverts a just collecting water from a large wetland complex and road runoff. The entire wetland system is within the east Branch Black Stream watershed but it is thousands of feet before reaching another defined stream channel.

We are preparing to analyze the forest composition within the riparian areas within 100 feet of the edge of the contiguous wetlands to determine the amount of riparian buffer impact comp that will be required. I am inclined to think that riparian buffer comp is not necessary in these cases given that the streams are small isolated channels that do not directly connect to any larger contiguous stream system for a very large distance. In a case like this could MDIFW be comfortable not recommending riparian buffer compensation? Clearly with a more detailed write up in the application to explain/describe the resource.

Jim



James Cassida | **Senior Program Director – Energy & Natural Resources**
Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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From: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Sent: Thursday, August 10, 2023 8:53 AM
To: Cassida, Jim <Jim.Cassida@tetratech.com>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>; Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project

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Good morning Jim,

MDIFW has a number of guidance documents designed for various objectives, some of which are included on our Environmental Review webpage https://www.maine.gov/ifw/programs-resources/environmental-review/guidance-documents.html, including the 2012 Performance Standards for Deer Winter Areas in Overhead Utility ROW Projects. However, some colleagues who are directly involved in DWA management for MDIFW recommend the attached, Deer Wintering Area Management guidance (Draft 2015), if the goal is to maximize the benefits of shelter for deer. Reportedly, this document was intended to improve upon the information and approaches used in MDIFW's Cooperative Management Agreements with large landowners. Though labeled as Draft, MDIFW manages its own lands under this approach and believes that the use of these methodologies promotes the highest quality habitat. I hope that you find it helpful. Bob.

Bob Stratton
Wildlife Biologist
Environmental Program Manager
Maine Department of Inland Fisheries & Wildlife
353 Water Street; 41 State House Station
Augusta, Maine 04333-0041
(207) 287-5659 office; (207) 592-5446 cell
mefishwildlife.com

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From: Cassida, Jim <Jim.Cassida@tetratech.com>
Sent: Thursday, August 10, 2023 8:24 AM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>; Smith, Shannon D <Shannon.D.Smith@maine.gov>
Subject: RE: Hartland Solar Project

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Bob:

Do you have a similar document to the attached for DWA's?

Jim

Direct: 207.358.2389 | Office: 207.358.2400 | Cell: 207.650.6406 | jim.cassida@tetratech.com

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TETRA TECH

Agency Correspondence

MNAP

February 11, 2021
Lisa St. Hilaire
Information Manager
Maine Natural Areas Program
177 State House Station
Augusta, ME 04333-0177

Sent via email: maine.nap@maine.gov

Subject: Significant Botanical Resources Information Request

Dear Lisa,

On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Natural Areas Program may have on rare and unique botanical features, including the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and associated zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly-owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility.

Please review the Project area and identify any known or suspected locations of rare and unique botanical features within the outlined area associated with this proposed development. If you have any questions or require additional information regarding this request please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.

Thank you for your time and attention.

Respectfully Submitted,

TETRA TECH, INC.

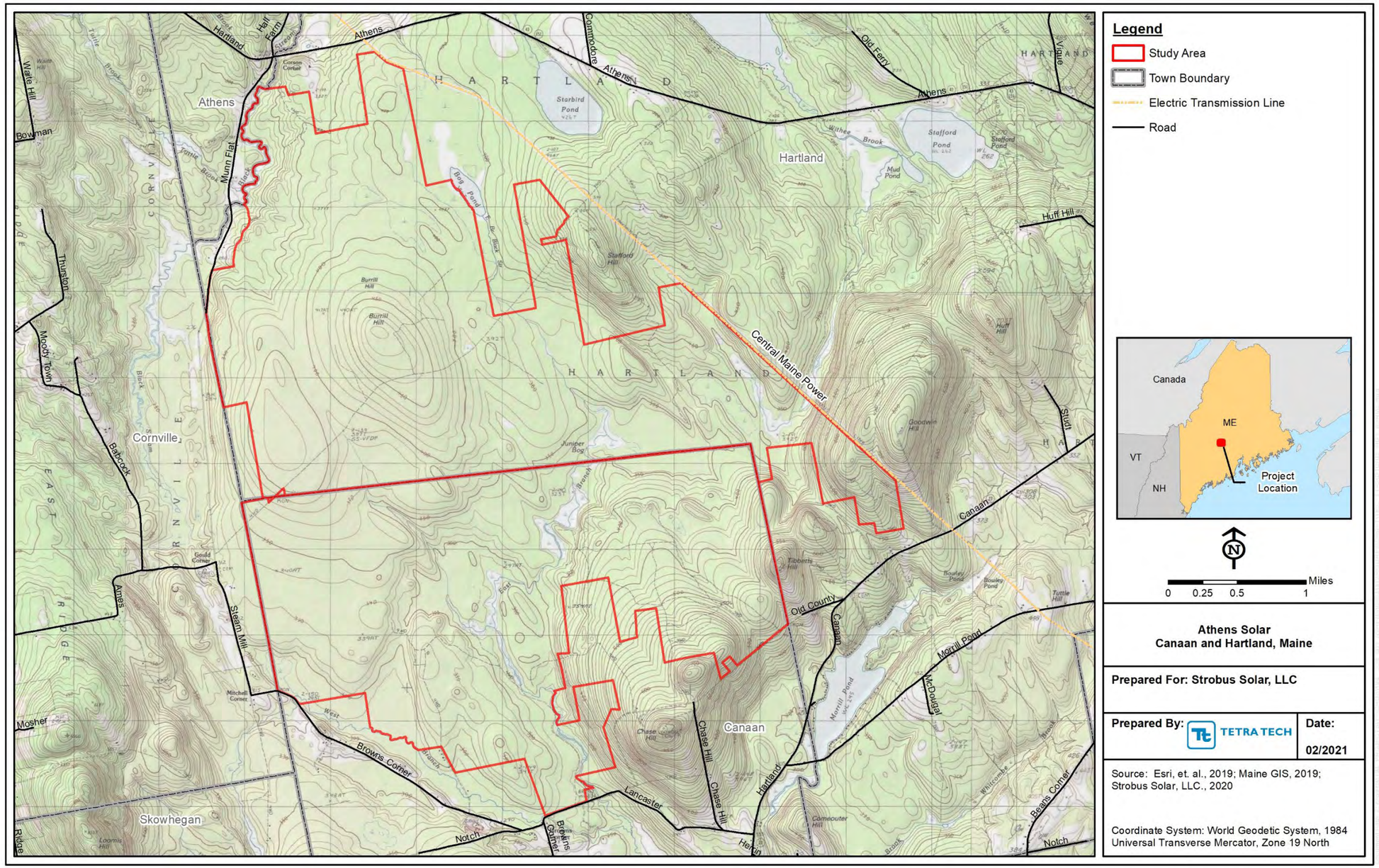
Brad Agius, Project Manager

Enclosures – Project Location Figure & Project Area

Shapefile CC: Dani Torcolacci (Strobus Solar LLC)

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Fax 207-879-9481 www.tetratech.com

TETRA TECH



Not for Construction

Project Overview: Athens Solar – Canaan and Hartland, Maine

Confidential Information. Do Not Distribute

Tetra Tech, Inc.
451 Presumpscot Street, Portland, ME 04103
Tel 207-358-2402 Fax 207-879-9481 www.tetratech.com

From:	St.Hilaire, Lisa
To:	Agius, Brad
Cc:	Dani Torcolacci; Beyer, Jim R; Zeh, Sally; Puryear, Kristen
Subject:	RE: RESPONSE: Athens Solar
Date:	Monday, March 8, 2021 10:25:24 AM
Attachments:	gentian.zip

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Hi Brad,

Shapefile attached. Thank you,

Lisa St. Hilaire

Information Manager | Maine Natural Areas Program
Department of Agriculture, Conservation and Forestry
177 State House Station | Augusta, ME 04333 (mailing address)
90 Blossom Lane | Augusta, ME 04333 (physical address)
PHONE 207-287-8044 | FAX 287-7548 (FAX)

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Monday, March 8, 2021 10:17 AM
To: St.Hilaire, Lisa <Lisa.St.Hilaire@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>; Beyer, Jim R <Jim.R.Beyer@maine.gov>; Zeh, Sally <Sally.Zeh@Maine.Gov>; Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RE: RESPONSE: Athens Solar

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Hi Lisa,
Thank you for the response for the Athens Solar Project. Could you please provide the GIS locations for the mapped Red-stemmed Gentian provided on your map for our due diligence and planning purposes.
Your assistance is greatly appreciated,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

---

From: St.Hilaire, Lisa <Lisa.St.Hilaire@maine.gov>
Sent: Monday, March 8, 2021 9:48 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>; Beyer, Jim R <Jim.R.Beyer@maine.gov>; Zeh, Sally <Sally.Zeh@Maine.Gov>; Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RESPONSE: Athens Solar

From:	St.Hilaire, Lisa
To:	Agius, Brad
Cc:	Dani Torcolacci; Beyer, Jim R; Zeh, Sally; Puryear, Kristen
Subject:	RESPONSE: Athens Solar
Date:	Monday, March 8, 2021 9:48:03 AM
Attachments:	tetratech_canaan-hartland_athenssolar_PUCclearance.pdf tetratech_canaan-hartland_athenssolar_DACF Solar Soils Letter.pdf tetratech_canaan-hartland_athenssolar.pdf

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Hi Brad,

Attached are MNAP's comments, MNAP's PUC determination, and DACF soil comments for the Athens Solar project in Canaan and Hartland. Thank you,

Lisa St. Hilaire

Information Manager | Maine Natural Areas Program
Department of Agriculture, Conservation and Forestry
177 State House Station | Augusta, ME 04333 (mailing address)
90 Blossom Lane | Augusta, ME 04333 (physical address)
PHONE 207-287-8044 | FAX 287-7548 (FAX)

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, February 11, 2021 6:38 PM
To: NAP, Maine <Maine.NAP@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: Athens Solar: Significant Botanical Resources Information Request

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Dear Lisa,
On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Natural Areas Program may have on rare and unique botanical features including the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and associated zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility. Please review the project area and identify any known or suspected locations of rare and unique botanical features within the outlined area associated with this proposed development. If you have any questions or require additional information regarding this request please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.
Thank you for your time and attention,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

March 8, 2021

Brad Agius
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Via email: brad.agius@tetratech.com

RE: Proposed Strobus Solar, LLC Athens Solar Project, Canaan and Hartland; Threatened, and Endangered Plants and Rare or Exemplary Natural Community Clearance Determination

Dear Mr. Agius:

I am writing in response to your request for a determination from the Maine Natural Areas Program (MNAP) on the potential for the above referenced project to result in adverse impacts to rare, threatened, or endangered plants or rare and exemplary natural communities, pursuant to the Maine Public Utilities Commission's Distributed Generation Siting Attribute criteria number 5.

There is no comprehensive statewide inventory that includes all rare, threatened, or endangered species occurrences and natural community types. Though many resources are included on data layers and resource maps, the completeness of these varies by species, habitat type, location, and previous survey efforts. Thus, such tools should be considered preliminary unless otherwise indicated by MNAP. It is the applicant's ultimate responsibility to ensure that their actions do not result in adverse impacts to rare, threatened, or endangered plants and rare or exemplary natural communities, regardless of whether species occurrences or natural communities have been previously identified and mapped.

MNAP's determination for this proposed project site is indicated in the selection below:

☐ **Based on review of the information provided, current documentation and available information indicate no known adverse impacts rare, threatened, or endangered plants or rare or exemplary natural communities on the proposed project site or in the vicinity.**

☐ **Based on review of the information provided, current documentation and available information indicate no known adverse impacts to rare, threatened, or endangered plants or rare or exemplary natural communities on the proposed project site. However, rare, threatened, or endangered plants or rare or exemplary natural communities have been documented in the vicinity of the proposed project site and MNAP recommends further investigations and surveys to enable a more definitive determination. Please contact MNAP for further guidance and survey protocols.**

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
BLOSSOM LANE, DEERING BUILDING

PHONE: (207) 287-804490
WWW.MAINE.GOV/DACF/MNAP

☒ **Based on review of the information provided, current documentation and available information indicate the presence of rare, threatened, or endangered plants or rare or exemplary natural communities on the proposed project site. Red-stemmed Gentian occurs on the powerline abutting the project site, and may be included within the project boundary at this location. In addition, suitable habitat appears to be present on the project site, and MNAP recommends survey for this and other rare species. Please see MNAP's comments dated March 4, 2020.**

Please note that this determination relates only to known information on rare, threatened, or endangered plants or rare or exemplary natural communities in relation to the proposed project site. This determination does not constitute a full environmental review response for the proposed project. If you require additional information, please contact maine.nap@maine.gov.

Sincerely,

Kristen Puryear |Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov

Cc: Sally Zeh, Christine Cook (MPUC)
Jim Beyer (MDEP)

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
BUREAU OF AGRICULTURE, FOOD & RURAL RESOURCES
28 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

February 24, 2021

Brad Agius
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Via email: brad.agius@tetratech.com

RE: Proposed Strobus Solar, LLC Athens Solar Project, Canaan and Hartland; Mapped Farmland Soils

Dear Mr. Agius:

In collaboration with the Maine Natural Areas Program (MNAP), the Bureau of Agriculture, Food and Rural Resources has searched the USDA Natural Resource Conservation Service (NRCS) Farmland Soils Data in response to your request received by MNAP on February 11, 2021 for information on the presence of land identified as Prime Farmland or Farmland of Statewide Importance at your project site in Canaan and Hartland, Maine. This letter is provided for informational purposes only.

Prime Farmland is land identified with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. This land may or may not be active farmland, but it is not currently urban, developed or inundated by water. Farmland of Statewide Importance generally includes areas that nearly meet the requirements for Prime Farmland and economically may produce high yields of crops when treated and managed according to acceptable farming methods.

☐ NO HIT: According to the information currently in the Farmland Soils Data layer, there are no farmland soils (Prime Farmland or Farmland of Statewide Importance) mapped specifically within the project area.

☒ FARMLAND SOIL HIT: According to the information currently in the Farmland Soils Data layer, the project site includes areas with mapped farmland soils. Agricultural siting best practices recommend avoiding conversion of land designated as Prime Farmland or Farmland of Statewide Importance. This project area includes soils mapped as:

- ☒ Prime Farmland
- ☒ Farmland of Statewide Importance

NANCY MCBRADY, BUREAU DIRECTOR
AGRICULTURE, FOOD & RURAL RESOURCES
90 BLOSSOM LANE, DEERING BUILDING

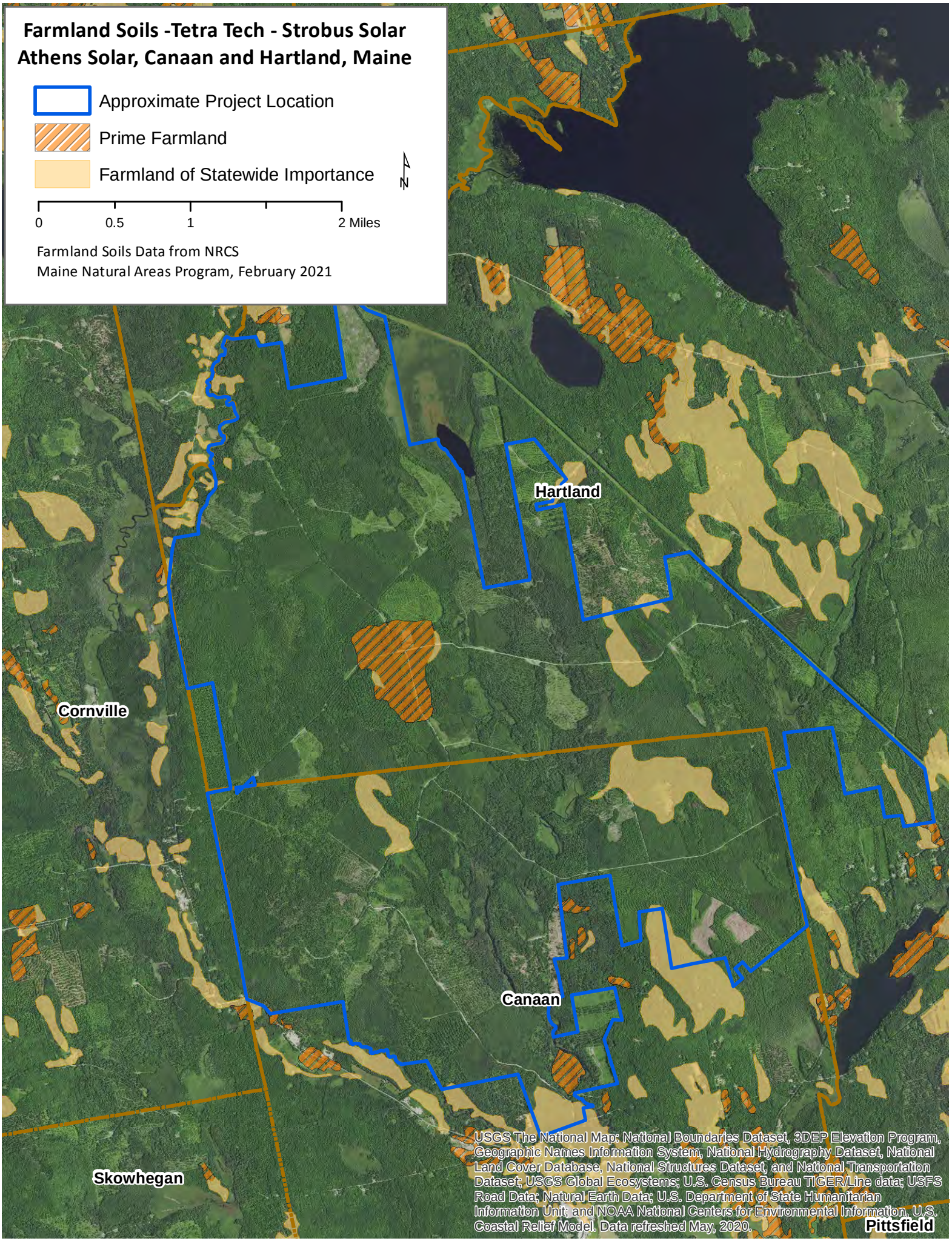
PHONE: (207) 287-3491
FAX: (207) 287-7548
WWW.MAINE.GOV/DACF

Our review covers only areas mapped as Prime Farmland or Farmland of Statewide Importance. This finding is not a substitute for on-site surveys. Field surveys are needed for solar project clearance according to the Maine Public Utilities Commission Procurement Announcement, Appendix A, Project Attribute Criteria #9.

As a general statement of policy, the Maine Department of Agriculture, Conservation and Forestry recommends that whenever possible, commercial scale solar projects be sited on non-agricultural lands. If that is not possible, the Department recommends minimizing the footprint of solar development on high value agriculture soils and encourages the development of dual use solar projects. The Department is currently in the process of developing technical guidance for solar developments to help minimize impacts to agricultural lands. For more information about this guidance, contact the Bureau of Agriculture's Division of Agricultural Resource Development at (207) 287-3491.

Sincerely,

Nancy McBrady, Director
Bureau of Agriculture, Food and Rural Resources


Farmland Soils -Tetra Tech - Strobus Solar
Athens Solar, Canaan and Hartland, Maine
Approximate Project Location
Prime Farmland
Farmland of Statewide Importance
N
0
0.5
1
2 Miles
Farmland Soils Data from NRCS
Maine Natural Areas Program, February 2021
Hartland
Cornville
Canaan
Skowhegan
Pittsfield
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

March 4, 2021

Brad Agius
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Via email: brad.agius@tetratech.com

Re: Rare and exemplary botanical features in proximity to: Strobus Solar, LLC Athens Solar Project, Canaan and Hartland, Maine

Dear Mr. Agius:

I have searched the Maine Natural Areas Program's Biological and Conservation Data System files in response to your request received February 11, 2021 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Canaan and Hartland, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. MNAP recommends that you have the site surveyed by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed. In particular, MNAP recommends that you survey project areas for Red-stemmed Gentian which occurs in the right-of-way along the eastern boundary of the project area, and it appears that suitable habitat may be present in the project area. In addition, if any work will be done to connect the project to the existing right-of-way, MNAP recommends avoiding any disturbance or clearing within 250 feet of documented populations. Please refer to the table below and attached map and factsheet.

Feature	State Status	State Rank	Global Rank	Notes
Red-stemmed Gentian *Gentiana rubricaulis*	Threatened	S1	G4?	Extant at ROW abutting site, Stafford Hill, Occurrence rank B, Good

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
BLOSSOM LANE, DEERING BUILDING

PHONE: (207) 287-804490
WWW.MAINE.GOV/DACF/MNAP

information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

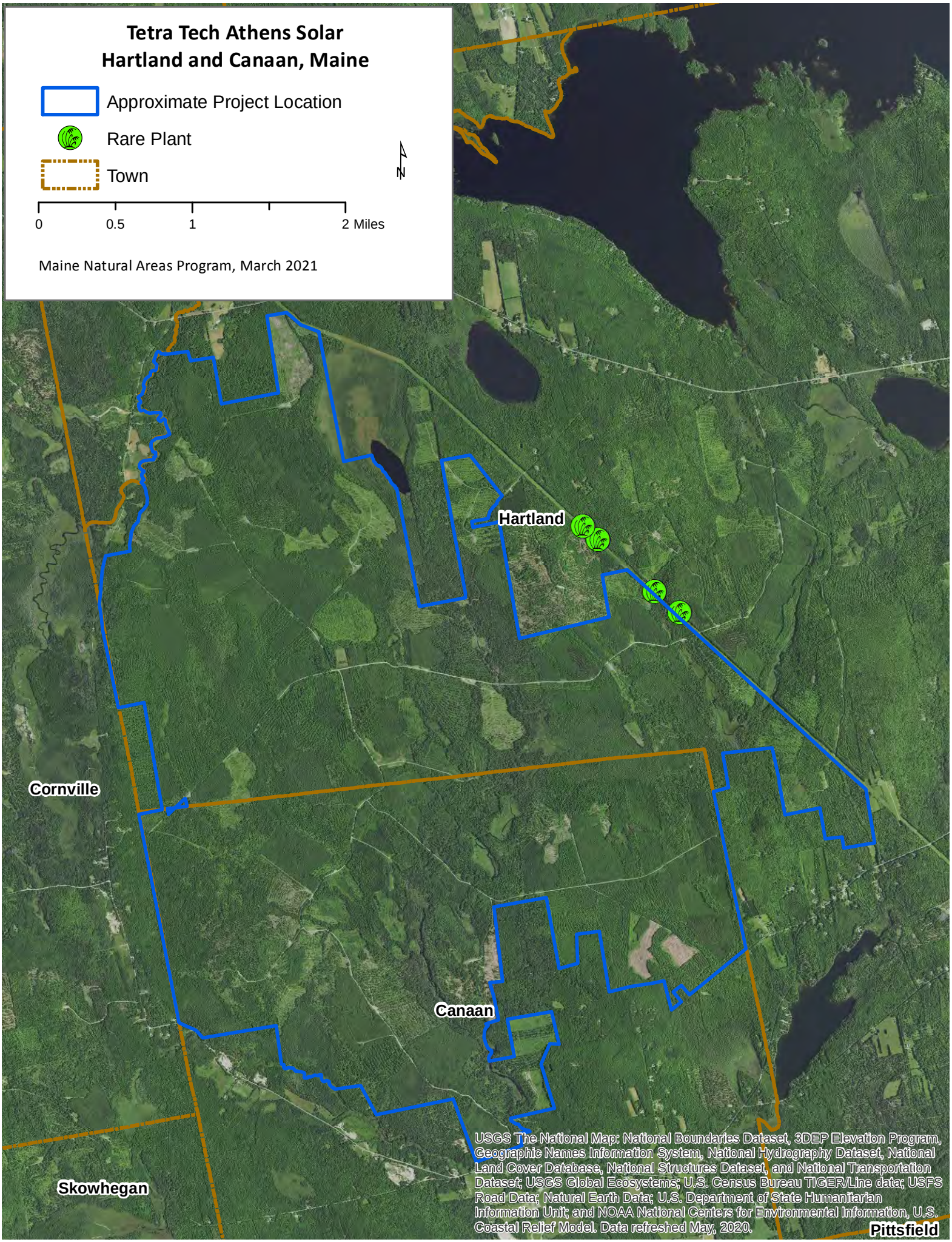
The Maine Natural Areas Program (MNAP) is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. MNAP welcomes coordination with individuals or organizations proposing environmental alteration or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

The Maine Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $150.00 for two hours of our services.

Thank you for using MNAP in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Kristen Puryear | Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov


Tetra Tech Athens Solar
Hartland and Canaan, Maine
Approximate Project Location
Rare Plant
Town
0
0.5
1
2 Miles
N
Maine Natural Areas Program, March 2021
Hartland
Cornville
Canaan
Skowhegan
Pittsfield
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.

About MNAP
Focus Areas
Communities, Plants and Animals
Natural Communities and Ecosystems
Rare Plants
Invasive Plants
Ecological Inventory and Monitoring
Rare Animals
State and Global Rarity Ranks
Survey Forms
Maps, Data, and Technical Assistance
Ecological Reserves

Maine Natural Areas Program

Gentiana rubricaulis Schwein.

Red-stemmed Gentian

- State Rank: S1
- Global Rank: G4?
- State Status: Threatened

Habitat: Moist woods, wet meadows, and shores, especailly nongranitic substrates.

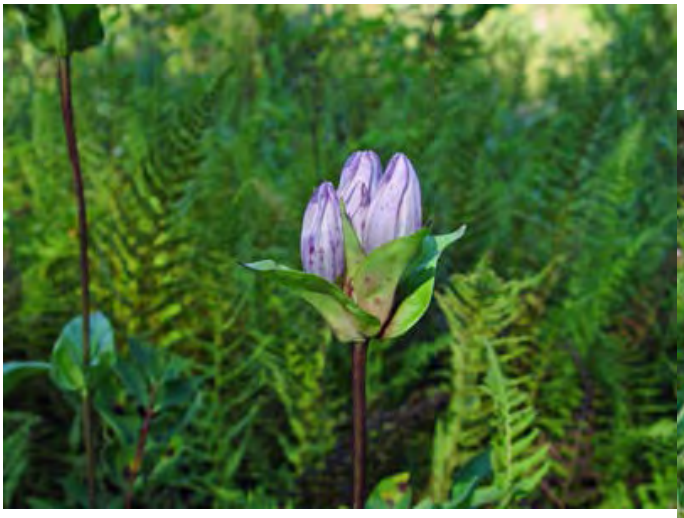
Family: Gentianaceae

Synonyms: *Dasystephana grayi* (Kusnez.) Britt; *Gentiana linearis* Froel. ssp. *rubricaulis* (Schwein.) J. Gillet; *Gentiana linearis* Froel. var. *lanceoata* Gray; *Gentiana linearis* Froel. var. *latifolia* Gray.

Range: Isolated stations in Maine and New Brunswick; otherwise Ontario to Saskatchewan, Minnesota, Wisconsin, Michigan, and Nebraska.

Phenology: Flowers Augusta to September.

Known Distribution in Maine: This rare plant has been documented from a total of 6 town(s) in the following county(ies): Kennebec, Somerset.



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Department of Agriculture, Conservation and Forestry
22 State House Station
18 Elkins Lane
Augusta, ME 04333
More Locations

Phone: (207) 287-3200
Fax: (207) 287-2400
TTY Users Call Maine Relay 711
DACF@Maine.gov

Rare and Exemplary Botanical Features within 4 miles of
Project: Strobus Solar Athens Solar Project, Hartland and Canaan, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
American Chestnut						
	SC	S4	G3	2000-summer	5	Hardwood to mixed forest (forest, upland)
American Winter-cress						
	PE	SH	G5	1903-06-30	3	Non-tidal rivershore (non-forested, seasonally wet)
Blue-leaf Willow						
	T	S2	G4	1915-08-17	5	Non-tidal rivershore (non-forested, seasonally wet)
Goldie's Wood Fern						
	SC	S2	G4G5	1899-07-31	4	Hardwood to mixed forest (forest, upland)
	SC	S2	G4G5	1899	11	Hardwood to mixed forest (forest, upland)
Hairy Wood Brome-grass						
	SC	S2	G5	1899-08-03	4	Hardwood to mixed forest (forest, upland),Non-tidal rivershore (non-forested, seasonally wet)
Red-stemmed Gentian						
	T	S1	G4?	2007-10-01	5	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	T	S1	G4?	2007-09-29	3	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
Shining Ladies'-tresses						
	T	S1	G4	1941	13	Non-tidal rivershore (non-forested, seasonally wet),Open wetland, not coastal nor rivershore (non-forested, wetland)
Showy Orchis						
	E	S1	G5	1941	14	Hardwood to mixed forest (forest, upland)
Silver Maple Floodplain Forest						
	<null>	S3	GNR	2003-09-29	14	Forested wetland
Spreading Sedge						
	E	S2	G5	1886-06-25	3	Hardwood to mixed forest (forest, upland)

Rare and Exemplary Botanical Features within 4 miles of
Project: Strobus Solar Athens Solar Project, Hartland and Canaan, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Wild Chervil						
	PE	SH	G5	1915-06	2	Hardwood to mixed forest (forest, upland)
Wild Ginger						
	T	S1S2	G5	1928-07-18	9	Hardwood to mixed forest (forest, upland)
	T	S1S2	G5	1938-05-22	8	Hardwood to mixed forest (forest, upland)

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3 Rare in Maine (20-100 occurrences).
S4 Apparently secure in Maine.
S5 Demonstrably secure in Maine.
SU Under consideration for assigning rarity status; more information needed on threats or distribution.
SNR Not yet ranked.
SNA Rank not applicable.
S#? Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
G3 Globally rare (20-100 occurrences).
G4 Apparently secure globally.
G5 Demonstrably secure globally.
GNR Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
PE Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!
http://www.maine.gov/dacf/mnap

From: Agius, Brad
Sent: Thursday, April 22, 2021 4:10 PM
To: Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RE: RESPONSE: Athens Solar

Hi Kristen and Lisa,
The Hartland Solar Project (formerly named Athens Solar) is having an virtual Teams informational meeting to introduce the Project to MDEP on Thursday April 29 at 1pm. Could you or a representative from MNAP be available to attend? If so, please let me know who the meeting invitation should include. We would like to be proactive, transparent and inclusive with the Project and are including invitations to the Corps, USFWS and MDIFW, too. The project footprint has been reduced to 1,388 acres. We look forward to your agency's additional input and guidance to design the Project to avoid and minimize impacts, and meet agency standards.
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: St.Hilaire, Lisa <Lisa.St.Hilaire@maine.gov>
Sent: Monday, March 8, 2021 10:25 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>; Beyer, Jim R <Jim.R.Beyer@maine.gov>; Zeh, Sally <Sally.Zeh@Maine.Gov>; Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RE: RESPONSE: Athens Solar

Hi Brad,

Shapefile attached. Thank you,

Lisa St. Hilaire

Information Manager | Maine Natural Areas Program
Department of Agriculture, Conservation and Forestry
177 State House Station | Augusta, ME 04333 (mailing address)
90 Blossom Lane | Augusta, ME 04333 (physical address)
PHONE 207-287-8044 | FAX 287-7548 (FAX)

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Monday, March 8, 2021 10:17 AM
To: St.Hilaire, Lisa <Lisa.St.Hilaire@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>; Beyer, Jim R <Jim.R.Beyer@maine.gov>; Zeh, Sally <Sally.Zeh@Maine.Gov>; Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RE: RESPONSE: Athens Solar

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Lisa,

Thank you for the response for the Athens Solar Project. Could you please provide the GIS locations for the mapped Red-stemmed Gentian provided on your map for our due diligence and planning purposes. Your assistance is greatly appreciated,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

From: St.Hilaire, Lisa <Lisa.St.Hilaire@maine.gov>
Sent: Monday, March 8, 2021 9:48 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>; Beyer, Jim R <Jim.R.Beyer@maine.gov>; Zeh, Sally <Sally.Zeh@Maine.Gov>; Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RESPONSE: Athens Solar

Hi Brad,

Attached are MNAP's comments, MNAP's PUC determination, and DACF soil comments for the Athens Solar project in Canaan and Hartland. Thank you,

Lisa St. Hilaire

Information Manager | Maine Natural Areas Program
Department of Agriculture, Conservation and Forestry
177 State House Station | Augusta, ME 04333 (mailing address)
90 Blossom Lane | Augusta, ME 04333 (physical address)
PHONE 207-287-8044 | FAX 287-7548 (FAX)

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, February 11, 2021 6:38 PM
To: NAP, Maine <Maine.NAP@maine.gov>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: Athens Solar: Significant Botanical Resources Information Request

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Dear Lisa,
On behalf of Strobus Solar LLC (the Applicant) this letter is to request any information the Maine Natural Areas Program may have on rare and unique botanical features including the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities in or around the proposed Athens Solar Project (Project) area in Canaan and Hartland, Maine. To aid in the review, a figure and associated zipped shapefile of the Project area are attached. We are supporting the Applicant, a wholly owned affiliate of Teichos Energy LLC, with evaluating this site for a proposed solar generation facility. Please review the project area and identify any known or suspected locations of rare and unique botanical features within the outlined area associated with this proposed development. If you have any questions or require additional information regarding this request please contact me directly at (207) 358-2402 or email me at brad.agius@tetratech.com.
Thank you for your time and attention,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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From:	Puryear, Kristen
To:	Agius, Brad
Subject:	RE: Solar Planting Recommendations
Date:	Thursday, September 30, 2021 6:46:07 AM
Attachments:	NativePlantsAMaineSourceList_UMaineCoopExtBulletin2502.pdf MaineCoastalPlantingGuide_CCSWCD_2017.pdf

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Hi Brad,
Sorry I did not get back to you sooner! Its been a crazy field season.
We don't have a tidy list, and of course all sites have different soil and condition variables. But I have attached some references to this email, and see below for a link to a great set of resources:
https://wildseedproject.net/
Specifically: https://shop.wildseedproject.net/ and https://wildseedproject.net/maine-native-plants-for-roadside-restoration/

I hope the school year has started off well for you and the kiddos! Keeping fingers crossed for a healthy and uninterrupted year!
Kristen

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, September 29, 2021 1:44 PM
To: Puryear, Kristen <Kristen.Puryear@maine.gov>
Subject: RE: Solar Planting Recommendations

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.
Hi Kristen,
How are you? Just following-up on my email below. Something you can weigh in on or is there someone else you suggest I contact about planting recommendations for solar projects.
Thanks,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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From: Agius, Brad
Sent: Monday, August 30, 2021 4:07 PM
To: Kristen.Puryear@maine.gov
Subject: Solar Planting Recommendations

Hi Kristen,
I hope Sean, the girls and you had a great summer. Did Maeve and Morgan start school today?

On a work note, does MNAP have any guidance or planting recommendations for solar projects. In particular native, pollinator plants, with limited height (~3ft) needing limited maintenance? In addition any seed mixes or companies that are recommended related to this.

Good luck with the start of the new school year adjustments.

Best,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Bulletin #2502, Native Plants: A Maine Source List

Native Plants: A Maine Source List

Lois Berg Stack, Extension professor and ornamental horticulture specialist

For information about UMaine Extension programs and resources, visit extension.umaine.edu.
Find more of our publications and books at extensionpubs.umext.maine.edu.

Nearly 1500 species of native plants are part of what makes Maine a unique place. Native plants—also called indigenous plants—are those that either originated here, or arrived without human intervention.

We have brought many nonnative plants—exotic or alien plants—to Maine as food, fiber, and landscape plants. In addition, we have introduced some nonnative plants unintentionally, as contaminants in crop seed, in the soil of other plants, and in ships' ballast.

Why are native plants important?

Native plants form the historical basis of our landscape, provide food and habitat for animals, and serve as natural sources of food, fiber, and other products.

Native plants can serve several functions in the landscape. Native shade trees such as red oak and white ash, and evergreens like white pine and eastern hemlock, form the structure of the natural landscape. Fruiting shrubs such as black chokeberry, gray dogwood, and winterberry provide food for wildlife and add seasonal interest to the landscape. Groundcovers like bearberry and creeping juniper can be planted to preserve a sense of open space while reducing the size of lawns. Native perennials and ferns can be used in woodland gardens.

To find out more about native plants that are useful in the landscape, see "Additional Resources" below.

Can nonnative plants cause problems?

Most of the nonnative plants we've introduced have a very positive impact on our society, and do not threaten our natural landscape. A few, however, have escaped cultivation and become naturalized. In some cases, invasive nonnative plants have displaced native plants, thereby degrading the integrity and diversity of our native plant communities. We've all witnessed the spread of purple loosestrife in our wetlands, where it has established large colonies and displaced native plants. Other invasive nonnative plants in Maine include multiflora rose, common and glossy buckthorns, shrubby honeysuckles, Asiatic bittersweet, Japanese knotweed, and Japanese barberry.

While native plants should form the major part of every landscape, selected noninvasive, nonnative plants can add beauty and interest. However, if these nonnative plants were planted exclusively, they would change the overall look of our collective landscape. Over time, our more heavily populated areas could become less "native" in appearance, and more dominated by nonnative trees, shrubs, and other plants. How Maine will look fifty years from now depends a great deal on what we choose to plant today. Each of us, in our own landscape, can play a part in preserving the integrity of the Maine landscape by using native plants.

Where can I get native plants for my landscape?

Below you will find a list, compiled in 2008, of Maine nurseries and garden centers that sell native plants. All of these companies sell propagated native plants only, and do not sell plants dug from the wild. Some sell only wholesale,

others only retail, and some do both. The list is coded to indicate which businesses sell trees, shrubs, perennials, ferns, vines, and groundcovers. Some nurseries and garden centers sell many types of native plants, while others specialize in just a few types. If you are looking for specific native plants, call ahead.

What else can I do to protect Maine's native landscape?

- Avoid disturbing natural areas or clearing land of native plants.
- Purchase only propagated native plants, not those dug from the wild.
- Do not purchase or plant invasive nonnative species.
- Discuss your concern about invasive nonnative plants with your local nursery or garden center professionals. Encourage them not to sell these plants, but rather to expand their offerings of propagated native plants.
- Learn to identify plants, so that you can learn more about them and determine if they have invasive tendencies. You can take samples of plants to local nurseries and garden centers for identification, or to your local county Extension office.
- Learn to identify and control invasive nonnative plants in your landscape (see "Additional Resources" below).
- Get involved in community efforts to control invasive nonnative plants on public lands.

Additional Resources available from UMaine Extension's publications catalog or 800-287-0274:

Gardening to Conserve Maine's Native Landscape, University of Maine Cooperative Extension bulletin #2500: provides a list of native plants that are useful in the landscape

Maine Invasive Plants, University of Maine Cooperative Extension series 2503: provides identification and control information for twenty-two terrestrial and aquatic invasive plants.

Maine Nurseries and Garden Centers Offering Native Plants			
KEY TO PLANT OFFERINGS: **T** = native trees **S** = native shrubs **V** = native vines and/or ground covers **P** = native perennials **F** = native ferns			
Company and Plant Offerings	**Address**	**E-mail; Web site**	**Phone** (area code 207)
WHOLESALE ONLY			
Burnt Meadow Nursery **T,S,V,P**	PO Box 25, Brownfield, Maine 04010	burntmeadow@hotmail.com; burntmeadownursery.com	890-74033
Groundnut Hill Nursery, Inc.* **T,S**	180 Logging Road, Cape Neddick, Maine 03902		361-1300
Pierson Nurseries, Inc.* **T,S,V,P,F**	291 Waterhouse Road, Dayton, Maine 04005	sales@piersonnurseries.com; www.piersonnurseries.com	499-2994
Salmon Falls Nursery and Landscaping* **T**	511 Portland Street, Berwick, Maine 03901>	mark@salmonfallsnursery.com	384-5540

Western Maine Nurseries* **T,S,V,F**	4 Nursery Lane, Fryeburg, Maine 04037	wmntrees@nxi.com; www.westernmainenurseries.com	935-2161
WHOLESALE AND RETAIL			
A.C. Parsons Landscaping and Garden Center **T,S,V,P,F**	71 Richtown Road, West Tremont, Maine 04612	landscaping@acparsons.com; www.acparsons.com	244-7785
Broadway Gardens, Inc* **T,S,V,P,F**	1640 Broadway, South Portland, Maine 04106		772-0415
Estabrook's Farm and Greenhouses* **T,S,V,P,F**	337 East Main Street, Yarmouth, Maine 04096	jim@estabrooksonline.com; www.estabrooksonline.com	846-4398
Fedco* **T,S,V,P,F**	PO Box 520, Waterville, Maine 04903	trees@fedcoseeds.com; www.fedcoseeds.com	873-7333
Gingerbread Farm Perennials* **P**	383 Old Winthrop Road, Wayne, Maine 04284	gblack1503@aol.com	685-4050
The Green Thumb **T,S,V,P,F**	RR 17, PO Box 22, West Rockport, Maine 04865		594-5070
Jillson's Farm Sugarhouse **P**	143 Jordan Bridge Road, Sabattus, Maine 04280	info@jillsonfarm.com; www.jillsonfarm.com	375-4486
KYC Gardens* **T,S**	124 Buxton Road, Saco, Maine 04072		282-0875
Longfellow's Greenhouses* **T,S,V,P,F**		lbabson@longfellowsgreenhouses.com; www.longfellowsgreenhouses.com	622-59655
Norpine Landscape, Inc **T,S**	153 Salem Road, Kingfield, Maine 04947	norpine@roadrunner.com; www.norpinelandscape.com	265-2430
Pinkham's Plantation **T,S,V,P,F**		pinkhams@roadrunner.com; www.pinkhamsplantation.com	563-50099
Plainview Farm, Inc * (plant list on Web site) **T,S,V,P,F**	529 Mountfort Road, North Yarmouth, Maine 04097	shpalmer@maine.rr.com; www.plainviewfarm.net>	829-5004, 800-396-1705
Pooh Corner Farm* **T,S,P,F**	436 Bog Road, Mason Township, Maine 04217	poohfarm@megalink.net; www.poohfarm.com	836-3276
Risbara's Greenhouse, Inc. **T,S,V,P,F**	426 Randolph Street, Portland, Maine 041033	urisbara@maine.rr.com; www.risbarasgreenhouse.com	797-0066
Roaring Brook Nurseries **T,S**	639 Gardiner Road, Wales, Maine 04280		375-4884

Skillin's Greenhouses* **T,S,V,P,F**	89 Foreside Road, Falmouth, Maine 04105	skillins@maine.rr.com; www.skillins.com	800-244-3860
Sprague's Nursery **T,S,V,P,F**	1664 Union Street, Bangor, Maine 04401	info@spraguesnursery.com; www.spraguesnursery.com	942-1394
Surry Gardens* **T,S,V,P,F**	PO Box 145, Surry, Maine 04684	surrygardens@downeast.net; www.surrygardens.com	667-4493
RETAIL ONLY			
Agricola Farms **P**	Rt 17 & Clarry Hill Road, Union, Maine 04862	veggies4u2@aol.com	
Alheri Gardens* **T,S,V,P**	Gray, Maine [plants sold at Portland Farmers' Market only]		657-4358
Allen, Sterling, and Lothrop* **T,S,V,P,F**	191 US Route 1, Falmouth, Maine 04105	lallensterling@maine.rr.com; www.allensterlinglothrop.com	781-4142
Aroostook Milling Company **T,S,V,P**	PO Box 129, 5 Hillview Avenue, Houlton, Maine 04730-0129	amcgrain@mfx.net	532-6130/7917
Beach Lobster and Farm Stand* **P**	<35 Saco Avenue, Old Orchard Beach, Maine 04064		934-3357
Blackrock Farm **T,S,V,P,F**	293 Goose Rocks Road, Kennebunkport, Maine 04046	info@blackrockfarm.net; www.blackrockfarm.net	967-5783
Blackwell Hill Nursery* **T,S,P,F**	265 Blackwell Hill Road, Madison, Maine 04950	blackwellhillnursery@beeline-online.net	696-3709
Blais Flower Shop and Greenhouse **P,F**	539 Webster Street, Lewiston, Maine 04240	salesblaisflowers@midmaine.com	783-8566, 1-800-783-8568
Boynton's Greenhouse, Inc* **S,V,P,F**		boyntons@beeline-online.net; www.boyntonsgreenhouses.com	474-28922
Cottage Garden Center **T,S,V,P,F**		cottage@tidewater.net	563-51388
Cranberry Creations* **V**	905 Sandy River Road, Mount Vernon, Maine 04352	wildcran@fairpoint.net; www.cranberrycreations.com	293-4055
Designs Florist and Interiors* **P**	2 Mechanic Street, PO Box 207, Bethel, Maine 04217	designs@megalink.net; www.janetblack.com	824-0888
Down to Earth Gardens **T,S,P,F**	1452 New Sweden Road, Woodland, Maine 04736		492-4162

Ellis Greenhouse and Nursery* **V,P**	PO Box 71, Hudson, Maine 04449	kellis@ellisnursery.com; www.ellisnursery.com	327-4674
Evermay Nursery* **P**	84 Beechwood Avenue, Old Town, Maine 04468	(e-mail form on Web site); www.evermaynursery.com	827-0522, 991-4467
Farmhouse Greenhouse **P**	346 Fort Fairfield Road, Caribou, Maine 04736	mcnjb@yahoo.com	227-2754
Fieldstone Gardens, Inc* **T,S,V,P,F**	55 Quaker Lane, Vassalboro, Maine 04989	info@fieldstonegardens.com; www.fieldstonegardens.com	923-3836
Flying Llama Farm* **T,S,V,P,F**	34 Jeffrey Woods Road, Windham, Maine 04062	bobfromllamafarm@gmail.com	892-0293
Focal Point Gardens **T,S,V,P,F**	1049 Alfred Road, Route 111, Arundel, Maine 04046		282-7700
Getchell Nursery* **T**	37 Getchell Corner Road, Vassalboro, Maine 04989	getch@midmaine.com	872-96133
Granite Gardens **S,V,P,F**	6 Wallston Road, Tenants Harbor, Maine 04860	granitegardens@verizon.net	372-0518
Green Art* **S,P,F**	30 Route 1 Bypass, Kittery, Maine 03904	rockcress@greenart.com; www.greenart.com	439-7700
Half Moon Gardens, Inc **F**	54 Greenhouse Lane, Thorndike, Maine 04986	info@halfmoongarden.com; www.halfmoongarden.com	568-3738
Hedgerow* **T,S,V,P,F**	8 Ridge Road, Tenants Harbor, Maine 04860	www.hedgerowdesign.com	372-0655
The Heirloom Garden of Maine* **V,P**	513 North Ridge Road, Montville, Maine 04941	info@theheirloomgarden.com; www.theheirloomgarden.com	342-22166
Hidden Gardens* **S,P,F**	96 Seekins Road, Searsport, Maine 04974		548-2864
Hoboken Gardens, Inc **T,S,V,P,F**	310 Commercial Street, Rockport, Maine 04856	askus@hobokengardens.com; www.hobokengardens.com	236-3023
The Little Red Greenhouse* **S,P,F**	34 Fellows Farm Road, Fayette, Maine 04349	jpgreifzu@hotmail.com	293-3159
Mainely Natives* **T,S,P,F**	436 South Hiram Road, Hiram, Maine 04041	mainelynatives@yahoo.com	625-8303
Mainescape Garden Shop **T,S,V,P,F**	PO Box 356, 48 South Street, Blue Hill, Maine 04614	mainescape@mainescape.com; www.mainescape.com>	374-2833, 800-244-2833
Mapes Garden Center* **T,S,V,P,F**	97 York Street, Kennebunk, Maine 04043	mapesgarden@gwi.net	985-3772
Maple Ridge Farm* **V,P,F**	1205 Cape Road, Limington, Maine 04049	gbloomers@fairpoint.net	637-28300

McLaughlin Garden **V,P,F**	PO Box 16, 97 Main Street, South Paris, Maine 04281	mclgardn@megalink.net; www.mclaughlingarden.org	743-8820
Moody's Nursery and Garden Center* **T,S,V,P,F**	82 Ferry Road, Saco, Maine 04072	moodysnursery@prexar.com; www.moodysnursery.com	284-72333
Mount Blue Agway **S,V,P,F**	912 US Route 2, Wilton, Maine 04294	sales@mtblueagway.com; www.mtblueagway.com	778-40544
Mountain Greenery Greenhouse **T,S,V,P**	590 West Bethel Road, Bethel, Maine 042177		836-3003
Mountain Greenery **T,S,V,P**	3706 Main Street, Rangeley, Maine 04970	info@mountain-greenery.com; www.mountain-greenery.com	864-2000
Mysty Mountain Farm* **T,S,P,F**	388 Upper Street, Turner, Maine 04282	packrats@megalink.net	225-3915
Naturescape Landscaping **T,S,V,P**	256 Oak Hill Road, Norridgewock, Maine 04957		634-5267
NewLand Nursery and Landscaping* **T,S,V,P,F**	PO Box 1133, 124 Bangor Road, Ellsworth, Maine 04605	newlandnursery@roadrunner.com; www.newlandnursery.com	667-7333
O'Donal's Nursery, LLC* **T,S,V,P,F**	6 County Road, Gorham, Maine 04038	onurser1@maine.rr.com; odonalsnurseries.com	839-4262
Paradis Nursery and Garden Center **T,S,V**	3675 Middle Road, Sidney, Maine 04330	paradis@dialmaine.com	547-4640
Pelletier Florist **T,S,V**	500 West Main Street, Fort Kent, Maine 04743	pellflorist@pivot.net; www.pelletierflorist.com	834-5241
The Potting Shed **P,F**	401 Main Street, Kingfield, Maine 04947		265-4566
Provencher's Landscape and Nursery, Inc. **T,S,V,P,F**	299 River Road, Lewiston, Maine 04240	rogerpln@adelphia.net	783-9777
Rebel Hill Farm* **P**	313 Rebel Hill Road, Clifton, Maine 04428		843-6916
Rippling Waters Organic Farm* (plant list on Web site) **P**	55 River Road, Steep Falls, Maine 04085	ripplingwatersfarm@gmail.com; www.ripplingwaters.org	642-5161
Robin's Flower Pot* **T,S,V,P,F**	387 Webster Road, Farmington, Maine 04938	garden@robinsflowerpot.com; www.robinsflowerpot.com	778-59377

Seashore Gardens* **V,P,F**	1748 Route 32, Round Pond, Maine 04564	fleurdelis@gwi.net	529-4372
Snell Family Farm **P**	PO Box 326, 1000 River Road, Bar Mills, Maine 04004	info@snellfamilyfarm.com; www.snellfarmilyfarm.com	929-5318; 929-6166
D.R. Struck Landscape Nursery **T,S,V,P,F**	Route 202, Box 2215, Winthrop, Maine 04364	drstruck@fairpoint.net	395-41122
Sunnyside Gardens* **S,P,F**	500 North Parish Road, Turner, Maine 04282	sunnyside@megalink.net; www.sunnysidegardens.com	225-3998
Through the Garden Gate **V,P**	438 Exeter Road, Corinna, Maine 04928	caddy@gwi.net	341-0191
Union Agway* **S,V,P**	2179 Heald Highway, Union, Maine 04862	uagway@tidewater.net; www.unionagway.com	785-4385
Wild Iris Herb Farm* **P,F**	Route 91, Kingsbury Lane, York, Maine 03909	lucy@wildirisherbfarm.com; wildirisherbfarm.info	363-4153
Windswept Gardens, LLC **T,S,V,P,F**	1709 Broadway, Bangor, Maine 04401	bob@windsweptgardens.com; www.windsweptgardens.com	941-9898

*plant list/catalog is available

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COASTAL PLANTING GUIDE

Planting for Slope Stabilization on Maine's Coastal Bluffs

Coastal Bluffs—defined as "a steep shoreline slope formed in sediment (loose material such as clay, sand, and gravel) that has three feet or more of vertical elevation just above the high tide line" (Maine Geological Survey)—make up about 38% of Maine's coastline. Unstable bluffs can erode slowly or suddenly collapse, forming landslides. Some amount of bluff erosion is expected, and is beneficial to replenishment of beaches and other shoreline areas. However, because of significant risks to life and property, landowners and shoreline managers may wish to temper the speed of bluff erosion and reduce the risk of sudden collapse.

The stability of a coastal bluff is influenced by interactions with both the land and sea. This guide includes information for one of the most critical factors affecting bluff erosion rates and overall stability: vegetation. When selecting plant varieties for slope stabilization, there are many factors to be considered, including salt tolerance, soil depth, and water availability. This guide recommends native Maine plants that can be used to stabilize coastal shorelines and that have been determined to be suitable for restoration that uses a living, natural shoreline instead of armoring (such as with rip rap). Plant species are organized by whether they are classified as woody or herbaceous and whether they are recommended for shallow soil (<18") or deep soil (>18").

Not all bluff shorelines are suitable for living shorelines. Prior to planting a living shoreline, see the Suitability Table (**Table 1**), to determine if your site is suitable. If a shoreline is not a suitable option for stabilization, alternatives to traditional hard armoring should be considered. For example woody debris can be placed on or anchored to shorelines. In some cases "root wads" (also known as toe wood), as shown in **Figure 1**, may be used as an alternative. Woody structures can help protect and armor exposed soil, particularly in areas that receive large waves, by absorbing the wave energy.

Figure 1. Root wads inserted into unstable banks can help protect bare soil from erosion, from a project in coastal Oregon. In areas not suitable for living shorelines, root wads can be an effective alternative providing stabilization and habitat.

Image source: BioEngineering Associates, *http://bioengineers.com/seaside/*

Slope Stabilization

Planting a mixture of woody and herbaceous plants will provide the best possible stabilization for slopes, because they have different root structures. Herbaceous plants primarily have many fine roots that grow near the surface to hold soil together. Woody plants have some fine roots that spread along the surface but also have larger roots that grow deeper in the ground, anchoring both the plant and the soil. Using a mixture of herbaceous and woody plants reduces erosion of the top layer of soil and secures soil to the slope, which decreases the potential for shallow slope failures. Slopes greater than approximately 18° may not be suitable for a living shoreline (using plantings for stabilization). Instead, root wads or armoring (such as rip-rap, gabion baskets, or other engineered structures) may be needed, depending on site conditions.

Soil Depth

Soil depth is the measure of the amount of topsoil down to a substrate where plants will not grow. Poor substrate includes bedrock, clay, or coarse nutrient-poor soils. Soil depth will limit the variety of woody plants that can be used, since many have long tap roots that require more than 18 inches of soil. Some species are able to grow into bedrock, which can enhance slope stability temporarily. Over time the roots may cause cracks and contribute to slope failure. This guide separates woody and herbaceous plants into a) those recommended for shallow soils and b) those recommended only for deep soils. The combination of a steep slope and shallow soil may increase the possibility that trees will fall.

Salt Tolerance

For plantings on coastal shorelines, it is important to consider the environmental and physical stresses these plants may experience because of their proximity to the ocean. **It is important to consider the effect of wave heights and "splash-over" on the site.** This guide includes plants with varying degrees of salt tolerance, as follows:

- **Low Tolerance -** can survive occasional salt spray directly on the leaves or in the surrounding soils
- **Medium Tolerance -** can survive occasional soil saturation of salt water or frequent salt spray
- **High Tolerance -** can survive frequent or constant soil saturation and salt spray

Recommended Placement on Bank

Plants should be placed in different zones (toe, lower bank, or upper bank) on the shoreline, depending on their water needs and salt tolerance. As shown in **Figure 2**, the toe zone falls between the mean low water line and the extent of the highest annual tide, known as the intertidal zone. The lower bank rises from the line of highest annual tide to a point roughly midway between top of the bank and the bottom where it transitions to the upper bank.

Plants that prefer wet soils and have a high salt tolerance should be placed on the toe of the bank. The toe is the closest zone to the waterbody and typically has soils that are saturated with fresh or salt water. Plants that prefer moist soils should be placed in the lower bank zone, where soils are typically damp but not completely saturated. Plants that prefer dry soils should be placed in the upper bank zone, where soils are less likely to be saturated by the adjacent water body. When placing plants in the lower bank, be mindful of the areas that may receive salt spray under storm conditions.

Plants with low salt tolerance can be planted on a bluff's upper bank.

Recommendations in low wave size areas assume that the upper bank will receive highly infrequent salt spray and no salt water saturation. Plants do not need to be salt tolerant but do need to prefer dry soil. The lower bank assumes infrequent salt spray and no salt water saturation. Plants do not need to be salt tolerant. The toe assumes frequent salt spray or salt water saturation. Plants need to have a high to medium salt tolerance.

When choosing plants, be mindful of how frequently the lower bank zone receives saltwater spray as you may need to select plants that are salt tolerant.

Table 1. Suitability Table - This table help to determine whether a living shoreline (a shoreline that is stabilized by vegetation) is an option for your site. Links to geographic information using Google Earth are provided as necessary.

Factor	Criteria	Scoring	My Site
Annualized Weighted Fetch* How far are waves traveling before they break? *Estimate the distance over open water between your coastline and the nearest significant land area.* Contact Maine Geological Survey for this information (see box below).	Very Low (<=0.5 mile)	8	
	Low (>0.5 and <=1 mile)	6	
	Med (1-3 miles)	2	
	High (3-5 miles)	1	
	Very High (>5 miles)	0	
Nearshore Slope How deep is the water? How quickly does it get deeper? http://www.charts.noaa.gov/	Shallow: Less than 3 feet deep at 100 feet out from the High Tide line	6	
	Deep: More than 3 feet deep at 100 feet out from the High Tide line	0	
Landward shoreline type From the mean high water line: what does the land look like where you are considering planting? *Note: A scarp is a sharp bank or cliff*	Wetlands, swamps, marshes	6	
	Beaches, Scarps, and Banks	5	
	Protected from wind; armored with rip-rap	3	
	Exposed shores armored with rip-rap	1	
Seaward shoreline type From the mean high water line: what does the land look like where it meets the water?	Marsh	6	
	Beach	5	
	Low speed channel	3	
	High speed channel	1	
	Rocky ledge or man-made features	0	
Sunlight Which direction does your site face?	South, Southeast, or southwest	6	
	East or west	4	
	Northeast or northwest	2	
	North	0	
Upland slope How steep is the bank closest to the water? http://www.maine.gov/megis/catalog/kml/wms/medem2_slope.kml	0-3%	6	
	4-9%	5	
	10-15%	4	
	16-30%	2	
	>30%	1	
Relief What is the average elevation 50 feet away from the water? http://www.maine.gov/megis/catalog/kml/wms/medem2.kml	0-5 feet	6	
	5-10 feet	5	
	10-20 feet	3	
	20+ feet	1	
		Total	

For help determining the **Annualized Weighted Fetch,** contact Maine Geological Survey: (207) 287-2801 or mgs@maine.gov

Table 2. Suitability Scoring Key, Total Points

Highly Unsuitable	3-7
Unsuitable	8-14
Possibly Suitable	15-21
Suitable	22-29
Highly Suitable	30-44

Adjusting Placement for Wave Size

Some coastal shore plantings will be impacted by wave energy, water, and salt exposure. The typical wave size for your planting location may affect how close to the water plants can survive. The area that constitutes the toe, or base, of the bank may not be able to support plant life if there are tall waves frequently crashing against it. In this case, it is the use of root wads is recommended to absorb the impact of the waves and guard the soil on the bank against erosion. (Note: installation of root wads requires state and local permits.) This guide recommends adjusting the plant placement in consideration of high predicted wave size. **High wave size (>2 feet over the mean high water line) will increase the amount of the bank that receives salt spray.**

Recommendations in high wave size areas assume that the upper bank will receive occasional salt spray. Plants should have at least some tolerance for salt exposure. The lower bank will receive frequent salt spray and occasional soil saturation. Plants should have at least a medium tolerance for salt. Given high wave sizes, planting on the toe is not recommended, and root wads should be used, if possible. Plants with no or unknown salt tolerance are not recommended for shorelines with high wave sizes.

Detailed Shoreline Types:

Marsh - Includes fresh/brackish marsh or water, fluvial marsh, salt pannes/ponds, low and high salt marsh, mud flats, eelgrass flat, seaweed community, mussel bars

Beach - Includes sand beach, gravel beach, mixed sand and gravel beach, boulder beach, boulder ramp, low energy beach, spit, washover fan, swash bars, dunes and beach ridges, upper shoreface, coarse-grained flats

Low Speed Channel - Includes tidal fluvial channel, abandoned channel, estuarine channel, low velocity channel

High Speed Channel - Influenced by tide, weather, or dredging

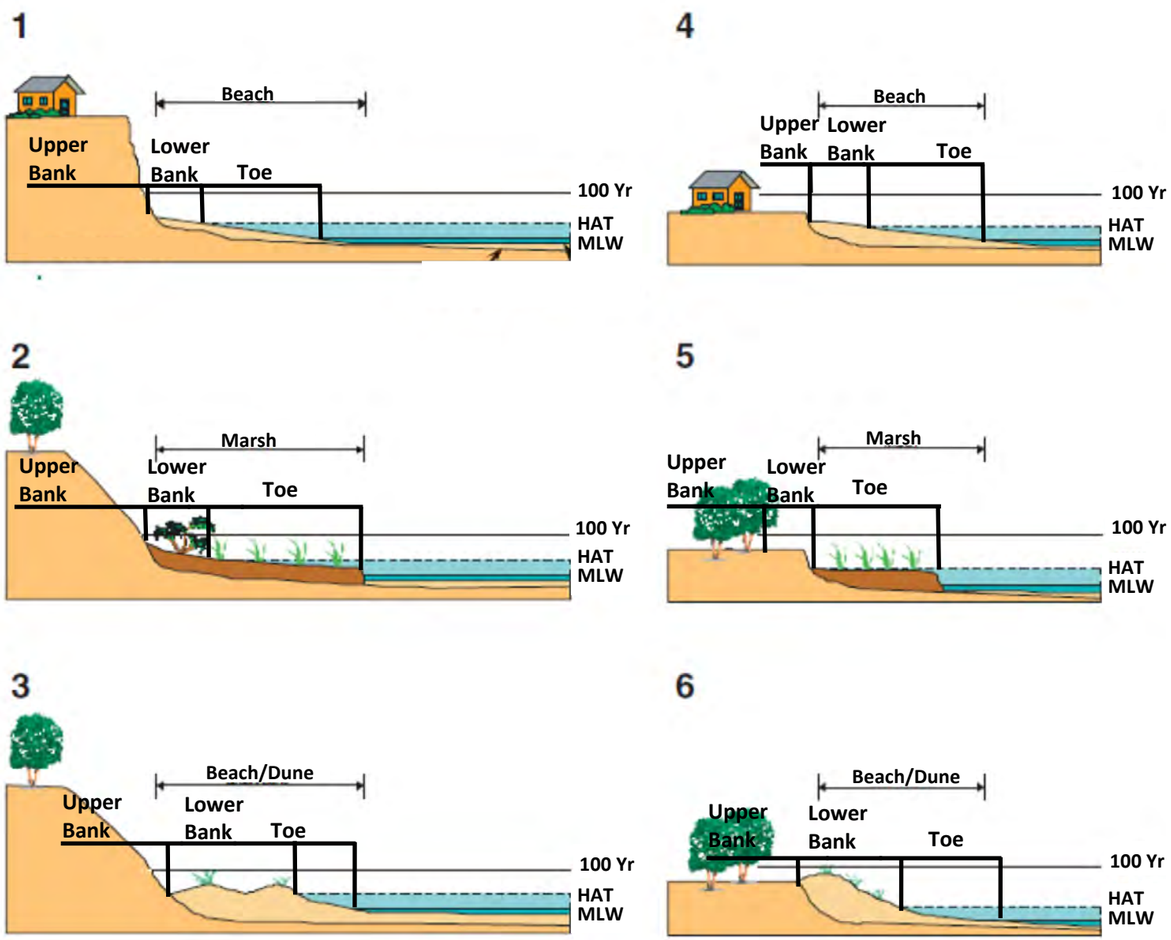


Figure 2. The toe, lower bank, and upper bank zones vary from site to site, depending on land formation and habitats. The toe is always found closest to the water and falls between the mean low water (MLW) line and the highest average tide (HAT) line. The bottom of the lower bank is always at the HAT line.
Image adapted from: Hardaway and Byrne, 1999.

Resiliency

Coastal plants experience extreme conditions and must be resilient to changing water and weather conditions. For coastal shoreline plants on the toe and lower bank, it is important to select for resilience. Being adjacent to fresh water means water table may rise and drop throughout a season. Plants in these zones must be able to adapt to having either saturated soils or drought for stretches of time. This guide indicates which plants are more resilient to these varying extreme conditions.

Tolerance of Wet Conditions

Water discharged from soil along bedrock may contribute to poor coastal slope stability. For shoreline areas that experience inputs of freshwater, either from streams, wetlands, or stormwater runoff, it is best to select plants that are indicated tolerant of wetland conditions. Using wetland vegetation in areas that receive freshwater can help control the amount of water draining through the soil. Plants indicated to be wetland tolerant in this guide may be placed in wet areas including areas that accumulate stormwater and wetlands. Species will vary based on salt tolerance.

Using wetland plants in areas that receive freshwater from streams, wetlands, or runoff can help reduce slumping caused by saturated soils.

Herbaceous Grasses

These plants are best for planting in marshes, dunes, beaches, or other shoreline areas.

Plant Species		Salt Tolerance				Recommended Location on Bank: Low Predicted Wave Size			Recommended Location on Bank (continued): High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerant	
Common Name	Scientific Name	High	Med	Low	None	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
American Beach Grass	*Ammophila breviligulata*	X					X	X		X		X		X				X
Big Blue Stem	*Andropogon gerardii*		X				X			X		X		X	X			X
Bulrushes	*Scirpus sp.*		X				X			X							X	
Canada Reed Grass/ Bluejoint	*Calamagrostis canadensis*				X		X				X			X			X	
Foxtail Barley	*Hordeum jubatum*		X			X	X	X	X	X				X				X
Green Saltgrass	*Distichlis spicata*	X						X			X	X		X			X	
Saltmeadow Cordgrass	*Spartina patens*	X						X			X		X	X			X	
Saltmeadow Rush	*Juncus gerardii*	X						X			X						X	
Smooth Cordgrass	*Spartina alterniflora*	X						X			X		X	X			X	
Sweetgrass / Vanilla Swamp Grass	*Hierochloe odorata*		X				X	X		X		X		X				X
Switchgrass / Panic Grass	*Panicum virgatum*		X				X	X		X		X		X	X			X

Herbaceous Low Perennials

These plants are best for planting in shallow soils on steep slopes.
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank			Recommended Location on Bank (continued)									
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size			High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerant	
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
Barren Strawberry*	*Waldsteinia fragarioides*	X						X			X				X	X	X		X
Beach Pea / Sea Pea / Sea Vetchling	*Lathyrus japonicus*		X					X	X		X		X		X	X		X	X
Bellflower	*Campanula rotundifolia*					X	X					X			X	X			X
Black-eyed Susan*	*Rudbeckia laciniata*		X				X	X		X				X	X	X			X
Blood-root*	*Sanguinaria canadensis*					X	X					X				X	X	X	
Blue Cohosh	*Caulophyllum thalictroides*				X		X	X				X		X		X	X	X	
Boneset* (Throughwort)	*Eupatorium perfoliatum*		X					X	X		X		X		X	X		X	
Bunchberry / Canada Dwarf Dogwood	*Chamaeperclymenum canadensis*				X		X	X				X		X			X	X	
Cardinal Flower*	*Lobelia cardinalis*				X		X	X				X			X	X		X	
Red / Wild Columbine*	*Aquilegia canadensis*	X						X			X		X		X	X			X
Common Yarrow*	*Achillea millefolium*			X			X	X		X			X		X				X
Coneflower*	*Echinacea angustifolia*			X			X	X		X				X	X				X
Evening Primrose	*Oenothera biennis*				X		X	X				X	X		X	X		X	
Fleabane	*Erigeron sp.*					X	X					X			X	X			X
Foamflower*	*Tiarella cordifolia*				X			X	X			X				X	X	X	
Helen's Flower*	*Helenium autumnale & flexuosum*			X				X				X		X	X			X	
Indian Cucumber-root	*Medeola virginiana*					X	X	X				X				X	X		X
Blue Flag Iris*	*Iris versicolor*				X			X				X		X	X	X		X	
Jack-in-the-Pulpit*	*Arisaema triphyllum*			X			X	X		X				X		X	X	X	
Jewelweed	*Impatiens capensis*				X			X				X		X				X	
Lupine*	*Lupinus perennis*		X				X	X		X	X				X	X			X
Marsh Marigold*	*Caltha palustris*		X					X			X			X	X	X		X	

Herbaceous Low Perennials (continued)

Plant Species							Recommended Location on Bank			Recommended Location on Bank (continued)									
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size			High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerant	
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
Milkweed*	*Asclepias incarnata & A. syriaca*				X		X	X				X		X	X			X	
New England Aster*	*Symphyotrichum novae-angliae*		X					X			X				X	X		X	
Obedient Plant	*Physostegia virginiana*		X					X	X		X				X	X		X	
Pearly Everlasting	*Anaphalis margaritacea*				X		X	X				X	X		X				X
Sea Lavender	*Limonium carolinianum*	X						X	X		X			X		X		X	
Seaside Goldenrod	*Solidago sempervirens*	X						X			X			X	X			X	
Silverweed	*Argentina anserina*			X			X			X				X	X			X	
Solomon's Seal*	*Polygonatum pubescens*					X		X				X				X	X		X
Spikenard*	*Aralia racemosa*					X	X	X				X				X	X		X
Spotted Joe-Pye Weed*	*Eupatorium maculatum*		X					X			X				X	X			X
Sweet Fern*	*Comptonia peregrina*		X				X	X		X	X		X		X	X			X
Sweet Flag	*Acorus americanus*				X			X				X		X	X	X		X	
Tall Meadow Rue	*Thalictrum pubescens*					X		X				X			X	X		X	
Thin-leaved Sunflower	*Helianthus decapetalus*				X			X				X			X				X
Trout-Lily	*Erythronium americanum*					X		X				X				X	X		X
Turtlehead*	*Chelone glabra*				X			X				X			X	X		X	
Violet*	*Viola sp.*					X		X				X			X	X		X	
Virgin's Bower*	*Clematis virginiana*				X			X				X		X	X	X		X	
White Baneberry	*Actaea pachypoda*			X			X	X		X						X	X		X
Wild-Oats	*Uvularia sessilifolia*					X		X				X				X	X	X	
Wintergreen*	*Gaultheria procumbens*				X			X				X	X			X	X		X
Yellow Bluebead-lily	*Clintonia borealis*				X		X	X				X		X		X	X	X	

Herbaceous Ferns

These plants are best for planting in shallow soils on steep slopes.
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank			Recommended Location on Bank (continued)									
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size			High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerant	
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
Bracken Fern	*Pteridium aquilinum*					X	X	X				X		X					X
Christmas Fern*	*Polystichum acrostichoides*					X		X				X				X	X		X
Cinnamon Fern*	*Osmunda cinnamomea*			X			X	X		X			X		X	X	X		X
Hay-scented Fern*	*Dennstaedtia punctilobula*					X	X	X				X				X	X		X
Interrupted Fern*	*Osmunda claytoniana*				X			X				X		X		X	X	X	
Lady Fern*	*Athyrium filix-femina*				X		X	X				X		X		X	X	X	
Long Beech Fern	*Phegopteris connectilis*					X		X				X				X	X		X
Maidenhair Fern*	*Adiantum pedatum*				X			X				X		X		X	X		X
Marginal Wood Fern*	*Dryopteris marginalis*				X		X	X				X			X	X			X
Ostrich Fern*	*Matteuccia struthiopteris*					X		X				X				X	X	X	
Royal Fern*	*Osmunda regalis*				X			X				X		X	X	X	X	X	
Sensitive Fern	*Onoclea sensibilis*			X				X				X		X	X	X	X	X	
Spinulose Wood Fern	*Dryopteris carthusiana*					X	X	X				X				X	X	X	

Cinnamon Fern

Woody Low Shrubs

These plants are best for planting in shallow soils on steep slopes.
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank		
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size		
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe
American Fly Honeysuckle	*Lonicera canadensis*				X		X		
Bearberry*	*Arctostaphylos uva-ursi*	X					X		
Bog Rosemary*	*Andromeda polifolia*			X				X	
Bush Cinquefoil	*Potentilla fruticosa*	X					X	X	X
Cranberry*	*Vaccinium macrocarpon*					X		X	X
Creeping Juniper*	*Juniperus horizontalis*		X				X	X	
Fox Grape	*Vitis labrusca*					X		X	
Huckleberry	*Gaylussacia baccata*				X		X	X	
Labrador Tea*	*Ledum groenlandicum*			X				X	
Leatherwood	*Dirca palustris*					X		X	
Meadowsweet*	*Spiraea alba*		X					X	X
Partridgeberry	*Mitchella repens*					X		X	
Pasture Rose	*Rosa carolina*	X					X	X	
Rhodora*	*Rhododendron canadense*				X			X	
Running Serviceberry	*Amelanchier spicata*					X		X	
Sheep Laurel*	*Kalmia angustifolia*		X				X	X	
St. Johnswort	*Hypericum perforatum*				X		X	X	
Virginia Creeper*	*Parthenocissus quinquefolia*		X				X	X	X
Virginia Rose	*Rosa viginiana*	X					X	X	X

Recommended Location on Bank (continued)									
High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
		X		X	X	X			X
X			X		X	X			X
		X			X	X		X	
X	X				X	X			X
		X			X			X	
X	X		X		X				X
		X			X				X
		X	X			X			X
		X		X		X			X
		X					X		
	X				X	X		X	
		X					X		X
X	X		X		X	X			X
		X		X	X			X	
		X			X	X			X
X	X				X	X		X	
		X	X		X	X			X
X	X		X		X	X	X	X	
X	X		X		X	X		X	

Woody Medium Shrubs

These plants are best for planting in shallow soils on gradual slopes
* Indicates additional details and photo included

Plant Species		Salt Tolerance					Recommended Location on Bank: Low Predicted Wave Size		
Common Name	Scientific Name	High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe
Am. Cranberry Viburnum	*Viburnum trilobum*				X			X	
American Yew*	*Taxus canadensis*			X				X	
Beach Plum*	*Prunus maritima*	X					X	X	
Bush Honeysuckle*	*Diervilla lonicera*				X		X		
Common Elderberry	*Sambucus canadensis*			X				X	
Flowering Raspberry*	*Rubus odoratus*				X			X	
Highbush Blueberry*	*Vaccinium corymbosum*	X						X	
Hobblebush	*Viburnum alnifolium*				X			X	
Lingonberry	*Vaccinium vitis-idaea*			X			X	X	
Mapleleaf Viburnum*	*Viburnum acerifolium*				X		X	X	
Northern Bayberry*	*Myrica pensylvanica*		X				X	X	
Red Chokeberry *	*Aronia arbutifolia*	X						X	
Silky Dogwood	*Cornus amomum*			X				X	
Smooth Sumac	*Rhus glabra*		X					X	
Smooth Witherod	*Viburnum nudum*					X		X	
Swamp Rose	*Rosa palustris*			X				X	
Sweet Gale (Bayberry)	*Myrica gale*				X			X	
Sweet Pepperbush *	*Clethra alnifolia*	X						X	
Witch Hazel	*Hamamelis virginiana*				X			X	

Recommended Location on Bank (continued): High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
		X		X	X	X		X	
		X		X		X	X		X
X	X		X		X	X			X
		X	X		X	X	X		X
		X	X		X	X		X	
		X		X	X	X	X		
	X		X		X	X		X	
		X	X		X	X	X		X
X				X	X	X	X	X	
		X	X		X	X			X
X	X		X			X		X	
	X				X	X		X	
		X	X		X	X		X	
	X		X		X				X
		X			X	X		X	
		X	X		X	X		X	
		X	X		X	X		X	
	X				X	X		X	
		X		X	X	X		X	

Woody Tall Shrubs

These plants are best for planting in shallow soils on gradual slopes
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank		
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size		
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe
Arrowwood*	*Viburnum dentatum*	X						X	
Beaked Hazelnut	*Corylus cornuta*				X		X		
Black Chokeberry*	*Aronia melanocarpa*			X			X	X	
Buttonbush*	*Cephalanthus occidentalis*		X					X	X
Common Juniper*	*Juniperus communis*	X					X	X	
Gray Dogwood*	*Cornus racemosa*		X				X	X	X
Hazelnut*	*Corylus americana*				X		X		
Nannyberry*	*Viburnum lentago*				X		X	X	
Red-osier Dogwood*	*Cornus alba*				X			X	X
Smooth Alder	*Alnus serrulata*				X			X	X
Snowball Bush	*Viburnum opulus*			X				X	
Spirea	*Spirea sp.*					X	X	X	X
Staghorn Sumac*	*Rhus typhina*					X	X		
Winged Sumac	*Rhus copallina*				X		X		
Winterberry*	*Ilex verticillata*			X				X	
Witherod Viburnum*	*Viburnum cassinoides*				X			X	

Recommended Location on Bank (continued)									
High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
	X				X	X		X	
		X		X	X	X			X
X					X	X		X	
	X		X		X			X	
X	X		X		X				X
X	X		X		X	X	X	X	
		X		X	X	X			X
		X	X		X	X	X	X	
		X	X		X	X		X	
		X	X		X			X	
		X	X		X	X		X	
X					X			X	
X			X		X				X
		X	X		X	X			X
		X		X	X	X		X	
		X		X	X	X			X

Woody Small Trees

These plants are best for planting in deep soils on gradual slopes.
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank			Recommended Location on Bank (continued)									
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size			High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
American Hornbeam*	*Carpinus caroliniana*				X		X	X				X		X		X	X	X	
American Mountain Ash	*Sorbus americana*				X			X				X		X	X	X		X	
Blackhaw*	*Viburnum prunifolium*				X		X	X				X		X		X			X
Canada Plum	*Prunus nigra*				X			X				X		X	X	X	X		X
Chokecherry*	*Prunus virginiana*	X						X			X		X		X	X			X
Cockspur Hawthorn*	*Crataegus crus-galli*	X						X			X			X	X	X		X	
Common Witchhazel*	*Hamamelis virginiana*				X			X				X		X	X	X	X	X	
Eastern Red Cedar	*Juniperus virginiana*	X						X			X		X		X				X
Ironwood	*Ostrya virginiana*				X			X				X		X		X			X
Mountain Maple	*Acer spicatum*				X			X				X		X	X	X			X
Northern Arrowwood	*Viburnum recognitum*					X		X				X			X	X		X	
Pagoda Dogwood*	*Cornus alternifolia*				X			X				X		X	X	X	X		X
Pussy Willow*	*Salix discolor*		X					X			X		X		X			X	
Sassafras*	*Sassafras albidum*		X					X			X			X	X	X			X
Scarlet Elder	*Sambucus racemosa*				X			X				X		X	X				X
Serviceberry	*Amelanchier sp*		X				X	X		X	X			X	X	X		X	
Shadblow Serviceberry*	*Amelanchier canadensis*	X						X			X		X			X		X	
Speckled Alder	*Alnus incana*		X					X			X		X		X	X	X	X	
Striped Maple*	*Acer pensylvanicum*		X					X			X			X		X	X		X

Woody Tall Trees

These plants are best for planting in deep soils on gradual slopes
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank		
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size		
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe
American beech	*Fagus grandifolia*			X				X	
Balsam Fir*	*Abies balsamea*		X					X	
Basswood (Linden)	*Tilia americana*				X			X	
Bigtooth Aspen	*Populus grandidentata*		X					X	
Black Cherry	*Prunus serotina*		X					X	
Black Spruce	*Picea mariana*				X			X	
Black Willow	*Salix nigra*		X					X	
Blackgum	*Nyssa sylvatica*	X						X	
Eastern White Pine*	*Pinus strobus*			X			X	X	
Gray Birch	*Betula populifolia*	X						X	
Green Ash*	*Fraxinus pennsylvanica*			X				X	
Hemlock*	*Tsuga canadensis*				X		X	X	
Jack Pine	*Pinus banksiana*			X			X		
Larch*	*Larix laricina*		X					X	
Mountain Ash	*Sorbus alnifolia*					X	X		
Northern Red Oak	*Quercus rubra*		X				X	X	
Paper Birch	*Betula papyrifera*		X				X	X	
Pin Cherry	*Prunus pensylvanica*				X			X	
Quaking Aspen	*Populus tremuloides*		X					X	
Red Maple	*Acer rubrum*		X					X	
Red Pine*	*Pinus resinosa*				X		X	X	

Recommended Location on Bank (continued)									
High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
		X	X		X	X			X
	X			X	X	X		X	
		X		X	X	X			X
	X			X	X				X
	X			X	X				X
		X		X	X			X	
	X		X		X			X	
	X			X	X	X		X	
X				X	X	X	X		X
	X			X	X			X	
		X	X		X	X		X	
		X		X	X				X
X				X	X				X
	X			X	X			X	
		X			X				X
X	X			X	X				X
X	X			X	X				X
		X		X	X				X
	X			X	X				X
	X		X		X	X		X	
		X		X	X				X

Woody Tall Trees (continued)

These plants are best for planting in deep soils on gradual slopes
* Indicates additional details and photo included

Plant Species							Recommended Location on Bank			Recommended Location on Bank (continued)									
Common Name	Scientific Name	Salt Tolerance					Low Predicted Wave Size			High Predicted Wave Size			Resiliency		Sun Requirements			Wetland Tolerance	
		High	Med	Low	None	Unknown	Upper Bank	Lower Bank	Toe	Upper Bank	Lower Bank	Not Rec'd	Yes	No	Sun	Part Sun	Shade	Yes	No
Silver Maple	*Acer saccharinum*			X				X				X	X		X			X	
Sugar Maple*	*Acer saccharum*			X				X				X		X	X				X
Swamp White Oak*	*Quercus bicolor*				X			X				X	X		X			X	
White Ash	*Fraxinus americana*	X						X			X			X	X	X		X	
White Cedar*	*Thuja occidentalis*		X					X			X		X		X	X		X	
White Oak	*Quercus alba*		X					X			X			X	X				X
White Spruce	*Picea glauca*	X					X	X		X	X			X	X				X
Yellow Birch*	*Betula alleghaniensis*	X						X			X		X			X	X	X	

Sugar Maple

Herbaceous Perennials

These plants are best for planting in shallow soils on steep slopes

Appalachian Barren Strawberry (***Waldsteinia fragarioides***) Grows from 3 to 8 inches high with a ½ to 1 foot spread. A low, mat-forming, strawberry-like plant with evergreen, basal leaves and several yellow flowers on a leafless stalk. Fruit is not fleshy or edible. Sun to shade. Prefers medium wet, well- drained, organic, slightly acidic soil, but tolerates a wide range. Flowers from April to June. Salt tolerant. Zones 3-9. ○◑●💧≡

Black-eyed Susan (***Rudbeckia laciniata***) Grows from 2 to 3 feet high with a spread of 1 to 2 feet and minimum root depth of 10 inches. Leaves are rough, hairy, and lance shaped. Flowers are yellow to orange-yellow with a dark brown center. Full sun to part shade. Prefers dry to medium wet, well-drained soil but is tolerant of heat, drought and a wide range of soils. Low maintenance. Zones 3-9. ○◑💧≡

Bloodroot (***Sanguinaria candensis***) Grows from 6 to 12 inches high and is usually found in colonies. Part sun to shade. Leaves and root contain an orange/red juice that is poisonous. Flowers in early spring. Grows best in part sun to shade and leaf litter. Zones 3-8 ○◑●💧

Blue Flag Iris (***Iris versicolor***) Grows from 1 to 3 feet high with a spread of 6 to 12 feet with a minimum root depth of 6 inches. Leaves are sword-shaped and can be up to 3 feet long. Flowers are usually blue-violet but can be lavender, or red-violet. Full sun to partial shade. Prefers moist to wet, organic, slightly acidic soils. Can tolerate growing in up to 6 inches of standing water. Grows well near bogs and ponds. Zones 3-9. ○◑💧

Boneset (***Eupatorium perfoliatum***) Grows 4 to 6 feet high with a spread of 3 to 4 feet. Clusters of small, white flowers bloom in late summer. Leaves are lance shaped and have hairy stems. Full sun to part shade. Prefers medium wet to wet soil and will tolerate sand and clay soils with adequate moisture. Found in swamps and on streambanks. Medium salt tolerance. Zones 4-8. ○◑💧

Cardinal Flower (***Lobelia cardinalis***) Grows from 2 to 4 feet high with a spread of 1 to 2 feet and minimum root depth of 12 inches. Bright red flowers are tubular and bloom in late summer. Lance- shaped leaves are finely toothed, approximately 4 inches long. Full sun to partial shade. Prefers medium wet to wet, rich, organic soil. Found near streams and swamps and in low wooded areas. Attractive to hummingbirds. Zones 3-9. ○◑💧

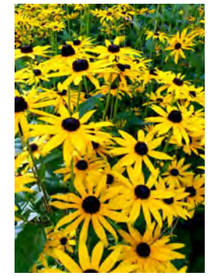
Columbine (***Aquilegia canadensis***) Grows from 2 to 3 feet high with a spread of 1 to 1½ feet. Flowers are light pink with yellow to blood red with yellow and bell shaped. Full sun to part shade. Prefers medium wet, well-drained soil but will tolerate a wide range as long as drainage is adequate. Flowers are attractive to hummingbirds. Salt tolerant. Zones 3-8. ○◑💧

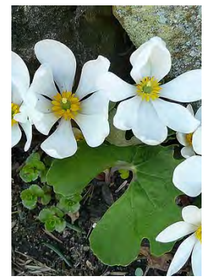
Common Yarrow (***Achillea millefolium***) Grows from 1 to 3 feet high with a spread of 1 foot and minimum root depth of 8 inches. Several long stems produce flat clusters of white, pink, yellow, or red flowers. Full sun to part shade. Prefers dry to moist, well-drained soil but will tolerate a wide range as long as drainage is adequate. Flowers are attractive to pollinators. Zones 3-9. ○◑≡

Coneflower/Echinacea (***Echinacea purpurea***) Grows from 1 to 3 feet high with a spread of 1 to 2 feet depending on variety and a minimum root depth of 24 inches. Large, daisy-like flowers can be red, white or light purple. Tends to form clumps. Full sun. Prefers moist, well-drained, neutral to slightly alkaline soil. Heat and drought tolerant. Attracts birds and butterflies. Low salt tolerance. Zones 3-10. ○≡

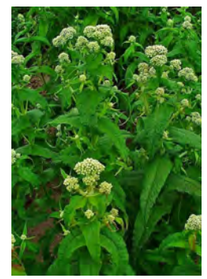
Helen's Flower (***Helenium autumnale***) Grows from 2 to 3 feet high with a spread of 3 to 5 feet and a minimum root depth of 6 inches. Yellow flowers are attractive to pollinators. Full sun. Prefers medium wet to wet soils. Low salt tolerance. Zones 3-8. ○💧

Appalachian Strawberry

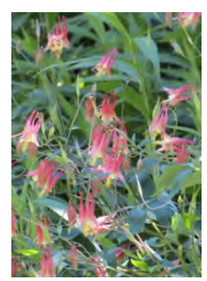

Black-eyed Susan


Bloodroot

Iris


Boneset

Cardinal Flower


Columbine

Common Yarrow

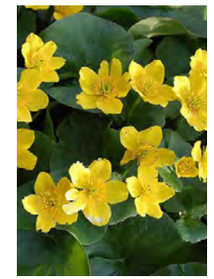
Coneflower

Helen's Flower

Foam Flower

Jack-in-the Pulpit

Lupine


Marsh Marigold

Milkweed

New England Aster

Soloman's Seal

Spikenard

Joe-Pye Weed

Foam Flower (***Tiarella cordifolia***) Grows 8 to 10 inches high with a 1 to ½ foot spread. Masses of tiny white or pink flowers seem to float above the foliage. Broad, maple shaped leaves. Flowers remain up to 6 weeks. Easy to grow in moist to dry soil. Wet soil, especially in winter, can kill the plant. Part shade to shade. Zones 3 to 8. ●≡

Jack-in-the-Pulpit (***Arisaema triphyllum***) Grows from 1 to 2 feet high with a spread of 1 to 1½ feet. Unusually shaped and striped "flower" in mid-spring; clusters of brilliant red berries in fall. Typically grows in wet woodland areas and may take 5 years to flower if grown from seed. Roots are poisonous. Prefers medium wet to wet rich organic soils and partial to full shade. Zones 3-9. ●💧

Lupine (***Lupinus perennis***) Grows from 3 to 4 feet high with a spread of 1 to 1½ feet. Flowers grow in tall spears ranging from blue to purple. Full sun to part shade. Prefers dry to medium wet, well-drained soil. Flowers are attractive to pollinators. Zones 3-6. ○◑≡

Marsh Marigold (***Caltha palustris***) Grows from 8 inches to 2 feet high with a spread of approximately 1 foot and a minimum root depth of 8 inches. Typically found in swamps and marshes and is recommended for planting along stream banks, in bog gardens and near ponds. Bright yellow flowers bloom in late spring to early summer. Prefers wet organic soils and partial to full sun. Zones 1-8. ○◑💧

Milkweed (***Asclepias syriaca***) Grows from 2 to 3 feet high with a spread of approximately 1 foot and minimum root depth of 18 inches. Clusters of pink flowers bloom in the late spring into the summer and are attractive to butterflies, particularly Monarch larvae. Very adaptable. Can grow in average, dry to medium wet soils that are well drained. Prefers full sun. Zones 3-9. ○💧≡

New England Aster (***Aster nova-angliae***) Grows from 1½ to 2 feet high with a spread of 2 to 3 feet. It grows best in average to wet, well-drained soil with full sun. Blooms in late summer to early fall with dark purple flowers that are attractive to butterflies. Medium salt tolerance. Zones 3-9. ○💧≡

Solomon's Seal (***Polygonatum pubescens***) Grows from 2 to 3 feet high with a spread of approximately 1 foot. Flowers are small, white, and bell shaped growing in a line down the stem. Full shade to part shade. Prefers wet to medium wet soil but will tolerate drought. Zones 3-8. ◑ ● 💧

Spikenard (***Aralia racemosa***) Grows from 3 to 5 feet high with an equal spread. Foliage produces large compound leaves with large clusters of small green white flowers. Full sun to part shade. Prefers dry to medium wet, well-drained soil. Zones 3-8. ○◑💧≡

Spotted Joe Pye Weed (***Eupatorium maculatum***) Grows from 4 to 5 feet high with a spread of 1.5 to 2 feet. Found naturally growing in damp meadows. Light pink flowers bloom from mid-summer to early fall and are attractive to butterflies. Prefers average to wet soil with full sun. Zones 4-8. ○◑💧

Blue Flag Iris

Plant Identification Key

- ○ Full Sun—more than 5 hours of direct sun per day
- ◑ Partial Sun—2 to 5 hours of direct sun per day or full day of dappled sun
- ● Full Shade—Fewer than 2 hours of direct sun per day
- 💧 Wet Soils—Soils that are wet most of the year and/or poorly drained soils
- ≡ Dry Soils—Soils that are dry year round and/or soils that drain quickly.

Herbaceous Perennials (Continued)

Turtlehead (***Chelone glabra***) Grows to a size of 2 to 3 feet with a spread of 1½ to 2½ feet. Flowers are white with a pinkish tinge and are similar to snapdragons. Prefers a rich, moist to wet, organic soil with partial shade. Zones 3 to 9. ◑💧

Violet (***Viola sp.***) Grows up to ½ a foot high with an equal spread. Simple flowers range in color from light pink to purple. Full sun to part shade. Prefers medium wet, well-drained soil. Flowers are attractive to pollinators. Zones 4-8. ○◑💧

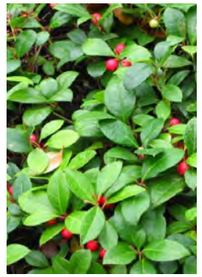
Virgin's Bower (***Clematis virginiana***) A climbing vine that can grow up to 20 feet high with a minimum root depth of 14 inches. Grows best in soil with average to medium moisture and full sun to partial shade. Attractive clusters of silky seeds follow showy white flowers. Grows best on a trellis or fence. Zones 2-10. ○◑≡

Wintergreen/Checkerberry (***Gaultheria procumbens***) Also knows as teaberry. Grows up to 6 inches high and spreads 4 to 6 inches annually with a minimum root depth of12 inches. Favors well- drained, acidic soil with average moisture. Grows in partial to full shade but produces more fruit with adequate light. Leaves are evergreen and red berries remain on the plant all winter. Young leaves and berries have a wintergreen flavor. Zones 3-5. ◑●💧≡

Turtlehead

Marsh Blue Violet

Virgin's Bower


Wintergreen

Example of a living shoreline with a coir log in Freeport, ME

Herbaceous Ferns

These plants are best for planting in shallow soils on steep slopes

Christmas Fern (***Polystichum acrostichoides***) Grows from 1 to 2 feet high with an equal spread. Plants grow in clumps and stay green year round. Full shade to part shade. Prefers dry to medium wet, well-drained soil. Zones 3-9. ◑ ● 💧

Cinnamon Fern (***Osmunda cinnamomea***) Grows from 2 to 3 feet high with an equal spread with a minimum root depth of 12 inches. Vegetation produces tall brown fronds along with typical fern leaves. Full sun to full shade. Prefers medium wet, well-drained soil. Low salt tolerance. Zones 3-8. ○ ◑ ● 💧

Hay-scented Fern (***Dennstaedtia punctiloba***) Vigorously spreading fern grows to 12 inches with light-green, finely-divided fronds. Foliage is sweet- scented when crushed. Versatile fern grows in many soils and tolerates drought. Found in clearings and on rocky slopes. Part-sun to shade. Moist, well-drained soil. Drought tolerant. Zones 3-8. ◑≡

Interrupted Fern (***Osmunda claytoniana***) Grows from 2 to 3 feet high with an equal spread and minimum root depth of 12 inches. By mid-summer vegetation has a distinctive gap between lower leaves and upper leaves on each frond where spore bearing leaves have fallen off. Full shade to part shade. Prefers wet to medium wet, well-drained soil. Zones 3-8. ◑ ● 💧

Lady Fern (***Athyrium filix*-femina**) Grows from 1 to 3 feet high with an equal spread and a minimum root depth of 12 inches. Vegetation produces fronds with fully separate slender leaves. Full shade to part shade. Prefers medium wet, well-drained soil. Zones 4-8. ◑ ● 💧

Maidenhair Fern (***Adiantum pedatum***) Grows from 1 to 2 feet high with an equal spread and a minimum root depth of 10 inches. Curved stalks cause leaves to spread in a circular pattern. Full shade to part shade. Prefers medium wet, well-drained soil. Zones 3-8. ◑ ● 💧

Marginal Wood Fern (**Dryopteris marginalis**) Grows from 1½ to 2 feet high with an equal spread. Vegetation remains green year round. Full shade to part shade. Prefers medium wet, well-drained soil. Zones 3-8. ◑ ● 💧

Ostrich Fern (***Matteuccia struthiopteris***) Grows from 3 to 6 feet high with a spread of 5 to 8 feet. Large fronds resemble feathers. Full shade to part shade. Prefers wet to medium wet soil. Zones 3-7. ◑ ● 💧

Royal Fern (***Osmunda regalis***) Grows from 2 to 3 feet high with an equal spread and a minimum root depth of 16 inches. Spores are found in tassels and the tip of the frond. Fibrous root systems. Full shade to part shade. Prefers wet to medium wet soil. Zones 3-9 ◑ ● 💧

Christmas Fern

Cinnamon Fern

Hay-scented Fern

Interrupted Fern

Lady Fern

Maidenhair Fern

Marginal Wood Fern

Ostrich Fern

Royal Fern

Plant Identification Key

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Woody Low Shrubs (Up to 4 feet)

These plants are best for planting in shallow soils on steep slopes

Bearberry (***Arctostaphylos uva-ursi***) Grows from 4 to 6 inches with a spread of 3 feet and minimum root depth of 10 inches. Spreads easily to form a mat. Grows best in moist, well-drained, rich, acidic soil. Full sun to partial shade. Light pink, cup-shaped flowers give way to bright red berries in the fall. Helps prevent erosion and is commonly planted along banks. Salt tolerant. Zones 2-6. ○◑💧≡

Bog Rosemary (***Andromeda polifolia***) Grows from 6 to 30 inches high with a spread of 3 feet. Leaves are narrow, evergreen and leathery with a blue-green color. Some resemblance to the culinary herb. Typically found in northern bogs and marshes. Flowers are small, pink, and bell-shaped. Grows best in very moist, acidic soil in cooler climates. Low salt tolerance. Zones 2-6. ●◑💧

Cranberry (***Vaccinium macrocarpon***) Grows from 6 to 9 inches high and spreads easily. Prefers an acidic, wet to moist soil. Typically grows in bogs. Grows best in full sun. Small pink flowers bloom in the spring and are followed by the commonly known red berries. Edible by wildlife and humans. Zones 2-6. ○ 💧

Creeping Juniper (***Junperus horizontalis***) Grows approximately 2 feet high with a spread of 8 feet and a minimum root depth of 12 inches. Tolerates a wide range of soil as long it is well drained. Grows best in full sun. Foliage is often a silvery blue color. Small, blue, berry-like fruit. Medium salt tolerance. Zones 3-9. ○≡

Labrador Tea (***Ledum groenlandicum***) Grows to approximately 3 feet high with a spread of 3 feet and an minimum root depth of 18 inches. Typically found growing in bogs and swamps. Clusters of white flowers bloom in the spring. Grows best with full sun to partial shade. Prefers a wet, acid soil. Leaves are evergreen with a silvery underside. Low salt tolerance. Zones 2-5. ●◑💧

Meadowsweet (***Spiraea alba***) Grows from 3 to 4 feet high with an equal spread and a minimum root depth of 12 inches. Flowers are white to light pink and form in conical clusters with a fuzzy appearance. Full sun to part shade. Prefers wet to medium wet, well-drained soil. Flowers are attractive to pollinators. Medium salt tolerance. Zones 3-7. ○◑💧

Rhodora (***Rhododendron canadense***) Grows from 1 to 3 feet high with a similar spread and minimum root depth of 16 inches. Typically found near bogs and marshy areas. Grows best in wet, acidic soils with full sun to partial shade. Bright pink/purple flowers bloom in spring. Very hardy. Zones 2-6. ●◑💧

Sheep Laurel/Lambkill (***Kalmia angustifolia***) Grows from 1 to 3 feet high with a greater spread. Grows best in moist, organic, cool, acidic soils but can tolerate a variety of soil types. Prefers full sun to partial shade. Bright pink flowers bloom in early summer. As the name suggests it is poisonous to livestock. Zones 1-6. ●◑💧

Woodbine/Virginia Creeper (***Parthenocissus quinquefolia***) A climbing vine that can reach sizes of up to 40 feet with a minimum root depth of 16 inches. Grows easily. Will tolerate a range of soil types and a variety of light conditions. Drought tolerant. Small white flowers in spring. Foliage turns bright red in the fall and small purple berries are produced. When not in a position to climb it is an excellent ground cover and will put down more roots. Zones 3-9. ○◑●💧≡

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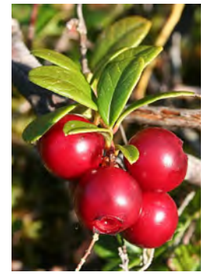
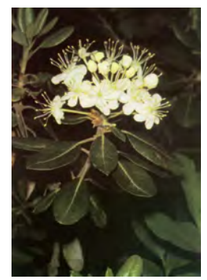

Bearberry

Bog Rosemary

Cranberry

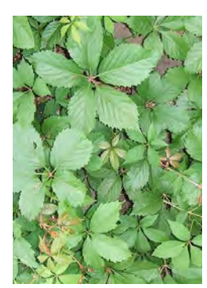
Creeping Juniper


Labrador Tea

Meadowsweet

Rhodora

Sheep Laurel

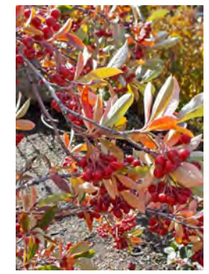

Woodbine

Bush Honeysuckle

Flowering Raspberry

Highbush Blueberry

Mapleleaf Viburnum


Red Chokeberry

Summersweet

Sweet Fern

American Yew

Beach Plum

Northern Bayberry

Woody Medium Shrubs (4-8 feet), Shallow Soil

These plants are best for planting in shallow soils on moderate slopes

Bush Honeysuckle (***Diervilla lonicera***) Also called American Fly Honeysuckle. (Do not confuse with European Fly Honeysuckle which is invasive.) Grows 2 to 5 feet high with a minimum root depth of 16 inches. A straggling shrub with handsome red berries. Sun to shade. Sandy, dry soil. Drought tolerant. Found in cool, rocky woods. Zones 3-7. ●◑○≡

Flowering Raspberry (***Rubus odoratus***) Grows from 3 to 6 feet high with a spread of 6 to 12 feet and a minimum root depth of 16 inches. Fragrant pink flowers produce edible red fruits. Full sun to part shade. Prefers medium wet, well-drained soil. Flowers are attractive to pollinators. Zones 3-8. ○◑💧

Highbush Blueberry (***Vaccinium corymbosum***) Grows from 6 to 8 feet in height with a spread of 8 to 12 feet and a minimum root depth of 16 inches. Typically found near bogs and marshes. Prefers moist, well-drained, acidic soil. Sun to partial shade. White bell-shaped flowers bloom in the spring and are followed by edible dark blue berries. Leaves turn red in the fall. Berries are attractive to birds and other wildlife. Zones 5-7. ●◑≡ 💧

Mapleleaf Viburnum (***Viburnum acerifolium***) Grows from 4 to 6 feet high with an equal spread and a minimum root depth of 14 inches. Grows best in well-drained, mildly acidic soil with average moisture but can tolerate drier soils. Prefers shade to partial shade. Similar to other viburnums, a cluster of small white flowers gives way to dark blue/black fruits that are enjoyed by birds and other wildlife. Zones 4-8. ●◑≡ 💧

Red Chokeberry (***Aronia arbutifolia***) Grows from 6 to 8 feet high with a spread of 3 to 4 feet and a minimum root depth of 14 inches. In fall, foliage turns to bright red and red berries attract birds. Full sun to part shade. Prefers medium wet, well-drained soil. Salt tolerant. Zones 4-9. ○◑💧

Summersweet (***Clethra alnifolia***) Also called Hummingbird Clethra or Sweet Pepperbush. Grows 3 to 8 feet high with a 4 to 6 foot spread and minimum root depth of 16 inches. Attractive, deep-green foliage and very fragrant, white or pink flowers in summer. Sun to shade. Moist to wet soil. Zones 4-8. ◑ ●💧

Sweet Fern (***Comptonia peregrina***) Grows from 2 to 5 feet high with a spread of 4 to 8 feet and a minimum root depth of 14 inches. Slender, deeply notched leaves. Full sun to part shade. Prefers dry to medium wet soil. Medium salt tolerance. Zones 2-6. ○◑≡

Woody Medium Shrubs (4-8 feet), Deep Soil

These plants are best for planting in deep soils on moderate slopes

American Yew (***Taxus canadensis***) Grows from 1 to 6 feet high with branches spreading to 6 feet and a minimum root depth of 24 inches. Grows best in moist, loamy, alkaline, well-drained soils. Prefers partial to full shade. A popular food for moose and deer. Low salt tolerance. Zones 2-6. ◑●💧

Beach Plum (***Prunus maritima***) Grows 6 to 8 feet high with a spread of 6 feet and a minimum root depth of 20 inches. Grows best in well-drained soil but is adaptable to a range of soil types. Prefers full sun. White flowers bloom in the spring and are followed by edible purple fruits. Typically found along the coast and tolerant of salt. Salt tolerant. Zones 3-7. ○≡ 💧

Northern Bayberry (***Myrica pennsylvanica***) Typically grows from 5 to 6 feet high but can reach 10 feet. Minimum root depth of 20 inches. Spreads easily and forms colonies. Often found in coastal areas. Foliage is semi-evergreen aromatic. Will grow well in dry, acidic soils. Grows best in full sun but will tolerate partial shade. Medium salt tolerance. Zones 2-6. ○◑💧≡

Woody Tall Shrubs (>8 feet) , Shallow Soil

These plants are best for planting in shallow soils on gradual slopes

Arrowwood (***Viburnum dentatum***) Grows from 6 to 10 feet high with an equal spread. Commonly used as a hedge. Produces flat clusters of small white flowers. Full sun to part shade. Prefers medium wet, well-drained soil. Flowers are attractive to pollinators. Salt tolerant. Zones 1-8. ○◑💧

Black Chokeberry (***Aronia melanocarpa***) Can grow up to 8 feet high with a spread of 8 feet and a minimum root depth of 14 inches. Grows best in moist, well-drained, acidic soils but will tolerate drier sandy soils or wet clay ones. Particularly good for soil stabilization. Prefers full to partial sun. White flowers bloom in the spring with black berries appearing in the fall and lasting through the winter. Low salt tolerance. Zones 3-8. ○◑💧≡

Buttonbush (***Cephalanthus occidentalis***) Grows 6 to 10 feet with a similar spread and a minimum root depth of 14 inches. Darkish-green, glossy leaves. Large, showy, spherical flowerheads (pom-poms) in summer, followed by spherical fruits that persist into winter. Sun to part-sun. Wet soil. Grows in up to 3 feet of water. Flood tolerant. Found along lakes and streams. Medium salt tolerance. Zones 4-11. ○◑💧

Common Juniper (***Juniperus communis***) Grows to a height of 3-10 feet with an equal spread and a minimum root depth of 14 inches. Form can be variable from low and spreading to an erect shrub. Cones are berry-like. Leaves are evergreen needles but can turn light brown during the winter. Grows best with full sun. Salt tolerant. Zones 2-6. ● 💧≡

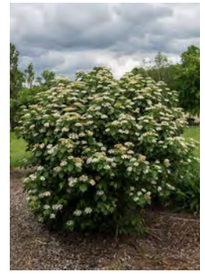
Gray Dogwood (***Cornus racemosa***) Grows to 10 feet high with a spread of 10 to 15 feet and a minimum root depth of 16 inches. Can form thickets. Tolerant of a wide range of soils and city air pollution. Grows best in medium wet soil with full sun to partial shade. Small white clusters of flowers bloom in late spring. Medium salt tolerance. Zones 3-8. ○◑💧

Nannyberry (***Viburnum lentago***) Grows from 14 to 16 feet with a spread of 6 to 12 feet and a minimum root depth of 14 inches. Grows well in medium wet to average soil but is tolerant of drier soils. Prefers full sun to part shade. Clusters of white flowers turn into blue/black berry like fruit. Supposedly the fruit is attractive to nanny goats, hence its name. Zones 2-8. ○◑💧≡

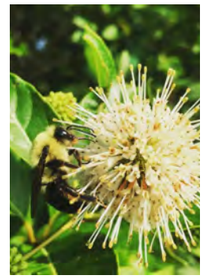
Staghorn Sumac (***Rhus typhina***) Grows from 10 to 25 feet tall with a spread of 15 to 20 feet. Tolerates a wide range of well drained soils. Grows best in full sun to partial shade. Clusters of fuzzy berry-like fruits are produced in the fall. A popular ornamental shrub due to its showy autumn colors. Zones 3-8. ○◑≡

Winterberry (***Ilex verticillata***) Grows 6 to 10 feet high with a similar spread and a minimum root depth of 16 inches. Grows best in moist well-drained soils but will tolerate wet, swampy areas. Prefers full sun to partial shade. Bright red attractive fruits last into winter. Male and female plants are needed to produce berries. Low salt tolerance. Zones 3-9. ○ ◑ 💧

Witherod (***Viburnum cassinoides***) Also called wild raisin. Grows 6 to 10 feet high with a lesser spread and minimum root depth of 14 inches. A slender, upright shrub with glossy, green leaves. Round clusters of feathery, white to pink flowers in late spring and whitish fruit turning blue-black in the fall. Red fall color. Sun to shade. Moist to wet soil but tolerates drier conditions. Good for birds. Zones 3-8. ○ ◑ ● 💧

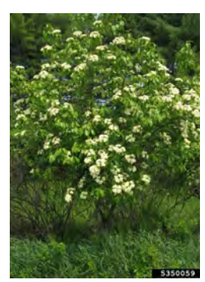

Arrowwood

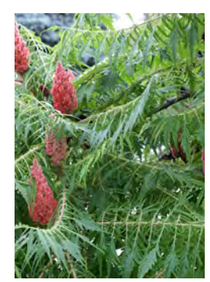
Black Chokecherry


Buttonbush

Common Juniper

Gray Dogwood


Nannyberry


Staghorn Sumac

Winterberry

Witherod

Woody Tall Shrubs (>8 feet), Deep Soil

These plants are best for planting in shallow soils on gradual slopes

Hazelnut (***Corylus americana***) Grows from 10 to 16 feet high with a spread of 8 to 13 feet and a minimum root depth of 20 inches. Small bell-shaped flowers grow in clusters. Female plants will produce small edible nuts in the summer. Prefers dry to medium wet, well-drained soil. Zones 4-9. ○◑≡

Red-osier Dogwood (***Cornus sericea***) Grows from 6 to 9 feet high with a spread of 8 to 12 feet and minimum root depth of 20 inches. Grows best in rich medium to wet soil. Typically found in bogs or swamps and will tolerate a wide range of soils. Young branches are bright red. Small white clusters of flowers bloom in late spring and are followed by fall fruits which are attractive to birds. Prefers full sun to part shade. Zones 2-7. ○◑💧

Hazelnut

Red Osier Dogwood

Plant Identification Key

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Example of a living shoreline on Bustins Island, Falmouth, ME

Woody Small Trees

These plants are best for planting in deep soils on moderate slopes

American Hornbeam (***Carpinus caroliniana***) Grows from 20 to 35 feet high with an equal spread and a minimum root depth of 20 inches. Smooth gray trunk with serrated oval leaves. Full shade to part shade. Prefers dry to medium wet soil. 3-9. ◑ ● ≡

Chokecherry (***Prunus virginiana***) Grows from 25 to 30 feet tall with a spread of 20 feet. Grows best in moist soil but will tolerate drier conditions. Partial to full sun. White flowers bloom in the spring and are followed by bright red berries. Flowers have a strong sweet fragrance. The fruit has an astringent taste but does attract birds. Zones 2-6. ○ ◑ ♦ ≡

Cockspur Hawthorn (***Crataegus crus-galli***) Grows from 25 to 35 feet high with an equal spread and a minimum root depth of 24 inches. Many fragrant white flowers bloom in spring. Branches are armored with long thorns. Fruit produced in the fall is edible, although, unpleasant. Full sun to part shade. Prefers medium wet, well-drained soil but will tolerate a wide range as long as drainage is adequate. Flowers are attractive to pollinators. Zones 3-7. ○ ◑ ♦

Common Witchhazel (***Hamamelis virginiana***) Grows 10 to 15 feet high with an equal spread with a minimum root depth of 20 inches. Prefers moist, acidic soil and grows best with full sun to partial shade. Small clumps of yellow flowers bloom in early fall and have a pleasing fragrance. Zones 3-8. ○ ◑ ♦

Pagoda Dogwood (***Cornus alternifolia***) Grows from 15 to 25 feet high with a spread of 20 to 32 feet and a minimum root depth of 20 inches. Small clusters of white flowers with a fuzzy appearance bloom in spring. Full sun to part shade. Prefers medium wet, well-drained soil. Flowers are attractive to pollinators. Zones 3-7. ○ ◑ ♦

Pussy Willow (***Salix discolor***) Grows from 6 to 15 feet high with a spread of 4 to 12 feet and a minimum root depth of 20 inches. Flowers are showy catkins that emerge in late winter. Full sun. Prefers wet to medium wet soil. Medium salt tolerance. Zones 4-8. ○ ♦

Sassafras (***Sassafras albidum***) Grows from 30 to 60 feet high with a spread of 25 to 40 feet and a minimum root depth of 18 inches. Flowers are yellow-green and grow in small showy clusters. Large tap root. Full sun to part shade. Prefers medium wet soil. Medium salt tolerance. Zones 4-9. ○ ◑ ♦

Shadblow Serviceberry (***Amelanchier canadensis***) Grows from 25 to 30 feet high with a spread of 15 to 20 feet. Grows best in medium wet, well- drained soil but will tolerate a wide range. Prefers partial shade to full sun. Clusters of white flowers are followed by edible red/purple berries in late summer. Zones 4-8. ○ ◑ ♦

Striped Maple (***Acer pensylvanicum***) Grows from 15 to 25 feet high with a spread of 12 to 20 feet and a minimum root depth of 28 inches. Green bark on younger trees has distinct white stripes. Full shade to part shade. Prefers medium wet, well-drained acidic soils. Medium salt tolerance. Zones 3-7. ◑ ● ♦

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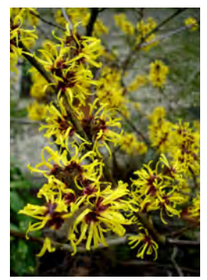
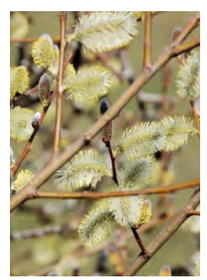
American Hornbeam

Chokecherry

Cockspur Hawthorn


Common Witchhazel

Pagoda Dogwood


Pussy Willow

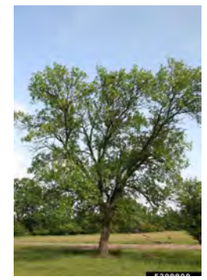
Sassafrass

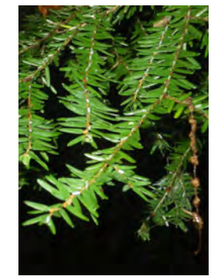
Shadblow Serviceberry

Striped Maple

Balsam Fir

Eastern White Pine


Green Ash

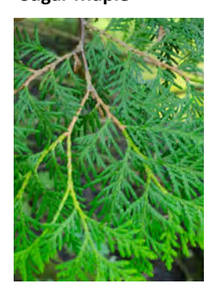

Hemlock

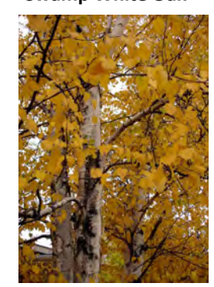
Larch

Red Pine

Sugar Maple

Swamp White Oak


White Cedar


Yellow Birch

Woody Tall Trees

These plants are best for planting in deep soils on gradual slopes

Balsam Fir (***Abies balsamea***) Grow up to 50 feet high and 20 feet wide. Narrow, pyramidal tree; typical Christmas tree shape. Needles are short, dark green, and blunt. Small, light brown cones. Sun to shade. Moist to wet soils. Zones 3-5. ◑ ● ♦

Eastern White Pine (***Pinus strobus***) Can grow to 100 feet with a 40 foot crown. Large, open tree with horizontal branching. Long, soft, blue-green needles. Can be pruned to hedges or windbreaks. Rapid growth. Sun to partial shade. Tolerates dry soil. Does not tolerate salt or flooding. Zones 3-7. ○ ◑ ≡

Green Ash (***Fraxinus pennsylvanica***) Grows to 60 feet. Rapid growth. Rounded crown. Leaves turn bright yellow in fall. Bark has narrow, interlacing ridges. Zones 3-9. ○ ◑ ♦

Hemlock (***Tsuga canadensis***) Can grow up to 80 feet with a 30 foot spread in ideal conditions. Large, irregular, pyramidal tree. Small, deep-green needles with a loose, feathery appearance. Small, interesting cones. Also available in dwarf forms. Sun to shade. Does best in cool, moist, well- drained soil. Tolerates shade and some flooding. Zones 3-7. ○ ◑ ● ♦ ≡

Larch (***Larix laricina***) Also know as Tamarack. Grows to 65 feet. Narrow and upright with horizontal branches and sweeping twigs. Fine, light-green needles turn yellow in fall and drop. Has the appearance of an evergreen but is not. Full sun. Prefers moist soil but tolerates poor, wet soil and flooding. Medium salt tolerance. Zones 2-4. ○ ♦

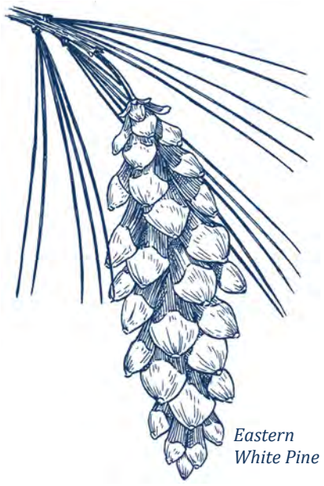
Red Pine (***Pinus resinosa***) Also called Norway Pine. Can reach 80 feet. Rapid growth. Large, handsome, straight tree. Long, dark green, stiff needles. Reddish bark. Makes an excellent windbreak. Full sun. Bet in dry, sandy soil. First discovered near Norway, Maine. Zones 2-5. ○ ≡

Sugar Maple (***Acer saccharum***) Grows up to 75 feet with a 40 foot spread. Stunning orange- red fall color. Full sun, but tolerates some shade. Moist, well-drained soil. Does not tolerate wet or compacted soil. Zones 3-8. ○ ◑ ≡

Swamp White Oak (***Quercus bicolor***) Grows to 60 feet with a similar spread. Produces many acorns. Leaves irregularly lobed, about 6 inches long, shiny, dark green above and light below. Bark on large trees ridged and furrowed. Moist to wet soil. Tolerates swampy, poorly-drained conditions. Zones 4-8. ○ ◑ ♦

White Cedar (***Thuja occidentalis***) Also called Arborvitae. Grows to 60 feet and 25 feet across. A dense tree with flat, green aromatic foliage. Often sheered and shaped for landscaping purposes, but has an attractive shape on its own. Sun to part sun. Moist soil best, tolerates flooding and occasional drought. Found in wet soils and swampy areas. Zone 3. ○ ◑ ♦

Yellow Birch (***Betula alleghaniensis***) Can grow up to 80 feet with a 50 foot spread. Attractive golden, peeling bark on older specimens. Leaves are alternate, 3-5 inches long, turning yellow in fall. Part-sun to shade. Moist soil. Found near streams. Zones 3-7. ◑ ● ♦


Eastern White Pine

Additional Resources

Natural Landscapes of Maine by Susan Growler & Andy Cutko:
http://maine.gov/dacf/mnap/about/publications/community_classification.htm
Additional plant information can be found on the Department of Agriculture, Conservation and Forestry's Maine Natural Areas Program website: http://maine.gov/dacf/mnap/features/index.htm

References

If not otherwise cited in text, references were used to generate plant list.
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DISCLAIMER: The information provided in this guide is intended for general planning purposes only. Many variables affect how successful individual plants will be at a given site. In addition, weather and overall climate fluctuations (including micro-climate factors) will have a large impact on the success of plant species or community. CCSWCD and the partners who collaborated to create this guide do not guarantee the success of any plant species at any site. Please consult a professional for designs of pathways or structures within the bluff zone.

CONTACT THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND YOUR MUNICIPAL CODE ENFORCEMENT OFFICER FOR THE PROPER PERMITS ANYTIME WORK IS BEING DONE ADJACENT TO A WATER BODY.

Acknowledgements

The Coastal Planting Guide was developed for the Maine Coastal Program/Maine Department of Agriculture, Conservation and Forestry by the Cumberland County Soil and Water Conservation District. This work was supported by the National Oceanic and Atmospheric Administration (NOAA) Coastal Zone Management Cooperative Agreement #NA14NOS4190047 pursuant to the Coastal Zone Management Act of 1972 as amended.

CCSWCD Authors: Jenna Martyn Fisher and Damon Yakovleff

We gratefully acknowledge the participation of the following individuals:

Peter Slovinsky and Stephen Dickson, Maine Geological Survey
For more information about the Maine Geological Survey, contact mgs@maine.gov or 207-287-2801.

Kathleen Leyden, Maine Coastal Program
For more information about the MCP, visit www.mainecoastalprogram.org or contact 207-287-2351.

Nicole Anderson, M.P.H., B.S. Horticulture

Troy Barry, Fluvial Geomorphologist

Agency Correspondence

USACE

From:	Agius, Brad
To:	Clement, Jay L NAE
Subject:	Hartland Solar - Informational Meeting
Date:	Thursday, April 22, 2021 4:20:00 PM
Attachments:	Hartland Solar Location Map.jpg

Hi Jay,
The Hartland Solar Project is having an virtual Teams informational meeting to introduce the Project to MDEP on Thursday April 29 at 1pm. Tetra Tech is supporting the Strobus Solar with the permitting of this project. This proposed solar photovoltaic commercial generation project will interconnect to Central Maine Power's existing transmission line (115 kV), via a new substation. The Project will create approximately 140 MW AC of generating capacity, see attached map. The proposed project's limit of work would be approximately 1,388 acres on existing commercial forest land adjacent to Central Maine Power's existing 115 kV transmission line in Hartland, Maine. Critical issues and desktop GIS constraints analyses have been completed and the project is being designed to avoid natural resource impacts. Current studies include lynx, deer wintering areas, and vernal pools.

Could you or a representative from the Corps be available to attend? If so, please let me know who the meeting invitation should include. We would like to be proactive, transparent and inclusive with the Project and are including invitations to the USFWS, MDIFW, and MNAP too. We look forward to your agency's input and guidance to design the Project to avoid and minimize impacts, and meet agency standards.
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

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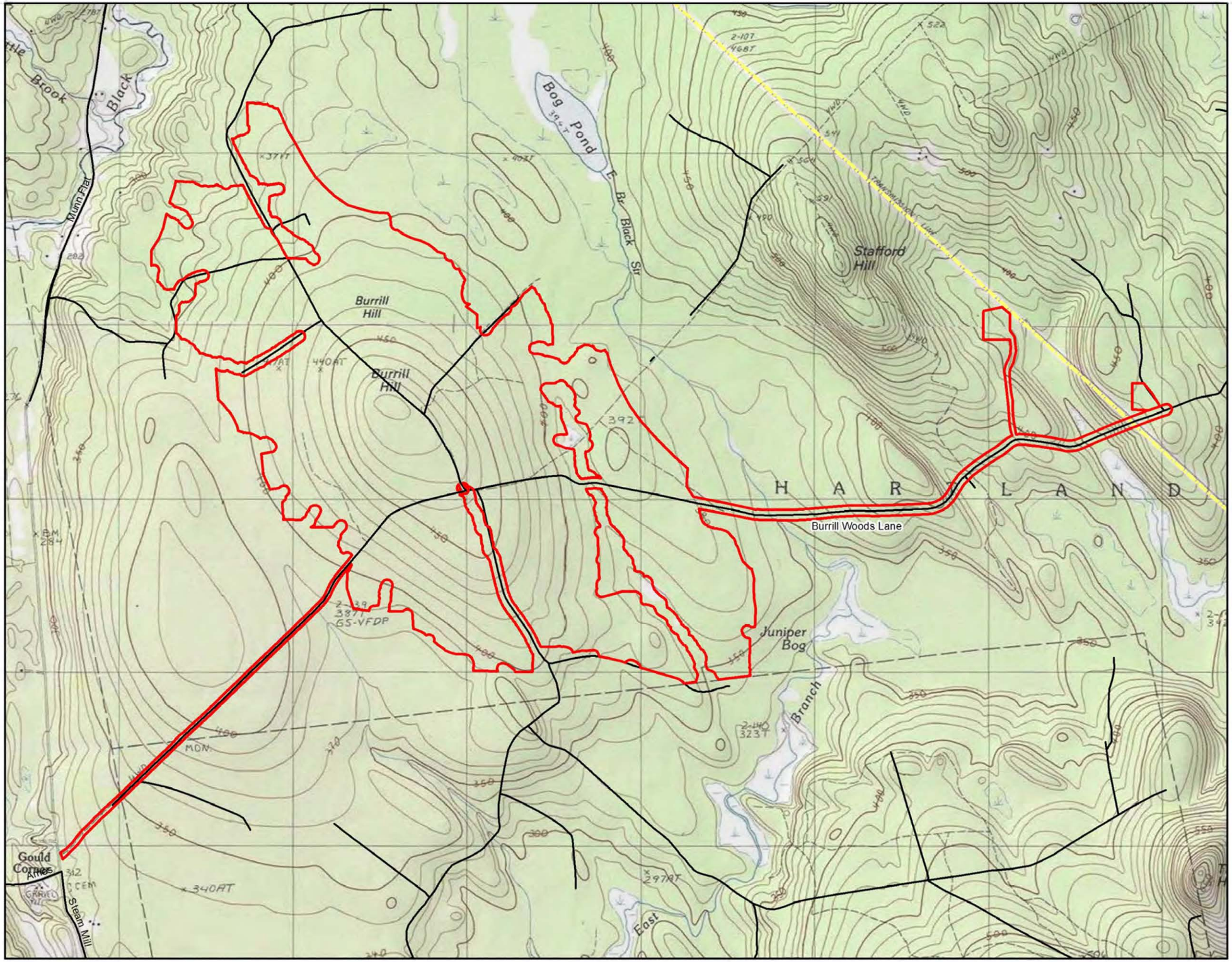
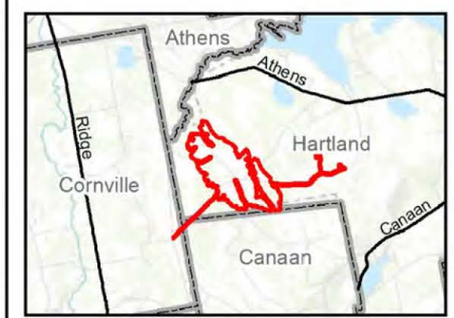


Legend

- Project Area of Interest
- Central Maine Power Transmission Line (115 kV)
- Road



N

0 1,000 2,000 4,000 Feet

Hartland Solar
Site Location Map
Hartland, Maine

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: 04/2021

Source: Esri, et. al., 2019; Maine GIS, 2019; Strobus Solar, LLC., 2020; ABB Suite, 2021

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction

From:	Clement, Jay L CIV USARMY CENAE (USA)
To:	Agius, Brad
Cc:	Mahaney, Shawn B CIV USARMY CENAE (USA)
Subject:	RE: Hartland Solar - Informational Meeting
Date:	Monday, April 26, 2021 5:15:53 PM

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Brad:

Shawn Mahaney in my office would normally handle Somerset County but he's out this week. Then I've got 3 others in the office who are either on temporary assignment to other states or on vacation also. The remaining two and myself are accordingly pegged out at the moment so Corps availability is a challenge. Shawn will have to play catch up with you next week or whenever you both can make it happen (knowing Shawn, he already has heard about this one).

Anyway, you know the drill:

1. Avoid permanent or temporary fills in wetlands and you avoid Corps jurisdiction.
2. Completely span any stream crossings and do them without the need for temporary cofferdam fills and you avoid Corps jurisdiction.
3. For any clearing of wetlands, do it in the winter, don't lay down temporary mats (mats = fill), and don't grub out the stumps and you avoid Corps jurisdiction.
4. Don't fill any vernal pools directly and you potentially avoid issues with the Corps and mitigation.
5. Keep any permanent and temporary fills <15,000 s.f. and you'll hopefully avoid the need for compensation, although we may still have questions regarding the extent of clearing, particularly if there's grubbing or filling involved.

Make good choices.

Jay

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, April 22, 2021 4:21 PM
To: Clement, Jay L CIV USARMY CENAE (USA) <Jay.L.Clement@usace.army.mil>
Subject: [Non-DoD Source] Hartland Solar - Informational Meeting

Hi Jay,
The Hartland Solar Project is having an virtual Teams informational meeting to introduce the Project to MDEP on Thursday April 29 at 1pm. Tetra Tech is supporting the Strobus Solar with the permitting of this project. This proposed solar photovoltaic commercial generation project will interconnect to Central Maine Power's existing transmission line (115 kV), via a new substation. The Project will create approximately 140 MW AC of generating capacity, see attached map. The proposed project's limit of work would be approximately 1,388 acres on existing commercial forest land adjacent to Central Maine Power's existing 115 kV transmission line in Hartland, Maine. Critical issues and

desktop GIS constraints analyses have been completed and the project is being designed to avoid natural resource impacts. Current studies include lynx, deer wintering areas, and vernal pools.

Could you or a representative from the Corps be available to attend? If so, please let me know who the meeting invitation should include. We would like to be proactive, transparent and inclusive with the Project and are including invitations to the USFWS, MDIFW, and MNAP too. We look forward to your agency's input and guidance to design the Project to avoid and minimize impacts, and meet agency standards.
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

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From: Mahaney, Shawn B CIV USARMY CENAE (USA)
To: Agius, Brad
Subject: RE: Hartland Solar - Call Summary
Date: Wednesday, June 2, 2021 11:35:30 AM

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Hi Brad,

Looks good to me!

Shawn
Shawn B. Mahaney, Senior Project Manager.
U.S. Army Corps of Engineers.
Maine Project Office.
442 Civic Center Drive, Suite 350.
Augusta, Maine 04330.

Tel: 207-623-8367 ext. 4 or 978-318-8492-Direct line.
Cell: 207-233-3243
Fax: 207-623-8206.
E-mail: Shawn.B.Mahaney@usace.army.mil
http://www.nae.usace.army.mil/Missions/Regulatory.aspx

"Follow us on Facebook! https://www.facebook.com/CorpsRegulatoryMaineProjectOffice/"

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, June 2, 2021 11:22 AM
To: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Subject: [Non-DoD Source] Hartland Solar - Call Summary

Hi Shawn,
I hope you had a great holiday weekend. I appreciated your call last week in respond to my two email questions I had previously sent. Below are the emailed questions regarding the Hartland Solar Project and the summary based on your call.

Email 1 "We just had the wetland delineation task funded for the Hartland Solar Project and will be mobilizing the delineation teams next week. The project is on commercial forest land and understand there to be numerous skidder ruts and woods trails in upland roads across the 1,388 acre study area. The features in question essentially have disturbed and compacted soils creating an atypical situation. Is there recent Corps guidance on these types of man-made features that would kick them out of Corps jurisdiction, in particular recent changes to the Clean Water Act? Or perhaps guidance on how the Corps would like these man-made features to be delineated and reported on? I appreciate any insight that you can provide."

Call Summary For skid ruts/trails in uplands, they are not wetlands if they are man-made compacted soil features (expressing as wetlands) if surrounded by uplands on all side. Refer the NCNE v2 Regional Supplement Chapter 5 - Difficult Wetland Situations in the Northcentral and Northeast Region – Silviculture. Furthermore, only paired Wetland/Upland data forms needed for each Cowardin type for general reporting. Additionally, forms are needed in areas that would be impacted, but that has not been determined yet. Furthermore, snow pack melt connectivity in Maine is likely to make most isolated wetlands jurisdictional.

-

Email 2 "We'll need some additional guidance regarding our upcoming soil survey at Hartland Solar. A mini-track hoe will be needed to dig test pits for the Class-B soil survey. While the site has been heavily logged we may need to cut a few trees to access some of the test pit locations. Tree cutting would be kept to an absolute minimum. This will not require any grubbing, filling or placing mats in the wetlands. I ask in particular as this would need to occur in the June/July timeframe. Would a permit be needed for tree clearing during this time period."

Call Summary Provided that the tree clearing (during the bat season) does not impact wetlands (e.g., grubbing of trees, filling or placing of mats in wetlands), then no action is needed for the Corps or USFWS.

I also appreciate your offer to visit the Project area if any issues arise, in particular difficult wetland scenarios. Please let me know if I missed anything from our call.
Thanks,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
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---

From: Agius, Brad
Sent: Tuesday, May 25, 2021 11:39 AM
To: 'Mahaney, Shawn B CIV USARMY CENAE (USA)' <Shawn.B.Mahaney@usace.army.mil>
Subject: Hartland Solar -Tree cutting

Hi Shawn,
We'll need some additional guidance regarding our up coming soil survey at Hartland Solar. A mini-track hoe will be needed to dig test pits for the Class-B soil survey. While the site has been heavily logged we may need to cut a few trees to access some of the test pit locations. Tree cutting would be kept to an absolute minimum. This will not require any grubbing, filling or placing mats in the wetlands. I ask in particular as this would need to occur in the June/July timeframe. Would a permit be needed for tree clearing during this time period.
Thank you for your clarification,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

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---

From: Agius, Brad
Sent: Monday, May 24, 2021 2:51 PM
To: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: Hartland Solar - Informational Meeting

Hi Shawn,
We just had the wetland delineation task funded for the Hartland Solar Project and will be mobilizing the delineation teams next week. The project is on commercial forest land and understand there to be numerous skidder ruts and woods trails in upland roads across the 1,388 acre study area. The features in question essentially have disturbed and compacted soils creating an atypical situation. Is there recent Corps guidance on these types of man-made features that would kick them out of Corps jurisdiction, in particular recent changes to the Clean Water Act? Or perhaps guidance on how the Corps would like these man-made features to be delineated and reported on? I appreciate any insight that you can provide.
Thank you,
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
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---

From: Agius, Brad
Sent: Tuesday, April 27, 2021 8:35 AM
To: Clement, Jay L CIV USARMY CENAE (USA) <Jay.L.Clement@usace.army.mil>; Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: Hartland Solar - Informational Meeting

Hi Jay,
Understood. Thank you for the update and advisements. This is just an initial meeting to introduce the Project to the agencies and project team, so there is plenty of time to follow-up. @Mahaney, Shawn B CIV USARMY CENAE (USA), let' catch-up as the Project progress.
I hope you both are well.
--Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager
Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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From: Clement, Jay L CIV USARMY CENAE (USA) <Jay.L.Clement@usace.army.mil>
Sent: Monday, April 26, 2021 5:16 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>

From:	Agius, Brad
To:	Mahaney, Shawn B NAE (Shawn.B.Mahaney@usace.army.mil)
Cc:	Dani Torcolacci
Subject:	Hartland Solar - Atlantic salmon
Date:	Thursday, July 14, 2022 2:32:00 PM
Attachments:	Hartland Solar Atlantic salmon 20220714.jpg

Hi Shawn,

We wanted to follow-up from the Section 7 discussion on 6/30 regarding Hartland Solar and in particular Atlantic salmon. Attached is a map of the proposed project in relation to the Atlantic salmon Gulf of Maine DPS. The project has no in water work and will use existing roads at the two stream crossings without need for upgrade. Therefore, it is our understanding that there will be no impact to Atlantic salmon. Do you concur?

Thank you for your input,

--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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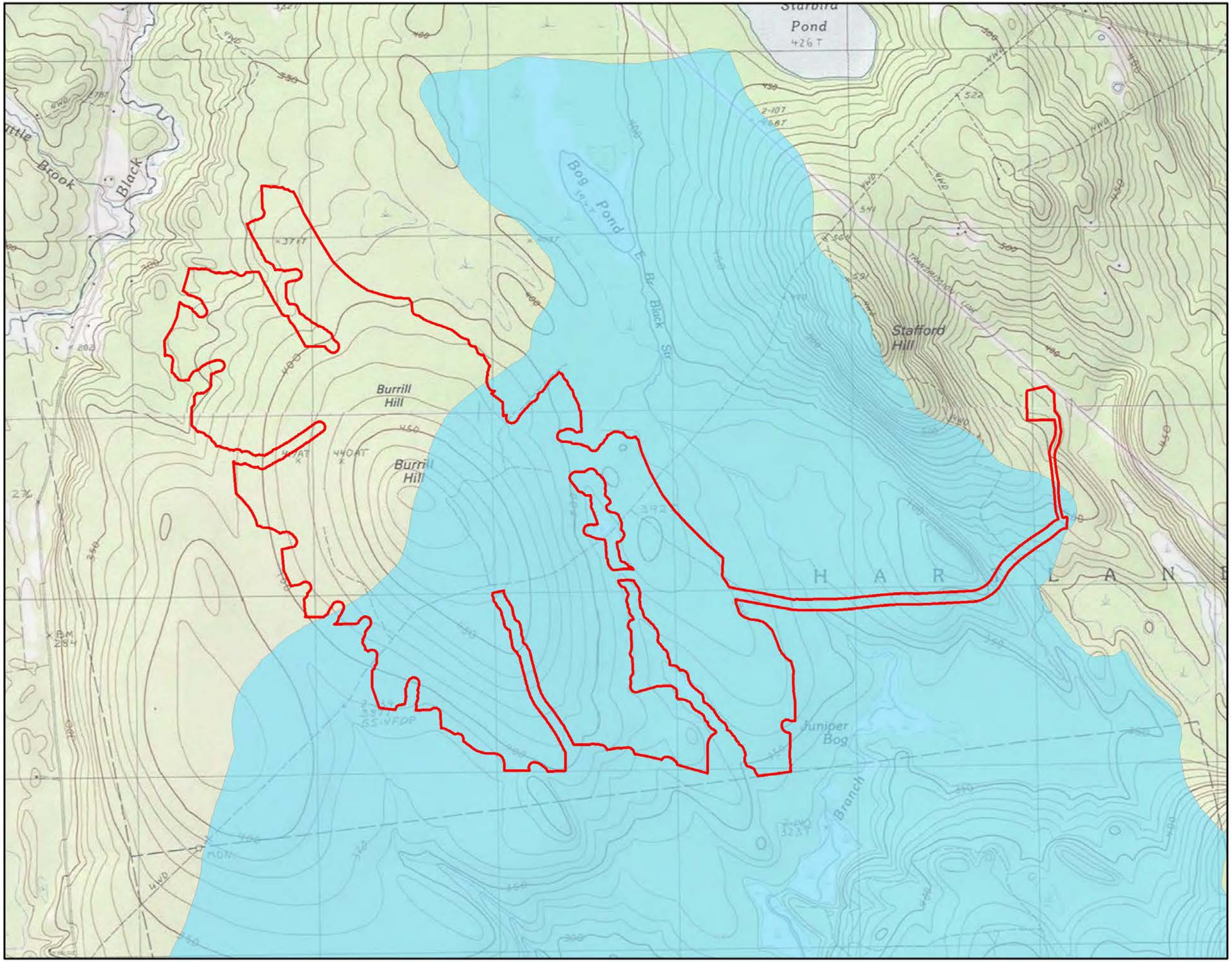

Legend

- Project Area
- Atlantic Salmon (Gulf of Maine DPS) Critical Habitat

N

0 1,000 2,000 4,000 Feet

Atlantic Salmon Critical Habitat
Hartland Solar
Hartland, Maine

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: 07/2022

Source: Esri, et. al., 2019; NOAA, 2022

Coordinate System: World Geodetic System, 1984
Universal Transverse Mercator, Zone 19 North

Not for Construction

Agency Correspondence

USFWS

From:	Hengstenberg, Derek
To:	Parrish, Clinton; Irvin, Emmy; Lin, Mao; Agius, Brad; Rivard, Linda
Cc:	Cassida, Jim
Subject:	Teichos Solar
Date:	Wednesday, January 27, 2021 4:11:43 PM

Hi all-

I talked with the USFWS and he is good with our overall approach for the camera trap survey at Gaddis and Athens. He was curious when a meeting with the agencies would be setup and I told him more details would be forthcoming but the crew has this on the agenda and wanted to make sure we covered the winter window. He agree that a survey was warranted.

He wants us to record all cat tracks including bobcat and conduct and record any incidental tracks we encounter during the survey.

For planning purposes he would like 6 cameras at Gaddis and 4 cameras at Athens.

Brad- I have a few other items we can talk about next week.

Derek Hengstenberg, CWB® | Senior Ecologist/ Project Manager
Direct **207-358-2401** | Business **207-358-2400**| Mobile **908-616-0436** | derek.hengstenberg@tetratech.com

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From: Mahaney, Wende
To: Hengstenberg, Derek
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA); Agius, Brad; Waddle, Kelly
Subject: Re: [EXTERNAL] Hartland Solar- NLEB P/A Survey Plan
Date: Monday, June 21, 2021 2:32:29 PM

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Sounds good, thanks!

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)
Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>
Sent: Monday, June 21, 2021 2:21 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>; Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: RE: [EXTERNAL] Hartland Solar- NLEB P/A Survey Plan

Thanks Wende for the prompt response and my bad on the attachment but we will use appropriate staff members and will include their resumes in the report. Clinton Parrish is our lead and will have back end support from Katelin Craven.

Brad confirmed from the client that they won't need to widen the existing CMP transmission right-of-way. There will be some clearing necessary at the tap point to accommodate the new CMP substation, but that already been included in the study area and is shown on the site plan.

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Monday, June 21, 2021 11:51 AM
To: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>; Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: Re: [EXTERNAL] Hartland Solar- NLEB P/A Survey Plan

Hi Derek,

The survey plan looks fine. Just one question, however, about the existing transmission line shown in a dashed pink line on Figure 1. Will the project just be connecting to the existing transmission line as-is or will the ROW need to be widened at all? Just want to make sure we are "covering" all potential sources of tree clearing for this project.

And then just want to note for the record that Attachment A was not included with the survey plan. Will trust that Tetra Tech will used appropriately qualified personnel to conduct the field verification of the desktop habitat assessment, deployment of acoustic detectors in appropriate locations, and data analysis. Please be sure to include this in the survey results report.

Thanks. Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
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From: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>
Sent: Monday, June 21, 2021 10:29 AM
To: Mahaney, Wende <wende_mahaney@fws.gov>
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>; Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: [EXTERNAL] Hartland Solar- NLEB P/A Survey Plan

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Morning Wende-

Hope you are enjoying your summer and happy solstice. On behalf of the project team, attached is the NLEB survey plan for the Hartland Solar project. We anticipate kicking off work in early July so if you could review and approve within a few weeks or sooner that would be great.

Let us know if you have any questions in the meantime.

Thanks

Derek

Derek Hengstenberg, CWB® | Senior Ecologist/ Project Manage
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NORTHERN LONG-EARED BAT SUMMER PRESENCE/ABSENCE SURVEYS
2021 WORK PLAN

HARTLAND SOLAR PROJECT
HARTLAND, MAINE

PREPARED FOR:

STROBUS SOLAR, LLC
500 UNION STREET SUITE 625
SEATTLE, WA 98101

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1.0 INTRODUCTION

Tetra Tech is pleased to present USFWS with this 2021 Work Plan for the northern long-eared bat (*Myotis septentrionalis*; NLEB) summer presence/absence surveys. The purpose of these surveys is to provide information to USFWS about the habitat suitability for, and presence or absence of, NLEB at the Hartland Solar combination linear and non-linear project in Hartland, Maine during the summer maternity and volancy periods. Tetra Tech will also provide information about the presence or absence of other bat species at this project area. This Work Plan briefly reviews the NLEB regulatory framework and biology, describes the methods that Tetra Tech will use to conduct the surveys, and provides a preliminary review of the project's anticipated level of effort. This Work Plan will be submitted to the USFWS Maine Field Office for review prior to conducting surveys. The results of these surveys will be used to assess the need for and potentially develop conservation measures and adaptive management for NLEB.

1.1 REGULATORY FRAMEWORK

This Work Plan was developed according to recommendations from the U.S. Fish and Wildlife Service (USFWS), the final 4(d) rule for NLEB, the *2020 Range-wide Indiana Bat Summer Survey Guidelines – March 2020*[1] (*Indiana Bat and Northern Long-eared Bat Guidelines*; Guidelines). On April 2, 2015, the USFWS announced that the northern long-eared bat was listed as threatened with an interim Section 4(d) rule; the final 4(d) rule was released on January 14, 2016 (USFWS 2016a[2]). The intent of the 4(d) rule is to provide the USFWS flexibility in implementing the ESA by modifying regulations necessary to provide for the conservation of a threatened species while not overburdening private landowners, state agencies, and others with blanket regulations that do not further the conservation of the species. The USFWS determined that WNS is the primary threat to northern long-eared bat and regulating other sources of mortality or harm will not effectively conserve this species. In 2016 the USFWS determined designating critical habitat for northern-long-eared bat was not prudent (USFWS 2016b[3]). On January 28, 2020, the District of Columbia district court remanded the listing decision for northern long-eared bat requiring a new determination of the species status from the USFWS (Locke and Lord 2020[4]). The 4(d) Rule will continue to be in effect for this species until the new listing decision is determined.

1.2 SPECIES INFORMATION

The NLEB is a medium-sized interior forest bat adapted to feeding on insects beneath the forest canopy. Found primarily across much of eastern and north-central U.S., NLEBs roost under tree bark and in small tree cavities of live and standing dead trees (snags) as well as on or in buildings. The species is more solitary than most other *Myotis* species, and individuals are generally found singularly or in small maternity colonies (typically fewer than 60

[1] USFWS. 2020. 2020 Range-Wide Indiana Bat Summer Survey Guidelines March 2020. https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/FINAL%20Range-wide%20IBat%20Survey%20Guidelines%203.23.20.pdf
[2] USFWS. 2016a. Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat. Federal Register 81(9): 1900-1922. Available online at http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf.
[3] USFWS. 2016b. Endangered and Threatened Wildlife and Plants; Determination that designation of Critical Habitat is not prudent for the Northern Long-Eared Bat. Federal Register 81(81): 24707-24714. Available online at https://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/FRnorthern long-eared batCH04272016.pdf.
[4] Locke and Lord. 2020. "Threatened" Listing for Northern Long-Eared Bats Endangered by District Court Decision: What You Need to Know. Available online at: https://www.jdsupra.com/legalnews/threatened-listing-for-northern-long-89318/.

individuals). The NLEB inhabits intact interior forest habitat with late successional features such as complex vertical structure, tree fall gaps, and standing snags. NLEBs hibernate from October or November until mid-March in caves, mines, and sometimes other man-made structures. Winter hibernacula can be up to 150 miles away from summer roost sites. As a cave-hibernating bat, NLEB has been strongly affected by white-nose syndrome (WNS), with population declines observed in most of its range. The entire range of NLEB in Maine either includes counties with WNS-infected hibernacula, or is within the 150-mile buffer zone around WNS-positive counties.

2.0 METHODS

2.1 KNOWN HIBERNACULA OR MATERNITY ROOST TREES

Standard section 7 consultation procedures will apply if a project will remove trees from within 0.25 mile of a hibernaculum at any time of year, remove known occupied maternity roost trees, or remove trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31.

2.2 DESKTOP ASSESSMENT

Prior to conducting field work, a desktop assessment was conducted to inform decision-making for survey design, in accordance with the Guidelines. This process involved identifying: (1) whether the Project is linear or non-linear, (2) the appropriate level of effort, (3) how many acoustic detectors should be deployed, and (4) approximate locations of where acoustic detectors will be deployed. In addition, basic field maps and global positioning system (GPS) points were generated during the desktop assessment to support the field portion of the survey.

To complete the desktop assessment, a qualified biologist[5] used geospatial information obtained for the Project site and Google Earth to review aerial photography and identify areas that may be used by NLEB and other bats for foraging and roosting during the breeding and migration seasons (Phase 1 of Guidelines). Potentially suitable roosting habitat was identified based on forest patch size and proximity to suitable foraging habitats. Closed-canopy forests are considered potentially suitable roosting or foraging sites and will be further evaluated during the field assessment. In addition to potential roosting habitat, landscape features that may be used by bats commuting between roosting and foraging habitats (e.g., fence rows, wind breaks) also were identified. Any areas that could potentially support hibernacula, including karst or similar geological formations were evaluated and protected natural resources (e.g., parks, wildlife refuges, wildlife management areas) near the Project area were noted.

Based on the preliminary desktop assessment completed for this Work Plan following the described methods, it was determined the Project has both linear and non-linear sections. According to USFWS Guidelines, a minimum of 2 detector nights are required per kilometer of suitable habitat for linear projects and 8 detectors nights per every 123 acres for non-linear projects. Overall, the geometry of the Project contains both non-linear solar array and linear features including a transmission line, gen-tie, access roads associated with the proposed solar array.

These linear features comprise less than 7 kilometers of suitable habitat and the non-linear features comprise approximately 1,200 suitable acres (10 total 123 acre sites; Figure 1). Therefore, Tetra Tech will deploy acoustic detectors at 7 linear detector locations (2 nights each for a minimum of 14 detector nights) and at 20 non-linear detectors locations (4 nights each for a minimum of 80 detector nights) distributed throughout the Project Area (2 detector locations per 123 acre site; Figure 1). Resumes of the qualified biologists who will conduct the field survey and data analyses are provided in **Attachment A**.

[5] Refer to USFWS Guidelines for qualifications of a “qualified biologist.” Qualifications vary for staff who may perform a summer habitat assessment, summer present/absence survey, or summer mist-netting.

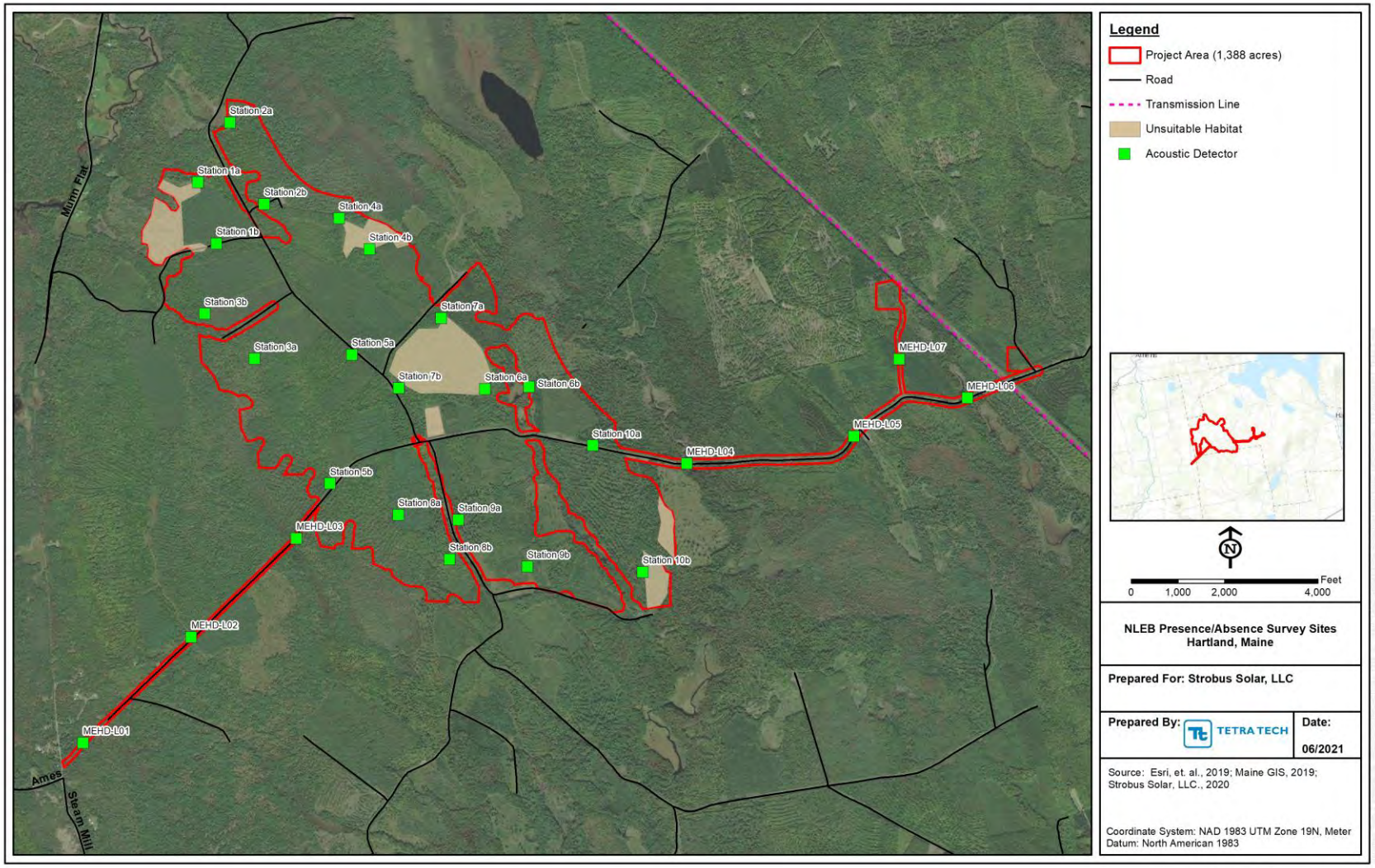

Figure 1. NLEB Presence / Absence Survey Sites Non-linear Project

2.3 FIELD VERIFICATION AND HABITAT ASSESSMENT

A qualified biologist will visit the Project area to verify the findings of the desktop assessment and complete the Phase 1 habitat assessment, as per USFWS Guidelines. Field maps, a GPS unit, or an iPad loaded with relevant geographic information system data (GIS) layers may be used to focus the habitat assessment on areas identified as possibly having suitable summer roosting and foraging habitat. Maps and GIS information are likely to include Project boundaries, potential roosting areas, potential foraging habitat, aerial imagery, and wetland locations from Project site surveys, the National Wetland Inventory, and the National Hydrography Dataset. Habitat assessment and verification procedures will be conducted on foot within the suitable habitat of the Project area. The focus of the habitat assessment will be on the Project area.

2.4 FIELD DATA COLLECTION

If a Phase 1 habitat assessment concludes that potential suitable summer habitat is available, the qualified biologist will be prepared to conduct an acoustic summer presence/absence survey during the same trip following the USFWS Guidelines. Bat activity will be sampled using acoustic detectors at multiple locations in forested habitat.

Level of Effort

The USFWS Guidelines recommends a minimum of eight detector-nights (four detector-nights at two sites) per 123 acres of suitable habitat for non-linear projects and two detector-nights per one kilometer of linear habitat. For these surveys, all forested habitat within the project area will be considered potentially suitable for NLEB. At each sampling location, one detector will be deployed for a minimum of two or four nights of suitable weather conditions, as defined in Appendix C of the USFWS Guidelines[6]. Additional detectors or additional nights will be used to achieve the minimum number of detector nights. A preliminary estimate of level of effort is 10 forest sections of 123 acres or less resulting in 20 detector sites and less than seven kilometers of linear habitat resulting in seven detector sites (Figure 1). Acoustic sampling will occur on nights with suitable weather conditions between May 15 and August 15 of any given year. Locations of the detectors will be based on microhabitat conditions, forest structure and accessibility within the Project area. All detectors will be deployed in accordance with the current USFWS Guidelines.

Detector Type

Acoustic detectors utilized for survey efforts must meet current USFWS Guidelines, which call for full spectrum bat acoustic monitoring equipment. A Wildlife Acoustics Song Meter-3 BAT or Song Meter-4 BAT ultrasonic bat detector (Wildlife Acoustics, Inc., Massachusetts, USA) will be used. Detectors will be equipped with a single external microphone (SMM-U2 Wildlife Acoustics) each on a 3-meter cable. Using an external microphone, as opposed to a microphone fixed to the detector, permits flexibility in the placement of the microphone. Survey reports will describe the detector types and other specifications that are used to conduct individual surveys.

Detector Deployment

Detectors will be micro-sited during deployment to ensure that potential habitats are sampled in accordance with the current USFWS Guidelines. Detectors will be deployed adjacent to the most suitable NLEB habitat available in the vicinity of the Project area. Sampling locations will be a minimum of 200 meters (656 feet) apart. Where possible,

[6] In general, suitable weather conditions include night-time temperatures above 50 ºF (10 ºC), without persistent precipitation or sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) during the first five hours of the survey period. See Appendix C of the Indiana Bat Guidelines.

detectors will be deployed in the following habitat types in order of descending priority (i.e., detector deployment in openings within interior forests will be prioritized, then within interior closed canopy forests, etc.):

- Interior forest-canopy openings;
- Closed canopy forests;
- Near water sources adjacent to forested habitat;
- Forest edges; and
- Linear forested corridors, including corridors connecting forested habitat blocks.

If none of the aforementioned habitat types are available, the most suitable natural habitat available will be sampled.

Microphone Placement

Detector microphones will be oriented and located in a manner that will provide the highest quality recordings possible to assure accurate identification of call sequences. Microphones will be orientated horizontally to the ground surface.

In accordance with the current USFWS Guidelines, every effort will be made to place all microphones at least 3 meters (10 feet) from any obstructions, parallel to forest edges (when not within forests), in an area without or with minimal vegetation within 10 meters (33 feet) of the microphone, and at least 15 meters (49 feet) from suitable roosting habitat (e.g., snags). Detector microphones will be deployed 3 meters (10 feet) above ground, or if deemed appropriate, detector microphones may be suspended from tree limbs above water sources or on the edges of forest clearings.

Documentation of Sampling Locations

GPS coordinates will be recorded for each sampling location. Multiple photographs will be taken at each detector location, including habitat around the detectors, photos of the deployed detector, and a photo from the detector showing the cone of detection. Also, a general description of the habitat in the vicinity of each detector location will be provided in the final survey report.

3.0 DATA ANALYSIS AND REPORTING

Recorded data will be analyzed according to the current USFWS Guidelines. The USFWS Guidelines recommend a multi-stage approach to call analysis. First, all data will be run through a coarse filter analysis to remove non-bat noise files. The coarse filtering will be followed by a quantitative analysis and a final qualitative analysis by a qualified biologist. An approved automated program (e.g., Kaleidoscope Pro v. 5.1.0) will be used for the automated acoustic analyses. Qualitative analysis of all probable NLEB calls identified during the automated acoustic analysis will be conducted.

After each detector site is sampled, the data will be analyzed and vetted and a brief email will be sent to Client indicating if NLEB were recorded during the monitoring period. Tetra Tech will then notify USFWS of any positive NLEB recording in a timely manner. All recorded NLEB call sequences and automated classification software outputs will be provided for USFWS's reference. All results including the habitat assessments will be submitted to USFWS regardless of the findings.

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, May 17, 2022 3:40 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>; shawn.b.mahaney@usace.army.mil
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>; Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>
Subject: Hartland Solar Pre Application Meeting

Hi Wende and Shawn,
We have the latest Hartland Solar design now. We have avoided and minimized as much as possible but will have wetland impacts and need Corps permitting for the project. I just sent you invites to the DEP Hartland Solar Pre Application Meeting on June 1st at 11am. Please let me know if there are other staff from your agencies that should be invited.
Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Friday, May 13, 2022 1:10 PM
To: Agius, Brad <Brad.Agius@tetratech.com>; Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>; shawn.b.mahaney@usace.army.mil
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: Re: [EXTERNAL] Hartland Solar NLEB P/A Survey Report

Thanks for the update, Brad.

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
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306 Hatchery Road (physical address)
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From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Friday, May 13, 2022 12:35 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>; Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>; shawn.b.mahaney@usace.army.mil <shawn.b.mahaney@usace.army.mil>
Cc: Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: RE: [EXTERNAL] Hartland Solar NLEB P/A Survey Report

Hi Wende,

As the Project Manager I'll jump into answer this. We will have the final design complete early next week and will have a definitive answer for you and Shawn about permitting soonest. We are also working on having an agency meeting update by the end of the month and will include you on those invites too. We appreciate the quick review of the bat report.
Have a great weekend,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Friday, May 13, 2022 12:22 PM
To: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>; shawn.b.mahaney@usace.army.mil
Cc: Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: Re: [EXTERNAL] Hartland Solar NLEB P/A Survey Report

Derek,

I forgot to ask for an update on whether or not this project will need a permit from the Corps. Looking back at emails from last year it sounds like design work was targeting no waterway impacts so no Corps permit. Is that still the case? Any Federal funding? Seems like USDA Rural Development is starting to fund more solar projects in Maine.

Just trying to get a read on whether USFWS may have further involvement with this project.

Thank you for any update that you can provide.

Wende

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From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Friday, May 13, 2022 10:46 AM
To: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>; shawn.b.mahaney@usace.army.mil <shawn.b.mahaney@usace.army.mil>
Cc: Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: Re: [EXTERNAL] Hartland Solar NLEB P/A Survey Report

Thanks for the report, Derek. Everything looks in order.

So discouraging that yet another acoustic survey finds no NLEBs. Good that we continue to LBBs, however.

Have a good weekend. Wende

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From: Hengstenberg, Derek <Derek.Hengstenberg@tetratech.com>
Sent: Wednesday, May 11, 2022 8:31:36 AM
To: Mahaney, Wende <wende_mahaney@fws.gov>; shawn.b.mahaney@usace.army.mil <shawn.b.mahaney@usace.army.mil>
Cc: Agius, Brad <Brad.Agius@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>
Subject: [EXTERNAL] Hartland Solar NLEB P/A Survey Report

Good Morning Wende-

On behalf of the project team at Hartland Solar attached is the survey results from the P/A Survey we conducted last summer as well as previous correspondence on the work plan.

Let us know if you have any questions and have a great day.

Derek

Derek Hengstenberg, CWB® | Senior Ecologist/ Project Manager
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From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent on: Tuesday, June 14, 2022 7:54:06 PM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: Re: [EXTERNAL] RE: Meeting Today

Good question, Brad. I would flip that question to the Corps since they are the federal action agency and responsible for determining if the proposed action may affect a listed species or designated critical habitat.

One potential consideration could be the proposed reclassification of the northern long-eared bat as endangered. If that happens (or the species stay listed as threatened but the 4(d) rule gets modified), projects that may affect the NLEB and are not completed by roughly the end of 2022 may have to reinitiate section 7 consultation.

Since I missed the meeting, I basically don't know much about the project. I have not heard anything from the Corps since the meeting. Maybe we need to circle back and have a conversation with the Corps?

Wende

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From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, June 14, 2022 1:08 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>
Subject: [EXTERNAL] RE: Meeting Today

Hi Wende,
Just wanted to check in on your thoughts regarding ESA section 7 consultation for the Hartland Solar Project. Please let me know if you have any questions about the project that can help with the determination.
Thanks,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast

Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Wednesday, June 1, 2022 9:38 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Subject: Meeting Today

HI Brad,

Sorry to have to do this at the last minute. I'm dealing with an ongoing family health emergency and I won't be able to make the meeting at 11 am.

I'll regroup with you and Shawn as soon as I can to figure out whether ESA section 7 consultation will be necessary for this project.

Again, my apologies.

Wende

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From: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Sent on: Monday, June 27, 2022 3:28:06 PM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Wende <wende_mahaney@fws.gov>
CC: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Too help Wende out, I'll be there!

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Monday, June 27, 2022 11:20 AM
To: Mahaney, Wende <wende_mahaney@fws.gov>; Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Cc: Dani Torcolacci <dtorcolacci@teichos.com>
Subject: [Non-DoD Source] RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Wende,
Understood. Shawn would you be able to do the meeting at 330 instead on Thursday? I'll move the meeting to that time as a placeholder so others don't swoop in and take that time.
Thanks,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
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From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Monday, June 27, 2022 11:14 AM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Brad,

Apologies but I am no longer available on Thursday afternoon. Internal meeting scheduling that is out of my control and has me booked from 1:30-3:30 pm. This crazy world of virtual meetings and "shared" calendars is out of control. Sigh.

If other folks still have some flexibility on June 30, I can meet from 3:30-4:30 pm.

Again, apologies. Wende

Wende S. Mahaney, C.W.B. (she/her/hers)

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From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Wednesday, June 22, 2022 10:06 AM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

I can do Thursday, June 30 form 2-4 pm.

Wende

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Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, June 22, 2022 10:04 AM
To: Mahaney, Wende <wende_mahaney@fws.gov>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Wende and Shawn,
Would Tuesday 6/28 between 9-12 or Thursday 6/30 from 2pm on work for you for a Hartland Solar meeting with Dani Torcolacci (the Teichos Project Manager) and myself?
Thanks,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Thursday, June 16, 2022 1:54 PM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Brad,

June 23 (Thursday) is already booked for me.

I'll let you decide how to best find a time that works for everyone.

Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)
Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Thursday, June 16, 2022 12:41 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Wende and Shawn,
Next Tuesday looks to be a conflict. Would you be able for Hartland Solar call next Thursday, 6/23, after 1130 instead?
Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Agius, Brad
Sent: Thursday, June 16, 2022 8:46 AM
To: Mahaney, Wende <wende_mahaney@fws.gov>
Cc: Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Wende,

Attached please find the Lynx Work Plans that were submitted to Mark for your administrative record. Teichos, the developer, would like to attend the call so let's go with next Tuesday so I have time to coordinate the meeting.

Some points for clarity:

1. The original project name for the Hartland Solar Project was Athens Solar, which is referenced in the attached.
2. We submitted 2 project lynx work plans to Mark at the same time, so the Gaddis Solar project is also attached here for your records.
3. Teichos Energy is the developer for these projects but the applicant subsidiary name is Strobus Solar, also referenced in the attached.
4. The Hartland Solar project has largely been on pause for interconnection delays, and results of field surveys have not been authorized for reporting yet. This includes the lynx survey results.

I look forward to discussing the project with you, and Shawn if he is available, as well as introducing you to Teichos. I'll provide a meeting invite as soon as confirm a time for next Tuesday.

Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Thursday, June 16, 2022 6:36 AM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Brad,

Can you please share with me the lynx survey plan and results? I can't find copies anywhere and I'm guessing they got "lost" in Mark's emails when he retired.

Would be good to have these in our project file.

Thank you. Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)

Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Thursday, June 16, 2022 6:30 AM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

I think this can be a quick conversation. I've got time tomorrow between 8 am - 12:30 pm. Next Tuesday (June 21) I'm also available until 2 pm.

Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)
Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Wednesday, June 15, 2022 2:45 PM
To: Mahaney, Wende <wende_mahaney@fws.gov>; Mahaney, Shawn B CIV USARMY CENAE (USA <Shawn.B.Mahaney@usace.army.mil>
Subject: RE: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Wende and Shawn,
Here is some follow-up to your recent questions. I would appreciate it if we could have a call soon to discuss the Hartland Solar project and any questions you may have:

1. Regarding lynx: Derek Hengstenberg (Tetra Tech) and Mark McCollough did discuss surveys. Tetra Tech submitted a work plan to Mark and which approved. The winter surveys in 2021 were completed and no lynx were present.

1. Regarding Atlantic salmon: while the Atlantic salmon critical habitat overlaps with the project area, no in stream work is proposed for the project.

1. Regarding the Official Species List from the iPaC – Attached it the latest iPaC run for the project today. I added both of you as named users on the Project's iPaC too.

Thank you,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast
Cell: **207.991.2633** | brad.agius@tetratech.com

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Wednesday, June 15, 2022 8:27 AM
To: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>; Agius, Brad <Brad.Agius@tetratech.com>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

One last question. I think at one time, Derek was talking with Mark McCollough about doing a winter track survey for lynx. Did that ever happen? The project is located outside the area where we would normally think about the potential for lynx to occur. But lynx do surprise us from time to time on where they show up in Maine.

If a survey was done and lynx tracks were found, that could kick us into consultation for lynx.

Thanks, Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)
Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Mahaney, Wende <wende_mahaney@fws.gov>
Sent: Wednesday, June 15, 2022 8:24 AM
To: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>; Agius, Brad <Brad.Agius@tetratech.com>
Subject: Re: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Since an acoustic survey was completed last summer (with review and approval by my office) with no detections of NLEB, those survey results are good for 5 years. So as long as the project is completed by summer 2026, the Corps can make a no effect determination for this species.

For Atlantic salmon, I would need more details on the location of any stream impacts. Based on a preliminary project plan from 2021, part of the project is in critical habitat for Atlantic salmon and part is not (but all within the range of the Gulf of Maine Distinct Population Segment).

Last I checked, no one has requested an official species list for this project from IPaC, at least that I could find. That should be done for the record if it hasn't.

If there will be stream impacts, we'll need to have further discussion about where and what.

Wende

Wende S. Mahaney, C.W.B. (she/her/hers)
U.S. Fish and Wildlife Service
Maine Field Office
P.O. Box A (mailing address)
306 Hatchery Road (physical address)
East Orland, Maine 04431
Telephone: (207) 902-1569 (direct line)
Fax: (207) 902-1588
Cellular Phone: 207-944-2991

From: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Sent: Wednesday, June 15, 2022 8:04 AM
To: Agius, Brad <Brad.Agius@tetratech.com>; Mahaney, Wende <wende_mahaney@fws.gov>
Subject: [EXTERNAL] RE: Hartland Solar - ESA section 7 consultation?

Hi Brad,

For Section 7 with USFWS you are going to have to consult on NLEB and if you need to cross any streams, Atlantic salmon will need to be consulted on.

As of now you can use the 4(d) rule form but when NLEB gets changed to Endangered then that won't be available. So we need to get with Wende and see what options are available. You can survey for NLEB and if none are found then it sound be an issue but you need to get an approved survey plan from Wende and there is only a limited time of the year that you can survey (May-Oct?).

Also, any stream crossing will need to be designed to stream simulation.

Wende, any other thoughts?

Shawn

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent: Tuesday, June 14, 2022 4:08 PM
To: Mahaney, Shawn B CIV USARMY CENAE (USA) <Shawn.B.Mahaney@usace.army.mil>
Subject: [Non-DoD Source] Hartland Solar - ESA section 7 consultation?

Hi Shawn,
I am glad you were able to make the Hartland Solar Pre-Application meeting. What are your thoughts on ESA section 7 consultation requirements. Please let me know if you need any additional information about the project, and or if we need to have a conversation with USFWS too.

Thanks,
--Brad

Brad Agius | Director – Renewable Energy & Natural Resources, Northeast

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Agency Correspondence

Miscellaneous

Lin, Mao

From: Eliza Donoghue <edonoghue@maineaudubon.org>
Sent: Thursday, July 7, 2022 9:27 AM
To: Agius, Brad
Cc: Eric Topper
Subject: Re: Solar Fencing

⚠ **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments. ⚠

Hi Brad,

You bet. You can find a slightly-outdated reference in our model site plan reg/conditional use document. Also, we're close to completing a vegetation management guide for solar projects in Maine, which will have the most up to date recommendation. Stay tuned! In the meantime, I've pasted that info below.

Holler if we can be of any more assistance.

Thanks,

Eliza

To allow for wildlife passage, we recommend that fences be elevated by a minimum of 5 inches. To maximize wildlife's ability to permeate fencing, we recommend using 'Solid Lock Game Fences'. Such fencing starts with 8- by 12-inch openings at the bottom (ground) with progressively smaller openings at the top of the fence. This type of fencing meets the National Electric Code for human safety, while also allowing more wildlife movement. Additionally, we recommend placing five-inch or larger diameter wooden escape poles at intermittent fence junctions as an alternative for wildlife to escape the enclosed area, as well as the development of a protocol to ensure the timely release of large, trapped wildlife, such as deer.

On Tue, Jul 5, 2022 at 12:05 PM Agius, Brad <Brad.Agius@tetratech.com> wrote:

> Hi Eliza,
>
> I hope you had a great 4th of July weekend. Someone recently ed to me that Audubon may have some wildlife friendly fencing recommendations for large solar projects. Neither of us could find a reference however. Is this something you are familiar with? If so, could you please provided me with the information.
>
> Thank you,
>
> --Brad
>
> **Brad Agius** | Director – Renewable Energy & Natural Resources, Northeast
>
> Cell: **207.991.2633** | brad.agius@tetratech.com

From: Eliza Donoghue <edonoghue@maineaudubon.org>
Sent: Thursday, October 7, 2021 8:59 AM
To: Agius, Brad <Brad.Agius@tetratech.com>
Cc: Eric Topper <etopper@maineaudubon.org>
Subject: Re: Guide to planting native pollinator veg

⚠ **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments. ⚠

Hi Brad,

Thanks for the email. Happy to sign you up for our email list, which will include correspondence about our work on renewable energy. I'd welcome the opportunity to share our work to date - holler if it'd like to find a time for a call. In the meantime, check out these resources on our website (likely the same stuff that was in the email that was forward to you).

That planting guide is still in the works, but we'd be happy to advise you directly on your projects, as we have with other developers. I'm cc'ing Eric Topper, our staff expert on this topic. We've already been in touch about your email and he looks forward to hearing from you.

We're excited to learn more about your projects!

Eliza

On Wed, Oct 6, 2021 at 9:49 AM Agius, Brad <Brad.Agius@tetratech.com> wrote:

> Hi Eliza,
>
> An acquaintance forwarded your "Updated! Introducing our Renewable Energy Siting Tool" email. Is there a way to sign up for future Audubon updates regarding renewable energy? Of particular interest is the "Coming soon: A guide to planting native, pollinator-friendly vegetation at solar project sites. Contact us today if you'd benefit from guidance on this topic prior to the guide's publication - we'd be happy to help!". We are currently working with clients on planting native, pollinator-friendly vegetation at numerous solar project sites.
>
> Thank you,
>
> --Brad

Brad Agius, MS, GISP, PWS | Senior Project Manager

Main: **207.358.2400** | Direct: **207.358.2402** | Cell: **207.991.2633** | brad.agius@tetratech.com

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Please consider the environment before printing.

--

Eliza Donoghue, Esq.

Director of Advocacy & Staff Attorney

207.221.8971

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maineaudubon.org

--

Eliza Donoghue, Esq. *(she/her)*
Director of Advocacy & Staff Attorney
Maine Audubon
207.712.4359 (cell)
maineaudubon.org

From: Agius, Brad <Brad.Agius@tetratech.com>
Sent on: Thursday, August 25, 2022 6:42:35 PM
To: Dani Torcolacci <dtorcolacci@teichos.com>
CC: Vincent Hansen <vh@teichos.com>; Asha Lewellen <alewellen@teichos.com>; Cassida, Jim <Jim.Cassida@tetratech.com>; Waddle, Kelly <Kelly.Waddle@tetratech.com>; Watts, Sarah <Sarah.Watts@tetratech.com>
Subject: Audubon - Vegetation Management Guide

Hi Dani,
The Maine Audubon just provided me with an advance copy of their Vegetation Management Guide : Check it out here. Below is a snap shot of the TOC, including info on pollinator species and fencing. Perhaps this maybe of use for the Hartland project.
--Brad

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Brad Agius | Director – Renewable Energy & Natural Resources, Northeast

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EXHIBIT 7-2 USFWS IPAC DATABASE REPORT

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

Somerset County, Maine

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

NOT FOR CONSULTATION

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Fishes

NAME	STATUS
Atlantic Salmon Salmo salar There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Atlantic Salmon Salmo salar https://ecos.fws.gov/ecp/species/2097#crithab	Final

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

NOT FOR CONSULTATION

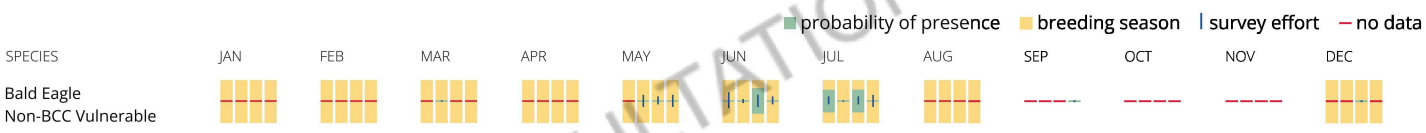
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area,

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visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

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Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

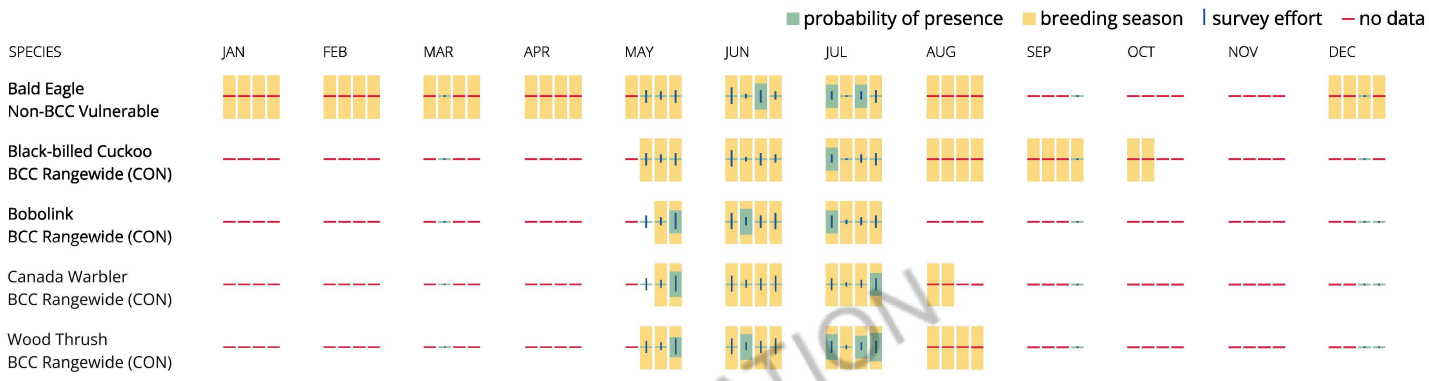
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND
- PEM1Eh

FRESHWATER FORESTED/SHRUB WETLAND
- PFO4E
- PSS1E
- PFO4/1E

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588

TEST PROJECT ONLY

In Reply Refer To: November 29, 2023
Project code: 2024-0000508
Project Name: Hartland Solar (Beta)

Federal Action Agency (if applicable): Army Corps of Engineers

Subject: Record of project representative's no effect determination for 'Hartland Solar (Beta)'

Dear Mao Lin:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on November 29, 2023, for 'Hartland Solar (Beta)' (here forward, Project). This project has been assigned Project Code 2024-0000508 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A

consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Atlantic Salmon *Salmo salar* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate

Critical Habitats:

- Atlantic Salmon Salmo salar Endangered

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the Maine Ecological Services Field Office and reference Project Code 2024-0000508 associated with this Project.

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Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Hartland Solar (Beta)

2. Description

The following description was provided for the project 'Hartland Solar (Beta)':

D-key test

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.878335699999994,-69.5889175124604,14z

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DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats <u>are</u> likely to be present in the action area, answer "NO" and continue through the key.

   Do you want to make a no effect determination?

   Yes

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PROJECT QUESTIONNAIRE

TEST PROJECT ONLY

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Mao Lin
Address: 451 Presumpscot St
City: Portland
State: ME
Zip: 04103
Email mao.lin@tetratech.com
Phone: 9176875838

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

TEST PROJECT ONLY

EXHIBIT 7-3 NATURAL RESOURCES SURVEY REPORT

Natural Resources Report

Hartland Solar Project
Somerset County, Maine

Prepared For:

Hartland Solar Facility, LLC

500 Union Street Suite 625
Seattle, WA 98101

Prepared By:

Tetra Tech, Inc.
Complex World, Clear Solutions™
451 Presumpscot St., Portland, ME 04103 | tetratech.com

Final October 2023

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1.0 INTRODUCTION

Hartland Solar Facility, LLC (Hartland Solar) is proposing to construct the Hartland Solar Project (Project), a ground-mounted solar photovoltaic system with a capacity of 140 megawatts of alternating current, located in the Town of Hartland, Somerset County, Maine. Tetra Tech conducted surveys for vernal pools within an approximately 1,856-acre study area (Vernal Pool Study Area). Additionally, a resource delineation was conducted for wetlands and watercourses (rivers, streams and brooks) within an approximately 1,611-acre area (Wetland and Watercourse Study Area) during the growing season of 2021. Both study areas can be described as gently to steeply sloping terrain with heavily managed forest land in various stages of regeneration. An existing network of dirt access roads are present throughout both study areas. This report outlines the results of the vernal pool survey and wetland and watercourse delineation and describes the existing conditions observed within the study areas.

2.0 DELINEATION AND SURVEY METHODS

The resources identified in this report are subject to regulation under the Maine Natural Resources Protection Act (NRPA), 38 Maine Revised Statutes Annotated (M.R.S.) §§ 480-A to 480-FF and corresponding rules[1] administered by the Maine Department of Environmental Protection (MDEP). Additionally, these resources are subject to the provisions outlined in Sections 401 and 404 of the Clean Water Act administered by the United States Army Corps of Engineers (USACE).

The Wetland and Watercourse Study Area and the Vernal Pool Study Area (Appendix A, Sheets 1 through 11) are based on a Project area showing a proposed conceptual layout that was provided by Hartland Solar to Tetra Tech. Based on NRPA regulations, wetlands and watercourses were delineated within 100 feet of the proposed layout, resulting in a 1,611.2-acre Wetland and Watercourse Study Area. A 250-foot buffer was applied to the proposed layout for the vernal pool survey, resulting in an 1,856-acre Vernal Pool Study Area.

Vernal pool, wetland and watercourse boundaries were delineated in the field and marked with alpha numeric coded flagging. Flags were spatially recorded using Apple iPads with the ArcGIS Collector application in conjunction with an EOS Positioning Systems Arrow 100 Sub-meter Global Navigation Satellite System.

2.1 Vernal Pool Survey

Vernal pool surveys were completed by Tetra Tech biologists in April and May 2021 in accordance with the criteria outlined in the Maine Association of Wetland Scientists Vernal Pool Technical Committee, Vernal Pool Survey Protocol (Maine Association of Wetland Scientists 2014). Two Site visits were completed during the vernal pool season to account for the different breeding periods of vernal pool species. During each visit, notes and photographs were collected to document conditions within the Vernal Pool Study Area, biological activity, egg mass counts, and general pool characteristics. For each vernal pool observed within the Vernal Pool Study Area, field scientists completed a Maine State Vernal Pool Assessment Form (MDEP 2017). For vernal pools that meet the criteria to be considered significant in accordance with NRPA Chapter 335, Significant Wildlife Habitat, section 9(B), forms were submitted to the Maine Department of Inland Fisheries and Wildlife (MDIFW) for documentation in the State GIS system and significance determinations. A determination decision letter was issued by MDIFW in July of

[1]NRPA rules available online: https://www.maine.gov/dep/land/nrpa/index.html

2022 for the vernal pools identified within the Vernal Pool Study Area, the results of which are discussed in section 3.1 of this report.

2.2 Wetland and Watercourse Delineation

Wetland and watercourse delineations were completed by Tetra Tech wetland scientists in June and July of 2021 and August 2023. Wetlands and watercourses were delineated in accordance with the USACE *1987 Wetland Delineation Manual* (USACE 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement Version 2* (USACE 2012) (Regional Supplement); and in accordance with criteria set forth in the NRPA Rules, Chapter 310, Wetlands and Waterbodies Protection. Wetlands of Special Significance (WOSS), regulated under the NRPA 38 M.R.S. §§ 480-D, were evaluated in accordance with the criteria described in NRPA, Chapter 310, Section 4(A).

USACE Wetland Determination Data Forms were completed at various sample locations within delineated wetlands and adjacent uplands in accordance with the procedures described in the Regional Supplement. Additionally, general notes on hydrology, vegetation and soil conditions were taken for each resource throughout the Wetland and Watercourse Study Area to adequately characterize the resources in support of the future permitting effort.

Watercourses were identified and delineated in accordance with the definitions described in the NRPA §480-B and the guidance provided in the Natural Resources Protection Act Identification Guide for Rivers, Streams, and Brooks (Danielson 2018). Representative Site photographs were taken of each watercourse and the physical dimensions, bottom composition, and flow regime were recorded.

3.0 SURVEY RESULTS

3.1 Vernal Pool Survey Results

There are twenty-two vernal pools identified within the Vernal Pool Study Area. The location of the vernal pools are shown in the Appendix A, map set, and the results are summarized Appendix B, Table 1. Maine State Vernal Pool Assessment Forms, for naturally occurring vernal pools, are provided in Appendix C.

A majority of the ephemeral pools identified in the Vernal Pool Study Area are non-natural in origin and were categorized as amphibian breeding areas. These pools appear to be created by tire ruts and roadside ditches that cause water impoundments and provide conditions conducive to spring amphibian breeding activities. Of the 22 vernal pools identified within the Vernal Pool Study Area, nine were disturbed by logging activities or potentially affected by drought conditions in 2021.

One of the vernal pools (VP01ML), shown on Sheet 5 of 11, is characterized as significant. This vernal pool appears to be naturally occurring and meets the egg mass count criteria to be considered significant under MDEP NRPA Chapter 335, Significant Wildlife Habitat Rules (MDEP 2014). Four of the vernal pools (VP33EI, VP35EI, VP08EI and ABA05EI) meet the criteria to be considered significant due to egg mass counts but were not originally considered significant in accordance with MDEP NRPA Chapter 335, Significant Wildlife Habitat Rules § B(4-A) due to drying too early for species viability. Upon review by MDIFW these four vernal pools were determined to be “potentially Significant” due to the drought documented by NOAA in Central Maine for June and July 2021 making the dry down kick out date an “unrealistic metric” (Richardson 2022).

3.2 Wetland Delineation Results

There are fifty wetlands totaling approximately 169.1 acres within the Wetland and Watercourse Study Area. The location of the wetlands are shown in the Appendix A, map set Sheets 1 through 11, and a

detailed description of each wetland is provided in Appendix B, Table 2). USACE Wetland Determination Data Forms documenting a collection of resources that are representative of wetlands that were delineated within the Wetland and Watercourse Study Area are included in Appendix D, and representative photographs are included in Appendix E. Paired plots were completed in accordance with USACE standards to determine vegetation, soils, and hydrology of the wetlands observed and can be provided upon request.

Twelve of the wetlands are hydrologically connected to watercourse channels, which all flow generally south toward Eastern Branch Black Stream, which is a tributary of Black Stream. The remaining wetlands within the Wetland and Watercourse Study Area are generally small, isolated wetlands that are influenced by past or current timber harvest activities.

Wetlands of Special Significance (WOSS) are defined under Maine Wetland Protection Rules, Chapter 310, Section 4 (MDEP 2009). Thirteen of the identified wetlands meet the criteria to be considered WOSS for one or more of the following criteria: contains a natural community that is critically imperiled or imperiled; contains significant wildlife habitat; or is located within 25 feet of a watercourse.

3.3 Watercourse Delineation Results

Seventeen watercourse segments were identified within the Wetland and Watercourse Study Area. The location of the watercourses are shown in (Appendix A, map set Sheets 1 through 11). Flow regimes present include four perennial watercourses, seven intermittent watercourses and six ephemeral drainages. Most of the delineated watercourses are associated with wetland complexes. Generally, the watercourses were observed to be impacted by past and present timber harvest operations as evidenced by the channelization of sheet flow runoff and naturalized dug ditches. A detailed description of each watercourse documented within the Wetland and Watercourse Study Area is provided in Appendix B, Table 3.

4.0 WETLANDS FUNCTIONS AND VALUES

In accordance with Chapter 310 (Wetland and Waterbodies Protection Rules), Tetra Tech completed a wetlands functions and values assessment to document the wetland functions and values present within the wetland areas. This information will be required in support of future permit applications if the project results in direct impacts to natural resources.

4.1 Methodology

The wetlands were evaluated using the USACE New England District's Highway Methodology Workbook[2]. This method bases function and value determinations on the presence or absence of criteria for each of 13 wetland functions and values typically considered by the Maine Department of Environmental Protection and the U.S. Army Corps of Engineers during the wetland permitting process. The criteria are assessed through direct field observations and a review of existing public data sources. As part of the evaluation, the "principal" (i.e., most important) functions and values associated with the subject wetland are identified and described. In addition, the ecological integrity of the wetland is evaluated based on the existing and past levels of disturbance and the overall significance of that wetland within the local

[2] USACE, New England District. 2015. The Highway Methodology Workbook Supplement. Wetland Functions and Values. April 6, 2015.

watershed. This descriptive and qualitative approach integrates wetland science with subjective value judgments made by wetland professionals.

The following are the 13 wetland functions and values considered in the assessment.

Groundwater Recharge/Discharge

This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

Flood-flow Alteration

This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

Fish and Shellfish Habitat

This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.

Sediment/Toxicant Retention

This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

Nutrient Removal

This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

Production Export

This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

Sediment/Shoreline Stabilization

This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

Wildlife Habitat

This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

Recreation

This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational

activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.

Educational/Scientific Value

This value considers the suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.

Uniqueness/Heritage

This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

Visual Quality/Aesthetics

This value considers the visual and aesthetic quality or usefulness of the wetland.

Endangered Species Habitat

This value considers the suitability of the wetland to support threatened or endangered species.

4.1 Results

A description of each wetland's functions and values are provided in Appendix F, Table 1. Palustrine Forested (PFO) wetland communities within the Wetland and Watercourse Study Area are the most common wetland community and represent approximately 79.1 percent (%) of the wetland cover types. The remaining wetland community is represented as 20.9 % Palustrine Scrub-Shrub (PSS) wetlands. There are no unconsolidated bottom or emergent wetlands present within the Wetland and Watercourse Study Area.

5.0 CONCLUSION AND DISCUSSION

In summary, twenty-two vernal pools, thirty-eight wetlands totaling approximately 159.6 acres, and seventeen watercourse segments were observed within the study areas. The data collected during these surveys may be used by Hartland Solar to inform the project development footprint.

The natural resources observed generally have signs of disturbance from past and ongoing commercial timber harvesting operations. Wetland complexes are associated with many of the watercourse segments.

In terms of Hartland Solar's development program, the delineated wetlands, water courses and vernal pools should be avoided to the extent practicable for both construction and operational activities. For those areas where complete avoidance is not achieved, minimizing direct impacts to wetlands, water courses and vernal pools is recommended. In addition, the strategy for impact avoidance and minimization of resource area impacts should include erosion prevention and sediment control, winter clearing, and micro siting of proposed project infrastructure will further minimize and/or reduce potential impacts to these natural resources.

6.0 REFERENCES

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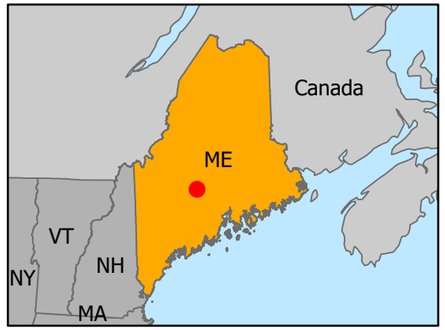
APPENDIX A. MAP SHEETS 1 THROUGH 11

Legend

- Wetland and Watercourses Study Area
- Vernal Pool Study Area
- Property Boundary
- Road



N

0 500 1,000 2,000 Feet

Vernal Pool, Wetland and Watercourse Delineation Results
Hartland, ME
Sheet 1 of 11

Prepared For: Strobus Solar, LLC

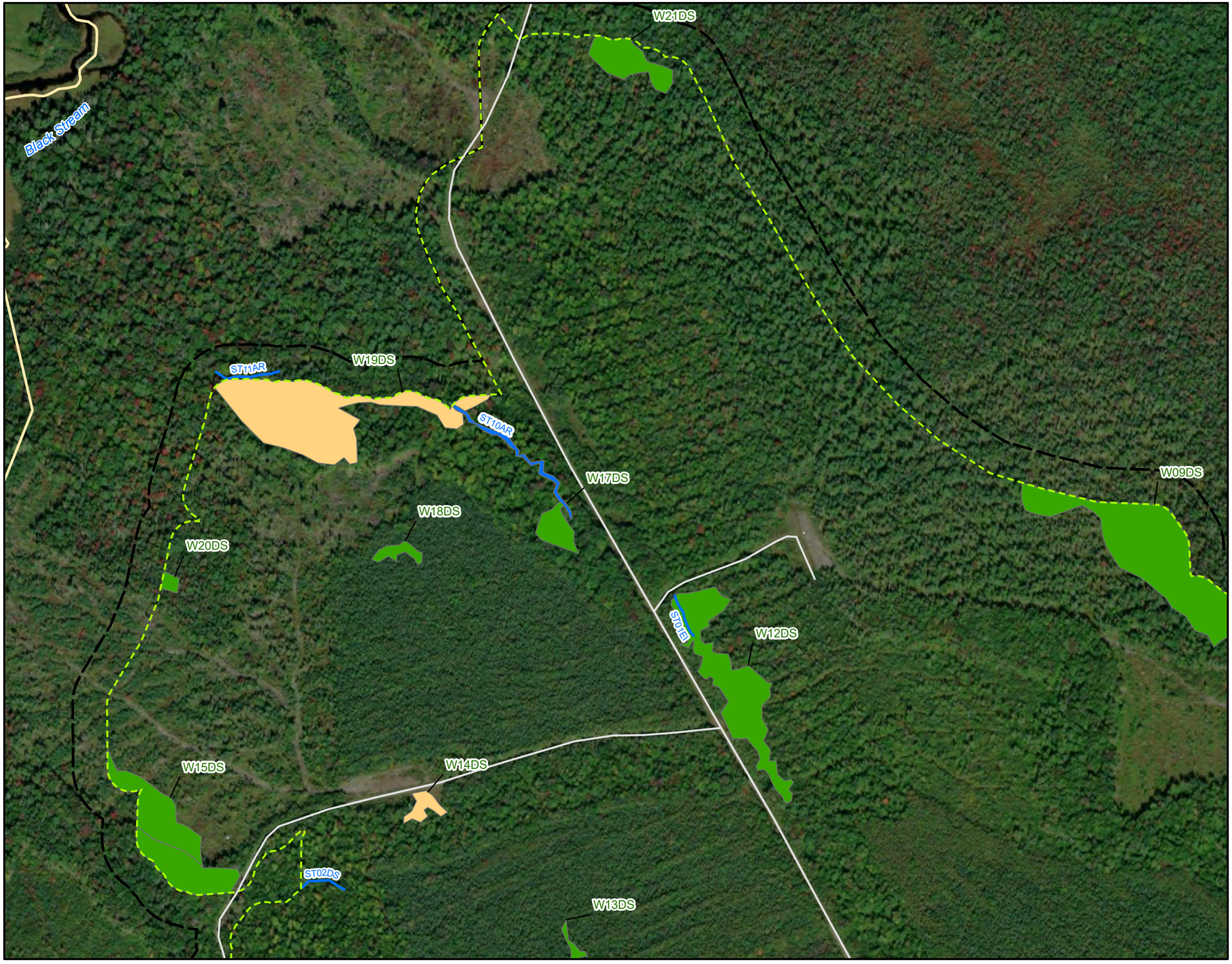
Prepared By: TETRA TECH

Date: **09/2023**

Source: Esri, et. al. 2022, Tetra Tech 2023

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

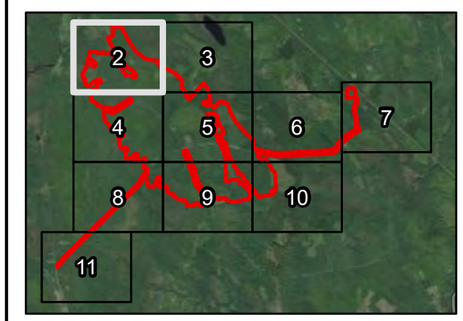


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream

Delineated Wetlands

- PFO
- PSS



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0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 2 of 11

Prepared For: Strobus Solar, LLC

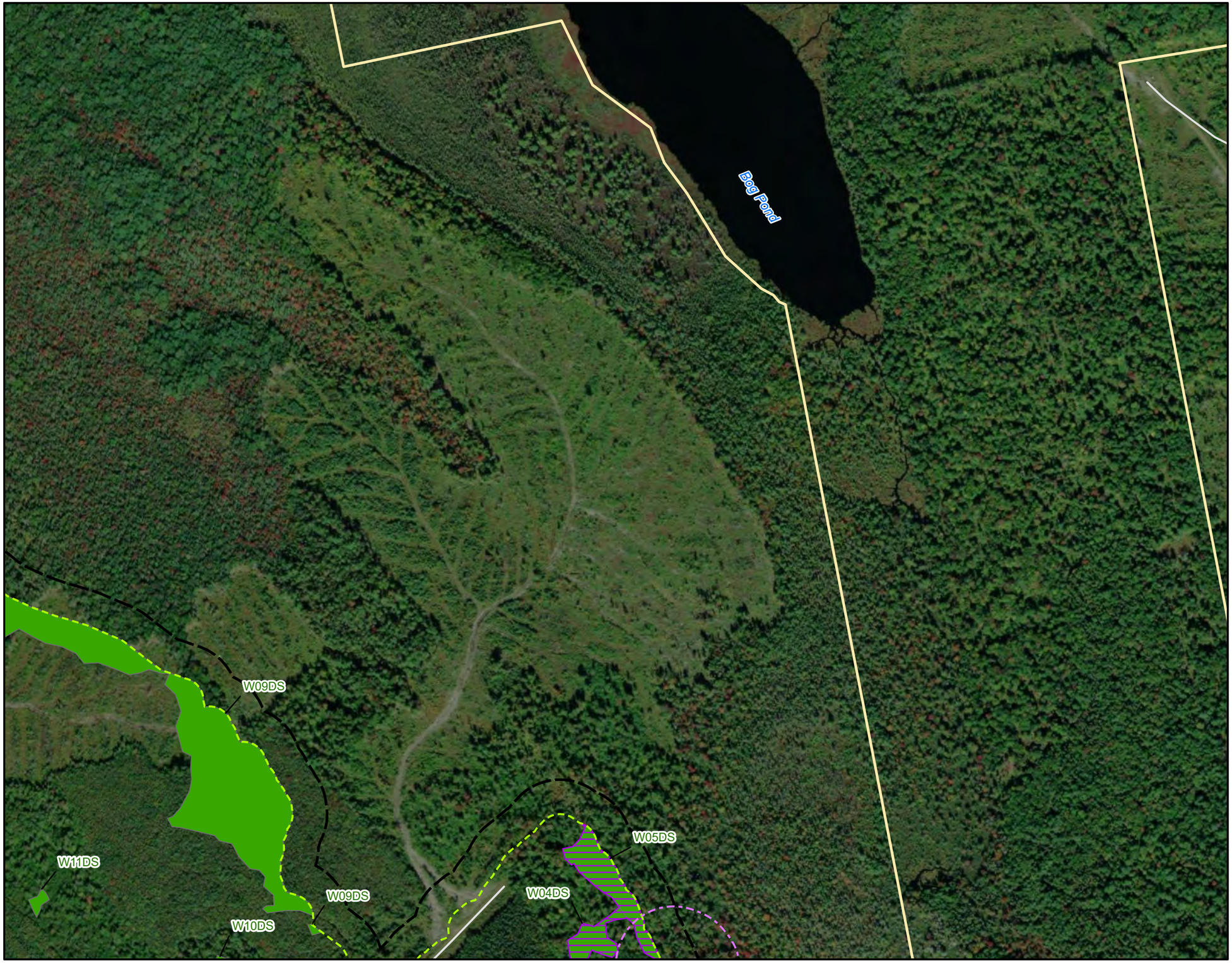
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

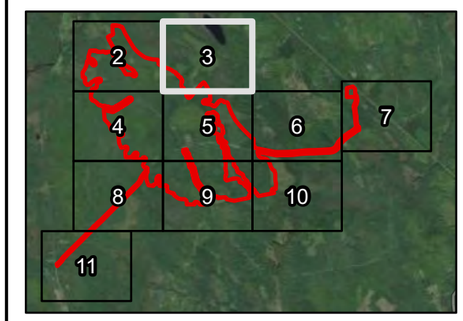


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Critical Terrestrial Habitat (250-foot buffer)

Delineated Wetlands

- PFO
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 3 of 11

Prepared For: Strobus Solar, LLC

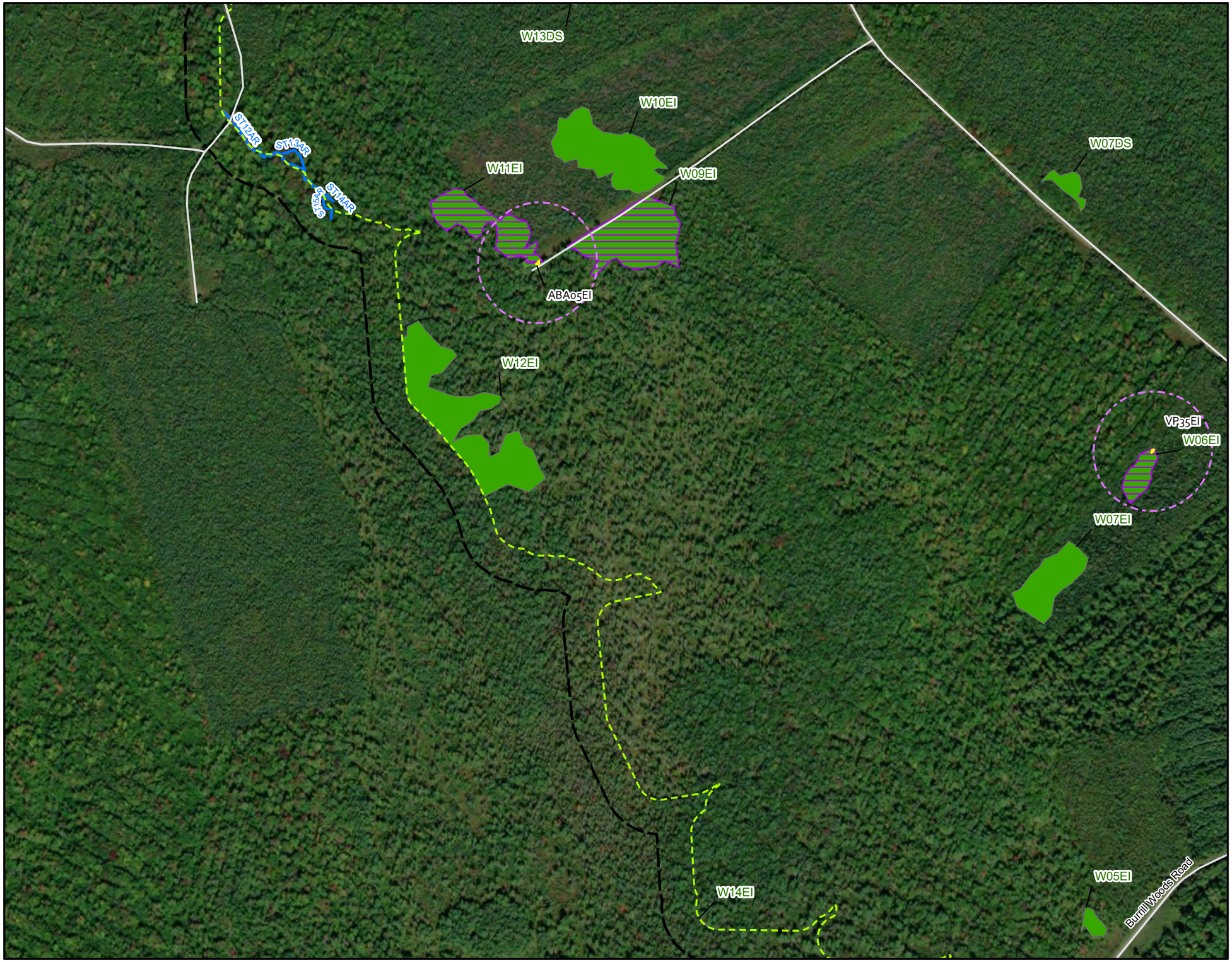
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

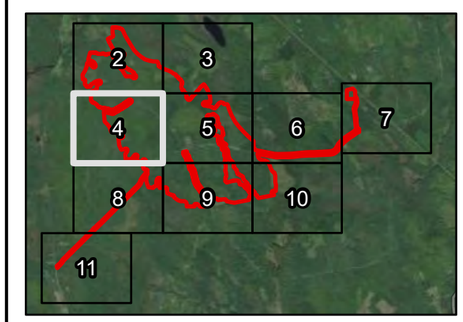


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Potential Significant Vernal Pool
- Critical Terrestrial Habitat (250-foot buffer)

Delineated Wetlands

- PFO
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 4 of 11

Prepared For: Strobus Solar, LLC

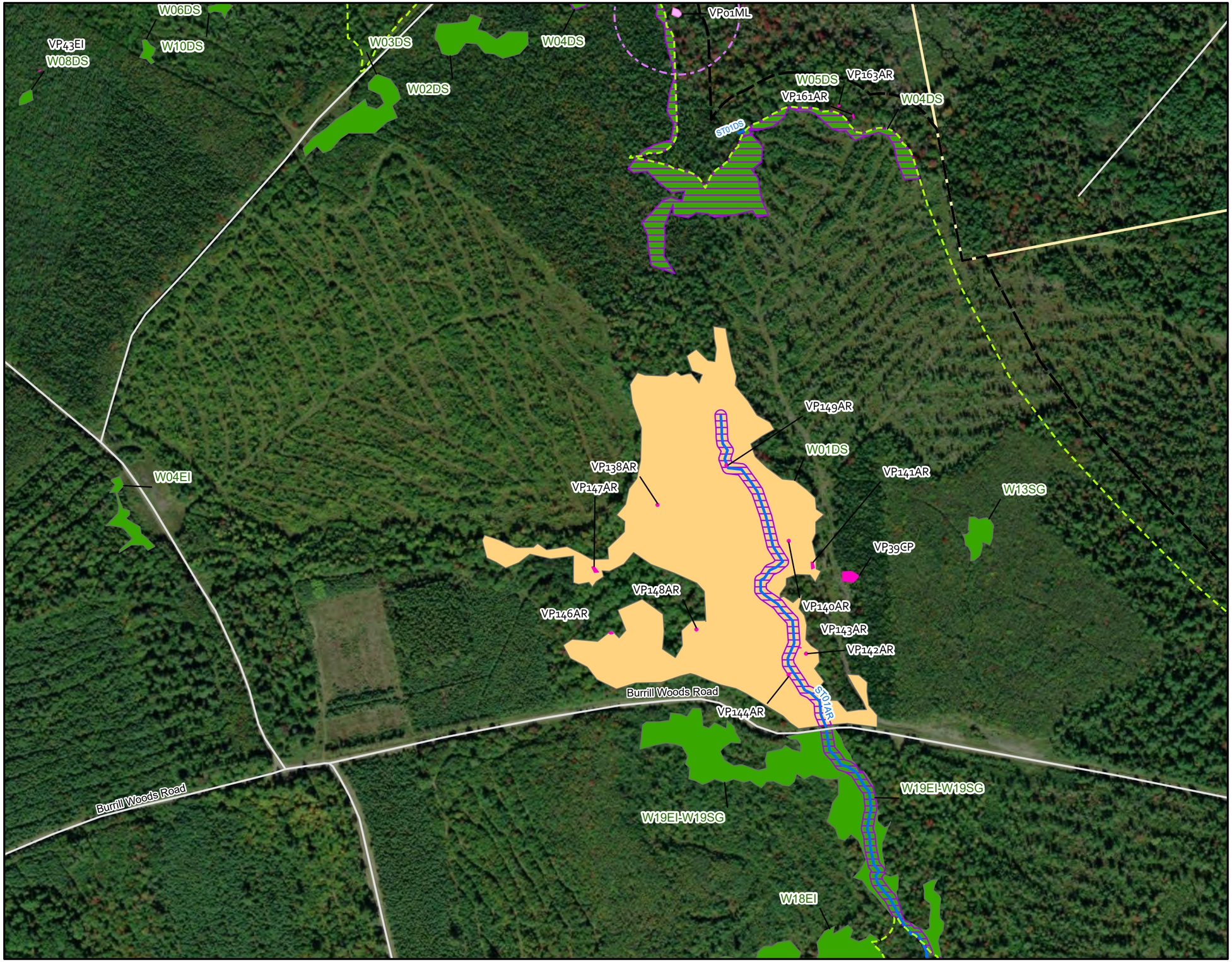
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

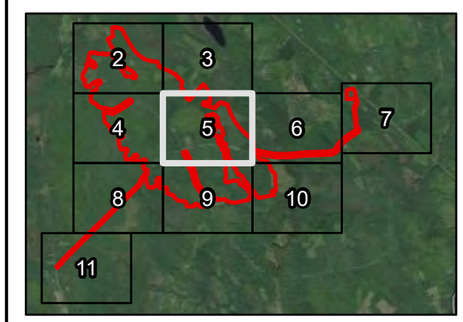


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Significant Vernal Pool
- Vernal Pool
- Critical Terrestrial Habitat (250-foot buffer)

Delineated Wetlands

- PFO
- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 5 of 11

Prepared For: Strobus Solar, LLC

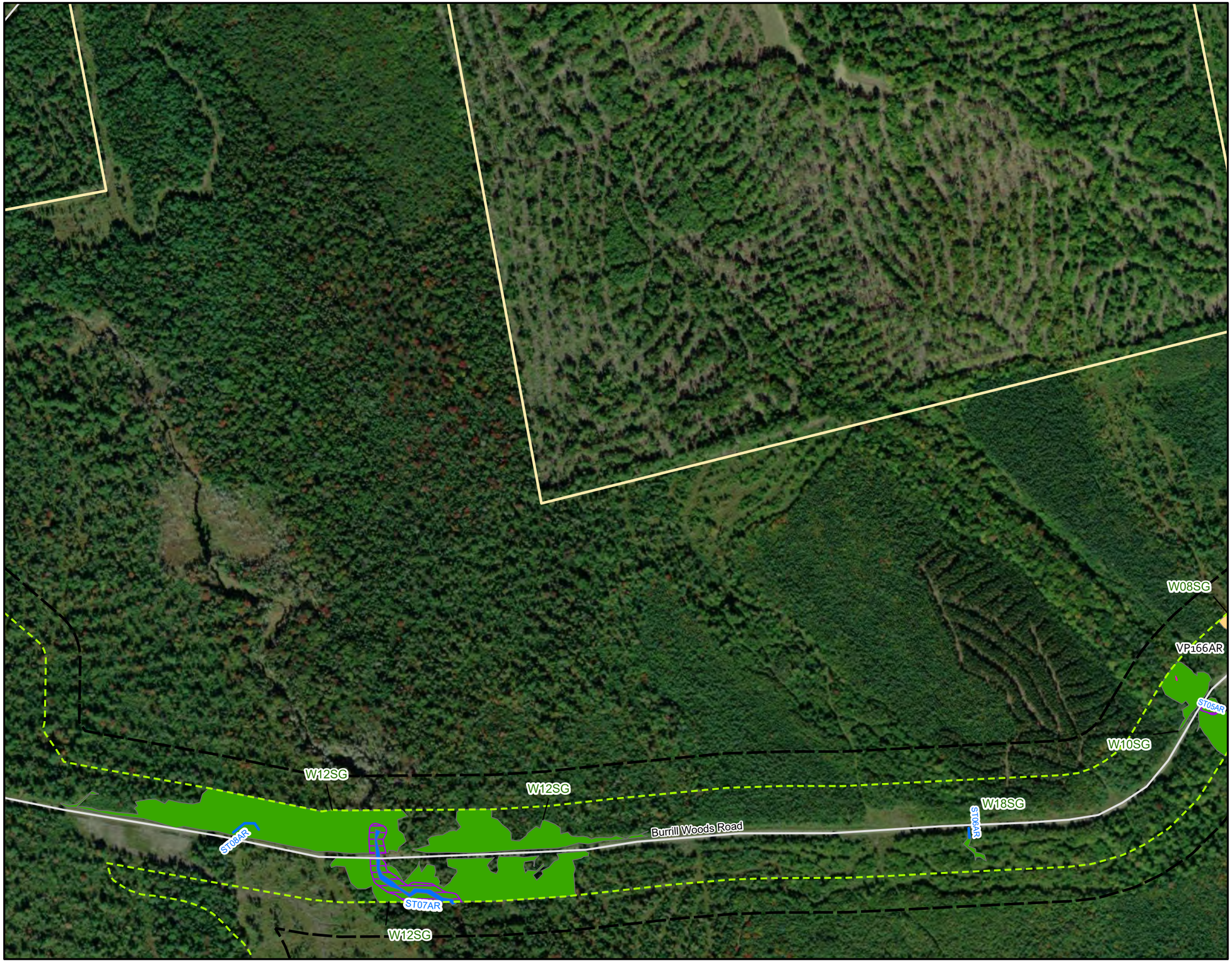
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

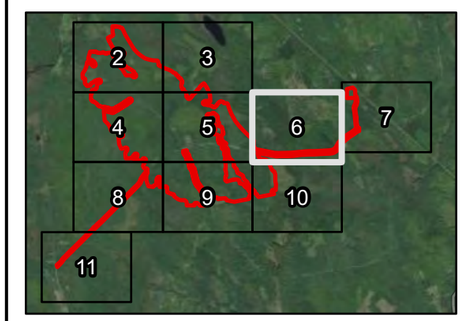


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Vernal Pool

Delineated Wetlands

- PFO
- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 6 of 11

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

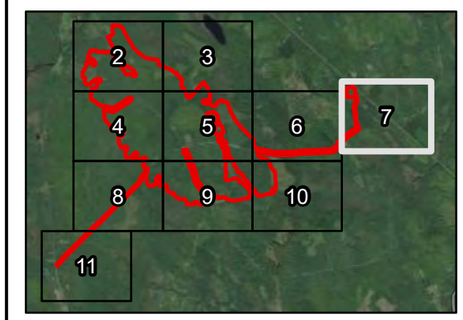
Not for Construction

Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream

Delineated Wetlands

- PFO
- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 7 of 11

Prepared For: Strobus Solar, LLC

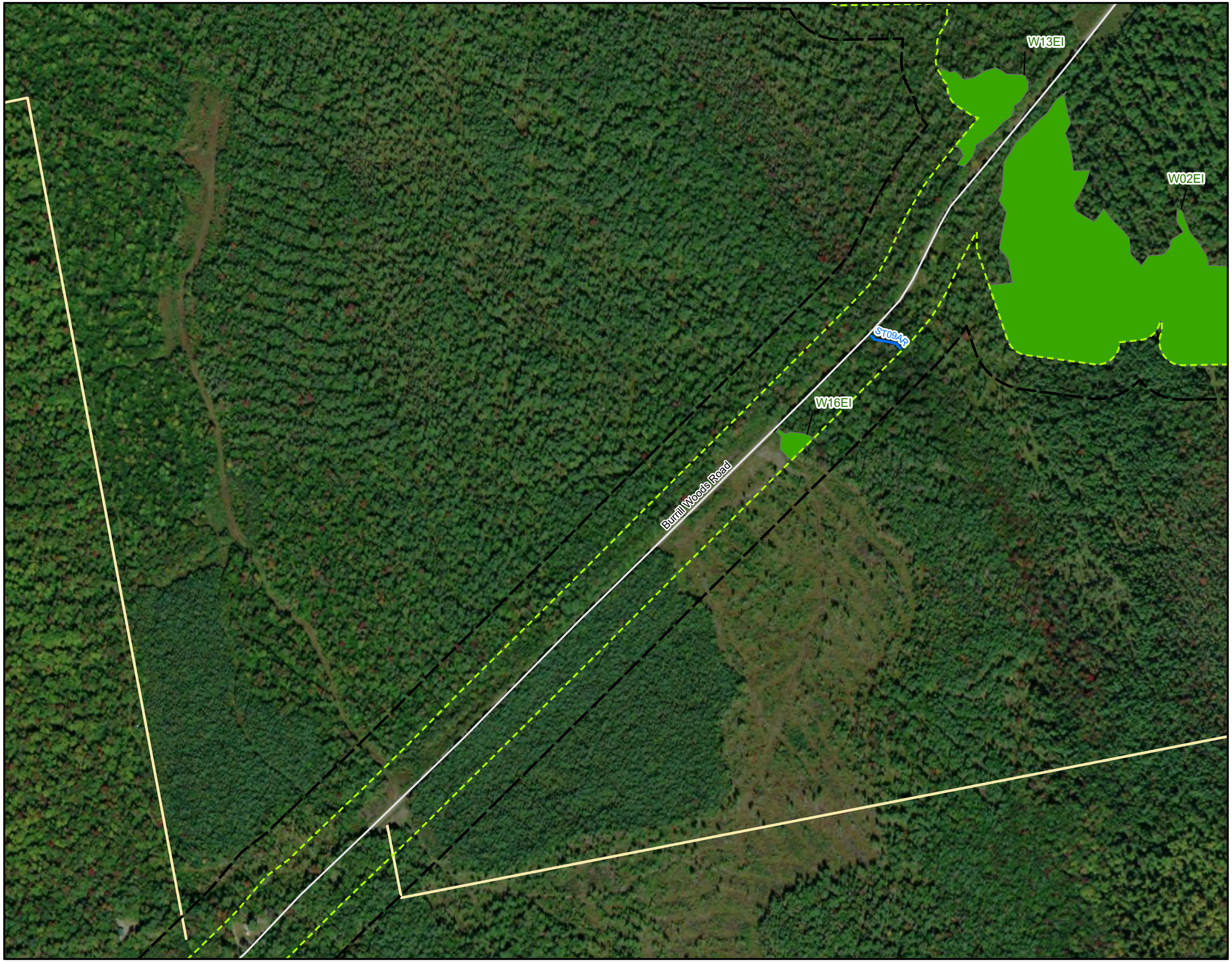
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

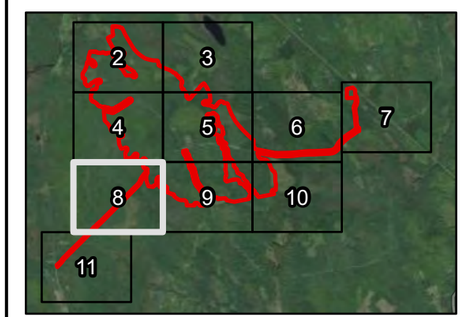


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream

Delineated Wetlands

- PFO



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 8 of 11

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

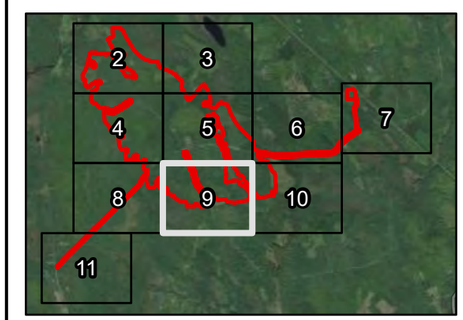
Not for Construction

Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Potential Significant Vernal Pool
- Vernal Pool

Delineated Wetlands

- PFO
- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 9 of 11

Prepared For: Strobus Solar, LLC

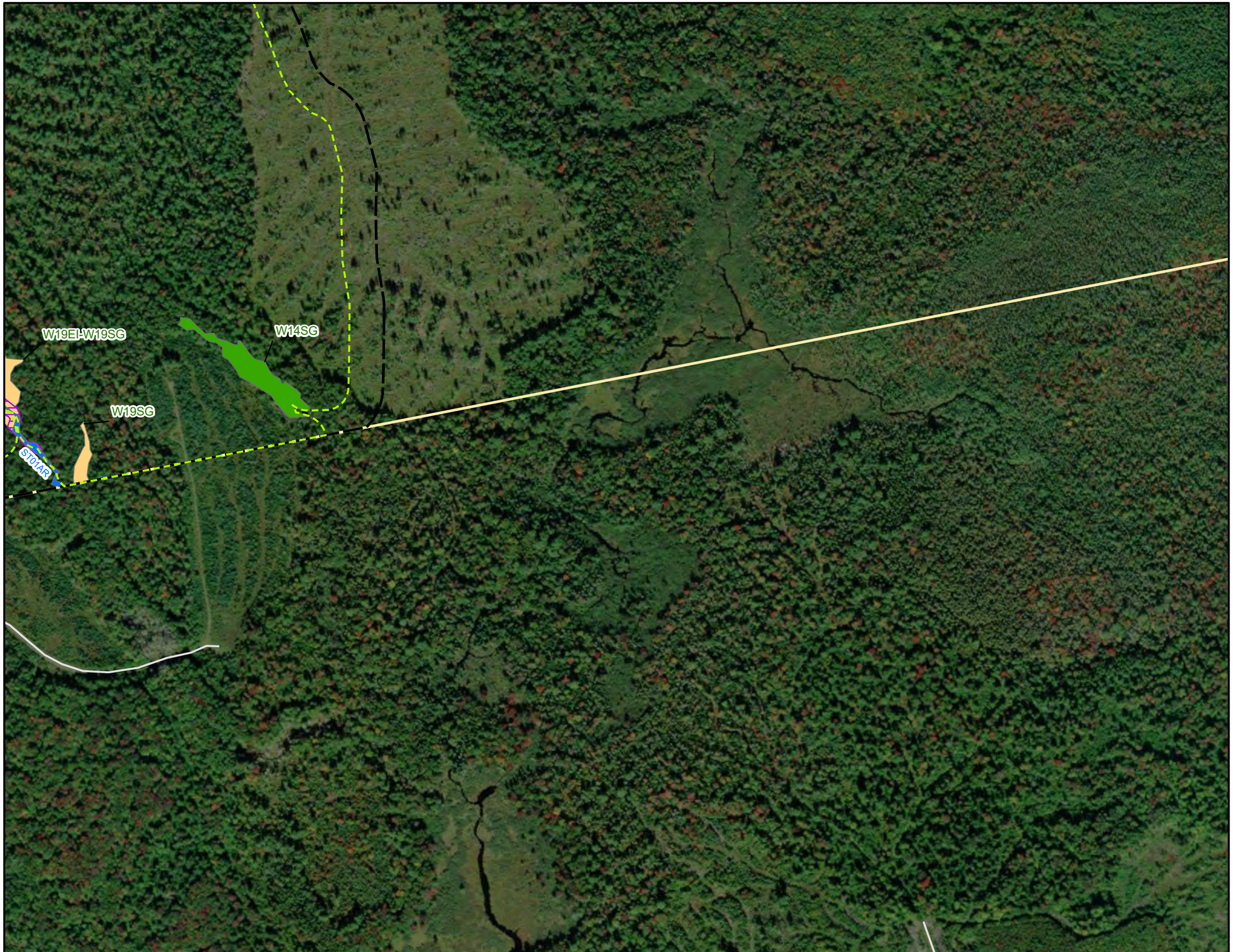
Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

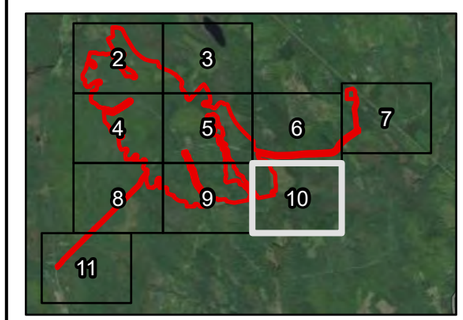


Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream

Delineated Wetlands

- PFO
- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 10 of 11

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

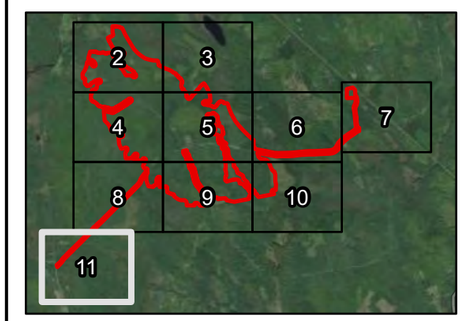
Not for Construction

Legend

- Wetland and Watercourse Study Area
- Vernal Pool Study Area
- Property Boundary
- Road
- Delineated Stream
- Potential Significant Vernal Pool
- Critical Terrestrial Habitat (250-foot buffer)

Delineated Wetlands

- PSS
- Wetland of Special Significance



N

0 250 500 1,000 Feet

Vernal Pool, Wetland, and Watercourse Delineation Results
Hartland, ME
Sheet 11 of 11

Prepared For: Strobus Solar, LLC

Prepared By: TETRA TECH

Date: **10/2023**

Source: Esri, et. al. 2022, Tetra Tech 2022

Coordinate System: North American Datum, 1983
Maine State Plane West, Feet

Not for Construction

APPENDIX B. VERNAL POOL, WETLAND, AND WATERCOURSE DELINEATION TABLES

Table 1. Vernal Pool Survey Results for Hartland Solar Project, Hartland, Somerset County, Maine.

Vernal Pool ID/Plan Sheet	Associated Wetland	Hydrology	MDEP NRPA Significant[1]	Pool Origin	First visit survey and counts			Second visit survey and counts			Comments
					Date[2]	Wood Frog (*Lithobates sylvaticus*)	Spotted Salamander (*Ambystoma maculatum*)	Date[2]	Wood Frog (*Lithobates sylvaticus*)	Spotted Salamander (*Ambystoma maculatum*)	
ABA05EI/Sheet 4	W11EI	Ephemeral	Potential	Natural-modified	4/15/2021	0	32	5/11/2021	0	32	Determined to be potentially significant due to state-wide drought conditions.
ABA17CP/Sheet 9	isolated	Ephemeral	No	Man-made	4/20/2021	1	0	5/10/2021	0	0	A shallow pool created by a tree root tip-up
VP01ML/Sheet 5	W05DS	Ephemeral	Yes	Natural	4/27/2021	0	21	5/12/2021	0	31	
VP08EI/ Sheet 11	W15EI	Semi-permanent	Potential	Natural-modified	4/14/2021	18	44	5/12/2021	0	44	Determined to be potentially significant due to state-wide drought conditions.
VP32EI/ Sheet 9	W02EI	Ephemeral	No	Natural	4/20/2021	0	5	5/10/2021	0	5	
VP33EI/ Sheet 9	W02EI	Ephemeral	Potential	Natural	4/20/2021	0	61	5/10/2021	0	61	Determined to be potentially significant due to state-wide drought conditions.
VP35EI/ Sheet 4	W06EI	Ephemeral	Potential	Natural	4/23/2021	0	21	5/12/2021	0	0	Determined to be potentially significant due to state-wide drought conditions
VP39CP/ Sheet 5	isolated	Ephemeral	No	Natural	4/27/2021	0	7	5/12/2021	0	4	
VP43EI/ Sheet 5	isolated	Ephemeral	No	Natural	4/29/2021	0	2	5/12/2021	0	2	
VP138AR/Sheet 5	W01DS	Ephemeral	No	Natural-modified	4/21/2021	3	0	5/10/2021	0	0	Recent logging has left ruts throughout area and removed all canopy and shrub cover
VP140AR/Sheet 5	isolated	Ephemeral	No	Natural	4/21/2021	0	4	5/10/2021	0	2	
VP141AR/Sheet 5	W01DS	Ephemeral	No	Natural	4/21/2021	1	12	5/10/2021	1	14	
VP142AR/Sheet 5	W01DS	Ephemeral	No	Natural	4/21/2021	2	0	5/10/2021	0	0	
VP143AR/Sheet 5	W01DS	Ephemeral	No	Natural	4/21/2021	7	0	5/10/2021	0	0	
VP144AR/Sheet 5	W01DS	Semi-permanent	No	Natural	4/21/2021	2	5	5/10/2021	0	5	
VP146AR/Sheet 5	W01DS	Ephemeral	No	Natural Modified	4/22/2021	2	8	5/11/2021	0	5	Observed 3 salamander egg masses appeared to be dead/not maturing at the point of the second visit (Not counted in second visit total)
VP147AR/Sheet 5	W01DS	Ephemeral	No	Natural-modified	4/22/2021	9	28	5/1/2021	0	17	Observed 3 spotted salamander egg masses during the second visit appeared to be dead or empty of embryos (not counted in second visit total)
VP148AR/Sheet 5	W01DS	Ephemeral	No	Natural-modified	4/21/2021	10	11	5/10/2021	0	14	Highly disturbed natural pool within a recently cut-over area with no remaining cover
VP149AR/Sheet 5		Ephemeral	No	Natural	4/21/2021	9	5	5/10/2021	0	2	

Vernal Pool ID/Plan Sheet	Associated Wetland	Hydrology	MDEP NRPA Significant[1]	Pool Origin	First visit survey and counts			Second visit survey and counts			Comments
					Date[2]	Wood Frog (*Lithobates sylvaticus*)	Spotted Salamander (*Ambystoma maculatum*)	Date[2]	Wood Frog (*Lithobates sylvaticus*)	Spotted Salamander (*Ambystoma maculatum*)	
VP161AR/Sheet 5	W05DS	Ephemeral	No	Natural	4/27/2021	0	8	5/12/2021	0	10	
VP163AR/Sheet 5	W04DS	Ephemeral	No	Natural	4/23/2021	0	0	5/10/2021	3	0	
VP166AR/Sheet 6	isolated	Ephemeral	No	Natural	4/28/2021	0	1	5/11/2021	0	2	

1 – Significance based on Maine Department of Environmental Protection (MDEP) Natural Resources Protection Act (NRPA) (38 Maine Revised Statutes Annotated §§480-A et seq.) and Maine Significant Wildlife Habitat Rules (Chapter 335). Available online at: http://www.maine.gov/dep/land/nrpa/index.html (MDEP 2014).
2 – Species count numbers are the highest numbers counted between the two surveys.
3 – Blue spotted salamander (*Ambystoma laterale*) and fairy shrimp (Anostraca spp.) were not observed in any of the pools identified on-Site. No vernal pool-dependent listed species were observed.
PVP = potential vernal pool.

Table 2. Wetland Delineation Results for Hartland Solar Project, Hartland, Somerset County, Maine.

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W01DS	PSS	Sheet 5	1,054,152/24.21	A large, scrub shrub wetland complex that has been largely disturbed by timber harvesting practices which have created an artificial pit/mound landscape. This wetland is hydrologically connected to wetlands W19EI and W19SG through the perennial stream, ST01AR, that is associated with these wetlands. Vegetation observed includes raspberry (*Rubus idaeus*), red maple (*Acer rubrum*), gray birch (*Betula populifolia*), balsam fir (*Abies balsamea*), speckled alder (*Alnus incana*), wrinkle-leaf goldenrod (*Solidago rugosa*), Canadian goldenrod (*Solidago canadensis*), greater bladder sedge (*Carex intumescens*), graceful sedge (*Carex gracillima*), Virginia strawberry (*Fragaria virginiana*), and Canadian thistle (*Cirsium arvense*). The hydrologic indicators observed include saturation, water marks, water-stained leaves, oxidized rhizospheres on living roots and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a fine sandy loam texture.	Yes
W01EI	PFO	Sheet 9	1,742.4/0.04	A small seep wetland that has been historically disturbed by timber harvesting practices. Vegetation observed includes eastern hemlock (*Tsuga canadensis*), green ash (*Fraxinus pennsylvanica*), red maple, yellow birch (*Betula alleghaniensis*), Indian cucumber (*Medeola virginiana*), horsetail (*Equisetum arvense*), sensitive fern (*Onoclea sensibilis*), New England blue violet (*Viola novae-angliae*), cinnamon fern (*Osmundastrum cinnamomeum*), uptight sedge (*Carex stricta*), dwarf raspberry (*Rubus pubescens*), and false lily-of-the-valley (*Maianthemum canadense*). The hydrologic indicators observed include drainage patterns, water-stained leaves, and high water table. The soils were determined to have a depleted dark surface (F7) hydric indicator and a silt loam/clay loam texture.	No
W02DS	PFO	Sheet 5	41,620.93/0.96	An isolated forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, green ash, sensitive fern, dwarf raspberry, false lily-of-the-valley, starflower (*Lysimachia borealis*), late lowbush blueberry (*Vaccinium angustifolium*), woodland horsetail (*Equisetum sylvaticum*). The hydrologic indicators observed include sediment deposits, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam/sandy clay loam texture.	No
W02EI	PFO	Sheet 9	1,597,345.2/36.67	A large, forested wetland complex that has been largely disturbed by timber harvesting practices. This wetland is associated with a significant vernal pool outside of the project area. Vegetation observed includes red maple, balsam fir, green ash, white pine (*Pinus strobus*), black ash (*Fraxinus nigra*), red oak (*Quercus rubra*), gray birch, yellow birch, witch hazel (*Hamamelis virginiana*), striped maple (*Acer pennsylvanica*), wild sarsaparilla (*Aralia nudicalis*), sensitive fern, starflower, interrupted fern (*Osmunda claytonia*), Canadian bunchberry (*Cornus canadensis*), marginal wood fern (*Dryopteris marginalis*), The hydrologic indicators observed include sediment deposits, and water-stained leaves. The soils were determined to have a depleted matrix (F3) hydric indicator and a silt loam texture.	No
W03DS	PFO	Sheet 5	48,288.26/1.11	An isolated forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, striped maple, green ash, sensitive fern, dwarf raspberry, false lily-of-the-valley, starflower, late lowbush blueberry, and interrupted fern. The hydrologic indicators observed include sediment deposits, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	No
W04DS	PFO	Sheet2/ Sheet 5	54,822.23/1.26	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, green ash, yellow birch, cinnamon fern, Canada bluejoint (*Calamagrostis canadensis*), royal fern (*Osmunda spectabilis*), sensitive fern, hay-scented fern (*Dennstaedtia punctilobula*), and interrupted fern. The hydrologic indicators observed include water marks, sediment deposits, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	Yes
W05DS	PFO	Sheet 5	206,133.6/4.73	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, green ash, yellow birch, cinnamon fern, Canada bluejoint, royal fern, sensitive fern, and interrupted fern. The hydrologic indicators observed include water marks, sediment deposits, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture. This wetland is hydrologically connected to wetland W04DS.	Yes
W04EI	PFO	Sheet 5	16,067.63/0.37	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, green ash, gray birch, yellow birch, eastern hemlock, white meadow sweet (*Spiraea alba*), cinnamon fern, hay-scented fern, starflower, uptight sedge, royal fern, sensitive fern, and parasol white-top (*Doellingeria umbellata*). The hydrologic indicators observed include water-stained leaves and microtopographic relief. The soils were determined to have a Histosol (A1) hydric indicator and a fine sandy loam texture.	No
W05EI	PFO	Sheet 4	8,118.10/0.19	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, yellow birch, cinnamon fern, hay-scented fern, starflower, uptight sedge, and sensitive fern. The hydrologic indicators observed include water-stained leaves and water marks. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a fine sandy loam texture.	No
W06EI	PFO	Sheet 4	19,717.53/0.45	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, white pine, green ash, red oak, black spruce (*Picea mariana*), cinnamon fern, royal fern, Canada bunchberry, New England blue violet. The hydrologic indicators observed include water-stained leaves and microtopographic relief. The soils were determined to have a depleted matrix (F3) hydric indicator and a fine sandy loam texture. This wetland is within the critical terrestrial habitat buffer of VP35EI.	Yes
W06DS	PFO	Sheet 5	3,853.72/0.09	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, European aspen (*Populus tremula),* cinnamon fern, sensitive fern and royal fern. The hydrologic indicators observed include water-stained leaves and sediment deposits. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W07DS	PFO	Sheet 4	12,632.4/0.29	A small, isolated, forested wetland that is adjacent to a gravel road that is heavily used both for timber harvesting practices as well as recreationally. Vegetation observed includes red maple, balsam fir, European aspen, cinnamon fern, sensitive fern dwarf raspberry and royal fern. The hydrologic indicators observed include water-stained leaves and sediment deposits. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W07EI	PFO	Sheet 4	53,955.63/1.24	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, white pine, red oak, black spruce, cinnamon fern, royal fern, Canada bunchberry, New England blue violet (*Viola novae-angliae*). The hydrologic indicators observed include water-stained leaves and microtopographic relief. The soils were determined to have a depleted matrix (F3) hydric indicator and a fine sandy loam texture.	No

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W07SG	PFO	Sheet 7	11,325.6/0.26	A forested wetland that has been largely disturbed by timber harvesting practices, as well as impoundment and runoff from an existing gravel road. Vegetation observed includes yellow birch, balsam fir, eastern hemlock, northern white cedar (*Thuja occidentalis*), green ash, witch hazel, cinnamon fern, and false lily-of-the-valley. The hydrologic indicators observed include drainage patterns, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	No
W08DS	PFO	Sheet 5	2,573.86/0.06	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, European aspen, cinnamon fern, sensitive fern and royal fern. The hydrologic indicators observed include water-stained leaves and sediment deposits. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W08SG	PSS	Sheet 7	51,447.07/1.18	A scrub shrub wetland that has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. Vegetation observed includes red maple, speckled alder, gray birch (*Salix bebbiana*), balsam fir, winterberry holly (*Ilex verticillata*), steeplebush (*Spirea tomentosa*), gray willow, sensitive fern, fringed sedge (*Carex crinita*), uptight sedge, pointed broom sedge (*Carex scoparia*), raspberry, greater bladder sedge, Virginia strawberry, interrupted fern, and soft rush (*Juncus effusus*). The hydrologic indicators observed include saturation, water-stained leaves, oxidized rhizospheres on living roots, moss trim lines, shallow aquitard, and microtopographic relief. The soils were determined to have depleted matrix (F3) hydric indicator and a clay loam texture.	Yes
W09DS	PFO	Sheet 2	546,631.10/12.55	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, red oak, larch, (*Larix laricina*), possumhaw (*Viburnum nudum*), winterberry holly, velvet leaf blueberry (*Vaccinium myrtilloides*), steeplebush, wild sarsaparilla, sensitive fern, dwarf raspberry, northern water-horehound (*Lycopus uniflorus*), and Canada bunchberry. The hydrologic indicators observed include water-stained leaves, sediment deposits, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	No
W09EI	PFO	Sheet 4	97,625.14/2.24	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, red oak, black spruce, white pine, yellow birch, eastern hemlock, velvet leaf blueberry, steeplebush, wild sarsaparilla, sensitive fern, dwarf raspberry, interrupted fern, uptight sedge, royal fern, Canada goldenrod, bracken fern, reed canary grass (*Phalaris arundinacea*), and Canada bunchberry. The hydrologic indicators observed include water-stained leaves, and microtopographic relief. The soils were determined to have a depleted below depleted matrix (F3) hydric indicator and a silt loam texture. This wetlands is within the critical terrestrial habitat buffer of ABA05EI.	Yes
W09SG	PSS	Sheet 7	7,019.65/0.16	A scrub shrub wetland that has been disturbed by timber harvesting practices. Vegetation observed includes red maple, speckled alder, gray birch, winterberry holly, steeplebush, sensitive fern, fringed sedge, uptight sedge, raspberry, greater bladder sedge, interrupted fern, and soft rush. The hydrologic indicators observed include saturation, water-stained leaves, moss trim lines, shallow aquitard, and microtopographic relief. The soils were determined to have depleted matrix (F3) hydric indicator and a silt loam texture.	No
W10DS	PFO	Sheet 5	4,024.76/0.09	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, yellow birch, gray birch, cinnamon fern, Canada bunchberry, sensitive fern and royal fern. The hydrologic indicators observed include water-stained leaves and sediment deposits. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W10EI	PFO	Sheet 4	98,516.66/2.26	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, red oak, black spruce, larch, white pine, yellow birch, eastern hemlock, meadow willow, velvet leaf blueberry, steeplebush, wild sarsaparilla, sensitive fern, dwarf raspberry, interrupted fern, uptight sedge, royal fern, Canada goldenrod, bracken fern, reed canary grass, and Canada bunchberry. The hydrologic indicators observed include water-stained leaves, and microtopographic relief. The soils were determined to have a depleted below depleted matrix (F3) hydric indicator and a silt loam texture.	No
W10SG	PFO	Sheet 6	57,655.86/1.32	A forested wetland that has been largely disturbed by timber harvesting practices and has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. Vegetation observed includes red maple, balsam fir, paper birch (*Betula papyrifera*), green ash, eastern hemlock, sensitive fern, jewelweed, three-leaf goldthread (*Coptis trifolia*), dwarf raspberry, interrupted fern, greater bladder sedge, cinnamon fern, and eastern marsh fern (*Thelypteris palustris*). The hydrologic indicators observed include saturation, water marks, sediment deposits, water-stained leaves, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a Histic epipedon (A2) hydric indicator and a loamy clay texture.	Yes
W11DS	PFO	Sheet 3	4,674.32/0.11	A small, isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, balsam fir, yellow birch, cinnamon fern, sensitive fern, Canada bunchberry, and royal fern. The hydrologic indicators observed include water-stained leaves and sediment deposits. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W11EI	PFO	Sheet 4	62,726.4/1.44	A forested wetland that has been largely disturbed by timber harvesting practices and contains a potentially significant vernal pool (ABA5EI). Vegetation observed includes red maple, eastern hemlock, yellow birch, white spruce (*Picea glauca*), balsam fir, dwarf raspberry, royal fern, interrupted fern, Canada bluejoint, fringed sedge, velvet leaf blueberry, hobble bush (*Viburnum lantanoides*), white meadowsweet (*Spirea alba*), parasol white-top, and starflower (*Trientalis borealis*). The hydrologic indicators observed include drainage patterns and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a very fine sandy loam texture. This wetland is within the critical terrestrial habitat buffer of ABA05EI.	Yes
W11SG	PFO	Sheet 7	3,920.4/0.09	A forested wetland that has been largely disturbed by timber harvesting practices. Includes red maple, speckled alder, gray birch, winterberry holly, steeplebush, sensitive fern, dwarf raspberry, greater bladder sedge, interrupted fern, and soft rush. The hydrologic indicators observed include saturation, water-stained leaves, and microtopographic relief. The soils were determined to have depleted matrix (F3) hydric indicator and a silt loam texture.	No
W12DS	PFO	Sheet 2	124,146.0/2.85	A forested wetland that has largely been disturbed by timber harvesting practices and runoff/impoundment from an existing gravel road. Vegetation observed includes red maple, gray birch, steeplebush, sensitive fern, wrinkle-leaf goldenrod (*Solidago rugosa*), pointed broom sedge, parasol white-top, and dwarf raspberry. The hydrologic indicators observed include sediment deposits and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	No
W12EI	PFO	Sheet 4	157,363.60/3.61	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, northern white cedar, black spruce, white pine, yellow birch, eastern hemlock, meadow willow, velvet leaf blueberry, sensitive fern, dwarf raspberry, marsh blue violet (*Viola cucullata*), uptight sedge, royal fern, starflower, poison ivy	No

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
				(*Toxicodendron radicans*), and Canada bunchberry. The hydrologic indicators observed include water-stained leaves, and microtopographic relief. The soils were determined to have a depleted below depleted matrix (F3) hydric indicator and a fine sandy loam texture.	
W12SG	PFO	Sheet 6	422,409.60/9.70	A forested wetland that has been largely disturbed by timber harvesting practices and has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. There is a perennial stream associated with this wetland and recent beaver activity. Vegetation observed includes black ash, green ash, balsam fir, red maple, swamp currant (*Ribes americanum*), sensitive fern, cinnamon fern, dwarf raspberry, creeping snowberry (*Gaultheria hispidula*), balsam fir, black spruce, speckled alder, gray willow, striped maple, greater bladder sedge, and soft rush. The hydrologic indicators observed include saturation, surface water, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a very fine sandy loam texture.	Yes
W13DS	PFO	Sheet 2	4,883.078/0.11	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, red spruce (*Picea rubens*), dwarf raspberry, sensitive fern, steeplebush, and Canada bunchberry. The hydrologic indicators observed include water-stained leaves, sediment deposits, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	No
W13EI	PFO	Sheet 8	76,833.8/1.76	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, white pine, eastern hemlock, white meadowsweet, velvet leaf blueberry, greater bladder sedge, winterberry holly, sensitive fern, dwarf raspberry, poison ivy, and starflower. The hydrologic indicators observed include water-stained leaves, and microtopographic relief. The soils were determined to have a depleted below depleted matrix (F3) hydric indicator and a silt loam texture.	No
W13SG	PFO	Sheet 5	15,609.56/0.36	A small, forested wetland that has been disturbed by timber harvesting practices. Vegetation observed includes gray birch, red maple, balsam fir, winterberry holly, northern water-horehound, sensitive fern, common marsh bedstraw (*Galium palustre*), Canada bunchberry, Virginia strawberry, and soft rush. The hydrologic indicators observed include saturation, water-stained leaves, shallow aquitard, and microtopographic relief. The soils were determined to have a depleted matrix (F3) hydric indicator and a loamy clay texture.	No
W14DS	PSS	Sheet 2	12,590.87/0.29	A small, scrub shrub wetland complex that has been largely disturbed by timber harvesting practices which have created an artificial pit/mound landscape. Vegetation observed includes European blackberry (*Rubus alleghaniensis*), steeplebush, meadow willow (*Salix Petiolaris*), wrinkle-leaf goldenrod, sensitive fern, dwarf raspberry, nodding sedge (*Carex gynandra*), and parasol white-top. The hydrologic indicators observed include saturation, water marks, water-stained leaves, oxidized rhizospheres on living roots and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam and sandy clay loam texture.	No
W14EI	PFO	Sheet 4	0.1/0.00	A forested wetland adjacent to a recent clearcut that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, white pine, eastern hemlock, yellow birch, white meadowsweet, velvet leaf blueberry, greater bladder sedge, winterberry holly, sensitive fern, interrupted fern, horsetail, dwarf raspberry, poison ivy, and starflower. The hydrologic indicators observed include water-stained leaves, and microtopographic relief. The soils were determined to have a depleted below depleted matrix (F3) hydric indicator and a silt loam texture.	No
W14SG	PFO	Sheet 10	79,694.86/1.83	A small, previously forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. Vegetation observed at the time of survey includes red maple, gray birch, black ash, green ash, sensitive fern, dwarf raspberry, fringed sedge, common marsh bedstraw, uptight sedge. The hydrologic indicators observed include drainage patterns, and saturation. The soils were determined to have a depleted matrix (F3) and a very fine sandy loam texture.	No
W15DS	PFO	Sheet 2	116,740.8/2.68	A forested wetland complex that has been disturbed by timber harvesting practices. Vegetation observed includes red maple, black ash, yellow birch, eastern hemlock, balsam fir, sensitive fern, jewelweed, dwarf raspberry and cut-leaf water-horehound (*Lycopus americanus*). The hydrologic indicators observed include saturation, water marks, sediment deposits, water-stained leaves, presence of reduced iron, drainage patterns, moss trim lines, and microtopographic relief. The soils were determined to have a stratified layers (A5) hydric indicator and a silt loam/clay loam texture.	No
W15EI	PSS	Sheet 11	13,939.2/0.32	A scrub shrub wetland that has been disturbed by timber harvesting practices. Vegetation observed includes speckled alder, white meadowsweet, velvet leaf blueberry, wild calla (*Calla palustris*), star sedge (*Carex echinata*), lesser bladder sedge (*Carex vesicaria*), fringed sedge, horsetail, sensitive fern, and Canada bluejoint. The hydrologic indicators observed include surface water, saturation, and aquatic vegetation. The soils were determined to have a depleted dark surface (F7) hydric indicator and a very fine sandy loam texture. This wetland is within the critical terrestrial habitat buffer of VP08EI.	Yes
W15SG	PFO	Sheet 9	193,427.7/4.44	A forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. This wetland is part of the same wetland complex that includes W22SG. Vegetation observed at the time of survey includes red maple, gray birch, black ash, green ash, sensitive fern, foamflower, fringed sedge, common marsh bedstraw, uptight sedge. The hydrologic indicators observed include drainage patterns, and saturation. The soils were determined to have a depleted matrix (F3) hydric indicator and a very fine sandy loam texture.	No
W16EI	PFO	Sheet 8	11,325.6/0.26	A forested wetland that has been previously disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, white pine, balsam fir, black spruce, white meadowsweet, sensitive fern, three-leaf goldthread, jewelweed (*Impatiens capensis*), white parasol flattop, dwarf raspberry, fringed sedge, lesser bladder sedge, and common marsh bedstraw. The hydrologic indicators observed include drainage patterns, and saturation. The soils were determined to have a depleted matrix (F3) hydric indicator and a very fine sandy loam texture.	No
W17EI	PFO	Sheet 9	22,087.49/0.54	A forested wetland complex that has been previously disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, white pine, balsam fir, witch hazel, sensitive fern, jewelweed (*Impatiens capensis*), white parasol flattop, dwarf raspberry, fringed sedge, common marsh bedstraw, uptight sedge. The hydrologic indicators observed include drainage patterns, and saturation. The soils were determined to have a depleted matrix (F3) hydric indicator and a very fine sandy loam texture.	No
W17DS	PFO	Sheet 2	23,344.96/0.51	A small, forested wetland that has been disturbed by timber harvesting practices. An ephemeral stream connects this wetland to W19DS. Vegetation observed includes red maple, American beech (*Fagus grandifolia*), yellow birch, white ash (*Fraxinus americana*), sensitive fern, dwarf raspberry, and American false hellebore (*Veratrum viride*). The hydrologic indicators observed include water marks and sediment deposits. The soils were determined to have a depleted matrix (F3) hydric indicator and a fine silty clay loam texture.	No

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W18DS	PFO	Sheet 2	10,390.41/0.24	A small, forested wetland that has been disturbed by timber harvesting practices. Vegetation observed includes red maple, yellow birch, red spruce, steeplebush, northern water-horehound, sensitive fern, dwarf raspberry, wrinkle-leaf goldenrod, and New York fern (*Parathelypteris noveboracensis*). The hydrologic indicators observed include water-stained leaves, presence of reduced iron, moss trim lines, geomorphic position, and microtopographic relief. The soils were determined to have a Histic epipedon (A2) hydric indicator and a silty clay texture.	No
W18EI	PFO	Sheet 5/ Sheet 9	47,2565.8/10.85	A large, forested black ash and cedar wetland complex that is hydrologically connected to wetland W19EI outside of the project Study Area. Vegetation observed includes black ash, northern white cedar, red maple, swamp currant, sensitive fern, cinnamon fern, dwarf raspberry, creeping snowberry, balsam fir, black spruce, speckled alder, gray willow, striped maple, greater bladder sedge, fringed sedge, marsh blue violet, Canada bunchberry, witch hazel, and foam flower (*Tiarella cordifolia*). The hydrologic indicators observed include saturation, surface water, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a very fine sandy loam texture.	No
W18SG	PFO	Sheet 6	2,606.714/0.06	A small, forested wetland that has been disturbed by timber harvesting practices and a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. Vegetation observed includes red maple, yellow birch, steeplebush, speckled alder, gray willow, sensitive fern, and greater bladder sedge. The hydrologic indicators observed include surface water, saturation, and water-stained leaves. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silty clay loam texture.	No
W19DS	PSS	Sheet 2	188,281.6/4.32	A small, scrub shrub wetland that has been disturbed by timber harvesting practices. An ephemeral stream connects this wetland to W17DS. Vegetation observed includes red maple, yellow birch, steeplebush, speckled alder, meadow willow, sensitive fern, dwarf raspberry, and American false hellebore. The hydrologic indicators observed include water marks and sediment deposits. The soils were determined to have a depleted matrix (F3) hydric indicator and a silty clay loam texture.	No
W19EI	PFO	Sheet 5/ Sheet 9/ Sheet 10	587,145.2/13.48	A large, forested wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR. Vegetation observed includes black ash, northern white cedar, red maple, swamp currant, sensitive fern, cinnamon fern, dwarf raspberry, creeping snowberry, balsam fir, black spruce, speckled alder, winterberry holly, striped maple, greater bladder sedge, fringed sedge, marsh blue violet, Canada bunchberry, witch hazel, reed canary grass, foam flower, gray birch and jewelweed. The hydrologic indicators observed include saturation, surface water, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	Yes
W19SG	PSS	Sheet 10	48,984.7/1.12	A scrub shrub/emergent wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR. Vegetation observed includes black ash, gray willow, speckled alder, winterberry holly, swamp currant, sensitive fern, cinnamon fern, dwarf raspberry, creeping snowberry, greater bladder sedge, fringed sedge, marsh blue violet, and jewelweed. The hydrologic indicators observed include saturation, surface water, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture.	Yes
W20DS	PFO	Sheet 2	5,227.2/0.12	An isolated, forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, yellow birch, red spruce, steeplebush, northern water-horehound, sensitive fern, dwarf raspberry, and wrinkle-leaf goldenrod. The hydrologic indicators observed include water-stained leaves, moss trim lines, geomorphic position, and microtopographic relief. The soils were determined to have a Histic epipedon (A2) hydric indicator and a silty clay texture.	No
W21DS	PFO	Sheet 2	43,375.41/1.00	A forested wetland that has been largely disturbed by timber harvesting practices. Vegetation observed includes red maple, gray birch, balsam fir, speckled alder, winterberry holly, velvet leaf blueberry, wild sarsaparilla, sensitive fern, cinnamon fern, parasol white-top. The hydrologic indicators observed include water-stained leaves, sediment deposits, and water marks. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a sandy clay loam texture.	No
W21SG	PFO	Sheet 9	12,196.8/0.28	A forested wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR (continues outside of wetland study area). Vegetation observed includes black ash, northern white cedar, red maple, swamp currant, sensitive fern, cinnamon fern, dwarf raspberry, creeping snowberry, balsam fir, black spruce, speckled alder, winterberry holly, striped maple, greater bladder sedge, fringed sedge, marsh blue violet, Canada bunchberry, witch hazel, reed canary grass, foam flower, gray birch and jewelweed. The hydrologic indicators observed include saturation, surface water, drainage patterns, geomorphic position, and microtopographic relief. The soils were determined to have a depleted below dark surface (A11) hydric indicator and a silt loam texture. Additional observations include signs of beaver activity.	Yes
W22SG	PFO	Sheet 9	778,502.4/17.87	A forested wetland that has been largely disturbed by ongoing timber harvesting practices. This wetland is part of the same wetland complex that includes W15SG. Vegetation observed includes red maple, balsam fir, white pine, red spruce, black spruce, cinnamon fern, interrupted fern, fringed sedge, Canada bluejoint and creeping snowberry. The soils were determined to have a depleted matrix (F3) hydric indicator and a fine sandy loam texture.	No

1 – PFO = palustrine forested; PEM = palustrine emergent; PSS = palustrine scrub-shrub; PFO/PSS = palustrine forested/palustrine scrub-shrub; PSS/PFO = palustrine scrub-shrub/palustrine forested; PFO/PEM = palustrine forested/palustrine emergent; PEM/PFO = palustrine emergent/palustrine forested; PEM/PSS= palustrine emergent/palustrine scrub-shrub; and PEM/PSS/PFO = palustrine emergent/palustrine scrub-shrub/palustrine forested (Cowardin et. al., 1979).
2 – Maine Wetlands of Special Significance (WOSS) designations, as defined in the Maine Department of Environmental Protection Natural Resource Protection Act (38 M.R.S.A. §§480-A et seq.) and the Maine Wetland Protection Rules (Chapter 310). Areas of significant habitat according to the Maine Department of Environmental Protection.

Table 3. Watercourse Delineation Results for Hartland Solar Project, Hartland, Somerset County, Maine.

Watercourse ID/Plan Sheet	Flow Regime	Summary
ST01AR/Sheet 5/Sheet 9/ Sheet 10	Perennial	STAR01 flows generally South Southeast and is hydrologically connected to several delineated wetlands. The top of bank width is 20 feet with an ordinary high water mark width of 13 feet and a bank depth of 18 inches. The substrate is 5% bedrock, 5% silt, 5% muck, 30% sand, 15% gravel, and 40% cobble. Ongoing American beaver (Castor canadensis) activity has affected the entire length of the mapped stream, creating pooled areas and a slower flow pattern in some areas.
ST02AR	Intermittent	STAR02 flows generally South and is a tributary to STAR01. The top of bank width is 8 feet with an ordinary high water mark width of 6 feet and a bank depth of 18 inches. The substrate is 50% boulder, 15% silt, 5% sand, and 30% cobble.
ST04AR/Sheet 7	Intermittent	STAR04 generally flows south into wetland W08SG and is a ditched channel north and south of the road; it then dissipates into deep ruts in a logged over area. The top of bank width is 12 feet with an ordinary high water mark width of 8 feet and a bank depth of 3 inches. The substrate is 80% silt, 10% grass, and 10% cobble.
ST05AR	Perennial	STAR05 is a channel within W10SG that generally flows south southeast before diffusing into the wetland. The top of bank width is 10 feet with an ordinary high water mark width of 8 feet and a bank depth of 10 inches. The substrate is 10% sand, 90% silt, and 20% cobble.
ST06AR	Ephemeral	STAR06 is a small dry channel flowing south that is associated with wetland W18SG. The top of bank width is 3 feet with an ordinary high water mark width of 2.5 feet and a bank depth of 5 inches. The substrate is 50% muck, 40% silt, and 10% sand.
ST07AR/Sheet 6	Perennial	STAR07 is named East Branch Black Stream on the USGS layer. There is beaver activity downstream and a beaver pond upstream. The top of bank width is 13 feet with an ordinary high water mark width of 9 feet and a bank depth of 18 inches. The substrate is 5% bedrock, 45% cobbles, 30% gravel, 15% sand, and 5% muck.
ST08AR/Sheet 6	Ephemeral	STAR08 is an ephemeral stream that is generally flowing southwest into a roadside ditch. The top of bank width is 1 foot with an ordinary highwater mark width of 6 inches and a bank depth of 0.5 inches. The substrate is 90% muck and 10% vegetation.
ST09AR/Sheet 8	Ephemeral	STAR09 is an ephemeral stream that flows generally south from the main road that transects the project area from east to west. The top of bank width is 5 feet with an ordinary high water mark width of 3 feet and a bank depth of 3 inches. The substrate is 100% muck.
ST10AR/Sheet 2	Ephemeral	STAR10 is an ephemeral stream that flows generally south starting at wetland W19DS and diffusing into wetland W17DS. The top of bank width is 12 feet with an ordinary high water mark width of 5 feet and a depth of 6 inches. The substrate is 50% silt and 50% muck.
ST11AR/Sheet 2	Ephemeral	STAR11 is an ephemeral stream that flows generally east. The top of bank width is 1 foot with an ordinary highwater mark width of 8 inches and a bank depth of 2 inches. The substrate is 65% cobbles, 25% muck and 10% muck.
ST12AR/Sheet 4	Intermittent	STAR12 is an intermittent forested stream that generally flows south and splits into several branches. The top of bank width is 10 feet with an ordinary highwater mark width of 7 feet and a bank depth of 12 inches. The substrate is 10% boulders, 40% cobbles 10% sand, 15% gravel and 25% silt.
ST13AR/Sheet 4	Intermittent	STAR13 is hydrologically connected to STAR12 and generally flows southeast. The top of bank width is 5 feet with an ordinary high water mark width of 2 feet and a bank depth of 4 inches. The substrate is 40% cobbles, 30% detritus, 10% sand, and 20% silt.
ST14AR/Sheet 4	Intermittent	STAR14 is hydrologically connected to STAR12 and generally flows south. The top of bank width is 4 feet with an ordinary high water mark width of 2 feet and a bank depth of 3 inches. The substrate is 25% muck, 30% detritus, 15% sand, and 30% silt.
ST15AR/Sheet 4	Intermittent	STAR15 is hydrologically connected to STAR12 and generally flows southwest. The top of bank width is 4 feet with an ordinary high water mark width of 3 feet and a bank depth of 18 inches. The substrate is 10% muck, 30% detritus, 10% sand, 10% cobbles and 40% silt.
ST01DS/Sheet 5	Intermittent	ST01DS is an intermittent stream that diffuses into wetland W04DS. The top of bank width is 2 feet with an ordinary high watermark width of 18 inches and a bank depth of 2 inches. The substrate is 20% detritus and 80% muck.
ST02DS/Sheet 2	Ephemeral	STAR12 is an intermittent forested stream that generally flows south and splits into several branches. The top of bank width is 10 feet with an ordinary highwater mark width of 7 feet and a bank depth of 12 inches. The substrate is 10% boulders, 40% cobbles 10% sand, 15% gravel and 25% silt.
ST01EI/ Sheet 2	Ephemeral	ST01EI is an ephemeral stream that flows into wetland W12DS.

APPENDIX C. MAINE STATE VERNAL POOL ASSESSMENT FORMS

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: ABA05EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Pool is located at the end of a small clear cut/road way 0.3 miles from the unnamed road running north/south through the project site.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.59817 Latitude/Northing: 44.87246

Coordinate system: WGS84

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☑ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☑ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Small existing wetland, possible stream that was impacted through the implementation of a logging road that is now closed. The pool is at the end of a road side ditch.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow pool, dried by 7/6/21.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 10 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ◉ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ◉ Other or Unknown (explain): There is flow from culverts upstream in the road ditch

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/15/21 & 5/11/21 & 7/6/21

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0	0	3	3	3									
Spotted Salamander	32	32	0	3	3	3	M	A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☑ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

A shallow pocket of water at the end of what was once a dug ditch for a logging road. By 7/6 the pool was dry and egg masses were gone. Due to dry conditions in 2021, pool was determined to be a potentially significant vernal pool based on 7/29/22 communication with IFW.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: ABA17CP

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Clinton Parrish

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located in block C16 of the prepared survey map. Southeast from the center of the site.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.860590° Latitude/Northing: -69.5704°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ◉ Isolated depression
- ○ Floodplain depression
- ○ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Large tip-up created pool in old skid road.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Very shallow pool 5" max

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 7 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/20/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	1	0		3	3		M				X			3	
Spotted Salamander															
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Shallow pool created by tip up.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP01ML

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Mao Lin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Pool is located 0.1 miles southeast of the closest unnamed gravel access road, on the north east side of the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.875340° Latitude/Northing: -69.575200°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☑ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Pool is in forested hummok wetland associated with a disperse stream.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool is 10" deep and area likely dries out most of the way late summer, some moisture may persist due to close association with stream/wetland complex.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 18 ○ m ◉ ft Length: 25 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ◉ Other or Unknown (explain): multiple pools in sphagnum hummock wetland

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/27/2021, 5/12/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	21	31	0	3	3	3	M	M,A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☑ SVP ☐ Potential SVP ☐ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Pool appears natural with some connection to broader wetland. Is a bit of a rambling pool with hydrologic connection to broader wetland and may not meet criteria due to some connection to other pooled wetland area.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP08EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Cornville

Brief site directions to the pool (using mapped landmarks):

Located on the south side of Burill Woods Rd, approximately 840 feet northeast of the intersection with Munn Road.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.6084 Latitude/Northing: 44.84915

Coordinate system: WGS84

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

An existing scrub shrub swamp that now abuts a road and has culvert inlet and ditch inlet/outlet

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Water level in pool dropped slightly from first to second visit, present on 3rd visit 7/6 but overall size much reduced. Max depth 8" on 7/6.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ◉ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 40 ○ m ◉ ft Length: 250 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ◉ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☑ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☑ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/14/2021, 5/12/2021, 7/6/21

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	18	0	0	3	3	3	H								
Spotted Salamander	44	44	0	3	3	3	M	A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☑ Potential SVP ☐ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Water present on July 6 visit, no egg masses observed in July. Due to dry conditions in 2021, pool was determined to be a potentially significant vernal pool based on 7/29/22 communication with IFW.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP32EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ○ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Natural VP in same PFO/PSS swamp as VP33EI.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.58503 Latitude/Northing: 44.85851

Coordinate system: WGS84

Check one:

○ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Large PFO and PSS pit/mound wetland that continues off-site.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Connected to larger wetland complex. Pool was dry upon hydrology check visit on July 6.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ○ m ◉ ft Length: 10 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/20/2021, 5/10/2021, 7/6/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ○ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	5	5	0	3	3	3	M	A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Pool completely dry by July dry down period.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP33EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

The vernal pool is located 0.4 miles southeast of Burrill Woods Rd. It is on the southwest side of the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.58461 Latitude/Northing: 44.8583

Coordinate system: WGS84

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ⊙ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ⊙ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ⊙ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

4-6" of water in 2nd survey (may). Natural pit/mound wetland drying out completely by 7/6/21.

■ Maximum depth at survey: ⊙ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 ○ m ⊙ ft Length: 150 ○ m ⊙ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ⊙ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☑ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ⊙ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/20/21 & 5/10/2021 & 7/6/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0	0	3	3	3									
Spotted Salamander	61	61	0	3	3	3	M	A							
Blue-spotted Salamander	0	0	0	3	3	3									
Fairy Shrimp[3]	0	0	0	3	3	3									

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☑ Potential SVP ☐ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Adult wood frogs observed at pool but no wood frog egg masses. No water present in pool during third check in July 6. Due to dry conditions in 2021, pool was determined to be a potentially significant vernal pool based on 7/29/22 communication with IFW.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP35EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ⊗ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Pool is approximately 1700ft northwest of Burrill Woods Rd, centrally located in the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.58785 Latitude/Northing: 44.87016

Coordinate system: WGS84

Check one:

○ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

◉ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Dry in July 6. May have held water longer in non-drought years.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 1 5 ○ m ◉ ft Length: 2 0 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☑ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/23/2021, 5/12/2021, 7/6/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	21	0	0	3	3	0	M								
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☑ Potential SVP ☐ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Located near the edge of a larger forested wetland. Due to dry conditions in 2021, pool was determined to be a potentially significant vernal pool based on 7/29/22 communication with IFW.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP39CP

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Clinton Parrish

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located in the northeastern portion of the site in survey map block C1 adjacent to the border of B20.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86865° Latitude/Northing: -69.572369°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ◉ Isolated depression
- ○ Floodplain depression
- ○ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Scattered forested wetland pockets throughout area. Pool 12" in depth within a complex amid tussocks and hummocks with sphagnum growth.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 ○ m ◉ ft Length: 40 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ◉ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/27/2021; 5/12/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	7	4		3	3		M	A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP43EI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ◉ same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ☒ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located in the north central portion of the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: -69.58595 Latitude/Northing: 44.8747

Coordinate system: WGS84

Check one:

☒ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

◉ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ◉ Isolated depression
- ○ Floodplain depression
- ○ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow, isolated pool. Small pockets of wetland forest in the area.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 12 ○ m ◉ ft Length: 10 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☑ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/29/2021, 5/12/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	2	2		3	3										
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Shallow natural pool.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP138AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 800ft north of Burill Woods Rd, and 1000ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86946° Latitude/Northing: -69.57561°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Very recently logged/grubbed prior to sampling. Pool has skidder ruts but appears deeper and rounder than just skidder ruts.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

No inlet. Isolated depression within a flatish landscape, highly disturbed by logging. 10" deep.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 12 ○ m ◉ ft Length: 8 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Outlet drains downslope through swale at high water.

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	3	0		3	3		M	H			X			3	
Spotted Salamander	0	0		3	3										
Blue-spotted Salamander	0	0		3	3										
Fairy Shrimp[3]	0	0		3	3										

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Pool appears natural due to shape and overall wetland complex in the area but recent logging has left ruts through the whole area and removed all canopy and shrub cover.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP140AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 800ft north of Burill Woods Rd, and 1000ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86901° Latitude/Northing: -69.57341°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool is associated with a wetland complex and braided stream channels that are likely intermittent to perennial. Pool is located in small side channels of these braids.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 3 ○ m ◉ ft Length: 15 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Outlet drains downslope through swale at high water.

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	0		3	3		M	H			X			3	
Spotted Salamander	4	2		3	3										
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Natural pool part of a wetland complex and braided stream channel. Intact forest and shrub cover throughout area.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP141AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 800ft north of Burill Woods Rd, and about1000ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86872° Latitude/Northing: -69.57302°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool is located in a slight upland area within a wetland complex.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 16 ○ m ◉ ft Length: 14 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	1	1		3	3		M	A							
Spotted Salamander	12	14		3	3		M	A							
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Forest natural pool, part of a wetland complex.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP142AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 800ft north of Burill Woods Rd, and about1000ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86872° Latitude/Northing: -69.57302°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Small pool within a large wetland complex.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 4 ○ m ◉ ft Length: 6 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Likely overland flow from wetland complex in high rains

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	2	0		3	3		M								
Spotted Salamander	0	0		3	3										
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Small natural pool near forest edge, part of a large wetland complex.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP143AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 700ft north of Burill Woods Rd, and about 2100ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86774° Latitude/Northing: -69.57324°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Small pool within a large wetland complex, minimal shrub cover.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 8 ○ m ◉ ft Length: 8 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Likely overland flow from wetland complex in high rains

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	7	0		3	3		M								
Spotted Salamander	0	0		3	3										
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Small natural pool near forest edge, part of a large wetland complex. No new egg masses on second visit.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP144AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 220ft north of Burill Woods Rd, and about 800ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86741° Latitude/Northing: -69.57343°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☑ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ◉ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Small pool within a large wetland complex, minimal shrub cover. Wide braided stream channels in area, pool may receive water from stream during high rain.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 12 ○ m ◉ ft Length: 20 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Likely overland flow from wetland complex in high rains

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	2	0		3	3		M								
Spotted Salamander	5	5		3	3		M	M							
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Small natural pool located in a PSS/PEM portion of a large wetland complex.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP146AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie/Mao Lin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Pool is located in a skid rut within a cut-over wetland about 1/4 mile east of 1st road junction from the Ames Road gate, and about 260 feet north of the main road, just east of the pre-commercial thinned plantation.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 69.576379 Latitude/Northing: -44.867926

Coordinate system: _____

Check one:

○ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

◉ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☑ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☑ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

pool is in a skidder rut in a cut-over forested wetland. It is unclear where original pools would have been as the entire area is cut-over and skidder ruts run throughout

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Likely drying out completely by end of summer, however it's unknown if saturation from wetland might maintain during wetter years.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 6 ○ m ◉ ft Length: 11 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ◉ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☑ Other: wood frog tadpoles

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/22/2021, 5/1-/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ◯ Yes ◯ No
- Was the entire pool surveyed for egg masses? ◯ Yes ◯ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	2	0		3			A	H			x			3	
Spotted Salamander	8	5,3		3	3		M	A, H							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Wood frog eggs had hatched. 3 of the spotted salamander egg masses were empty or dead, five had mature larvae in May survey. Pool is at edge of wetland where hill slopes up. upland plants on northern side.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ◯ does not meet biological criteria. ◯ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP147AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie/Mao Lin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Pool is located in a skid rut within a cut-over wetland about 1/4 mile east of 1st road junction from the Ames Road gate, and about 260 feet north of the main road, just east of the pre-commercial thinned plantation.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 69.576379° Latitude/Northing: -44.867926°

Coordinate system: NAD83

Check one:

○ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

◉ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☑ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☑ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ○ Natural-Modified ◉ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Pool is in a skidder rut in a cut-over forested wetland. It is unclear where original pools would have been as the entire area is cut-over and skidder ruts run throughout.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool dry by 7/6/21, no fauna observed. Unknown in saturation from wetland might maintain during wetter years.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 12 ○ m ◉ ft Length: 30 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ◉ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☑ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☑ Other: wood frog tadpoles

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/22/2021, 5/1/2021, 7/6/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ◯ Yes ◯ No
- Was the entire pool surveyed for egg masses? ◯ Yes ◯ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	9	0	0	3	3	3	A	H			x			3	
Spotted Salamander	28	17,3	0	3	3	3	M	A, H							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Wood frog eggs had hatched in May. 3 of the spotted salamander egg masses were empty or dead, 17 had mature larvae. Hydric soils were present outside of pool, wetland plants present in landscape surrounding pool.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ◯ does not meet biological criteria. ◯ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP148AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 220ft north of Burill Woods Rd, and about 1900ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86796˚ Latitude/Northing: -69.57498˚

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☑ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ◉ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Pool is in a recently cutover area with ruts running through it. All shrubby and forested cover is cut. Pool overall appears naturally round in shape.

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow (6" deep) and wide pool within a large wetland complex, little to no remaining shrub cover.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 35 ○ m ◉ ft Length: 8 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	10	0		3	3		M				X			3	
Spotted Salamander	11	14		3	3		M	A							
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Highly disturbed small natural pool in recently cutover area, no remaining cover. Wetland complex throughout area.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP149AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located centrally approximately 1,000ft north of Burill Woods Rd, and about 2000ft east of the intersection of Burill Woods and an unnamed road running north/south through the project area.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.86992˚ Latitude/Northing: -69.57445˚

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☐ Forested swamp
- ☑ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☑ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool is located in a broad wetland complex and wide braided stream channel. Stream is likely intermittent to perennial. 15" deep.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ◉ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ○ m ◉ ft Length: 25 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☑ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): Connected to braided channel

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/21/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	9	0		3	3		M								
Spotted Salamander	5	2		3	3		M	A							
Blue-spotted Salamander	0	0													
Fairy Shrimp[3]	0	0													

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Long narrow pool associated with large wetland complex and braided stram channel. Shrub cover with sedge hummocks.

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP161AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ○ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located in the northeastern portion of the site in the Northwest corner of survey map area B17.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.874090° Latitude/Northing: -69.572300°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ⊙ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ⊙ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

Pool is in forested hummok wetland associated with a disperse stream, flow is cut off from larger wetland complex and appears to be a natural pool

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ⊙ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Pool likely dries out in late summer as no permanant aquatic vegetation is present and soils are generally decaying leaves over sphagnum with just a shallow layer of muck

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ⊙ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 24 ○ m ⊙ ft Length: 14 ○ m ⊙ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ⊙ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☑ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ⊙ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/27/2021, 5/12/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	8	10		3	3		M	A							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Natural pool but not enough egg masses to make a significant pool

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP163AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Approximately 60' northwest from VP161AR

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.874220° Latitude/Northing: -69.5725°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Shallow pool with no inlet/outlet.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 12 ○ m ◉ ft Length: 10 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ◉ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ◉ No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/23/2021; 5/10/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog	0	3		3	3		A	H							
Spotted Salamander															
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Natural tip-up in stream/wetland complex

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS:

- **Complete all 3 pages of form thoroughly. Most fields are required for pool registration.**
- **Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.**

Observer's Pool ID: VP166AR

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: Anna Ritchie

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ○ same as observer ◉ other Emmy Irvin

b. Contact and credentials previously provided? ○ No (submit Addendum 1) ◉ Yes

c. Project Name: Hartland Solar

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ◉ No If no, was landowner permission obtained for survey? ◉ Yes ○ No

b. Landowner's contact information (required)

Name: Henning Stabins, Weyerhaeuser Phone: 1-207-313-3563

Street Address: 49 Mountain Ave., P.O. Box 89 City: Fairfield State: ME Zip: 04937

c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Hartland

Brief site directions to the pool (using mapped landmarks):

Located on the eastern side of the subject area in survey map area C9. Adjacent to Burrill Woods Road heading toward Route 151 in Hartland.

b. Mapping Requirements

i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 44.867230° Latitude/Northing: -69.54630°

Coordinate system: NAD83

Check one:

◉ GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

○ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (Good)

○ The center of the pool is approximately _____ m ○ ft ○ in the compass direction of _____ degrees from the above GPS point. (Acceptable)

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated depression
- ○ Floodplain depression
- ◉ Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☑ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake or pond cove
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain
- ☐ Mostly unvegetated pool
- ☐ ATV or skidder rut
- ☐ Dug pond or borrow pit
- ☐ Roadside ditch
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ◉ Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (**required**):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (**required**):

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ◉ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

Small outlet on eastern side. Depth of pool only 7", 2"-7" depth in outlet area. Completely dry at third visit.

■ Maximum depth at survey: ◉ 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 5 ○ m ◉ ft Length: 7 ○ m ◉ ft

■ Predominate substrate in order of increasing hydroperiod:

- ◉ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☑ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☑ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ◉ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 4/28/2021; 5/11/2021

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ○ Yes ◉ No
- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae[4]					
	Visit #1	Visit #2	Visit #3	Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander	1	2		3	3		M	A, H							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching
3-Fairy shrimp: X = present
4-Tadpoles/larvae: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

☐ SVP ☐ Potential SVP ☑ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Jason.Czapiga@maine.gov

NOTE: Digital submissions are preferred but if not possible, please mail to: Maine Department of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street
Bangor, ME 04401

For MDIFW use only Reviewed by MDIFW Date:_____ Initials: _____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

APPENDIX D. USACE WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Hartland Solar City/County: Somerset Sampling Date: 6/1/2021

Applicant/Owner: Strobus Solar, LLC State: ME Sampling Point: _____

Investigator(s): Emmy Irvin, Erin Gilmore Section, Township, Range: Hartland, ME

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR or MLRA): _____ Lat: 44.86 Long: -69.58 Datum: _____

Soil Map Unit Name: Bangor very stony silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil x, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil x, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No x	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** x
Hydric Soil Present?	Yes _____	No x	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No x	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No x	Depth (inches): _____
Water Table Present?	Yes _____	No x	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No x	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. tsuga canadensis	35	Y	FACU
2. acer rubrum	15	Y	FAC
3. betula alleghaniesis	15	Y	FAC
4. betula papyrifeya	10	N	FACU
5.			
6.			
7.			
	75 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. betula alleghaniesis	5	N	FAC
2. acer pennsylvanica	5	N	FACU
3. Hamemelis virginia	15	Y	FACU
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Aralia nudicaulis	5	N	FACU
2. Trientalis borealis	10	Y	FAC
3. Cornus canadensis	5	N	FAC
4. Quercus rubra	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	organic						sapric	
2-20+	2.5Y 6/1	95	7.5YR 5/8	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

soil had gravel mixed in, likely from previous logging activities

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Hartland Solar City/County: Somerset Sampling Date: 6/1/2021

Applicant/Owner: Strobus Solar, LLC State: ME Sampling Point: _____

Investigator(s): Emmy Irvin, Erin Gilmore Section, Township, Range: Hartland, ME

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR or MLRA): _____ Lat: 44.86 Long: -69.58 Datum: _____

Soil Map Unit Name: Bangor very stony silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil x, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil x, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No x	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** x
Hydric Soil Present?	Yes _____	No x	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No x	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No x	Depth (inches): _____
Water Table Present?	Yes _____	No x	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No x	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. tsuga canadensis	35	Y	FACU
2. acer rubrum	15	Y	FAC
3. betula alleghaniesis	15	Y	FAC
4. betula papyrifeya	10	N	FACU
5.			
6.			
7.			
	75 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. betula alleghaniesis	5	N	FAC
2. acer pennsylvanica	5	N	FACU
3. Hamemelis virginia	15	Y	FACU
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Aralia nudicaulis	5	N	FACU
2. Trientalis borealis	10	Y	FAC
3. Cornus canadensis	5	N	FAC
4. Quercus rubra	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	organic						sapric	
2-20+	2.5Y 6/1	95	7.5YR 5/8	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

soil had gravel mixed in, likely from previous logging activities

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Hartland Solar City/County: Somerset Sampling Date: 6/1/2021

Applicant/Owner: Strobus Solar, LLC State: ME Sampling Point: _____

Investigator(s): Emmy Irvin, Erin Gilmore Section, Township, Range: Hartland, ME

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR or MLRA): _____ Lat: 44.86 Long: -69.58 Datum: _____

Soil Map Unit Name: Bangor very stony silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil x, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil x, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No x	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** x
Hydric Soil Present?	Yes _____	No x	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No x	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No x	Depth (inches): _____
Water Table Present?	Yes _____	No x	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No x	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. tsuga canadensis	35	Y	FACU
2. acer rubrum	15	Y	FAC
3. betula alleghaniesis	15	Y	FAC
4. betula papyrifeya	10	N	FACU
5.			
6.			
7.			
	75 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. betula alleghaniesis	5	N	FAC
2. acer pennsylvanica	5	N	FACU
3. Hamemelis virginia	15	Y	FACU
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Aralia nudicaulis	5	N	FACU
2. Trientalis borealis	10	Y	FAC
3. Cornus canadensis	5	N	FAC
4. Quercus rubra	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	organic						sapric	
2-20+	2.5Y 6/1	95	7.5YR 5/8	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

soil had gravel mixed in, likely from previous logging activities

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Hartland Solar City/County: Somerset Sampling Date: 6/1/2021

Applicant/Owner: Strobus Solar, LLC State: ME Sampling Point: _____

Investigator(s): Emmy Irvin, Erin Gilmore Section, Township, Range: Hartland, ME

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR or MLRA): _____ Lat: 44.86 Long: -69.58 Datum: _____

Soil Map Unit Name: Bangor very stony silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil x, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil x, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No x	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** x
Hydric Soil Present?	Yes _____	No x	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No x	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No x	Depth (inches): _____
Water Table Present?	Yes _____	No x	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No x	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. tsuga canadensis	35	Y	FACU
2. acer rubrum	15	Y	FAC
3. betula alleghaniesis	15	Y	FAC
4. betula papyrifeya	10	N	FACU
5.			
6.			
7.			
	75 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. betula alleghaniesis	5	N	FAC
2. acer pennsylvanica	5	N	FACU
3. Hamemelis virginia	15	Y	FACU
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Aralia nudicaulis	5	N	FACU
2. Trientalis borealis	10	Y	FAC
3. Cornus canadensis	5	N	FAC
4. Quercus rubra	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	organic						sapric	
2-20+	2.5Y 6/1	95	7.5YR 5/8	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

soil had gravel mixed in, likely from previous logging activities

APPENDIX E. REPRESENTATIVE SITE PHOTOGRAPHS

Appendix E
Hartland Solar Project
Representative Site Photographs

VERNAL POOLS

Photo: 01 Description: Overview of vernal pool ABA05EI Date: April 15, 2021 Source: Tetra Tech, Inc.	

Photo: 02 Description: Spotted salamander eggs in vernal pool ABA05EI Date: May 11, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 03 Description: Overview of vernal pool ABA17CP Date: April 20, 2021 Source: Tetra Tech, Inc.	

Photo: 04 Description: View of wood frog egg mass observed in vernal pool ABA17CP Date: April 20, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 05 Description: Overview of vernal pool VP01ML Date: April 27, 2021 Source: Tetra Tech, Inc.	

Photo: 06 Description: View of spotted salamander egg masses observed in vernal pool VP01ML Date: April 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 07 Description: Overview of vernal pool VP08E Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 08 Description: Wood frog egg mass of vernal pool VP08EI Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 09 Description: Spotted salamander eggs in vernal pool VP32EI Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 10 Description: Overview of vernal pool VP32EI Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 11 Description: Spotted salamander eggs in vernal pool VP33EI Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 12 Description: Overview of vernal pool VP33EI Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 13 Description: Overview of vernal pool VP35EI Date: April 23, 2021 Source: Tetra Tech, Inc.	

Photo: 14 Description: Overview of vernal pool VP35EI Date: April 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 15 Description: Overview of vernal pool VP39CP Date: April 27, 2021 Source: Tetra Tech, Inc.	

Photo: 16 Description: Overview of vernal pool VP39CP Date: April 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 17 Description: Overview of vernal pool VP43EI Date: April 29, 2021 Source: Tetra Tech, Inc.	

Photo: 18 Description: Overview of vernal pool VP43EI Date: April 29, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 19 Description: Overview of vernal pool VP138AR Date: May 10, 2021 Source: Tetra Tech, Inc.	

Photo: 20 Description: Overview of vernal pool VP140AR Date: May 10, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 21 Description: Overview of vernal pool VP140AR Date: May 10, 2021 Source: Tetra Tech, Inc.	

Photo: 22 Description: Overview of vernal pool VP141AR Date: May 10, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 23 Description: Overview of vernal pool VP141AR Date: May 10, 2021 Source: Tetra Tech, Inc.	

Photo: 24 Description: Wood frog egg masses of vernal pool VP142AR Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 25 Description: Overview of vernal pool VP142AR Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 26 Description: Overview of vernal pool VP143AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 27 Description: Overview of vernal pool VP143AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 28 Description: Overview of vernal pool VP144AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 29 Description: Overview of vernal pool VP144AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 30 Description: Overview of vernal pool VP146AR. Date: April 22, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 31 Description: Photo of two spotted salamander egg masses observed in VP146AR. Date: April 22, 2021 Source: Tetra Tech, Inc.	

Photo: 32 Description: Overview of vernal pool VP147AR. Date: April 22, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 33 Description: Photo of spotted salamander egg mass observed in vernal pool VP147AR. Date: April 22, 2021 Source: Tetra Tech, Inc.	

Photo: 34 Description: Overview of vernal pool VP148AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

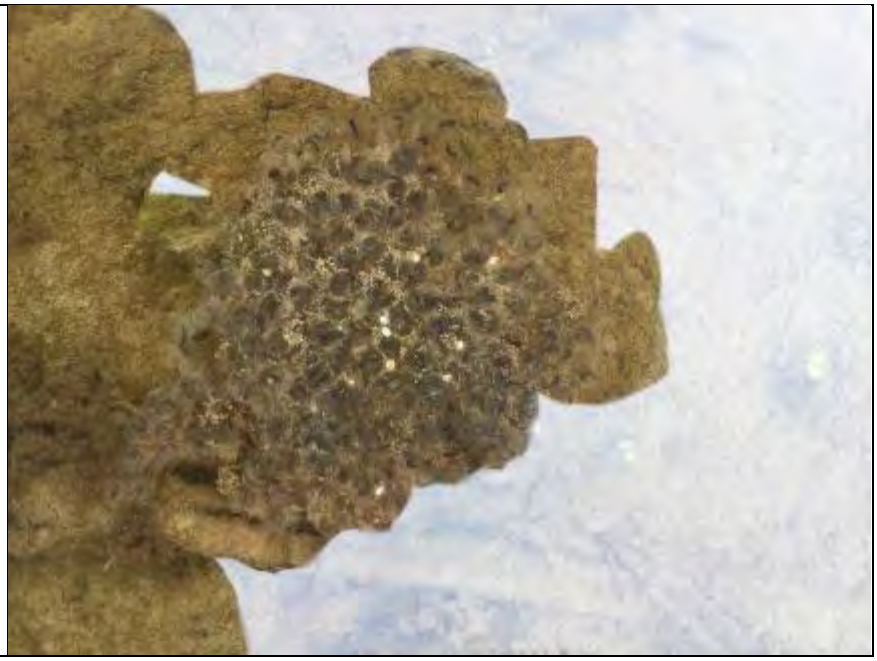
Photo: 35 Description: Wood frog egg mass and sediment of vernal pool VP148AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 36 Description: Overview of vernal pool VP149AR. Date: April 21, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 37 Description: Spotted salamander egg mass of vernal pool VP149AR Date: April 21, 2021 Source: Tetra Tech, Inc.	

Photo: 38 Description: Overview of vernal pool VP161AR Date: April 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 39 Description: Photo of a spotted salamander egg mass observed in VP161AR Date: April 23, 2021 Source: Tetra Tech, Inc.	

Photo: 40 Description: Overview of vernal pool VP163AR Date: April 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 41 Description: Overview of vernal pool VP166AR Date: April 28, 2021 Source: Tetra Tech, Inc.	

Photo: 42 Description: View of vernal pool VP166AR Date: April 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

WETLANDS

Photo: 43 Description: View of W01DS Date: June 6, 2021 Source: Tetra Tech, Inc.	

Photo: 44 Description: View of W01DS Date: June 6, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 45 Description: View of W02DS Date: August 30, 2022 Source: Tetra Tech, Inc.	

Photo: 46 Description: View of W02DS Date: September 8, 2022 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 47 Description: View of W02EI Date: June 6, 2021 Source: Tetra Tech, Inc.	

Photo: 48 Description: View of W03DS Date: June 4, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 49 Description: View of W03DS Date: June 4, 2021 Source: Tetra Tech, Inc.	

Photo: 50 Description: View of W04DS Date: June 14, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 51 Description: View of W04DS Date: June 14, 2021 Source: Tetra Tech, Inc.	

Photo: 52 Description: View of W04EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 53 Description: View of W04EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 54 Description: View of W05DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 55 Description: View of W05DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 56 Description: View of W05EI Date: June 4, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 57 Description: View of W06EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 58 Description: View of VP35EI within W06EI Date: June 10, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 59 Description: View of W06DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 60 Description: View of W06DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 61 Description: View of W07EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 62 Description: View of W08DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 63 Description: View of W08SG Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 64 Description: View of W09DS Date: September 8, 2022 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 65 Description: View of W09DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 66 Description: View of W09EI Date: June 14, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 67 Description: View of W09SG Date: June 24, 2021 Source: Tetra Tech, Inc.	

Photo: 68 Description: View of W10DS Date: June 24, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 69 Description: View of W10EI Date: June 14, 2021 Source: Tetra Tech, Inc.	

Photo: 70 Description: View of W10SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 71 Description: View of W11DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 72 Description: View of W11DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 73 Description: View of W12EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 74 Description: View of W12SG Date: July 1, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 75 Description: View of W12SG looking towards East Branch Black Stream Date: July 1, 2021 Source: Tetra Tech, Inc.	

Photo: 76 Description: View of W13DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 77 Description: View of W13DS Date: July 1, 2021 Source: Tetra Tech, Inc.	

Photo: 78 Description: View of W13SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 79 Description: View of W13SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 80 Description: View of W13SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 81 Description: View of W13EI Date: June 4, 2021 Source: Tetra Tech, Inc.	

Photo: 82 Description: View of W14DS Date: June 22, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 83 Description: View of W14DS Date: June 22, 2021 Source: Tetra Tech, Inc.	

Photo: 84 Description: View of W14DS Date: June 22, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 85 Description: View of W14SG Date: July 6, 2021 Source: Tetra Tech, Inc.	

Photo: 86 Description: View of W14SG Date: July 13, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 87 Description: View of W17EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 88 Description: View of W17DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 89 Description: View of W18DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 90 Description: View of W18EI Date: July 7, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 91 Description: View of W18EI Date: July 7, 2021 Source: Tetra Tech, Inc.	

Photo: 92 Description: View of W18SG Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 93 Description: View of W18SG Date: July 7, 2021 Source: Tetra Tech, Inc.	

Photo: 94 Description: View of W19DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 95 Description: View of W19DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 96 Description: View of W15SG Date: July 13, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 97 Description: View of W19EI Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 98 Description: View of W19EI Date: June 23, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 99 Description: View of W19SG Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 100 Description: View of W19SG Date: September 8, 2022 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 101 Description: View of W21DS Date: June 24, 2021 Source: Tetra Tech, Inc.	

Photo: 102 Description: View of W21DS Date: June 24, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 103 Description: View of wetland W22SG where recent clearing activity occurred Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 104 Description: View of W22SG Date: July 13, 2022 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

WATERCOURSES

Photo: 105 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 106 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 107 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 108 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 109 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 110 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 111 Description: View of ST02AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 112 Description: View of ST02AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 113 Description: View of ST03AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 114 Description: View of ST03AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 115 Description: View of ST03AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 116 Description: View of ST03AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 117 Description: View of ST04AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 118 Description: View of ST04AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 119 Description: View of ST05AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 120 Description: View of ST05AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 121 Description: View of ST06AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 122 Description: View of ST06AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 123 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 124 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 125 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 126 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 127 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 128 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 129 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 130 Description: View of ST07AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 131 Description: View of ST08AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 132 Description: View of ST08AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 133 Description: View of ST08AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 134 Description: View of ST09AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 135 Description: View of ST09AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 136 Description: View of ST10AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 137 Description: View of ST10AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 138 Description: View of ST11AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 139 Description: View of ST11AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 140 Description: View of ST12AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 141 Description: View of ST12AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 142 Description: View of ST12AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 143 Description: View of ST13AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 144 Description: View of ST13AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 145 Description: View of ST14AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 146 Description: View of ST14AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 147 Description: View of ST15AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 148 Description: View of ST15AR Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 149 Description: View of ST01DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 150 Description: View of ST01DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 151 Description: View of ST01DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 152 Description: View of ST02DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

Appendix E
Hartland Solar Project
Representative Site Photographs

Photo: 153 Description: View of ST02DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

Photo: 154 Description: View of ST02DS Date: May 28, 2021 Source: Tetra Tech, Inc.	

APPENDIX F. WETLAND FUNCTIONS AND VALUES TABLES

Table 1. Wetland Functions and Values Results for Hartland Solar Project, Hartland, Somerset County, Maine.

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W01DS	PSS	Sheet 5	890,351.1/20.44	A large, scrub shrub wetland complex that has been largely disturbed by timber harvesting practices which have created an artificial pit/mound landscape. This wetland is hydrologically connected to wetlands W19EI and W19SG through the perennial stream, ST01AR, that is associated with these wetlands. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater recharge, floodflow alteration, sediment/toxicant retention, nutrient removal, production export, and sediment/shoreline stabilization.	Yes
W01EI	PFO	Sheet 9	1,742.4/0.04	A small forested, seep wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is ground water discharge, with secondary functions including production export and wildlife habitat.	No
W02DS	PFO	Sheet 5	41,620.93/0.96	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W02EI	PFO	Sheet 9	1,597,345.2/36.67	A large, forested wetland complex that has been disturbed by previous timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W03DS	PFO	Sheet 5	48,288.26/1.11	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W04DS	PFO	Sheet2/ Sheet 5	54,822.23/1.26	A forested wetland complex that has been largely disturbed by timber harvesting practices. This wetland is hydrologically connected to wetland W05DS. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater recharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	Yes
W05DS	PFO	Sheet 5	206,133.6/4.73	A forested wetland complex that has been largely disturbed by timber harvesting practices. This wetland is hydrologically connected to wetland W04DS. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater recharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	Yes
W04EI	PFO	Sheet 5	16,067.63/0.37	A forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W05EI	PFO	Sheet 4	8,118.10/0.19	A forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including production export.	No
W06EI	PFO	Sheet 4	19,717.53/0.45	A small, previously forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W06DS	PFO	Sheet 5	3,853.72/0.09	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W07DS	PFO	Sheet 4	12,632.4/0.29	An isolated forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W07EI	PFO	Sheet 4	53,955.63/1.24	A small, previously forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W07SG	PFO	Sheet 7	11,325.6/0.26	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W08DS	PFO	Sheet 5	2,573.86/0.06	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W08SG	PSS	Sheet 7	51,447.07/1.18	A scrub shrub wetland that has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. The primary function of this wetland is floodflow alteration, with secondary functions and values including sediment/toxicant retention, nutrient removal, production export, and wildlife habitat.	Yes
W09DS	PFO	Sheet 2	546,631.10/12.55	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W09EI	PFO	Sheet 4	97,625.14/2.24	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is floodflow alteration, with secondary functions and values including sediment/toxicant retention, production export, and wildlife habitat.	No
W09SG	PSS	Sheet 7	7,019.65/0.16	A scrub shrub wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W10DS	PFO	Sheet 5	4,024.76/0.09	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W10EI	PFO	Sheet 4	98,516.66/2.26	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is floodflow alteration, with secondary functions and values including sediment/toxicant retention, production export, and wildlife habitat.	No
W10SG	PFO	Sheet 6	57,655.86/1.32	A forested wetland that has been largely disturbed by timber harvesting practices and has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. The primary function of this wetland is floodflow alteration, with secondary functions and values including fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat.	Yes
W11DS	PFO	Sheet 3	4,674.32/0.11	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W11EI	PFO	Sheet 4	62,726.4/1.44	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W11SG	PFO	Sheet 7	3,920.4/0.09	An isolated forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W12DS	PFO	Sheet 2	124,146/2.85	An isolated forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W12EI	PFO	Sheet 4	157,363.60/3.61	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W12SG	PFO	Sheet 6	422,409.60/9.70	A forested wetland that has been largely disturbed by timber harvesting practices and has been bisected by a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. There is a perennial stream associated with this wetland. The primary function of this wetland is floodflow alteration, with secondary functions and values including groundwater recharge, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat.	Yes
W13DS	PFO	Sheet 2	4,883.078/0.11	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W13EI	PFO	Sheet 8	76,833.8/1.76	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W13SG	PFO	Sheet 5	15,609.56/0.36	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including production export.	No
W14DS	PSS	Sheet 2	12,590.87/0.29	A small, scrub shrub/emergent wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W14EI	PFO	Sheet 4	0.1/0.00	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W14SG	PFO	Sheet 10	79,694.86/1.83	A small, previously forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W15DS	PFO	Sheet 2	116,740.8/2.68	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W15EI	PSS	Sheet 11	13,939.2/0.32	A forested wetland that has been largely disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	No
W15SG	PFO	Sheet 9	193,427.7/4.44	A forested wetland that was observed to have been harvested for timber since the initial wetland delineation in summer of 2021. This wetland is part of the same wetland complex that includes W22SG. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal and production export.	Yes
W16EI	PFO	Sheet 8	11,325.6/0.26	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention and production export.	No
W17EI	PFO	Sheet 9	22,087.49/0.54	A forested wetland complex that has been previously disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, and production export.	No
W17DS	PFO	Sheet 2	23,344.96/0.51	A small, forested wetland that has been disturbed by timber harvesting practices. An ephemeral stream connects this wetland to W19DS. The primary function of this wetland is wildlife habitat, with secondary functions and values including floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	Yes

Wetland ID	Cowardian Classification[1]	Plan Sheet	Area (Sq. Ft.)/AC	Summary Notes	Wetland of Special Significance[2]
W18DS	PFO	Sheet 2	10,390.41/0.24	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W18EI	PFO	Sheet 5/ Sheet 9	47,2565.8/10.85	A large, forested wetland complex that is hydrologically connected to wetland W19EI outside of the project Study Area. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and recreation.	No
W18SG	PFO	Sheet 6	2,606.714/0.06	A small, forested wetland that has been disturbed by timber harvesting practices and a maintained gravel road used for timber harvesting as well as local vehicle traffic, and recreational traffic. The primary function of this wetland is floodflow alteration, with secondary functions and values including sediment/toxicant retention, nutrient removal, and wildlife habitat.	Yes
W19DS	PSS	Sheet 2	188,281.6/4.32	A small, scrub shrub wetland that has been disturbed by timber harvesting practices. An ephemeral stream connects this wetland to W17DS. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export.	Yes
W19EI	PFO	Sheet 5/ Sheet 9/ Sheet 10	587,145.2/13.48	A large, forested wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR. The primary function of this wetland is floodflow alteration, with secondary functions and values including ground water recharge, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat.	Yes
W19SG	PSS	Sheet 10	48,984.7/1.12	A large, forested wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR. The primary function of this wetland is floodflow alteration, with secondary functions and values including ground water recharge, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat.	Yes
W20DS	PFO	Sheet 2	5,227.2/0.12	A small, forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W21DS	PFO	Sheet 2	43,375.41/1.00	A forested wetland that has been disturbed by timber harvesting practices. The primary function of this wetland is wildlife habitat, with secondary functions and values including sediment/toxicant retention, nutrient removal, and production export.	No
W21SG	PFO	Sheet 9	12,196.8/0.28	A forested wetland complex that is hydrologically connected to several other wetlands in the area through the associated perennial stream ST01AR. The primary function of this wetland is floodflow alteration, with secondary functions and values including ground water recharge, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat.	Yes
W22SG	PFO			A large, forested wetland complex that has been largely disturbed by timber harvesting practices. This wetland is part of the same wetland complex that includes W15SG. The primary function of this wetland is wildlife habitat, with secondary functions and values including groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal and production export.	Yes

EXHIBIT 7-4 USACE PAIRED PLOT FORMS

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 07/02/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification: PSS	Wetland ID: W08SG
Landform:	hillslope	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.867227°	Longitude: -69.544913° Datum: NAD83	

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Recently selectively cut forested area; regen is mostly shrub and trees < 10 ft in height. Appears to have been cut multiple times - few large trees remain. Skid trails, ruts, soil compaction, slash throughout area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☑ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☑ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Associated with drainage from culvert. Several additional culverts likely exist along north boundary of wetland. Skid trails provide additional stormwater input from upslope areas.

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	7.5YR	5/2	100	--	--	--	--	--	clay loam
2	4	--	7.5YR	4/1	85	7.5YR	4/6	15	C	PL	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
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NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 4

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W08SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	20	Y	FAC
2.	*Alnus incana*	20	Y	FACW
3.	*Betula populifolia*	10	N	FAC
4.	*Abies balsamea*	5	N	FAC
5.	*Ilex verticillata*	5	N	FACW
6.	*Spiraea tomentosa*	5	N	FACW
7.	*Salix bebbiana*	5	N	FACW
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	70		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	15	Y	FACW
2.	*Carex crinita*	10	Y	OBL
3.	*Carex stipata*	5	Y	OBL
4.	*Carex scoparia*	5	Y	FACW
5.	*Impatiens capensis*	5	Y	FACW
6	*Carex intumescens*	5	Y	FACW
7.	*Juncus effusus*	3	N	OBL
8.	*Rubus idaeus*	3	N	FACU
9.	*Fragaria virginiana*	3	N	FACU
10.	*Solidago rugosa*	3	N	FAC
11.	*Osmunda claytoniana*	3	N	FAC
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	60		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	18	x 1 =	18
FACW spp.	65	x 2 =	130
FAC spp.	41	x 3 =	123
FACU spp.	6	x 4 =	24
UPL spp.	0	x 5 =	0
Total	130 (A)		295 (B)

Prevalence Index = B/A = ***2.269***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

Highly disturbed. Very diverse mix of wetland and upland plants throughout - often the wetland edge in recently cut area is based primarily on slightly higher densities and types of sedges and lack of Populus tremuloides, Populus grandidentata, rubus idaeus and pteridium aquilinum. Acer rubrum and Betula populifolia (FAC) regen and some sedges nearly everywhere!

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W08SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	--	10YR	3/3	100	--	--	--	--	--	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W08SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	10	Y	FAC
2.	*Fraxinus pennsylvanica*	5	Y	FACW
3.	*Populus tremuloides*	5	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	20		

Herb Stratum (Plot size: 2 meter radius)

1.	*Rubus idaeus*	25	Y	FACU
2.	*Pteridium aquilinum*	10	Y	FACU
3.	*Fragaria virginiana*	5	N	FACU
4.	*Solidago rugosa*	5	N	FAC
5.	*Equisetum sylvaticum*	5	N	FACW
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	50		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***40.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	10	x 2 =	20
FAC spp.	15	x 3 =	45
FACU spp.	45	x 4 =	180
UPL spp.	0	x 5 =	0
Total	70 (A)		245 (B)

Prevalence Index = B/A = ***3.500***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification: PFO4e	Wetland ID: W09SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude: Datum: WGS84	

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Floodplain wetland at toe of slope - associated with unnamed stream (mapped by Tetra Tech). Hummocky pit-mound topography throughout. Somerset County annual precipitation 3.97" below normal, per NOAA/National Integrated Drought Information System.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☑ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☑ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	12	--	7.5YR	2.5/1	100	--	--	--	--	--	mucky peat
12	36	--	7.5YR	2.5/1	100	--	--	--	--	--	mucky loam/clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☑ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: None Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W09SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	25	Y	FAC
2.	*Betula papyrifera*	20	Y	FACU
3.	*Abies balsamea*	20	Y	FAC
4.	*Fraxinus pennsylvanica*	15	N	FACW
5.	*Tsuga canadensis*	10	N	FACU
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	90		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	5	Y	FAC
2.	*Fraxinus pennsylvanica*	5	Y	FACW
3.	*Tsuga canadensis*	5	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	10	Y	FACW
2.	*Coptis trifolia*	10	Y	FACW
3.	*Impatiens capensis*	10	Y	FACW
4.	*Rubus pubescens*	10	Y	FACW
5.	*Osmunda claytoniana*	5	N	FAC
6	*Thelypteris palustris*	5	N	FACW
7.	*Carex intumescens*	5	N	FACW
8.	*Osmundastrum cinnamomeum*	5	N	FACW
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	60		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***80.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	75	x 2 =	150
FAC spp.	55	x 3 =	165
FACU spp.	35	x 4 =	140
UPL spp.	0	x 5 =	0
Total	165 (A)		455 (B)

Prevalence Index = B/A = ***2.758***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

Hummocky. Spahgnum throughout - deep/dense in some areas. Some upland spp on elevated areas: Cornus cornuta, Tsuga canadensis, Thuja occidentalis, aralia nudicalis.

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W09SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	--	10YR	4/3	100	--	--	--	--	--	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 12

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W09SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	15	Y	FAC
2.	*Fraxinus pennsylvanica*	5	N	FACW
3.	*Populus tremuloides*	10	Y	FACU
4.	*Alnus incana*	5	N	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	35		

Herb Stratum (Plot size: 2 meter radius)

1.	*Rubus idaeus*	30	Y	FACU
2.	*Pteridium aquilinum*	15	Y	FACU
3.	*Fragaria virginiana*	10	N	FACU
4.	*Solidago rugosa*	5	N	FAC
5.	*Equisetum sylvaticum*	5	N	FACW
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	65		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***25.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	15	x 2 =	30
FAC spp.	20	x 3 =	60
FACU spp.	65	x 4 =	260
UPL spp.	0	x 5 =	0
Total	100 (A)		350 (B)

Prevalence Index = B/A = ***3.500***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21	
Applicant: Teichos Solar		County: Somerset	
Investigator #1: S.Grove	Investigator #2:	State: Maine	
Soil Unit:	NWI/WWI Classification:	Wetland ID:	
Landform: Terrace	Local Relief: Linear	Sample Point: **Wetland**	
Slope (%): 3	Latitude: Longitude: Datum:		

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☐ No Depth: (in.)
Water Table Present? ☐ Yes ☐ No Depth: (in.)
Saturation Present? ☐ Yes ☐ No Depth: (in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: 0 | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	0		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***NA*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	0 (A)		0 (B)

Prevalence Index = B/A = ***NA***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W10SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	--	7.5YR	3/4	100	--	--	--	--	--	loamy clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W10SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer saccharinum*	30	Y	FACW
2.	*Thuja occidentalis*	20	Y	FACW
3.	*Betula alleghaniensis*	20	Y	FAC
4.	*Fraxinus pennsylvanica*	10	n	FACW
5.	*Tsuga canadensis*	10	N	FACU
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	90		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	10	Y	FAC
2.	*Acer pensylvanicum*	10	Y	FACU
3.	*Acer saccharinum*	5	Y	FACW
4.	*Viburnum lantanoides*	5	Y	FACU
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	30		

Herb Stratum (Plot size: 2 meter radius)

1.	*Aralia nudicaulis*	10	Y	FACU
2.	*Osmundastrum cinnamomeum*	10	Y	FACW
3.	*Trientalis borealis*	5	N	FAC
4.	*Cornus canadensis*	5	N	FAC
5.	*Clintonia borealis*	5	N	FAC
6	*Parathelypteris noveboracensis*	5	N	FAC
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	40		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***66.7%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	75	x 2 =	150
FAC spp.	50	x 3 =	150
FACU spp.	35	x 4 =	140
UPL spp.	0	x 5 =	0
Total	160 (A)		440 (B)

Prevalence Index = B/A = ***2.750***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification: PFO	Wetland ID: W12SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☑ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☑ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes	☐ No	Depth:	3	(in.)
Water Table Present?	☐ Yes	☐ No	Depth:		(in.)
Saturation Present?	☑ Yes	☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	7.5YR	3/1	100	--	--	--	--	--	very fine sandy loam
6	16	--	7.5YR	4/1	85	10YR	4/6	15	C	M	very fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W12SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Fraxinus nigra*	25	Y	FACW
2.	*Fraxinus pennsylvanica*	15	Y	FACW
3.	*Abies balsamea*	5	N	FAC
4.	*Acer rubrum*	10	Y	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	55		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	5	Y	FAC
2.	*Alnus incana*	10	Y	FACW
3.	*Salix bebbiana*	5	Y	FACW
4.	*Ribes americanum*	1	N	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	21		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	20	Y	FACW
2.	*Osmundastrum cinnamomeum*	30	Y	FACW
3.	*Gaultheria hispidula*	20	Y	FACW
4.	*Carex intumescens*	5	N	FACW
5.	*Rubus pubescens*	5	N	FACW
6	*Juncus effusus*	5	N	OBL
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	85		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	5	x 1 =	5
FACW spp.	136	x 2 =	272
FAC spp.	20	x 3 =	60
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	161 (A)		337 (B)

Prevalence Index = B/A = ***2.093***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21	
Applicant: Teichos Solar		County: Somerset	
Investigator #1: S.Grove	Investigator #2:	State: Maine	
Soil Unit:	NWI/WWI Classification:	Wetland ID: W12SG	
Landform: Terrace	Local Relief: Linear	Sample Point: **Wetland**	
Slope (%): 3	Latitude: Longitude: Datum:		

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	--	7.5YR	3/4	100	--	--	--	--	--	loamy clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W12SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Populus tremuloides*	25	Y	FACU
2.	*Acer rubrum*	15	Y	FAC
3.	*Betula alleghaniensis*	15	Y	FAC
4.	*Fraxinus pennsylvanica*	10	N	FACW
5.	*Tsuga canadensis*	10	N	FACU
6.	*Abies balsamea*	5	N	FAC
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	5	Y	FAC
2.	*Acer pensylvanicum*	15	Y	FACU
3.	*Acer rubrum*	5	Y	FAC
4.	*Viburnum lantanoides*	5	Y	FACU
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	30		

Herb Stratum (Plot size: 2 meter radius)

1.	*Aralia nudicaulis*	15	Y	FACU
2.	*Onoclea sensibilis*	5	Y	FACW
3.	*Trientalis borealis*	10	Y	FAC
4.	*Cornus canadensis*	5	N	FAC
5.	*Clintonia borealis*	10	Y	FAC
6	*Parathelypteris noveboracensis*	5	N	FAC
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	50		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***63.6%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	15	x 2 =	30
FAC spp.	75	x 3 =	225
FACU spp.	70	x 4 =	280
UPL spp.	0	x 5 =	0
Total	160 (A)		535 (B)

Prevalence Index = B/A = ***3.344***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification: PFO	Wetland ID: W13SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Cut forested area with early successional regen on average 30 ft in height. Some areas nearly impenetrable Abies balsamea, with overstory of Betula papyrifera. Appears to have been cut multiple times - few large trees remain. Very deep skid ruts and skid trails, soil compaction, slash and blowdown

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☑ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	5	--	7.5YR	4/1	--	--	--	--	--	--	loamy clay
5	11	--	7.5YR	6/1	75	7.5YR	4/6	5	C	M	loamy clay
--	--	--	--	--	--	7.5YR	5/2	20	D	M	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 11

Hydric Soil Present? ☑ Yes ☐ No

Remarks: Shallow rocky soils most areas. Much of soil surface covered with 2" or more duff, rotting wood. Soil very stony throughout. Soil type not hydric, but area located close to NWI hydric soil type.

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W13SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula populifolia*	30	Y	FAC
2.	*Acer rubrum*	15	Y	FAC
3.	*Abies balsamea*	5	N	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	50		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula populifolia*	20	Y	FAC
2.	*Abies balsamea*	20	Y	FAC
3.	*Acer rubrum*	15	Y	FAC
4.	*Ilex verticillata*	5	N	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	60		

Herb Stratum (Plot size: 2 meter radius)

1.	*Lycopus uniflorus*	15	Y	OBL
2.	*Onoclea sensibilis*	10	Y	FACW
3.	*Galium palustre*	5	N	OBL
4.	*Cornus canadensis*	5	N	FAC
5.	*Fragaria virginiana*	5	N	FACU
6	*Juncus effusus*	2	N	OBL
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	42		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	22	x 1 =	22
FACW spp.	15	x 2 =	30
FAC spp.	110	x 3 =	330
FACU spp.	5	x 4 =	20
UPL spp.	0	x 5 =	0
Total	152 (A)		402 (B)

Prevalence Index = B/A = ***2.645***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Highly disturbed wetland mosaic, mostly due to repeated harvesting. Diverse mix of wetland and upland plants throughout - often the wetland edge is based primarily on slighly higher cover of sedges, and lack of Populus species and aralia nud. Sphagnum, Cornus canadensis, Mianthemum

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W13SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	--	10YR	4/3	100	--	--	--	--	--	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W13SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Populus tremuloides*	20	Y	FACU
2.	*Acer rubrum*	30	Y	FAC
3.	*Betula alleghaniensis*	15	Y	FAC
4.	*Fraxinus pennsylvanica*	5	N	FACW
5.	*Tsuga canadensis*	15	Y	FACU
6.	*Abies balsamea*	5	N	FAC
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	90		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	5	Y	FAC
2.	*Acer pensylvanicum*	15	Y	FACU
3.	*Acer rubrum*	5	Y	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	25		

Herb Stratum (Plot size: 2 meter radius)

1.	*Aralia nudicaulis*	15	Y	FACU
2.	*Parathelypteris noveboracensis*	5	Y	FAC
3.	*Trientalis borealis*	5	N	FAC
4.	*Cornus canadensis*	20	Y	FAC
5.	*Clintonia borealis*	10	Y	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	55		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***63.6%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	100	x 3 =	300
FACU spp.	65	x 4 =	260
UPL spp.	0	x 5 =	0
Total	170 (A)		570 (B)

Prevalence Index = B/A = ***3.353***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W18SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes	☐ No	Depth:	2	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:		(in.)
Saturation Present?	☑ Yes	☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	2.5YR	2.5/1	100	--	--	--	--	--	silty clay loam
6	12	--	2.5YR	4/1	70	10YR	4/6	30	C	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W18SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula alleghaniensis*	30	Y	FAC
2.	*Acer rubrum*	30	Y	FAC
3.	*Betula populifolia*	20	Y	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Alnus incana*	10	Y	FACW
2.	*Salix bebbiana*	5	N	FACW
3.	*Spiraea tomentosa*	5	N	FACW
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	20		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	30	Y	FACW
2.	*Carex intumescens*	25	Y	FACW
3.	*Gaultheria hispidula*	5	N	FACW
4.	*Cornus canadensis*	5	N	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	65		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	80	x 2 =	160
FAC spp.	85	x 3 =	255
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	165 (A)		415 (B)

Prevalence Index = B/A = ***2.515***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	S.Grove	Investigator #2:	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W18SG
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude:	Longitude:	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	9	--	10YR	3/4	100	--	--	--	--	--	silty loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 9

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W18SG | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula populifolia*	20	Y	FAC
2.	*Acer rubrum*	15	Y	FAC
3.	*Pinus strobus*	10	Y	FACU
4.	*Quercus rubra*	5	N	FACU
5.	*Fraxinus pennsylvanica*	5	N	FACW
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	55		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula populifolia*	5	N	FAC
2.	*Salix bebbiana*	5	N	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	10		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	10	Y	FAC
2.	*Gaultheria hispidula*	10	Y	FACW
3.	*Pteridium aquilinum*	10	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	30		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***66.7%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	20	x 2 =	40
FAC spp.	50	x 3 =	150
FACU spp.	25	x 4 =	100
UPL spp.	0	x 5 =	0
Total	95 (A)		290 (B)

Prevalence Index = B/A = ***3.053***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 06/08/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin Erin Gilmore	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W02EI
Landform:	Side slope	Local Relief: Linear	Sample Point: **Wetland**
Slope (%):	3	Latitude: 44.860000 Longitude: -69.58 Datum: NAD83	

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: NOAA confirmed drought during summer of 2021

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☑ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 10	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	Oa	10YR	2/1	100	--	--	--	--	--	sapric
3	9	E	2.5Y	5/1	80	10YR	6/8	20	C	M	sandy loam
9	16	A	2.5Y	5/1	75	10YR	4/6	25	C	M	sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☑ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W02EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	15	Y	FAC
2.	*Fraxinus pennsylvanica*	15	Y	FACW
3.	*Betula alleghaniensis*	5	N	FAC
4.	*Pinus strobus*	5	N	FACU
5.	*Quercus rubra*	5	N	FACU
6.	*Picea mariana*	5	N	FACW
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	50		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Pinus strobus*	10	Y	FACU
2.	*Acer rubrum*	10	Y	FAC
3.	*Betula alleghaniensis*	5	Y	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	25		

Herb Stratum (Plot size: 2 meter radius)

1.	*Carex stricta*	90	Y	OBL
2.	*Onoclea sensibilis*	25	Y	FACW
3.	*Impatiens capensis*	10	N	FACW
4.	*Rubus hispidus*	10	N	FACW
5.	*Pteridium aquilinum*	10	N	FACU
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	145		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***85.7%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	90	x 1 =	90
FACW spp.	65	x 2 =	130
FAC spp.	35	x 3 =	105
FACU spp.	30	x 4 =	120
UPL spp.	0	x 5 =	0
Total	220 (A)		445 (B)

Prevalence Index = B/A = ***2.023***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Hartland Solar City/County: Somerset Sampling Date: 6/1/2021

Applicant/Owner: Strobus Solar, LLC State: ME Sampling Point: W02EI

Investigator(s): Emmy Irvin, Erin Gilmore Section, Township, Range: Hartland, ME

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR or MLRA): _____ Lat: 44.86 Long: -69.58 Datum: _____

Soil Map Unit Name: Bangor very stony silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil x, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil x, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No x	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** x
Hydric Soil Present?	Yes _____	No x	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No x	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No x	Depth (inches): _____
Water Table Present?	Yes _____	No x	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No x	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. tsuga canadensis	25	Y	FACU
2. acer rubrum	10	N	FAC
3. Fraxinus pennsylvanica	15	Y	FACW
4. Pinus strobus	15	Y	FACU
5. Quercus rubra	20	Y	FACU
6.			
7.			
	85 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. tsuga canadensi	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Medeola virginiana	10	Y	FACU
2. Trientalis borealis	5	N	FAC
3. Cornus canadensis	2	N	FAC
4. Quercus rubra	5	N	FACU
5. Maianthemum canadense	5	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	27 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	organic						sapric	
2-6	10YR 4/3	100					SL	
LEDGE								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ledge

Depth (inches): 6

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

soil had gravel mixed in, likely from previous logging activities

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W05EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☑ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	10YR	2/1	100	--	--	--	--	--	fine sandy loam
6	12	--	2.5Y	4/1	80	10YR	4/6	20	C	M	fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Ledge Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W05EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	40	Y	FAC
2.	*Betula alleghaniensis*	25	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	65		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	10	Y	FAC
2.	*Acer pensylvanicum*	5	Y	FACU
3.	*Betula alleghaniensis*	5	Y	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	20		

Herb Stratum (Plot size: 2 meter radius)

1.	*Osmundastrum cinnamomeum*	35	Y	FACW
2.	*Carex stricta*	20	Y	OBL
3.	*Onoclea sensibilis*	20	Y	FACW
4.	*Maianthemum canadense*	5	N	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	80		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***87.5%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	20	x 1 =	20
FACW spp.	55	x 2 =	110
FAC spp.	80	x 3 =	240
FACU spp.	10	x 4 =	40
UPL spp.	0	x 5 =	0
Total	165 (A)		410 (B)

Prevalence Index = B/A = ***2.485***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W05EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	Oa	--	--	--	--	--	--	--	--	sapric
2	21	A	2.5Y	4/1	100	--	--	--	--	--	Silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W05EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Tsuga canadensis*	35	Y	FACU
2.	*Acer rubrum*	15	Y	FAC
3.	*Betula alleghaniensis*	15	Y	FAC
4.	*Betula papyrifera*	10	N	FACU
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula alleghaniensis*	5	N	FAC
2.	*Acer pensylvanicum*	5	N	FACU
3.	*Hamamelis virginiana*	15	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	25		

Herb Stratum (Plot size: 2 meter radius)

1.	*Aralia nudicaulis*	5	Y	FACU
2.	*Trientalis borealis*	10	Y	FAC
3.	*Cornus canadensis*	5	Y	FAC
4.	*Quercus rubra*	5	Y	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	25		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	50	x 3 =	150
FACU spp.	75	x 4 =	300
UPL spp.	0	x 5 =	0
Total	125 (A)		450 (B)

Prevalence Index = B/A = ***3.600***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification: PFO	Wetland ID: W07EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	Oa	10YR	2/1	100	--	--	--	--	--	sapric
3	20	A	2.5Y	5/1	80	10YR	4/6	20	C	M	fine sandy loam
											--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Ledge Depth: 20

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W07EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	40	Y	FAC
2.	*Picea mariana*	25	Y	FACW
3.	*Betula populifolia*	15	N	FAC
4.	*Quercus rubra*	5	N	FACU
5.	*Pinus strobus*	5	N	FACU
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	90		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	5	N	FAC
2.	*Picea mariana*	5	N	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	10		

Herb Stratum (Plot size: 2 meter radius)

1.	*Osmundastrum cinnamomeum*	25	Y	FACW
2.	*Osmunda spectabilis*	15	Y	OBL
3.	*Viola novae-angliae*	15	Y	OBL
4.	*Cornus canadensis*	20	Y	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	75		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	30	x 1 =	30
FACW spp.	55	x 2 =	110
FAC spp.	80	x 3 =	240
FACU spp.	10	x 4 =	40
UPL spp.	0	x 5 =	0
Total	175 (A)		420 (B)

Prevalence Index = B/A = ***2.400***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W07EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	15	--	7.5YR	4/3	100	--	--	--	--	--	very fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 15

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W07EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Tsuga canadensis*	15	Y	FACU
2.	*Acer rubrum*	20	Y	FAC
3.	*Pinus strobus*	20	Y	FACU
4.	*Quercus rubra*	15	Y	FACU
5.	*Picea mariana*	5	N	FACW
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula alleghaniensis*	5	N	FAC
2.	*Acer pensylvanicum*	5	N	FACU
3.	*Hamamelis virginiana*	5	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	10	Y	FAC
2.	*Trientalis borealis*	10	Y	FAC
3.	*Aralia nudicaulis*	5	N	FACU
4.	*Quercus rubra*	5	N	FACU
5.	*Rubus idaeus*	5	N	FACU
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	35		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***42.9%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	45	x 3 =	135
FACU spp.	75	x 4 =	300
UPL spp.	0	x 5 =	0
Total	125 (A)		445 (B)

Prevalence Index = B/A = ***3.560***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21	
Applicant: Teichos Solar		County: Somerset	
Investigator #1: Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine	
Soil Unit:	NWI/WWI Classification: PFO	Wetland ID: W10EI	
Landform: Terrace	Local Relief: Linear	Sample Point: **Wetland**	
Slope (%): 3	Latitude: 44.860000 Longitude: -69.58	Datum:	

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth: (in.)
Water Table Present? ☐ Yes ☑ No Depth: (in.)
Saturation Present? ☐ Yes ☑ No Depth: (in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	Oa	10YR	2/1	100	--	--	--	--	--	sapric
3	20	A	2.5Y	5/1	85	10YR	5/8	15	C	M	fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W10EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	20	Y	FAC
2.	*Betula populifolia*	20	Y	FAC
3.	*Picea mariana*	15	Y	FACW
4.	*Quercus rubra*	5	N	FACU
5.	*Betula alleghaniensis*	5	N	FAC
6.	*Larix laricina*	5	N	FACW
7.	*Tsuga canadensis*	10	N	FACU
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula alleghaniensis*	10	Y	FAC
2.	*Spiraea tomentosa*	5	N	FACW
3.	*Vaccinium myrtilloides*	20	Y	FACW
4.	*Salix petiolaris*	5	N	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	40		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	25	Y	FACW
2.	*Osmunda claytoniana*	20	Y	FAC
3.	*Rubus pubescens*	10	N	FACW
4.	*Carex stricta*	20	Y	OBL
5.	*Osmunda spectabilis*	5	N	OBL
6	*Solidago canadensis*	5	N	FACU
7.	*Pteridium aquilinum*	5	N	FACU
8.	*Phalaris arundinacea*	5	N	FACW
9.	*Cornus canadensis*	10	N	FAC
10.	*Aralia nudicaulis*	5	N	FACU
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	110		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	25	x 1 =	25
FACW spp.	90	x 2 =	180
FAC spp.	85	x 3 =	255
FACU spp.	30	x 4 =	120
UPL spp.	0	x 5 =	0
Total	230 (A)		580 (B)

Prevalence Index = B/A = ***2.522***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W10EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	12	--	7.5YR	4/3	100	--	--	--	--	--	very fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 12

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W10EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Pinus strobus*	15	Y	FACU
2.	*Acer rubrum*	20	Y	FAC
3.	*Tsuga canadensis*	20	Y	FACU
4.	*Quercus rubra*	15	Y	FACU
5.	*Fraxinus nigra*	5	N	FACW
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Tsuga canadensis*	5	N	FACU
2.	*Acer pensylvanicum*	5	N	FACU
3.	*Hamamelis virginiana*	5	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	10	Y	FAC
2.	*Trientalis borealis*	10	Y	FAC
3.	*Pteridium aquilinum*	10	Y	FACU
4.	*Quercus rubra*	5	N	FACU
5.	*Rubus idaeus*	5	N	FACU
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	40		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***37.5%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	40	x 3 =	120
FACU spp.	85	x 4 =	340
UPL spp.	0	x 5 =	0
Total	130 (A)		470 (B)

Prevalence Index = B/A = ***3.615***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification: PFO	Wetland ID: W19EI
Landform:	Side slope	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation☐ , Soil☐ , or Hydrology☐ significantly disturbed?
Are Vegetation☐ , Soil☐ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☑ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☑ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes	☐ No	Depth:	2	(in.)
Water Table Present?	☑ Yes	☐ No	Depth:	8	(in.)
Saturation Present?	☑ Yes	☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	10YR	2/1	100	--	--	--	--	--	silt loam
6	21	--	10YR	4/1	90	7.5YR	4/6	10	C	M	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: none Depth:

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W19EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Fraxinus nigra*	25	Y	FACW
2.	*Acer rubrum*	15	Y	FAC
3.	*Thuja occidentalis*	20	Y	FACW
4.	*Picea mariana*	5	N	FACW
5.	*Fraxinus pennsylvanica*	5	N	FACW
6.	*Abies balsamea*	5	N	FAC
7.	*Betula populifolia*	5	N	FAC
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Thuja occidentalis*	5	N	FACW
2.	*Ribes lacustre*	10	Y	FACW
3.	*Abies balsamea*	5	N	FAC
4.	*Ilex verticillata*	15	Y	FACW
5.	*Acer pensylvanicum*	1	N	FACU
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	36		

Herb Stratum (Plot size: 2 meter radius)

1.	*Osmundastrum cinnamomeum*	15	Y	FACW
2.	*Onoclea sensibilis*	15	Y	FACW
3.	*Rubus pubescens*	5	N	FACW
4.	*Carex intumescens*	20	Y	FACW
5.	*Carex crinita*	25	Y	OBL
6	*Viola cucullata*	15	Y	OBL
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	95		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 10 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	40	x 1 =	40
FACW spp.	140	x 2 =	280
FAC spp.	30	x 3 =	90
FACU spp.	1	x 4 =	4
UPL spp.	0	x 5 =	0
Total	211 (A)		414 (B)

Prevalence Index = B/A = ***1.962***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #: 194-1228-0001	Date: 08/01/21
Applicant:	Teichos Solar		County: Somerset
Investigator #1:	Emmy Irvin	Investigator #2: Erin Gilmore	State: Maine
Soil Unit:		NWI/WWI Classification:	Wetland ID: W19EI
Landform:	Terrace	Local Relief: Linear	Sample Point: **Wetland**
Slope (%): 3	Latitude: 44.860000	Longitude: -69.58	Datum:

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: Recorded drought year for location

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: 0 Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	16	--	10YR	4/2	100	--	--	--	--	--	very fine sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: ledge Depth: 16

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W19EI | Sample Point **Wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Pinus strobus*	20	Y	FACU
2.	*Acer rubrum*	15	Y	FAC
3.	*Betula populifolia*	10	Y	FAC
4.	*Quercus rubra*	10	Y	FACU
5.	*Fraxinus nigra*	5	N	FACW
6.	*Thuja occidentalis*	5	N	FACW
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	65		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula populifolia*	5	N	FAC
2.	*Acer pensylvanicum*	5	N	FACU
3.	*Hamamelis virginiana*	5	N	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	10	Y	FAC
2.	*Gaultheria hispidula*	10	Y	FACW
3.	*Pteridium aquilinum*	10	Y	FACU
4.	*Quercus rubra*	5	N	FACU
5.	*Acer rubrum*	5	N	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	40		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***57.1%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	20	x 2 =	40
FAC spp.	45	x 3 =	135
FACU spp.	55	x 4 =	220
UPL spp.	0	x 5 =	0
Total	120 (A)		395 (B)

Prevalence Index = B/A = ***3.292***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks:

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Dixmont very stony silt loam, 0-8% slopes	NWI/WWI Classification:	PEM1e/f
Landform:	Floodplain	Local Relief:	Concave
Slope (%):	Latitude:	Longitude:	Datum:

Date:	06/02/21
County:	Somerset
State:	Maine
Wetland ID:	W01DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Wetland is associated with a perennial stream and extends across multiple vegetation and soil types. Other NWI classes present include PFO1, PFO4, and PSS1. Functional values include: production export, groundwater discharge and recharge, wildlife habitat, and floodwater attenuation.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☑ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☐ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 3	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Dixmont very stony silt loam, 0-8% slopes — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	--	10YR	2/2	100	--	--	--	--	--	--
3	8	--	10YR	4/1	100	--	--	--	--	--	--
8	18	--	10YR	6/1	90	10YR	4/6	10	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: gravel rock Depth: 18

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W01DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Rubus idaeus*	10	n	FACU
2.	*Acer rubrum*	15	n	FAC
3.	*Betula populifolia*	10	n	FAC
4.	*Abies balsamea*	2	n	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	37		

Herb Stratum (Plot size: 2 meter radius)

1.	*Solidago rugosa*	5	n	FAC
2.	*Solidago canadensis*	5	n	FACU
3.	*Carex intumescens*	20	y	FACW
4.	*Carex gracillima*	10	n	FACU
5.	*Fragaria virginiana*	5	n	FACU
6	*Cirsium arvense*	2	n	FACU
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	47		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	20	x 2 =	40
FAC spp.	32	x 3 =	96
FACU spp.	32	x 4 =	128
UPL spp.	0	x 5 =	0
Total	84 (A)		264 (B)

Prevalence Index = B/A = ***3.143***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: This site is highly disturbed due to clearcut logging. Presence of ruts has created high and low areas that are vegetated with upland and wetland plants respectively. No relatively undisurbed areas in which to assess "natural" conditions are present.

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	
Landform:	Footslope	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W01DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: upland plot in area where wetland loops around

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	7.5YR	3/2	100	--	--	--	--	--	silt loam
2	12	--	10YR	4/4	100	--	--	--	--	--	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 13

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W01DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula populifolia*	15	Y	FAC
2.	*Acer rubrum*	10	N	FAC
3.	*Fraxinus americana*	20	Y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	45		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	5	Y	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	5	N	FACW
2.	*Cornus canadensis*	15	Y	FAC
3.	*Lysimachia borealis*	5	N	UPL
4.	*Maianthemum canadense*	5	N	FACU
5.	*Coptis trifolia*	5	N	FACW
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	35		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***75.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	10	x 2 =	20
FAC spp.	45	x 3 =	135
FACU spp.	25	x 4 =	100
UPL spp.	5	x 5 =	25
Total	85 (A)		280 (B)

Prevalence Index = B/A = ***3.294***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	PFO1e
Landform:	Terrace	Local Relief:	--
Slope (%):	Latitude:	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W07DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Wetland values: stormwater attenuation, whildlife habitat, groundwater recharge.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/2	100	--	--	--	--	--	silt loam
2	5	--	10YR	4/1	100	--	--	--	--	--	silty clay loam
5	12	--	10YR	5/2	60	10YR	4/6	40	--	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W07DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	30	y	FAC
2.	*Populus tremula*	40	y	FAC
3.	*Abies balsamea*	15	n	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	85		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	50	y	FACW
2.	*Osmundastrum cinnamomeum*	10	n	FACW
3.	*Osmunda regalis*	10	n	OBL
4.	*Rubus pubescens*	5	n	FACW
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	75		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	10	x 1 =	10
FACW spp.	65	x 2 =	130
FAC spp.	85	x 3 =	255
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	160 (A)		395 (B)

Prevalence Index = B/A = ***2.469***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	NA
Landform:	Footslope	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W07DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	5	--	10YR	3/3	100	--	--	--	--	--	silt loam
5	12	--	10YR	4/3	100	--	--	--	--	--	sandy loam
12	14	--	10YR	5/2.5	60	10YR	5/6	40	--	M	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 14

Hydric Soil Present? ☐ Yes ☑ No

Remarks: top two layers were silty loam with sand

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W07DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Abies balsamea*	30	y	FAC
2.	*Acer rubrum*	30	y	FAC
3.	*Fraxinus americana*	15	y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Maianthemum canadense*	30	y	FACU
2.	*Cornus canadensis*	20	y	FAC
3.	*Lysimachia borealis*	2	n	UPL
4.	*Smilacina racemosa*	15	y	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	67		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	80	x 3 =	240
FACU spp.	60	x 4 =	240
UPL spp.	2	x 5 =	10
Total	142 (A)		490 (B)

Prevalence Index = B/A = ***3.451***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	PFO1e
Landform:	Terrace	Local Relief:	--
Slope (%):	Latitude:	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W08DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Wetland values: stormwater attenuation, whildlife habitat, groundwater recharge.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/1	100	--	--	--	--	--	silt loam
2	5	--	10YR	4/1	100	--	--	--	--	--	silty clay loam
5	12	--	10YR	5/2	70	10YR	4/6	30	C	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W08DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	35	y	FAC
2.	*Populus tremula*	30	y	FAC
3.	*Abies balsamea*	10	n	FAC
4.	*Betula alleghaniensis*	20	Y	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	95		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula alleghaniensis*	5	N	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	35	Y	FACW
2.	*Osmundastrum cinnamomeum*	25	Y	FACW
3.	*Osmunda regalis*	10	N	OBL
4.	*Rubus pubescens*	5	N	FACW
5.	*Viola cucullata*	5	N	OBL
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	80		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	15	x 1 =	15
FACW spp.	65	x 2 =	130
FAC spp.	100	x 3 =	300
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	180 (A)		445 (B)

Prevalence Index = B/A = ***2.472***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	NA
Landform:	Terrace	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W08DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	--	10YR	3/3	100	--	--	--	--	--	silt loam
4	12	--	10YR	4/3	100	--	--	--	--	--	sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W08DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Abies balsamea*	30	y	FAC
2.	*Acer rubrum*	30	y	FAC
3.	*Fraxinus americana*	15	y	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Maianthemum canadense*	20	Y	FACU
2.	*Cornus canadensis*	35	Y	FAC
3.	*Lysimachia borealis*	10	Y	UPL
4.	*Smilacina racemosa*	5	N	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	70		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	95	x 3 =	285
FACU spp.	40	x 4 =	160
UPL spp.	10	x 5 =	50
Total	145 (A)		495 (B)

Prevalence Index = B/A = ***3.414***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	PFO1e
Landform:	Terrace	Local Relief:	--
Slope (%):	0-2	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W09DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Wetland values - Groundwater recharge, floodwater retention, wildlife habitat.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	--	10YR	3/3	100	--	--	--	--	--	loam
4	5	--	7.5YR	4/1	100	--	--	--	--	--	loam
5	14	--	2.5Y	6/1	70	10YR	5/4	30	--	M	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 14

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W09DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula populifolia*	30	y	FAC
2.	*Acer rubrum*	20	y	FAC
3.	*Quercus rubra*	5	n	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	55		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Viburnum nudum*	10	n	FACW
2.	*Ilex verticillata*	5	n	FACW
3.	*Spiraea tomentosa*	8	n	FACW
4.	*Vaccinium myrtilloides*	25	y	FACW
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	48		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	15	y	FACW
2.	*Rubus pubescens*	10	n	FACW
3.	*Aralia nudicaulis*	5	n	FACU
4.	*Cornus canadensis*	10	n	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	40		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	73	x 2 =	146
FAC spp.	60	x 3 =	180
FACU spp.	10	x 4 =	40
UPL spp.	0	x 5 =	0
Total	143 (A)		366 (B)

Prevalence Index = B/A = ***2.559***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	
Landform:	Footslope	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W09DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes	☑ No	Hydric Soils Present?	☐ Yes	☑ No
Wetland Hydrology Present?	☐ Yes	☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes**	☑ **No**

Remarks: upland plot in area where wetland loops around

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	7.5YR	3/2	100	--	--	--	--	--	silt loam
2	6	--	10YR	5/2	100	--	--	--	--	--	silt loam
6	13	--	10YR	5/2	75	10YR	5/6	25	--	M	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 13

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W09DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Betula populifolia*	30	y	FAC
2.	*Acer rubrum*	35	y	FAC
3.	*Abies balsamea*	15	n	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	80		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Abies balsamea*	5	n	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 2 meter radius)

1.	*Acer rubrum*	5	n	FAC
2.	*Cornus canadensis*	15	y	FAC
3.	*Lysimachia borealis*	5	n	UPL
4.	*Maianthemum canadense*	5	n	FACU
5.	*Coptis trifolia*	10	n	FACW
6	*Aralia nudicaulis*	10	n	FACU
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	50		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	10	x 2 =	20
FAC spp.	105	x 3 =	315
FACU spp.	15	x 4 =	60
UPL spp.	5	x 5 =	25
Total	135 (A)		420 (B)

Prevalence Index = B/A = ***3.111***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	PFO1e
Landform:	Terrace	Local Relief:	--
Slope (%):	Latitude:	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W10DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:

- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:

- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/1	100	--	--	--	--	--	silt loam
2	6	--	10YR	4/2	100	--	--	--	--	--	silty loam
6	12	--	10YR	5/2	75	10YR	4/6	25	C	M	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W10DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	40	Y	FAC
2.	*Betula populifolia*	25	Y	FAC
3.	*Abies balsamea*	10	N	FAC
4.	*Betula alleghaniensis*	10	Y	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	85		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula populifolia*	10	Y	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	10		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	20	Y	FACW
2.	*Osmundastrum cinnamomeum*	30	Y	FACW
3.	*Osmunda regalis*	5	N	OBL
4.	*Cornus canadensis*	20	Y	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	75		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	5	x 1 =	5
FACW spp.	50	x 2 =	100
FAC spp.	115	x 3 =	345
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	170 (A)		450 (B)

Prevalence Index = B/A = ***2.647***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	NA
Landform:	Terrace	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W10DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	10YR	3/3	100	--	--	--	--	--	silt loam
6	12	--	10YR	4/3	100	--	--	--	--	--	silt loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
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--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W10DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Abies balsamea*	30	Y	FAC
2.	*Acer rubrum*	30	Y	FAC
3.	*Betula alleghaniensis*	10	N	FAC
4.	*Betula populifolia*	5	N	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	5	N	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 2 meter radius)

1.	*Maianthemum canadense*	30	Y	FACU
2.	*Cornus canadensis*	20	Y	FAC
3.	*Lysimachia borealis*	5	N	UPL
4.	*Smilacina racemosa*	5	N	FACU
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	60		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***75.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	100	x 3 =	300
FACU spp.	35	x 4 =	140
UPL spp.	5	x 5 =	25
Total	140 (A)		465 (B)

Prevalence Index = B/A = ***3.321***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	PFO1e
Landform:	Terrace	Local Relief:	--
Slope (%):	Latitude:	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W11DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:

- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:

- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/2	100	--	--	--	--	--	silty clay loam
2	4	--	10YR	4/2	100	--	--	--	--	--	silty clay loam
4	12	--	10YR	5/2	60	10YR	4/6	40	C	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]

- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W11DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Acer rubrum*	25	Y	FAC
2.	*Betula populifolia*	25	Y	FAC
3.	*Abies balsamea*	15	N	FAC
4.	*Betula alleghaniensis*	5	Y	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	70		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Betula alleghaniensis*	5	Y	FAC
2.	*Abies balsamea*	5	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	10		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	35	Y	FACW
2.	*Osmundastrum cinnamomeum*	40	Y	FACW
3.	*Osmunda regalis*	5	N	OBL
4.	*Cornus canadensis*	15	Y	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	95		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	5	x 1 =	5
FACW spp.	75	x 2 =	150
FAC spp.	95	x 3 =	285
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	175 (A)		440 (B)

Prevalence Index = B/A = ***2.514***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% very stony	NWI/WWI Classification:	NA
Landform:	Terrace	Local Relief:	--
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/9/021
County:	Somerset
State:	Maine
Wetland ID:	W11DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	10YR	3/3	100	--	--	--	--	--	silty clay loam
6	12	--	10YR	4/3	100	--	--	--	--	--	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 12

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W11DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Abies balsamea*	25	Y	FAC
2.	*Acer rubrum*	40	Y	FAC
3.	*Betula alleghaniensis*	5	N	FAC
4.	*Betula populifolia*	5	N	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	5	N	FAC
2.	*Betula populifolia*	5	N	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	10		

Herb Stratum (Plot size: 2 meter radius)

1.	*Maianthemum canadense*	30	Y	FACU
2.	*Cornus canadensis*	20	Y	FAC
3.	*Lysimachia borealis*	5	N	UPL
4.		--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	55		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***75.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	105	x 3 =	315
FACU spp.	30	x 4 =	120
UPL spp.	5	x 5 =	25
Total	140 (A)		460 (B)

Prevalence Index = B/A = ***3.286***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Bangor very stony silt loam, 3-8% slopes	NWI/WWI Classification:	PFO4/1e
Landform:	Terrace	Local Relief:	Concave
Slope (%):	0	Latitude:	Longitude:	Datum:

Date:	6/21/021
County:	Somerset
State:	Maine
Wetland ID:	W13DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: Wetland values: Groundwater recharge, wildlife habitat, floodwater attenuation.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☑ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Bangor very stony silt loam, 3-8% slopes — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/3	100	--	--	--	--	--	peat
2	4	--	10YR	3/2	100	--	--	--	--	--	mucky loam
4	13	--	10YR	4/2	70	10YR	3/6	30	--	M	silt loam
13	15	--	2.5YR	4/2	85	2.5YR	4/4	15	--	M	sandy clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 15

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W13DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Picea rubens*	45	y	FACU
2.	*Betula populifolia*	30	y	FAC
3.	*Acer rubrum*	15	n	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	90		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Rubus pubescens*	30	y	FACW
2.	*Onoclea sensibilis*	8	n	FACW
3.	*Cornus canadensis*	5	n	FAC
4.	*Spiraea tomentosa*	5	n	FACW
5.	*Osmundastrum cinnamomeum*	5	n	FACW
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	53		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***66.7%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	48	x 2 =	96
FAC spp.	50	x 3 =	150
FACU spp.	45	x 4 =	180
UPL spp.	0	x 5 =	0
Total	143 (A)		426 (B)

Prevalence Index = B/A = ***2.979***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Bangor very stony silt loam, 3-8% slopes	NWI/WWI Classification:	
Landform:	Footslope	Local Relief:	Linear
Slope (%):	2 to 5	Longitude:	Datum:

Date:	6/21/021
County:	Somerset
State:	Maine
Wetland ID:	W13DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation☑ , Soil☑ , or Hydrology☑ significantly disturbed?
Are Vegetation☐ , Soil☑ , or Hydrology☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: Within red spruce plantation

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Bangor very stony silt loam, 3-8% slopes — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	7.5YR	2.5/1	100	--	--	--	--	--	peat
2	11	--	10YR	4/2	100	--	--	--	--	--	
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocks Depth: 11

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W13DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Picea rubens*	50	y	FACU
2.	*Betula populifolia*	30	y	FAC
3.	*Acer rubrum*	15	n	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	95		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	20	y	FAC
2.	*Maianthemum canadense*	15	y	FACU
3.	*Lysimachia borealis*	10	n	OBL
4.	*Parathelypteris noveboracensis*	2	n	FAC
5.	*Rubus pubescens*	2	n	FACW
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	49		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	10	x 1 =	10
FACW spp.	2	x 2 =	4
FAC spp.	67	x 3 =	201
FACU spp.	65	x 4 =	260
UPL spp.	0	x 5 =	0
Total	144 (A)		475 (B)

Prevalence Index = B/A = ***3.299***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Bangor very stony silt loam, 3-8% slopes	NWI/WWI Classification:	PEM/SS1e
Landform:	Terrace	Local Relief:	Concave
Slope (%):	0	Longitude:	Datum:

Date: 6/21/021
County: Somerset
State: Maine
Wetland ID: W14DS
Sample Point: **wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Extensively disturbed area adjacent to road, but also possesses sufficient evidence of natural dampness. Wetland values: Wildlife Habitat, stormwater retention, groundwater recharge.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☑ B1 - Water Marks
- ☑ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Bangor very stony silt loam, 3-8% slopes
Series Drainage Class:
Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	--	10YR	5/2	90	10YR	2/2	10	--	PL	silty clay loam
3	10	--	10YR	6/1	60	2.5Y	5/4	40	--	M	silt loam
10	11	--	10YR	4/2	50	10YR	4/2	50	--	M	sandy clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: boulders/ledge Depth: 11

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W14DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Spiraea tomentosa*	15	y	FACW
2.	*Salix petiolaris*	3	n	FACW
3.	*Rubus allegheniensis*	8	n	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	26		

Herb Stratum (Plot size: 2 meter radius)

1.	*Carex gynandra*	15	y	OBL
2.	*Onoclea sensibilis*	10	n	FACW
3.	*Doellingeria umbellata*	10	n	FACW
4.	*Rubus pubescens*	10	n	FACW
5.	*Acer rubrum*	5	n	FAC
6	*Solidago rugosa*	5	n	FAC
7.	*Parathelypteris noveboracensis*	10	n	FAC
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	65		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	15	x 1 =	15
FACW spp.	48	x 2 =	96
FAC spp.	20	x 3 =	60
FACU spp.	8	x 4 =	32
UPL spp.	0	x 5 =	0
Total	91 (A)		203 (B)

Prevalence Index = B/A = ***2.231***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☑ Yes ☐ No Morphological Adaptations (Explain) *
- ☑ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Bangor very stony silt loam, 3-8% slopes	NWI/WWI Classification:	
Landform:	Footslope	Local Relief:	Linear
Slope (%):	5	Longitude:	Datum:

Date:	6/21/021
County:	Somerset
State:	Maine
Wetland ID:	W14DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Bangor very stony silt loam, 3-8% slopes — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/2	100	--	--	--	--	--	loam
2	6	--	10YR	4/2	85	2.5Y	5/2	15	--	M	silt loam
6	13	--	10YR	5/3	100	--	--	--	--	--	sandy loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocky/ledge Depth: 13

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM

Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W14DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Tsuga canadensis*	20	Y	FACU
2.	*Betula alleghaniensis*	15	Y	FAC
3.	*Acer rubrum*	10	N	FAC
4.	*Betula populifolia*	25	Y	FAC
5.	*Abies balsamea*	10	N	FAC
6.	*Quercus rubra*	5	N	FACU
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	85		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Aralia nudicaulis*	10	Y	FACU
2.	*Cornus canadensis*	10	Y	FAC
3.	*Maianthemum canadense*	5	N	FACU
4.	*Lysimachia borealis*	2	N	UPL
5.	*Quercus rubra*	5	N	FACU
6	*Acer rubrum*	2	N	FAC
7.	*Parathelypteris noveboracensis*	5	N	FAC
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	39		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***60.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	77	x 3 =	231
FACU spp.	45	x 4 =	180
UPL spp.	2	x 5 =	10
Total	124 (A)		421 (B)

Prevalence Index = B/A = ***3.395***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% slopes, very stony	NWI/WWI Classification:	PFO
Landform:	Depression	Local Relief:	Concave
Slope (%):		Latitude: 44.880501	Longitude: 69.600297

Datum: WGS1984

Date:	6/23/021
County:	Somerset
State:	Maine
Wetland ID:	W18DS
Sample Point:	**wetland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: wetland is within a red spruce plantation near a weak draw sloping to the northwest

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☑ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☑ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☑ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☑ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% slopes, very stony — Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	--	7.5YR	2/1	100	--	--	--	--	--	peat
6	8	--	10YR	2/2	100	--	--	--	--	--	peat
8	10	--	2.5Y	5/2	95	2.5Y	5/6	5	C	M	silty clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☑ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocky — Depth: 10 inches

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W18DS | Sample Point **wetland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Picea rubens*	40	y	FACU
2.	*Betula populifolia*	20	y	FAC
3.	*Acer rubrum*	10	n	FAC
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	70		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Acer rubrum*	5	n	FAC
2.	*Spiraea tomentosa*	20	y	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	25		

Herb Stratum (Plot size: 2 meter radius)

1.	*Onoclea sensibilis*	20	y	FACW
2.	*Lycopus uniflorus*	15	y	OBL
3.	*Rubus pubescens*	15	y	FACW
4.	*Parathelypteris noveboracensis*	5	n	FAC
5.	*Solidago rugosa*	10	n	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	65		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***83.3%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	15	x 1 =	15
FACW spp.	55	x 2 =	110
FAC spp.	50	x 3 =	150
FACU spp.	40	x 4 =	160
UPL spp.	0	x 5 =	0
Total	160 (A)		435 (B)

Prevalence Index = B/A = ***2.719***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site:	Hartland Solar	Project #:	194-1228-0001
Applicant:			
Investigator #1:	Dave Santillo	Investigator #2:	Anna Ritchie
Soil Unit:	Monarda silt loam, 0-3% slopes, very stony	NWI/WWI Classification:	
Landform:	Rise	Local Relief:	Convex
Slope (%):		Latitude: 44.880596	Longitude: 69.600338 Datum: WGS1984

Date:	6/23/021
County:	Somerset
State:	Maine
Wetland ID:	W18DS
Sample Point:	**upland**

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☑ No

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☐ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: wetland is within a red spruce plantation near a weak draw sloping to the northwest

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry-Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☐ Yes	☑ No	Depth:	(in.)

Wetland Hydrology Present? ☐ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS

Map Unit Name: Monarda silt loam, 0-3% slopes, very stony Series Drainage Class:

Taxonomy (Subgroup):

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Mottles Color (Moist)		Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	2	--	10YR	3/3	100	--	--	--	--	--	loam
2	4	--	10YR	4/3	100	--	--	--	--	--	silt loam
4	10	--	2.5Y	5/2.5	85	2.5Y	5/6	15	C	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (LRR R, MLRA 149B)
- ☐ S8 - Polyvalue Below Surface (LRR R, MLRA 149B)
- ☐ S9 - Thin Dark Surface (LRR R, MLRA 149B)
- ☐ F1 - Loamy Mucky Mineral (LRR K, L)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (LRR K, L, MLRA 149B)
- ☐ A16 - Coast Prairie Redox (LRR K, L, R)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (LRR K, L, M)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: rocky Depth: 10 inches

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

TETRA TECH

WETLAND DETERMINATION DATA FORM
Northeast and Northcentral Region

Project/Site: Hartland Solar | Wetland ID: W18DS | Sample Point **upland**

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Picea rubens*	75	y	FACU
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	75		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Cornus canadensis*	8	n	FAC
2.	*Maianthemum canadense*	3	n	FACU
3.	*Fraxinus americana*	2	n	FACU
4.	*Lysimachia borealis*	5	n	UPL
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	18		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***0.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	8	x 3 =	24
FACU spp.	80	x 4 =	320
UPL spp.	5	x 5 =	25
Total	93 (A)		369 (B)

Prevalence Index = B/A = ***3.968***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☐ No Morphological Adaptations (Explain) *
- ☐ Yes ☐ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: highly disturbed area with recent and past logging activity

Additional Remarks:

EXHIBIT 7-5 AQUATIC RESOURCES PHOTOGRAPHIC LOG

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

WETLANDS

Photo: 01 Description: View of W01DS Date: June 6, 2021 Source: Tetra Tech, Inc.	

Photo: 02 Description: View of W01DS Date: June 6, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 03 Description: View of W02EI Date: June 6, 2021 Source: Tetra Tech, Inc.	

Photo: 04 Description: View of W05EI Date: June 4, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 05 Description: View of W06DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 06 Description: View of W06DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 07 Description: View of W07EI Date: September 8, 2022 Source: Tetra Tech, Inc.	

Photo: 08 Description: View of W08DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 09 Description: View of W08SG Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 10 Description: View of W09DS Date: September 8, 2022 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 11 Description: View of W09DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 12 Description: View of W09SG Date: June 24, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 13 Description: View of W10DS Date: June 24, 2021 Source: Tetra Tech, Inc.	

Photo: 14 Description: View of W10EI Date: June 14, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 15 Description: View of W10SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 16 Description: View of W11DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 17 Description: View of W11DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 18 Description: View of W12SG Date: July 1, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 19 Description: View of W12SG looking towards East Branch Black Stream Date: July 1, 2021 Source: Tetra Tech, Inc.	

Photo: 20 Description: View of W13DS Date: July 2, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 21 Description: View of W13DS Date: July 1, 2021 Source: Tetra Tech, Inc.	

Photo: 22 Description: View of W13SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 23 Description: View of W13SG Date: July 2, 2021 Source: Tetra Tech, Inc.	

Photo: 24 Description: View of W14DS Date: June 22, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 25 Description: View of W14DS Date: June 22, 2021 Source: Tetra Tech, Inc.	

Photo: 26 Description: View of W18DS Date: June 23, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 27 Description: View of W18SG Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 28 Description: View of W18SG Date: July 7, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 29 Description: View of W19EI Date: June 23, 2021 Source: Tetra Tech, Inc.	

Photo: 30 Description: View of W19EI Date: June 23, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

WATERCOURSES

Photo: 31 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 32 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 33 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 34 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 35 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Photo: 36 Description: View of ST01AR Date: May 27, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 37 Description: View of ST04AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 38 Description: View of ST04AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 39 Description: View of ST05AR. Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 40 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 41 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 42 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 43 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 44 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Exhibit 7-5
Hartland Solar Project
Representative Site Photographs

Photo: 45 Description: View of ST07AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

Photo: 46 Description: View of ST08AR Date: May 26, 2021 Source: Tetra Tech, Inc.	

EXHIBIT 7-6 FUNCTION AND VALUES ASSESSMENT SUMMARY FORMS

Wetland Function-Value Evaluation Form – Palustrine Forested Non-WOSS

Total Wetland Area: **54.67 acres (2,381,425.20 square feet)** Human made? **No** Is wetland part of a wildlife corridor? **No** or a "habitat island"? **No** Wetland ID: **See Table 1**
Adjacent land use: **Active Timberland** Distance to nearest roadway or other development? **Some areas are adjacent to roadway, some are 1,500+ feet from roadway**
Dominant wetland systems present: **PFO** Contiguous undeveloped buffer zone present: **No**
Is the wetland a separate hydraulic system? **No** If not, where does the wetland lie in the drainage basin: Generally
How many tributaries contribute to the wetland? **3** Wildlife & vegetation diversity/abundance: **See Table X.**
Impact: Type: **Fill** Prepared by: **Emmy Irvin**

Wetland Impact: **Type**: Clearing: 22,918.19 square feet **Type**: Permanent: 7,135.32 square feet **Combined Total:** 30,053.51 square feet

Function/Value	Suitability Y/N	Rational Reference #'s	Principal or Secondary Function	Comments
Groundwater Recharge/Discharge	Y	7, 9, 10	Primary	Some wetlands contain small streams that originate and/or disperse in wetland
Floodflow Alteration	Y	1	secondary	This is a large wetland compared to other wetlands in the area
Fish and Shellfish Habitat	N			Wetlands are not suitable to fish and shellfish habitat
Production Export	N			No exportable products are produced in wetlands
Sediment/Toxicant Retention	Y	1, 10	secondary	Some wetlands contain small streams and flood in the spring
Nutrient Removal	N			Wetlands are not suitable to nutrient removal
Sediment/Shoreline Stabilization	Y	2, 4	secondary	Some wetlands provide bank stabilization to intermittent streams
Wildlife Habitat	Y	5, 7, 8, 20	secondary	Wildlife habitat is abundant in the surrounding area
Educational/Scientific Value	N			Limited potential for educational values
Recreation	N			No potential for recreation associated with wetlands
Uniqueness/Heritage	Y	24		Wetland is, or contains, a WOSS
Visual Quality/Aesthetics	N			Not a visually or aesthetically pleasing wetland
Endangered Species Habitat	N			No listed species habitat is present in wetlands
Other	N			

Wetland Function-Value Evaluation Form – Palustrine Forested -WOSS

Total Wetland Area: **53.04 acres (2,310,422.40 square feet)** Human made? **No** Is wetland part of a wildlife corridor? **No** or a "habitat island"? **No** Wetland ID: **See Table 1**
Adjacent land use: **Active Timberland** Distance to nearest roadway or other development? **Some areas are adjacent to roadway, some are 1,500+ feet from roadway**
Dominant wetland systems present: **PFO** Contiguous undeveloped buffer zone present: **No**
Is the wetland a separate hydraulic system? **No** If not, where does the wetland lie in the drainage basin:
How many tributaries contribute to the wetland? **3** Wildlife & vegetation diversity/abundance: **See Table 2.**
Impact: Type: **Fill** Prepared by: **Emmy Irvin**

Wetland Impact: **Type**: Clearing: 53,519.06 square feet **Type:** Permanent: 844.09 square feet **Combined Total:** 1.25 acres (54,363.15 square feet)

Function/Value	Suitability Y/N	Rational Reference #'s	Principal or Secondary Function	Comments
Groundwater Recharge/Discharge	Y	2, 4, 7, 10	Secondary	Wetlands have watercourses (perennial/ephemeral) associated with them with potential to function as groundwater recharge.
Floodflow Alteration	Y	1, 2, 3, 5, 6, 7, 8, 9, 10	Secondary	Some wetlands have perennial watercourses associated with them and are in flat areas with flood storage potential.
Fish and Shellfish Habitat	Y	1, 4, 8, 14	Secondary	One wetland, associated with a perennial watercourse, has limited potential for fish and shellfish habitat.
Production Export	Y	1, 2, 3, 4, 5, 10, 12	Secondary	All wetlands have previously, or are currently part of active timber harvesting, fruiting plants such as blueberry (*vaccinium* spp.), and flowering plants occur in wetland, and evidence of higher trophic level consumers (i.e. bears, coyotes, etc.) using these wetlands is present.
Sediment/Toxicant Retention	Y	1, 2, 3, 4, 10	Secondary	Wetlands occur in or adjacent to active timber harvesting operation, historic timber harvesting operations, or adjacent to a gravel roadway with commercial and recreational traffic.
Nutrient Removal	Y	1, 3, 4, 5, 7, 8	Secondary	Some wetlands have a thick herbaceous layer and are saturated most of the season.
Sediment/Shoreline Stabilization	Y	2, 3, 4	Secondary	One wetland has a perennial watercourse associated with them with limited potential for sediment/shoreline stabilization.
Wildlife Habitat	Y	4, 5, 6, 7, 8, 11, 13, 15, 17, 19, 20	Primary	Wetlands occur in generally undeveloped areas. Some wetlands are contiguous with other wetland systems connected by a watercourse, as well as overland access to other wetlands. Wildlife food sources are present as well as signs of animal use such as scat and tracks observed. Amphibian breeding is occurring in or near wetlands and high insect populations are present.
Educational/Scientific Value	N			Limited potential for educational values
Recreation	Y	3	Secondary	The general area where wetlands occur is currently used for hunting.
Uniqueness/Heritage	N			Limited potential for uniqueness or heritage value
Visual Quality/Aesthetics	N			No visually or aesthetically pleasing wetlands
Endangered Species Habitat	N			No listed species habitat is present in wetlands
Other	N			

Wetland Function-Value Evaluation Form – Palustrine Scrub Shrub -Non-WOSS

Total Wetland Area: **19,610.52 square feet** Human made? **No** Is wetland part of a wildlife corridor? **No** or a "habitat island"? **No** Wetland ID: **See Table 1**
Adjacent land use: **Active Timberland** Distance to nearest roadway or other development? **Some areas are adjacent to roadway, some are 1,500+ feet from roadway**
Dominant wetland systems present: **PSS** Contiguous undeveloped buffer zone present: **No**
Is the wetland a separate hydraulic system? **No** If not, where does the wetland lie in the drainage basin:
How many tributaries contribute to the wetland? **3** Wildlife & vegetation diversity/abundance: **See Table 2.**
Impact: Type: **Fill** Prepared by: **Emmy Irvin**

Wetland Impact: **Type**: Clearing: 917.53 square feet **Type:** Permanent: 0 square feet **Combined Total:** 917.53 square feet

Function/Value	Suitability Y/N	Rational Reference #'s	Principal or Secondary Function	Comments
Groundwater Recharge/Discharge	N			Limited potential for groundwater recharge or discharge
Floodflow Alteration	Y	1, 6, 7, 13	secondary	Some wetlands are large compared to other wetlands in the area and are in a relatively flat area that has flood storage potential and/or have an associated intermittent stream
Fish and Shellfish Habitat	N			Wetlands are not suitable to fish and shellfish habitat
Production Export	N			No exportable products are produced in wetlands
Sediment/Toxicant Retention	Y	1, 2, 10	secondary	Some wetlands occur in the USAF radar field with historic human made disturbances or within man-made roadside ditches
Nutrient Removal	Y	8	Secondary	Some wetlands have a thick herbaceous layer
Sediment/Shoreline Stabilization	N			Wetland occurs in between roadway and two intermittent or perennial streams
Wildlife Habitat	Y	3, 4, 5, 7, 8, 13,17, 21	Primary	Wildlife habitat is abundant in the surrounding area. some wetlands have beaver activity.
Educational/Scientific Value	N			Limited potential for educational values
Recreation	N			No potential for recreation associated with wetlands
Uniqueness/Heritage	N			Limited potential for uniqueness or heritage value
Visual Quality/Aesthetics	N			Not a visually or aesthetically pleasing wetland
Endangered Species Habitat	N			No listed species habitat is present in wetlands
Other	N			

Wetland Function-Value Evaluation Form – Palustrine Scrub Shrub-WOSS

Total Wetland Area: **27.07 acres (1,179,169.20 square feet)** Human made? **No** Is wetland part of a wildlife corridor? **No** or a "habitat island"? **No** Wetland ID: **See Table 1**
Adjacent land use: **Active Timberland** Distance to nearest roadway or other development? **Some areas are adjacent to roadway, some are 1,500+ feet from roadway**
Dominant wetland systems present: **PSS** Contiguous undeveloped buffer zone present: **No**
Is the wetland a separate hydraulic system? **No** If not, where does the wetland lie in the drainage basin: **Generally plateau wetlands**.
How many tributaries contribute to the wetland? **3** Wildlife & vegetation diversity/abundance: **See Table X.**
Impact: Type: **Fill** Prepared by: **Emmy Irvin**

Wetland Impact: **Type**: Clearing: 1,210.73 square feet **Type:** Permanent: 198.36 square feet **Combined Total:** 1,409.09 square feet

Function/Value	Suitability Y/N	Rational Reference #'s	Principal or Secondary Function	Comments
Groundwater Recharge/Discharge	Y	2, 4, 7, 10	Secondary	Wetlands have watercourses (perennial/ephemeral) associated with them with may function as both groundwater recharge and discharge.
Floodflow Alteration	N	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 18	Primary	Wetlands have perennial or ephemeral watercourses associated with them and are in flat areas with flood storage potential.
Fish and Shellfish Habitat	N			Wetlands are not suitable to fish and shellfish habitat.
Production Export	Y	1, 2, 3, 4, 5, 7, 8, 12	Secondary	All wetlands have previously, or are currently part of active timber harvesting, fruiting plants such as blueberry (*vaccinium* spp.), and flowering plants occur in wetland, and evidence of higher trophic level consumers (i.e. bears, coyotes, etc.) using these wetlands is present.
Sediment/Toxicant Retention	Y	1, 2, 3, 4, 10	Secondary	Wetlands occur in or adjacent to active timber harvesting operation, historic timber harvesting operations, or adjacent to a gravel roadway with commercial and recreational traffic.
Nutrient Removal	Y	1, 3, 4, 5, 7, 8	Secondary	Some wetlands have a thick herbaceous layer and are saturated most of the season.
Sediment/Shoreline Stabilization	Y	4, 7, 9, 13	Secondary	Some wetlands have a perennial watercourse associated with them.
Wildlife Habitat	Y	4, 5, 6, 7, 8, 11, 13, 15, 17, 19, 20	Secondary	Wetlands occur in generally undeveloped areas, except for where adjacent to gravel roads. Some wetlands are contiguous with other wetland systems connected by a watercourse, as well as overland access to other wetlands. Wildlife food sources are present as well as signs of animal use such as scat and tracks observed. Amphibian breeding is occurring in or near wetlands and high insect populations are present.
Educational/Scientific Value	N			Limited potential for educational values
Recreation	N			Limited potential for recreation associated with wetlands
Uniqueness/Heritage	N			Limited potential for uniqueness or heritage value
Visual Quality/Aesthetics	N			No visually or aesthetically pleasing wetlands
Endangered Species Habitat	N			No listed species habitat is present in wetlands
Other	N			

EXHIBIT 7-7 MDEP VERNAL POOL SIGNIFICANCE LETTER

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID #s 4864, 4867, 4870, 4871, 4872, 4873, 4874, 4875, 4876, 4877, 4880, 4881, 4882, 4883, 4884, 4878, 4879–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field surveys, it has been determined that the vernal pools identified above on the property of Weyerhaeuser are NOT SIGNIFICANT because either: 1. the features do not meet the definition of a vernal pool under the Significant Wildlife Habitat rules, 06-096 CMR 335(9) or 2. the vernal pools do not meet the biological standards for exceptional wildlife use of the Significant Wildlife Habitat rules, 06-096 CMR 335(9)(B). Therefore, activities within 250 feet of the pools are not regulated under the Natural Resources Protection Act (NRPA) unless there are other protected natural resources nearby such as streams or freshwater wetlands. I have attached a copy of the database printout that verifies the State's findings with respect to your surveys.

I want to also advise you that the pool areas on the property can be considered freshwater wetlands and therefore direct pool alterations may require permitting under the NRPA.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
207-941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

WEBSITE: www.maine.gov/dep

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID #s 4863, 4868, 4869–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field surveys, it has been determined that the vernal pools identified above on the property of Weyerhaeuser are POTENTIALLY SIGNIFICANT because either: 1. the entire pool was not surveyed, 2. the pool was surveyed outside the appropriate survey window for the year in question, or 3. the survey was lacking sufficient data to assess pool significance.

To ensure compliance with the Natural Resources Protection Act (NRPA) potentially significant vernal pools should be considered significant until an accurate assessment of the pool is completed. All areas on the property within 250 feet of significant or potentially significant vernal pool depressions, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335. It is suggested that further survey(s) are completed and data submitted that meet requirements for significance determination. With additional data the vernal pool may be reassigned as Not Significant or Significant and you will be notified accordingly.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID # 4866–Cornville

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field survey, it has been determined that the vernal pool identified above on the property of Weyerhaeuser is POTENTIALLY SIGNIFICANT because either: 1. the entire pool was not surveyed, 2. the pool was surveyed outside the appropriate survey window for the year in question, or 3. the survey was lacking sufficient data to assess pool significance.

To ensure compliance with the Natural Resources Protection Act (NRPA) potentially significant vernal pools should be considered significant until an accurate assessment of the pool is completed. All areas on the property within 250 feet of significant or potentially significant vernal pool depressions, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335. It is suggested that further survey(s) are completed and data submitted that meet requirements for significance determination. With additional data the vernal pool may be reassigned as Not Significant or Significant and you will be notified accordingly.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MELANIE LOYZIM
COMMISSIONER

July 29, 2022

Emmerald Irvin
Tetra Tech
451 Presumpscot Street
Portland, ME 04103

Re: Vernal Pool Significance Determination, Pool ID # 4865–Hartland

Dear Emmerald Irvin:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field survey, it has been determined that the vernal pool identified above on the property of Weyerhaeuser is SIGNIFICANT. I have attached a copy of the database printout that verifies the State's findings with respect to our survey.

As a significant vernal pool, all areas on the Weyerhaeuser property within 250 feet of the vernal pool depression, known as the "critical terrestrial habitat", will be subject to the requirements of the Natural Resources Protection Act, 38 M.R.S.A. §§480-A to 480-FF, and the Significant Wildlife Habitat rules, 06-096 CMR 335.

The Department will ensure that the vernal pool's location and status is entered and mapped in the State's vernal pool database. Note that if the pool depression (only) crosses two or more property boundaries the abutter(s) are similarly subject to the requirements of the Natural Resources Protection Act and the Significant Wildlife Habitat rules.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Marybeth Richardson
Acting Director, Bureau of Land Resources

cc. town file

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4863 Twp: Hartland
Observer's ID: ABA05E1
UTM Coordinates of Pool Center: 452750 E, 4968957 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/15/2021 Additional Survey Dates: 05/11/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4864 Twp: Hartland
Observer's ID: ABA17CP
UTM Coordinates of Pool Center: 454932 E, 4967623 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4865 Twp: Hartland
Observer's ID: VP01ML
UTM Coordinates of Pool Center: 454564 E, 4969263 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: GREEN: SIGNIFICANT
IFW Comments: Pool provides significant breeding habitat for spotted salamanders.

IFW's Pool ID: 4866 Twp: Cornville
Observer's ID: VP08E1
UTM Coordinates of Pool Center: 451921 E, 4966376 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/14/2021 Additional Survey Dates: 05/12/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders and some habitat for wood frogs based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity. It is also unclear if this pool was formed from the abutting road or naturally occurring. Need additional photos of inlet/outlet and overview of pool to confirm.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4867 Twp: Hartland
Observer's ID: VP32EI
UTM Coordinates of Pool Center: 453777 E, 4967400 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021, 07/06/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria

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IFW's Pool ID: 4868 Twp: Hartland
Observer's ID: VP33EI
UTM Coordinates of Pool Center: 453810 E, 4967377 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/20/2021 Additional Survey Dates: 05/10/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4869 Twp: Hartland
Observer's ID: VP35EI
UTM Coordinates of Pool Center: 453563 E, 4968696 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/23/2021 Additional Survey Dates: 05/12/2021, 07/06/2021
IFW's Recommendation: YELLOW: POTENTIALLY SIGNIFICANT, insufficient data
IFW Comments: Pool provides significant breeding habitat for spotted salamanders based on the submitted egg mass data. Additionally, because the months of June and July were classified as periods of moderate drought in central Maine in 2021 (based on NOAA monitoring) the 7/15 dry down kick-out date is considered an unreliable metric for assessing long-term pool productivity.

IFW's Pool ID: 4870 Twp: Hartland
Observer's ID: VP39CP
UTM Coordinates of Pool Center: 454782 E, 4968511 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamander but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4871 Twp: Hartland
Observer's ID: VP43EI
UTM Coordinates of Pool Center: 453717 E, 4969199 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/29/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4872 Twp: Hartland
Observer's ID: VP138AR
UTM Coordinates of Pool Center: 454529 E, 4968610 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4873 Twp: Hartland
Observer's ID: VP140AR
UTM Coordinates of Pool Center: 454703 E, 4968560 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4874 Twp: Hartland
Observer's ID: VP14AR
UTM Coordinates of Pool Center: 454734 E, 4968527 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4875 Twp: Hartland
Observer's ID: VP142AR
UTM Coordinates of Pool Center: 454724 E, 4968410 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4876 Twp: Hartland
Observer's ID: VP143AR
UTM Coordinates of Pool Center: 454716 E, 4968418 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4877 Twp: Hartland
Observer's ID: VP144AR
UTM Coordinates of Pool Center: 454700 E, 4968382 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4878 Twp: Hartland
Observer's ID: VP146AR
UTM Coordinates of Pool Center: 454465 E, 4968441 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/22/2021 Additional Survey Dates: 05/01/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the vernal pool definition
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria. Pool also appears to be unnatural in origin (skidder ruts) and does not meet MDEP vernal pool criteria.

IFW's Pool ID: 4879 Twp: Hartland
Observer's ID: VP147AR
UTM Coordinates of Pool Center: 454445 E, 4968526 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/22/2021 Additional Survey Dates: 05/01/2021, 07/06/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the vernal pool definition
IFW Comments: Pool provides significant breeding habitat for spotted salamanders and some habitat for wood frogs; however, pool appears to be unnatural in origin (skidder ruts) and does not meet MDEP vernal pool criteria.

IFW's Pool ID: 4880 Twp: Hartland
Observer's ID: VP148AR
UTM Coordinates of Pool Center: 454579 E, 4968444 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, July 29, 2022

IFW's Pool ID: 4881 Twp: Hartland
Observer's ID: VP149AR

UTM Coordinates of Pool Center: 454622 E, 4968662 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/21/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs and spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4882 Twp: Hartland
Observer's ID: VP161AR

UTM Coordinates of Pool Center: 454797 E, 4969123 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/27/2021 Additional Survey Dates: 05/12/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamanders but does not meet biological criteria.

IFW's Pool ID: 4883 Twp: Hartland
Observer's ID: VP163AR

UTM Coordinates of Pool Center: 454778 E, 4969137 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/23/2021 Additional Survey Dates: 05/10/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for wood frogs but does not meet biological criteria.

IFW's Pool ID: 4884 Twp: Hartland
Observer's ID: VP166AR

UTM Coordinates of Pool Center: 456840 E, 4968346 N
ProjectType: Hartland Solar

Landowner: Henning Stabins - Weyerhaeuser
49 Mountain Ave, P.O. Box 89
Fairfield, ME 04937
(207) 313-3563 Henning.Stabins@weyerhaeuser.

Contact: Emmerald Irvin - Tetra Tech
451 Presumpscot Street
Portland, ME 04103
(207) 252-8608 emmy.irvin@tetratech.com

Survey Date: 4/28/2021 Additional Survey Dates: 05/11/2021
IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the biological criteria
IFW Comments: Pool provides some habitat for spotted salamander but does not meet biological criteria.

EXHIBIT 7-8 NORTHERN LONG-EARED BAT PRESENCE ABSENCE SURVEY REPORT

Northern Long-eared Bat Presence/Absence Survey Report

Hartland Solar Project
Somerset County, Maine

Prepared For:

Hartland Solar Facility, LLC

500 Union Street Suite 625
Seattle, WA 98101

Prepared By:

Tetra Tech, Inc.
Complex World, Clear Solutions™
451 Presumpscot St., Portland, ME 04103 | tetratech.com

Final October 2023

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APPENDIX D. RELEVANT STAFF RESUMES

1.0 Introduction

Project	**Northern Long-eared Bat (NLEB) Presence/Absence Survey at Hartland Solar**
Town	**Hartland, Maine**
Project Area	**Approximately 1,388 acres**
Surveyor Name/Firm	**Clinton Parrish, Mao Lin / Tetra Tech, Inc.**
Nights of Detector Operation	**July 6–18, 2021**
# of Detectors/Total Detector-nights	**25 Detectors / 122 Detector-nights**
Survey Results	**NLEB NOT DETECTED**

This report summarizes the results of the summer presence/absence acoustic survey for northern long-eared bat (*Myotis septentrionalis*, NLEB) at the proposed Hartland Solar Project (Project), located in the Town of Hartland, Maine. Acoustic detectors deployed by Tetra Tech, Inc. (Tetra Tech) did not detect the presence of NLEB. A single bat pass was auto-classified as the federally listed threatened NLEB by analysis software but presence was not confirmed during qualitative assessment, which involves manual review of the bat pass by a biologist with experience in bat acoustics. The analysis software auto-classified 103 bat passes as little brown bat (*Myotis lucifugus*), which is listed as endangered in the state of Maine. These passes also were manually reviewed, and half were confirmed as little brown bat. The presence of five bat species were confirmed at the Project during the survey including big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*L. cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and little brown bat.

Appendix A of this report includes photographs illustrating site conditions and microphone orientation. Appendix B includes copies of the completed Phase 1 Summer Habitat Assessment forms for the Project. Appendix C includes a summary of Maximum Likelihood Estimates (MLE), and Appendix D includes resumes for relevant staff members involved with the summer presence/absence survey at the Project.

2.0 Project Description

The proposed Hartland Solar Project is located in the Town of Hartland, Maine, approximately 10 miles northeast of Skowhegan, the largest town in the area (Figure 1; Project Area). The Project Area is approximately 1,388 acres and generally characterized by working timber lands with a long history of timber harvest. Forested areas include a mixture of softwood and hardwood at various stages of regeneration; early to mid-successional softwood plantations; and some mature forest, which is mostly limited to riparian areas. Wetlands and forested wetlands occur throughout; however, upland areas are present and support species such as red oak (*Quercus rubra*). Dominant tree species within these variable land types include red maple (*Acer rubrum*), birch species (*Betula* spp.), white pine (*Pinus strobus*), balsam fir (*Abies balsamea*), and red spruce (*Picea rubens*). Historical land use at the Project Area and in the surrounding region was dominated by timber harvest and agriculture. Numerous streams, ponds and lakes are present throughout the landscape surrounding the Project Area. Black Stream skirts the western boundary and the east branch of Black Stream flows through the central portion of the Project Area. The 3,856-acre Great Moose Lake lies 2 miles northeast of the Project Area.

3.0 Methods

The summer presence/absence survey was conducted in accordance with the 2021 U.S. Fish and Wildlife Service (USFWS) *Range-wide Indiana Bat Summer Survey Guidelines* (Guidelines; USFWS 2021). This survey utilized a two-phased approach: Phase 1, desktop and field-based habitat assessments, and Phase 2, acoustic surveys. Tetra Tech deployed full spectrum acoustic detectors during Phase 2, and the resulting data was processed using Kaleidoscope Pro version 4.2.0 (Wildlife Acoustics, Inc.). Qualified Tetra Tech personnel carried out all phases of the survey. Specific roles are summarized in Table 1 and resumes for staff are provided in Appendix D.

Table 1. Personnel Involved in Bat Presence/Absence Survey and Analyses for the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Personnel	Desktop Analysis	Field Assessment	Detector Deployment	Acoustic Analysis	Qualitative Analysis
Clinton Parrish Wildlife Biologist	X	X	X	X	X
Mao Lin Wildlife Biologist		X	X		

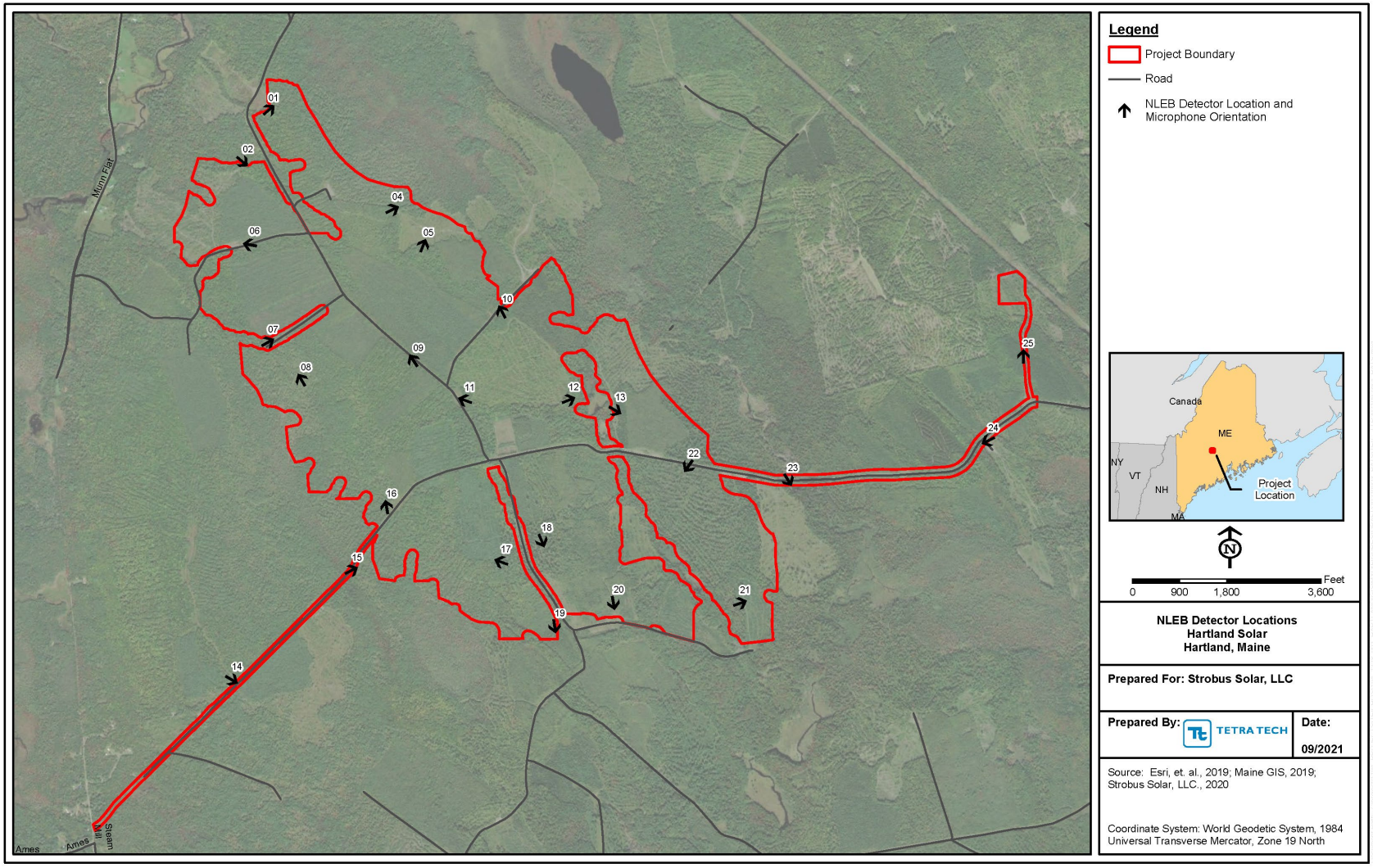

Figure 1. Locations of Acoustic Detectors Deployed at the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

3.1 Habitat Assessment

3.1.1 Desktop Assessment

Prior to conducting field work, Tetra Tech performed a desktop land cover analysis to identify suitable NLEB habitat within the proposed Project Area (Figure 1). Tetra Tech reviewed aerial photography and Google Earth imagery to identify areas that may be used by NLEB for foraging and roosting during the maternity season and spring/fall regional migration. This determination was based on forest patch size, proximity to closed-canopy forests, and landscape features that may be used by bats commuting between roosting and foraging habitats (e.g., forested tracts, wetlands, and streams). All forested lands within the Project Area were considered suitable habitat for NLEB (USFWS 2021). Based on the desktop assessment it was determined the Project has both linear (transmission line, gen-tie, access roads) and non-linear (solar array) features.

According to the 2021 USFWS Guidelines, a minimum of 2 detector nights are required per kilometer of suitable habitat for linear projects and a minimum of 8 detector nights are required per every 123 acres for non-linear projects. The linear features in the Project Area comprise less than 5 kilometers of suitable habitat and the non-linear features comprise approximately 1,200 suitable acres (10 sites, 123-acres each; Figure 1). Therefore, a minimum of 5 acoustic detectors across 5 linear detector locations (2 nights each for a minimum of 10 detector nights) and a minimum of 20 acoustic detectors across 20 non-linear detector locations (4 nights each for a minimum of 80 detector nights) should be distributed throughout the Project Area (2 detector locations per 123 acre site; Figure 1). Therefore, it was determined that 25 detector stations were required to meet the Guidelines.

3.1.2 Field-based Assessment

On July 6 and 13, 2021, Tetra Tech conducted site visits to describe and verify the presence of the NLEB habitat identified during the desktop assessment and to deploy full spectrum acoustic detectors. General habitat descriptions are provided in Table 2. The completed Phase 1 Summer Habitat Assessment is included in Appendix B.

Table 2. Detector Station Descriptions and Survey Data for the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Detector Station	Suitable NLEB Habitat	Description	Latitude	Longitude	Microphone Orientation (degrees)	Survey Dates (night of)
MEHD-01	Yes	Station located in corner of approx. 5-year-old clear cut on a mature forest edge.	44.884792	-69.597968	50	7/6–7/12/2021
MEHD-02	Yes	Station located on a riparian forest edge along a recent strip cut. Ephemeral stream 40 meters away but is currently dry.	44.882096	-69.599896	130	7/6–7/12/2021
MEHD-03	Yes	Station located along a logging road through a mid-successional mixed forest.	44.880135	-69.595241	61	7/6–7/12/2021
MEHD-04	Yes	Station located along a skid road on boundary between mixed mature shelterwood stands	44.879518	-69.588899	64	7/6–7/12/2021
MEHD-05	Yes	Station located along mature mixed stand and early successional clear cut	44.877620	-69.586631	22	7/6–7/12/2021
MEHD-06	Yes	Station located along primary logging road between mixed early successional and mature deciduous stands.	44.877735	-69.599451	280	7/6–7/12/2021
MEHD-07	Yes	Station located along old logging road on boundary between mixed early successional and mature deciduous stands.	44.872606	-69.598130	60	7/6–7/12/2021
MEHD-08	Yes	Station located in the middle of a mixed, mid-successional shelterwood.	44.870623	-69.595713	330	7/6–7/12/2021
MEHD-09	Yes	Station located off primary logging road in a 60-meter gap in canopy. Flanked by mid-successional forest on both sides.	44.871602	-69.587413	326	7/6–7/12/2021
MEHD-10	Yes	Station located off primary, gravel road creating a 70-meter gap within mid-successional canopy.	44.874112	-69.580863	332	7/6–7/12/2021
MEHD-11	Yes	Station located off primary, gravel road creating an 80-meter gap within mid-successional canopy.	44.869472	-69.583651	290	7/6–7/12/2021
MEHD-12	Yes	Station located in the middle of a 2-year-old clear cut. Sparse, mature trees to the east and mid-successional deciduous stand to the west.	44.869466	-69.575998	68	7/6–7/12/2021
MEHD-13	Yes	Station located next to skid road separating riparian areas and a mid-successional, mixed stand	44.868926	-69.572561	120	7/13–7/18/2021

Detector Station	Suitable NLEB Habitat	Description	Latitude	Longitude	Microphone Orientation (degrees)	Survey Dates (night of)
MEHD-14	Yes	Station located along junction of western access road and an old skid road.	44.854950	-69.600951	120	7/13–7/18/2021
MEHD-15	Yes	Station located in a small regenerating clearing on the southeast side of the western access road.	44.860625	-69.592057	63	7/13–7/18/2021
MEHD-16	Yes	Station located on the northwest side of the western access road in a recently logged area.	44.863922	-69.589467	350	7/13–7/18/2021
MEHD-17	Yes	Station located in a recently cleared area on the west side of the north/south access road.	44.860990	-69.581078	290	7/13–7/18/2021
MEHD-18	Yes	Station located in a recently cleared area on the east side of the north/south access road.	44.862099	-69.578045	157	7/13–7/18/2021
MEHD-19	Yes	Station located on edge of mid-successional forest and recently cleared area on the west side of the north/south access road.	44.857603	-69.57714	172	7/13–7/18/2021
MEHD-20	Yes	Station located within early succession softwood along a skidder trail on the north side of the southeastern access road.	44.858805	-69.572805	170	7/13–7/18/2021
MEHD-21	Yes	Station located on the edge of a mature-mixed forest and clearing along a skid road.	44.85876	-69.563459	70	7/13–7/18/2021
MEHD-22	Yes	Station on the edge of a recently cleared skid road and mature, mixed shelter wood.	44.86596	-69.567192	215	7/13–7/18/2021
MEHD-23	Yes	Station located at the junction of primary access road and the East Branch of Black Stream. Microphone oriented towards beaver impoundment within stream.	44.865164	-69.559875	148	7/13–7/15/2021
MEHD-24	Yes	Station located in a cleared early successional area on the southeast side of the primary access road.	44.867173	-69.545086	244	7/13–7/18/2021
MEHD-25	Yes	Station located on edge of two-track creating a canopy gap within a mid-successional mixed forest.	44.871577	-69.542468	360	7/13–7/18/2021

3.2 Acoustic Surveys

3.2.1 Detector Type

Wildlife Acoustics Song Meter-4 BAT ultrasonic bat detectors (Wildlife Acoustics, Inc., Massachusetts, USA) equipped with SMM-U2 microphones were used for the duration of the survey effort. Detectors were set to record from an hour before sunset to an hour after sunrise (approximately 7:20 PM–6:00 AM) in full-spectrum mode, and files were saved in .WAV format on internal SD cards.

The detectors were fully waterproof and were powered by internal D cell batteries. The detectors and microphones were tested prior to deployment with a Wildlife Acoustics Ultrasonic Calibrator to ensure equipment was functioning properly and device sensitivity was within the manufacturer's suggested thresholds. A "chirp test" with the Ultrasonic Calibrator was used to confirm that the connections were sound and that the microphones registered high frequency noise once the detectors were set. Tetra Tech performed this test again at demobilization to ensure microphones were functioning while they were deployed. Log files were reviewed when units were removed to verify proper functioning for the duration of the survey.

3.2.2 Detector Deployment

Detectors were micro-sited in suitable habitat for NLEB within the Project Area to ensure potential habitats were sampled in accordance with the Guidelines. Detectors were deployed on July 6, pulled and redeployed at new sites on July 13, and retrieved on July 18, 2021. Detectors were deployed along potential flyways near wetlands, canopy gaps created by logging roads, and forest edges.

Microphones were mounted at a minimum height of 9 feet above ground level to avoid ground vegetation and to elevate the cone of detection. Microphones were situated within suspected flight paths to increase the number of call pulses and quality of recordings. Appendix A includes station conditions and photographs illustrating detector orientation.

3.2.3 Weather Requirements

Weather requirements outlined in the Guidelines (temperatures remain above 50 degrees Fahrenheit, no precipitation that exceeds 30 minutes, and sustained wind speed less than 9 miles/hour) must be met during the first 5 hours of the survey period to qualify as a valid survey night. Weather history in hourly increments was reviewed from the closest weather station to the Project (Waterville airport) that had data on temperature, wind speed, wind gusts, precipitation rate, and precipitation accumulation (Weather Underground 2021). This ensured that the Guidelines were met for a valid survey night.

3.2.4 Acoustic Analysis

Tetra Tech analyzed the recorded data according to the Guidelines. Data was filtered and analyzed using Kaleidoscope Pro version 4.2.0, using the classifier "Bats of North America 4.2.0" for species of bats in Maine at the 0 Balanced "Neutral" sensitivity level. Signals of interest ranged from 16–120 kilohertz, lasting 2–500 milliseconds, with a minimum of two call pulses. Full spectrum .WAV files were converted to zero-crossing using a division ratio of eight. All files auto-classified as NLEB, little brown bat, and tricolored bat (*Perimyotis subflavus*) were subsequently manually reviewed using SonoBat v 4.2.0. In addition, all bat passes recorded at MEHD-13 on the night of July 8 were manually reviewed per Guideline recommendations for nights with Maximum Likelihood Estimation (MLE) less than 0.05 for NLEB.

In addition, a subsample of files auto-classified as big brown bat, silver-haired bat, eastern red bat, and hoary bat were manually reviewed to confirm species presence. Bat passes auto-classified as "No ID"

means that the software program recognized the recording as a bat but could not identify it to species level. These "No ID" auto-classifications were filtered by characteristic frequency (Fc), and those with an Fc greater than or equal to 35 kilohertz were labeled "unidentified high frequency bat species" and those less than 35 kilohertz were labeled "unidentified low frequency bat species." Results were summarized by station and by night.

4.0 Results

The desktop and field-based habitat assessments revealed approximately 1,200 acres and 5 linear kilometers of suitable NLEB habitat within the Project Area. Based on the results of the habitat assessment, Tetra Tech deployed 25 detectors targeting NLEB in two survey blocks. The first 12 detectors were deployed on July 6 through the night of July 12. Then on July 13, 13 detectors were deployed through the night of July 18 for a total of 159 six detector nights. Weather conditions were satisfactory for acoustical monitoring for all but three survey nights when intermittent showers took place during the early hours of the survey (Table 3). Even with three nights not meeting Guideline requirements, a total of 122 detector nights did meet qualifications, which was well above the minimum requirement of 80 nights.

Table 3. Summary of Weather Information during the First 5 Hours of each Survey Night at the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Survey Night	Temperature Range* (Fahrenheit)	Wind Range (mph)	Precipitation	Qualifying Night
7/6/2021	59–74	0–8	None	Yes
7/7/2021	57–70	3–5	None	Yes
7/8/2021	57–61	0–0	Yes	**No**
7/9/2021	64–66	5–10	Yes	**No**
7/10/2021	57–68	0–0	None	Yes
7/11/2021	65–73	0–3	None	Yes
7/12/2021	60–73	0–3	None	Yes
7/13/2021	63–68	0–6	None	Yes
7/14/2021	64–66	0–3	None	Yes
7/15/2021	69–78	0–5	None	Yes
7/16/2021	63–75	0–6	None	Yes
7/17/2021	66–72	0–3	None	Yes
7/18/2021	63–64	3–7	Yes	**No**

*The nearest weather station with nightly records was the Waterville Airport (KWVL; wunderground.com 2021)

Interpreting results solely on the number of species' bat passes by software auto-classification can be misleading, as there are varying levels of confidence associated with the classifications. MLEs are used as a secondary measure to determine likelihood of species presence by incorporating known error rates for each species classifier within the software. In most cases, manual review of bat passes by experienced biologists serves as the most accurate method for species identification. MLEs indicated that seven of the eight Maine bat species (big brown bat, eastern red bat, hoary bat, silver-haired bat, little brown bat, NLEB, and tricolored bat) are likely present within the Project Area (Table 4). Manual review did not confirm the presence of eastern small-footed bat (*Myotis leibii*), NLEB, or tricolored bat.

Table 4. Summary of Species Presence by Kaleidoscope Pro at the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Species	MLE Prediction*	Qualitative Analysis	Overall Evaluation
Big brown bat	**Present**	**Present**	**Present**
Eastern red bat	**Present**	**Present**	**Present**
Hoary bat	**Present**	**Present**	**Present**
Silver-haired bat	**Present**	**Present**	**Present**
Eastern Small-footed bat	Absent	Absent	Absent
Little brown bat	**Present**	**Present**	**Present**
Northern long-eared bat	**Present**	Absent	Absent
Tricolored bat	**Present**	Absent	Absent

*Based on probability of presence for any site on any night. See Appendix C for complete listing of MLEs by site/night.

Tetra Tech recorded 20,663 total bat passes at the 25 stations the nights of July 6–18, 2021 (Table 5). All but one detector (MEHD-23) was functional the entire survey period. Based on manual review, five species were confirmed present in the Project Area, with 78 percent of the activity by big brown bat, followed by silver-haired bat (11 percent), unidentified high frequency species (5 percent), hoary bat (3 percent), and unidentified high frequency species, eastern red bat, and little brown bat (all less than 1 percent). A single bat pass was classified as NLEB by analysis software but during manual vetting it was determined to be an unidentified low frequency species. All little brown bat and tricolored bat passes classified by analysis software were reviewed. Presence of little brown bat was confirmed during the qualitative assessment, though some of the reviewed files were downgraded to unknown high frequency species, or eastern red bat. In addition, MLEs for little brown bat were in agreement suggesting presence of little brown bat was likely. Analysis software classified six bat passes as tricolored bat, and no passes were confirmed during manual review.

Table 5. Summary of Bat Passes Recorded at the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
Project Total		**16,453**	**80**	**599**	**2,182**	**53**	**182**	**1,114**	**20,663**
MEHD-01	**Station Total**	**166**	**2**	**21**	**320**	**3**	**33**	**64**	**609**
	7/7/2021	8	0	1	11	0	1	1	22
	7/8/2021	3	0	0	0	0	0	0	3
	7/9/2021	0	0	0	1	0	0	0	1
	7/10/2021	50	1	6	143	0	1	15	216
	7/11/2021	37	0	8	46	2	3	10	106
	7/12/2021	68	1	6	119	1	28	38	261

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
MEHD-02	**Station Total**	**431**	**1**	**13**	**47**	**1**	**5**	**31**	**529**
	7/7/2021	27	0	0	10	1	0	3	41
	7/8/2021	8	0	0	0	0	0	1	9
	7/9/2021	80	0	1	6	0	0	7	94
	7/10/2021	58	0	4	5	0	1	0	68
	7/11/2021	141	1	3	17	0	3	8	173
	7/12/2021	117	0	5	9	0	1	12	144
MEHD-03	**Station Total**	**520**	**3**	**13**	**30**	**7**	**6**	**13**	**592**
	7/7/2021	86	0	1	8	1	0	0	96
	7/8/2021	20	0	0	0	0	0	1	21
	7/9/2021	103	0	0	9	0	0	2	114
	7/10/2021	54	0	3	6	1	2	2	68
	7/11/2021	163	2	4	5	1	2	3	180
	7/12/2021	94	1	5	2	4	2	5	113
MEHD-04	**Station Total**	**1,101**	**4**	**6**	**60**	**1**	**5**	**24**	**1,201**
	7/7/2021	198	0	1	34	0	0	4	237
	7/8/2021	63	0	0	1	0	0	1	65
	7/9/2021	181	1	0	3	0	0	1	186
	7/10/2021	135	1	2	11	0	0	3	152
	7/11/2021	284	2	2	8	1	3	5	305
	7/12/2021	240	0	1	3	0	2	10	256
MEHD-05	**Station Total**	**130**	**0**	**20**	**27**	**3**	**9**	**26**	**215**
	7/7/2021	17	0	1	1	2	1	0	22
	7/8/2021	1	0	0	0	0	0	0	1
	7/9/2021	3	0	0	1	0	0	0	4
	7/10/2021	24	0	3	12	0	6	6	51
	7/11/2021	37	0	5	7	0	1	9	59
	7/12/2021	48	0	11	6	1	1	11	78
MEHD-06	**Station Total**	**503**	**6**	**15**	**83**	**1**	**11**	**38**	**657**
	7/7/2021	67	0	2	12	0	1	3	85
	7/8/2021	48	1	0	1	0	0	0	50
	7/9/2021	47	0	2	6	0	0	6	61
	7/10/2021	71	0	2	26	0	3	3	105
	7/11/2021	149	2	7	27	1	2	17	205
	7/12/2021	121	3	2	11	0	5	9	151

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
MEHD-07	**Station Total**	**360**	**4**	**23**	**205**	**1**	**5**	**32**	**630**
	7/7/2021	78	2	4	26	0	2	10	122
	7/8/2021	10	0	0	1	0	0	0	11
	7/9/2021	25	0	0	2	0	0	2	29
	7/10/2021	46	0	9	38	0	1	5	99
	7/11/2021	91	1	5	122	1	2	7	229
	7/12/2021	110	1	5	16	0	0	8	140
MEHD-08	**Station Total**	**125**	**3**	**25**	**97**	**5**	**26**	**56**	**337**
	7/7/2021	23	0	4	6	0	2	6	41
	7/8/2021	0	0	0	0	0	0	0	0
	7/9/2021	4	0	1	1	0	0	0	6
	7/10/2021	11	1	3	6	2	1	1	25
	7/11/2021	63	1	6	68	2	17	35	192
	7/12/2021	24	1	11	16	1	6	14	73
MEHD-09	**Station Total**	**788**	**10**	**32**	**76**	**2**	**9**	**62**	**979**
	7/7/2021	172	0	8	24	1	1	13	219
	7/8/2021	7	0	0	0	0	0	1	8
	7/9/2021	4	0	1	1	0	0	3	9
	7/10/2021	300	1	18	28	0	1	21	369
	7/11/2021	99	5	1	8	1	4	9	127
	7/12/2021	206	4	4	15	0	3	15	247
MEHD-10	**Station Total**	**72**	**0**	**4**	**8**	**0**	**0**	**3**	**87**
	7/7/2021	69	0	4	7	0	0	2	82
	7/8/2021	2	0	0	0	0	0	0	2
	7/9/2021	0	0	0	0	0	0	0	0
	7/10/2021	0	0	0	0	0	0	0	0
	7/11/2021	0	0	0	1	0	0	0	1
	7/12/2021	1	0	0	0	0	0	1	2
MEHD-11	**Station Total**	**1396**	**3**	**57**	**56**	**2**	**4**	**74**	**1592**
	7/7/2021	226	0	15	9	0	0	26	276
	7/8/2021	64	0	0	0	0	0	1	65
	7/9/2021	100	0	1	2	0	0	2	105
	7/10/2021	579	1	13	28	0	1	22	644
	7/11/2021	184	1	10	7	1	1	4	208
	7/12/2021	243	1	18	10	1	2	19	294

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
MEHD-12	**Station Total**	**252**	**1**	**11**	**36**	**0**	**1**	**25**	**326**
	7/7/2021	30	0	5	6	0	0	0	41
	7/8/2021	10	0	0	0	0	0	0	10
	7/9/2021	16	0	0	0	0	0	0	16
	7/10/2021	12	0	3	12	0	1	3	31
	7/11/2021	126	1	1	15	0	0	16	159
	7/12/2021	58	0	2	3	0	0	6	69
MEHD-13	**Station Total**	**497**	**1**	**8**	**39**	**3**	**7**	**46**	**601**
	7/7/2021	118	0	1	8	2	2	12	143
	7/8/2021	39	0	0	1	0	0	1	41
	7/9/2021	137	0	0	5	0	0	7	149
	7/10/2021	28	1	2	6	0	1	6	44
	7/11/2021	115	0	1	14	0	1	15	146
	7/12/2021	60	0	4	5	1	3	5	78
MEHD-14	**Station Total**	**591**	**5**	**46**	**178**	**2**	**8**	**83**	**913**
	7/13/2021	52	2	2	14	0	1	1	72
	7/14/2021	86	0	11	26	0	0	5	128
	7/15/2021	158	0	9	46	0	5	42	260
	7/16/2021	103	1	5	31	1	0	10	151
	7/17/2021	165	2	15	60	1	2	24	269
	7/18/2021	27	0	4	1	0	0	1	33
MEHD-15	**Station Total**	**1,401**	**6**	**26**	**43**	**4**	**8**	**70**	**1,558**
	7/13/2021	396	0	3	16	0	1	18	434
	7/14/2021	184	0	0	4	0	0	3	191
	7/15/2021	345	2	9	12	1	0	26	395
	7/16/2021	187	1	9	2	0	3	9	211
	7/17/2021	264	3	3	9	3	4	11	297
	7/18/2021	25	0	2	0	0	0	3	30
MEHD-16	**Station Total**	**2,773**	**4**	**34**	**170**	**1**	**4**	**127**	**3,113**
	7/13/2021	511	0	8	7	0	1	17	544
	7/14/2021	621	0	0	10	0	0	15	646
	7/15/2021	586	0	11	119	0	0	49	765
	7/16/2021	355	0	7	19	0	3	13	397
	7/17/2021	519	4	6	13	1	0	20	563
	7/18/2021	181	0	2	2	0	0	13	198

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
MEHD-17	**Station Total**	**66**	**1**	**10**	**20**	**1**	**1**	**13**	**112**
	7/13/2021	7	0	1	1	0	0	2	11
	7/14/2021	4	0	2	1	0	0	1	8
	7/15/2021	34	0	2	1	0	0	4	41
	7/16/2021	5	1	1	5	1	0	1	14
	7/17/2021	13	0	4	11	0	1	5	34
	7/18/2021	3	0	0	1	0	0	0	4
MEHD-18	**Station Total**	**511**	**0**	**16**	**32**	**2**	**2**	**18**	**581**
	7/13/2021	80	0	2	4	0	0	2	88
	7/14/2021	79	0	1	2	0	0	1	83
	7/15/2021	146	0	4	9	0	0	7	166
	7/16/2021	21	0	0	4	0	2	1	28
	7/17/2021	116	0	9	13	2	0	5	145
	7/18/2021	69	0	0	0	0	0	2	71
MEHD-19	**Station Total**	**214**	**4**	**23**	**42**	**1**	**4**	**27**	**315**
	7/13/2021	10	0	4	4	0	0	1	19
	7/14/2021	1	0	0	0	0	0	1	2
	7/15/2021	33	0	5	9	1	1	1	50
	7/16/2021	62	1	5	9	0	1	7	85
	7/17/2021	64	2	7	19	0	2	13	107
	7/18/2021	44	1	2	1	0	0	4	52
MEHD-20	**Station Total**	**59**	**6**	**27**	**58**	**2**	**2**	**8**	**162**
	7/13/2021	10	0	3	1	0	0	1	15
	7/14/2021	6	0	0	2	0	2	1	11
	7/15/2021	20	0	8	19	1	0	5	53
	7/16/2021	8	4	8	11	1	0	0	32
	7/17/2021	14	1	7	24	0	0	1	47
	7/18/2021	1	1	1	1	0	0	0	4
MEHD-21	**Station Total**	**582**	**1**	**33**	**146**	**0**	**2**	**48**	**812**
	7/13/2021	143	0	7	40	0	0	11	201
	7/14/2021	66	0	0	6	0	0	4	76
	7/15/2021	217	0	11	35	0	1	13	277
	7/16/2021	47	1	7	25	0	1	8	89
	7/17/2021	75	0	7	31	0	0	5	118
	7/18/2021	34	0	1	9	0	0	7	51

Station	Date	Big brown bat	Eastern red bat	Hoary bat	Silver-haired bat	Little brown bat	Unidentified high frequency species	Unidentified low-frequency species	Grand Total
MEHD-22	**Station Total**	**1,508**	**2**	**25**	**111**	**4**	**11**	**99**	**1,760**
	7/13/2021	450	0	2	21	0	3	23	499
	7/14/2021	166	0	1	5	0	0	8	180
	7/15/2021	407	1	7	24	1	1	25	466
	7/16/2021	136	0	2	30	1	1	15	185
	7/17/2021	339	1	13	31	2	6	27	419
	7/18/2021	10	0	0	0	0	0	1	11
MEHD-23	**Station Total**	**773**	**3**	**39**	**99**	**0**	**10**	**44**	**968**
	7/13/2021	289	1	5	21	0	2	14	332
	7/14/2021	205	0	3	32	0	5	11	256
	7/15/2021	279	2	31	46	0	3	19	380
MEHD-24	**Station Total**	**1,492**	**6**	**55**	**168**	**2**	**3**	**70**	**1,796**
	7/13/2021	282	0	3	9	0	1	15	310
	7/14/2021	442	0	7	10	0	0	16	475
	7/15/2021	461	2	17	56	0	0	13	549
	7/16/2021	61	0	6	22	2	0	8	99
	7/17/2021	167	3	20	65	0	2	16	273
	7/18/2021	79	1	2	6	0	0	2	90
MEHD-25	**Station Total**	**142**	**4**	**17**	**31**	**5**	**6**	**13**	**218**
	7/13/2021	27	0	2	4	1	1	5	40
	7/14/2021	25	0	0	2	0	1	3	31
	7/15/2021	22	0	11	7	0	0	1	41
	7/16/2021	24	2	1	1	4	2	4	38
	7/17/2021	40	2	3	17	0	1	0	63
	7/18/2021	4	0	0	0	0	1	0	5

5.0 Conclusion

5.1 NLEB and Little Brown Bat

A single bat pass was auto-classified as the federally listed endangered NLEB by Kaleidoscope Pro software, but species presence was not confirmed through manual vetting. MLE values generated by the software indicate that presence of NLEB was unlikely overall and likely for only a single night (July 8) during any of the site/nights over the duration of the survey period. See Appendix C for a complete listing of MLEs by site night. No NLEBs were manually confirmed while following the summer survey protocol. Given that NLEB was not detected during the survey, activities associated with the Project are unlikely to adversely affect the species. Avoiding tree removal activities when possible may improve foraging and roosting opportunities for this species.

Presence was confirmed for little brown bat, which is listed as endangered in the state of Maine (MDIFW 2015). The USFWS is currently conducting a discretionary status review of little brown bat but there are currently no federal protections in place for the species. Subsurface mines and caves are listed as the primary habitat for little brown bat, and nearly all common forest types fall into the category of secondary habitat. No critical habitat is designated for little brown bat species. Identified threats to the species that can be addressed through active management include collisions with wind turbines and recreational caving. A lack of information on current distributions in Maine make identifying specific risks to the species difficult (MDIFW 2015). According to the Maine Department of Inland Fisheries and Wildlife Solar Energy Project General Resource Guidance and Recommendations (Updated March 5, 2020), if there are no rocky features present on and within 250 feet of the Project Area then "MDIFW does not anticipate significant impacts to bat species as a result of a solar project, based on current best available science" (2020). No rocky features suitable as bat wintering habitat were identified during desktop analysis and field reconnaissance conducted in September 2023. Although no regulatory mechanisms are in place for little brown bat, avoidance of tree removal adjacent to open water sources would be a prudent action to avoid impacting potential foraging habitat for this species as preferred foraging habitats include forest edges and over water bodies (Clare et al. 2011).

5.2 Overall Bat Activity

Detector location and habitat type did not appear to influence species composition or activity rates. The big brown bat was the most commonly recorded species at the Project regardless of habitat type. Overall, activity was dominated by low frequency bats (big brown, silver-haired, and hoary bats), with high frequency bats (*Myotis*, eastern red and unidentified high frequency bats) accounting for less than 2 percent of the total passes recorded. Stations MEHD-17 and MEHD-24 were deployed in less open settings within the canopy along narrow flight corridors; conditions more suitable for smaller, slower flying *Myotis*. Yet, few *Myotis* were detected in these locations. Little brown bat, eastern red bat, hoary bat, and silver-haired bat are all Species of Special Concern in Maine (MDIFW 2011), none of which were detected at relatively high activity rates.

Overall activity was distributed among all stations with the highest percentage of passes recorded at Stations MEHD-16 (15 percent), MEHD-24 (9 percent), MEHD-11 (8 percent), and 15 (8 percent). Big Brown bat dominated passes recorded at these Stations which were located along roads or clear cuts on forest edges. These data align with trends observed in other studies, which demonstrated a drastic increase in the proportion of non-myotis recordings on a post white-nose syndrome landscape (Nocera et al. 2019).

6.0 References

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Nocera, T., Ford, W.M., Silvis, A. and Dobony, C.A., 2019. Patterns of acoustical activity of bats prior to and 10 years after WNS on Fort Drum Army Installation, New York. Global Ecology and Conservation, 18, p.e00633.

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APPENDIX A. STATION CONDITIONS AND DETECTOR ORIENTATION PHOTOGRAPHS

Photo No.: 1

Station: MEHD-01

Date: July 6, 2021

Comments: Station located in a corner of an approximately 5-year-old clear cut on mature forest edge.

Photo No.: 2

Station: MEHD-02

Date: July 6, 2021

Comments: Station located on riparian forest edge along a recent strip cut. Ephemeral dry stream located 40 meters to the northeast.

Photo No.: 3

Station: MEHD-3

Date: July 6, 2021

Comments: Station located along logging road through mid-successional mixed forest.

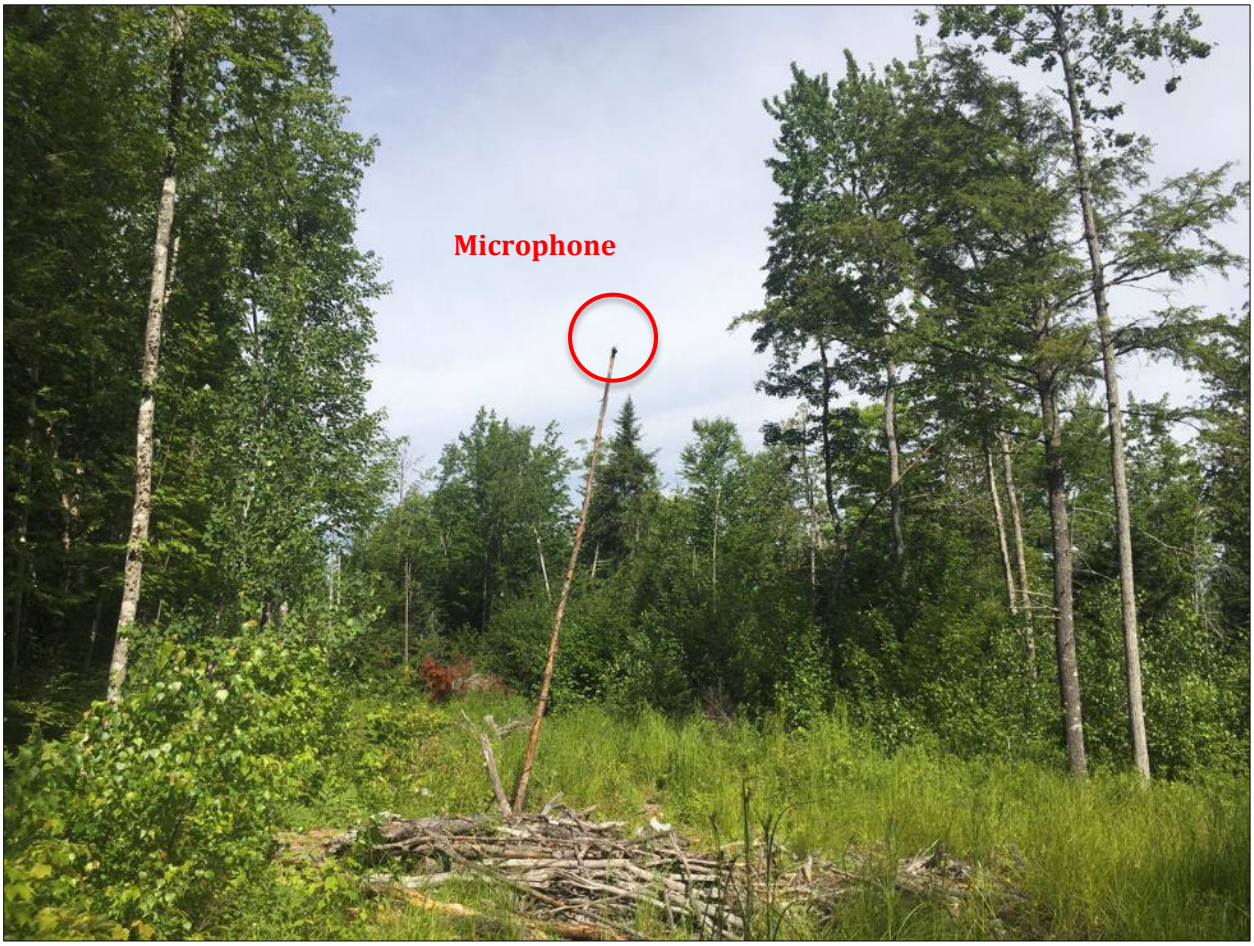

Photo No.: 4

Station: MEHD-4

Date: July 6, 2021

Comments: Station located in skid road on the edge of a mature mixed forest and mixed shelterwood stand.

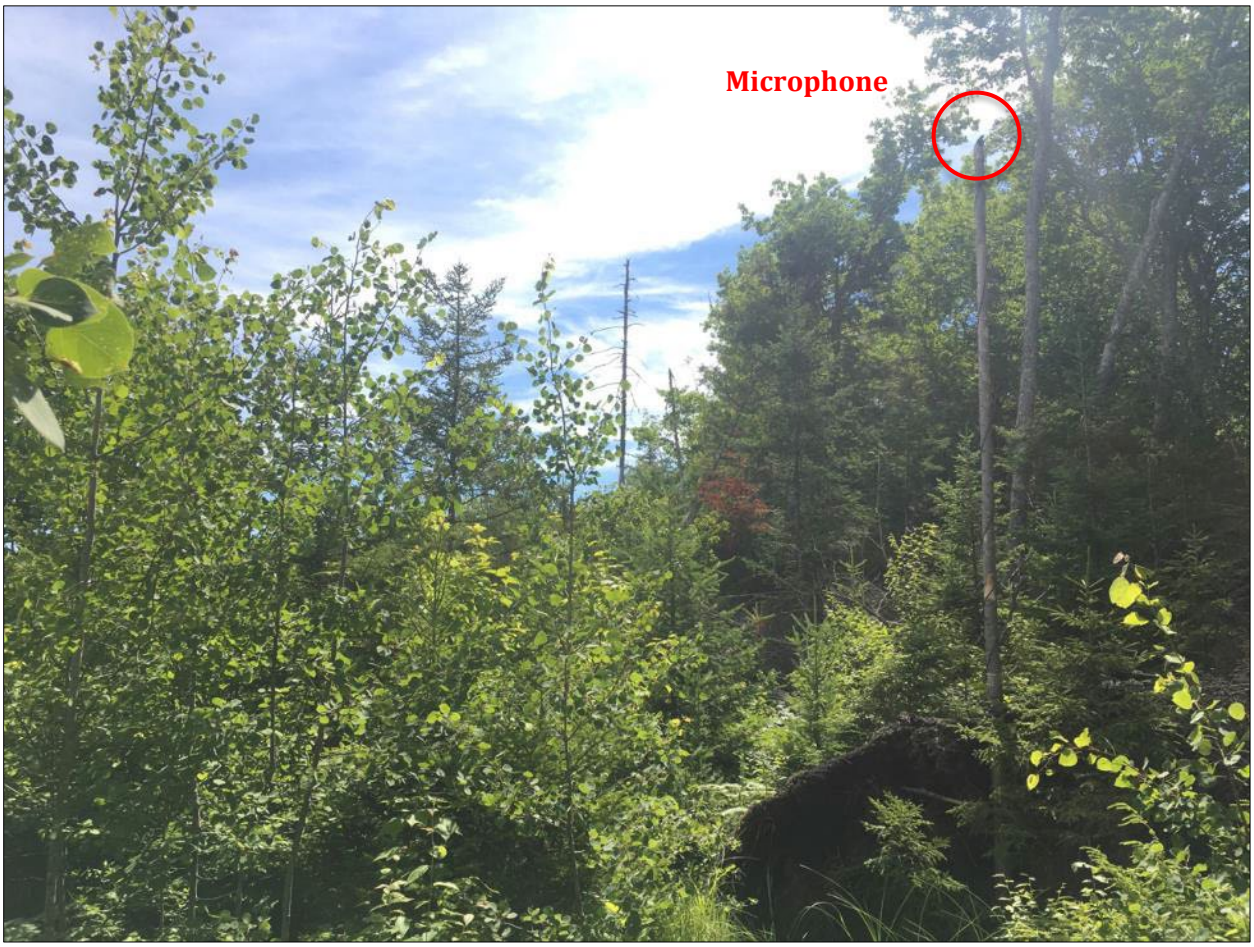

Photo No.: 5

Station: MEHD-5

Date: July 6, 2021

Comments: Station located on the edge of a mixed mature forest and early successional clear cut.

Photo No.: 6

Station: MEHD-6

Date: July 6, 2021

Comments: Station located near the edge of a mid-successional deciduous forest. View to the north along a primary logging road.

Photo No.: 7

Station: MEHD-7

Date: July 6, 2021

Comments: Station located on an old logging road on the boundary between mixed early successional and mature deciduous stands.

Photo No.: 8

Station: MEHD-8

Date: July 6, 2021

Comments: Station located in the middle of a mid-successional shelterwood stand.

Photo No.: 9

Station: MEHD-9

Date: July 6, 2021

Comments: Station located off a primary logging road in a 60-meter gap in the canopy.

Photo No.: 10

Station: MEHD-10

Date: July 6, 2021

Comments: Station located off a primary logging road in a 70-meter gap in the canopy. Mixed mid-successional forest. Slight skid road behind station created potential flyway.

Photo No.: 11

Station: MEHD-11

Date: July 6, 2021

Comments: Station located off the primary logging road within a clearing 80 meters wide. Logging road behind microphone creates a potential flyway.

Photo No.: 12

Station: MEHD-12

Date: July 6, 2021

Comments: Station located in the middle of a 2-year old clear cut. Sparse matures trees to the east and mid-successional deciduous stand to the west.

Photo No.: 13

Station: MEHD-13

Date: July 6, 2021

Comments: Station located next to a skid road separating riparian areas and mid-successional mixed stand.

Photo No.: 14

Station: MEHD-14

Date: July 13, 2021

Comments: Station located on a skid road on the edge of mature forest and early successional clear cut.

Photo No.: 15

Station: MEHD-15

Date: July 13, 2021

Comments: Station located on edge of the primary logging road and a small clearing. Microphone is elevated over a low canopy in the clearing.

Photo No.: 16

Station: MEHD-16

Date: July 13, 2021

Comments: Station located on the edge of a mature forest edge and a recent clear cut. View south towards primary logging road.

Photo No.: 17

Station: MEHD-17

Date: July 13, 2021

Comments: Station located in a small clearing created by the intersection of skid roads within mature, mixed forest.

Photo No.: 18

Station: MEHD-18

Date: July 13, 2021

Comments: Station located at an intersection in a recently cleared area within mixed forest. View southwest towards largest opening.

Photo No.: 19

Station: MEHD-19

Date: July 13, 2021

Comments: Station located near the edge of a mid-successional deciduous forest and within an early successional clear cut. View to the southeast towards primary logging road.

Photo No.: 20

Station: MEHD-20

Date: July 13, 2021

Comments: Station located on a two-track within mid successional, wet, softwood dominated stand. View south down two-track.

Photo No.: 21

Station: MEHD-21

Date: July 13, 2021

Comments: Station located in a log landing backed against the edge of a mature, riparian stand. Microphone oriented towards clearing and mid-successional softwood plantation.

Photo No.: 22

Station: MEHD-22

Date: July 13, 2021

Comments: Station located on the edge of a very recently cleared skid road within wet, mixed, mature stand. Microphone oriented down potential flyway.

Photo No.: 23

Station: MEHD-23

Date: July 13, 2021

Comments: Station located along the primary logging road and East Branch of Black Stream. Small beaver impoundment below bridge. Microphone oriented over stream and open canopy.

Photo No.: 24

Station: MEHD-24

Date: July 13, 2021

Comments: Station located off primary logging road within early successional clearing.

Photo No.: 25

Station: MEHD-25

Date: July 13, 2021

Comments: Station located on two-track through softwood dominated stand. Microphone oriented straight down flyway over two-track.

APPENDIX B. COMPLETED PHASE 1 SUMMER HABITAT ASSESSMENT FORMS

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

NLEB
~~INDIANA BAT~~ HABITAT ASSESSMENT DATASHEET

Project Name: Hartland Solar Project
Date: 2021-07-21
Township/Range/Section: Hartland, Maine
Lat Long/UTM/ Zone: 44°51'58.14"N, 69°34'54.63"W
Surveyor: Tetra Tech

Brief Project Description

Potential solar development site located in the Town of Hartland, Somerset County, Maine.

Project Area

	Total Acres	Forest Acres		Open Acres
Project	1,388 acres			
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres- no clearing	
	TBD	TBD	TBD	

Vegetation Cover Types

Pre-Project	Post-Project
Mostly forested, but some regenerating stands, young forest, and recently cleared areas	TBD

Landscape within 5 mile radius

Flight corridors to other forested areas?

Access roads, ATV trails, old logging roads, and stream corridors provide extensive flight corridors to other forested areas in the region.

Describe Adjacent Properties (e.g. forested, grassland, commercial or residencial development, water sources)

Mostly forested timberlands. Some light agricultural use and light residential development.

Proximity to Public Land

What is the distance (mi.) from the project area to forested public lands (e.g., national or state forests, national or state parks, conservation areas, wildlife management areas)?

Great Moose Wetlands Preserve app. 1 mile north, Passaconaway Point North Shore app. 3 miles northwest, UMaine Huff Hill Property app. 1 mile east, Lake George app. 3 miles south, Chestnut Ridge app. 2 miles west

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area
Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-01. Station located in corner of approximately 5yo clear cut on mature forest edge

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	1	1	
Dominant Species of Mature Trees	red maple, sugar maple, yellow birch			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	1	5	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented towards corner of forest. Also adjacent to old skid road into forest (potential flyway).

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos1-5

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-02. Station located on riparian forest edge along recent strip cut.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral 1	Intermittent	Perennial	Describe existing condition of water sources: Ephemeral stream 40m to north. Currently dry.
Pools/Ponds (# and size)		Open and accessible to bats? N		
Wetlands (approx. ac.)	Permanent Y, 4	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ') 3	Midstory (20-50') 1	Understory (<20') 1	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees	red maple, sugar maple, yellow birch			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in) 1	Med (9-15 in) 1	Large (>15 in) 5	
No. of Suitable Snags		1		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented alone riparian forest edge.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos1-5

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s):	MEHD-03. Station located along logging road through mid-successional mixed forest.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		5	3	
Dominant Species of Mature Trees	red oak, hemlock, red maple			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	4	5		
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:
Mic oriented along road creating potential flyway through mixed stand.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s):	MEHD-04. Station located along skid road on boundary between mixed mature and shelterwood stands

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		5	3	
Dominant Species of Mature Trees	White birch, hemlock, red maple			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	4	5		
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented away and up from forest edge towards area with open and low canopy.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): MEHD-05. Station located along mature mixed stand and early succession clear cut.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	4	5	
Dominant Species of Mature Trees	hemlock, red maple, aspen			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	4		
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:
Mic oriented away and up from forest edge towards area with open and low canopy.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s):	~~MEHD-~~06Station located along primary logging road between mixed early succession and mature deciduous stands.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		6	2	
Dominant Species of Mature Trees	Red oak,red maple, white birch			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	6	2		
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented away and up from forest edge towards area with open and low canopy.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-07. Station located along old logging road on boundary between mixed early successional and mature deciduous stands.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	2	2	
Dominant Species of Mature Trees	red maple, red oak,white birch, red spruce.			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	2	1	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented away and up from forest edge towards area with open and low canopy.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-3

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): MEHD-08. Station located in middle of a mixed, mid- successional shelterwood.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		4	4	
Dominant Species of Mature Trees	red maple, hemlock,red oak			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	2	1	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:
Mic mounted on spruce pole at 20, high, above understory. Open canopy in stand.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): MEHD-09. Station off primary logging road in a 60m gap in canopy

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	0	5	2	
Dominant Species of Mature Trees	red maple, white birch,aspen			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	3	0	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:
Mic oriented up and along forest edge in a wide canopy opening.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): MEHD-10. Station off primary logging road in a 70m gap in canopy

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	0	5	2	
Dominant Species of Mature Trees	red maple, white birch,aspen			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	3	0	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:
Mic oriented up and away from forest edge in a wide canopy opening. Old skid road leads from forest to south creating a slight flyway.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-4

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-11. Station off primary logging road in a 80m gap in canopy

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: None
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		3	1	
Dominant Species of Mature Trees	red oak, white birch			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	0	5	0	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented up and away from forest edge in a wide canopy opening. Old skid road leads from forest to east creating a s flyway.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-2

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-12. Station located in middle of 2yo cut. Sparse mature trees to East and mid-succession deciduous stand to west.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Riparian area 120m to east
		1		
Pools/Ponds (# and size)		Open and accessible to bats?		
		N		
Wetlands (approx. ac.)	Permanent	Seasonal		
	3 ac			

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
		1	1	
Dominant Species of Mature Trees	red oak, white cedar, red maple.			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	4	2	2	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented up and away from forest edge in a wide canopy opening. Old skid road leads from forest to east creating a s flyway.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-2

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): MEHD-13. Station located next to skid road separating riparian areas s mid-succession mixed stand.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent 1	Perennial	Describe existing condition of water sources: Riparian area 60 to west
Pools/Ponds (# and size)		Open and accessible to bats? N		
Wetlands (approx. ac.)	Permanent 3 ac	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ') 1	Midstory (20-50') 4	Understory (<20') 2	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees	red oak, white cedar, fir			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in) 2	Med (9-15 in) 4	Large (>15 in) 2	
No. of Suitable Snags		6		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Y

Additional Comments:

Mic oriented along skid road and potential flyway between stands.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Photos
1-2

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): _____ MEHD-14. Located along western access road and an old skid road.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		Water-filled ruts, but otherwise no wetlands or streams in the immediate vicinity. Black Stream is approximately 1 mile to the west.
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	5	5	5	
Dominant Species of Mature Trees	White pine, yellow birch, quaking aspen			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	3	2	
No. of Suitable Snags		5		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): _____ MEHD-15. Located in a small regenerating clearing on the southeast side of the western access road.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Small stream to the southwest along the access road and a forested wetland to the east. Neither of these resources was immediately visible from the detector station.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	3	
Dominant Species of Mature Trees	White pine, white birch, red spruce, red maple			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-16. Located on the northwest side of the western access road in a recently logged area.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: No open water visible but wetland hydrology (saturated soils) and vegetation at the site.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	<0.25 acre	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	2	
Dominant Species of Mature Trees	Quaking aspen, white pine, yellow birch, red spruce, red maple			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		10		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats. Lots of slash on the ground and abundant snags.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): _____ MEHD-17. Located in a recently cleared area on the west side of the north-south access road.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: No open water visible but forested wetlands mapped to the south-southwest
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	White pine, red spruce, red maple			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats. Lots of slash on the ground.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): _____ MEHD-18. Located in a recently cleared area on the east side of the north-south access road.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: No open water visible.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	2	
Dominant Species of Mature Trees	White pine, red spruce, red maple, red oak			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		5		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats. Lots of slash on the ground and abundant snags.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-19. Located in a recently cleared area on the west side of the north-south access road.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: No open water visible.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	2	
Dominant Species of Mature Trees	White birch, quaking aspen			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	1	1	
No. of Suitable Snags		2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited in the immediate vicinity of the detector but bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats. Lots of slash on the ground and cleared area may be conducive to foraging.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-20. Located along a skidder trail on the north side of the southeastern access road.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Water-filled skidder ruts open and accessible to bats.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	2	
Dominant Species of Mature Trees	Yellow birch, red spruce, white pine			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources were limited to water-filled skidder ruts. Bats may use the access road and extensive network of logging roads and ATV trails to travel between a variety of foraging and roosting habitats.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-21. Located in a cleared area along a logging road in the southeastern corner of the project area.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: No water sources visible in the immediate vicinity. Unnamed waterbody located approximately 500 feet west of the detector station.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	Red maple, red spruce			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:
Water sources are limited in the immediate vicinity of the detector but there is an unnamed watebody located approximately 500 feet to the west. Bats may use the access road and the extensive network of logging roads and ATV trails to travel to the stream corridor and a variety of foraging and roosting habitats.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-22. Located in a cleared area on the south side of the east-west access road.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Water-filled ditches open and accessible to bats. Located between an unnamed waterbody to the east and East Branch of Black Stream to the west.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	Red maple, red spruce, white pine			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		5		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water sources are limited to water-filled ditches in the immediate vicinity of the detector, but the station is located between an unnamed waterbody to the east and East Branch of Black Stream to the west. Bats may use the access road and the extensive network of logging roads and ATV trails to travel to the stream corridors and a variety of foraging and roosting habitats.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

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A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description	
Sample Site No.(s): _____	MEHD-23. Located at the intersection of the east-west access road and the East Branch of Black Stream.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Stream/wetland complex of East Branch of Black Stream and associated wetlands
	N/A	N/A	>3 miles	
Pools/Ponds (# and size)	>5 acres	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	>10 acres	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	Red maple, red spruce			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		>20		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Abundant water resources from East Branch of Black Stream and associated wetlands. Beaver dams created small pools that were open and accessible to bats. Bats may use the access road and the extensive network of logging roads and ATV trails to travel to the stream corridor and a variety of foraging and roosting habitats. Suitable snags are also abundant at this detector station.

***The post/tree that the detector and microphone were mounted on fell over and the microphone may have been submerged underwater. The microphone cord was severed and may have been chewed by an animal.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): _____ MEHD-24. Located in a cleared area on the southeast side of the east-west access road.

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Water-filled ruts. Otherwise, no water resources in immediate vicinity of the detector station, but wetlands and streams were delineated nearby.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	Red maple, quaking aspen			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	3	2	1	
No. of Suitable Snags		5		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water resources in the immediate vicinity of the detector station are limited to water-filled ruts, but wetlands and streams were mapped nearby. Bats may use the access road and the extensive network of logging roads and ATV trails to travel to the stream corridor and a variety of foraging and roosting habitats. Suitable snags are availble near this detector station.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
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Sample Site Description	
Sample Site No.(s): _____	MEHD-25. Located along an old logging road or ATV trail on the north side of the east-west access road.

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Water-filled ruts. Otherwise, no water resources in immediate vicinity of the detector station.
	N/A	N/A	N/A	
Pools/Ponds (# and size)	N/A	Open and accessible to bats?		
		N/A		
Wetlands (approx. ac.)	Permanent	Seasonal		
	N/A	N/A		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	3	2	
Dominant Species of Mature Trees	Red maple, red spruce, white pine			
% Trees w/ Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	1	5	1	
No. of Suitable Snags		3		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR ~~INDIANA BATS~~ NLEB? Yes

Additional Comments:

Water resources in the immediate vicinity of the detector station are limited to water-filled ruts, Bats may use the access road and the extensive network of logging roads and ATV trails to travel to the stream corridor and a variety of foraging and roosting habitats. A plantation forest adjecent to the detector station may provide closed-canopy flight corridors for bats like NLEB. An unnamed waterbody is located about 0.25 mile to the east of the detector station.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX C. MAXIMUM LIKELIHOOD ESTIMATES (MLE) SUMMARY

Summary of Maximum Likelihood Estimates (MLEs) for Species Presence by Kaleidoscope Pro at the Hartland Solar Project, Hartland, Maine; July 6–18, 2021.

Station	Date	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern small-footed Bat	Little Brown Bat	Northern long-eared Bat	Tir-colored Bat
MEHD-01	7/7/2021	**0.00**	1.00	0.99	**0.00**	1.00	0.13	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	1.00	1.00	1.00	0.18	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.20	1.00	**0.00**	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	1.00	0.18	**0.00**	1.00	**0.00**	1.00	1.00
	7/12/2021	**0.00**	0.45	1.00	**0.00**	1.00	0.09	1.00	1.00
MEHD-02	7/7/2021	**0.00**	1.00	1.00	0.28	1.00	0.13	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	0.89	1.00	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	0.73	1.00	1.00	1.00	**0.01**	1.00	1.00
	7/12/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-03	7/7/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	1.00	1.00	1.00	**0.00**	1.00	1.00
	7/11/2021	**0.00**	0.16	1.00	1.00	1.00	0.61	1.00	1.00
	7/12/2021	**0.00**	0.71	1.00	1.00	1.00	**0.00**	1.00	1.00
MEHD-04	7/7/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/9/2021	**0.00**	0.70	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.60	1.00	1.00	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	0.31	1.00	1.00	1.00	0.64	1.00	0.18
	7/12/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	**0.03**
MEHD-05	7/7/2021	**0.00**	1.00	0.99	1.00	1.00	**0.02**	1.00	1.00
	7/8/2021	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.01**	1.00	1.00	0.91	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	0.65	0.06	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	1.00	0.23	1.00	1.00	1.00	1.00	1.00
	7/12/2021	**0.00**	1.00	**0.00**	1.00	1.00	**0.02**	1.00	1.00
MEHD-06	7/7/2021	**0.00**	0.38	1.00	1.00	1.00	1.00	1.00	1.00
	7/8/2021	**0.00**	0.24	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	1.00	**0.04**	1.00	0.13	1.00	1.00

Station	Date	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern small-footed Bat	Little Brown Bat	Northern long-eared Bat	Tir-colored Bat
	7/11/2021	**0.00**	0.17	1.00	1.00	1.00	0.61	1.00	1.00
	7/12/2021	**0.00**	**0.03**	1.00	1.00	1.00	0.08	1.00	1.00
MEHD-07	7/7/2021	**0.00**	0.07	1.00	0.09	1.00	0.63	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	0.09	**0.00**	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	0.53	1.00	**0.00**	1.00	0.09	1.00	1.00
	7/12/2021	**0.00**	0.55	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-08	7/7/2021	**0.00**	1.00	0.19	0.91	1.00	0.13	1.00	1.00
	7/8/2021	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	0.52	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.36	0.18	0.25	1.00	**0.02**	1.00	1.00
	7/11/2021	**0.00**	0.78	1.00	**0.00**	1.00	**0.00**	1.00	1.00
	7/12/2021	**0.00**	0.41	**0.00**	**0.01**	1.00	**0.02**	1.00	1.00
MEHD-09	7/7/2021	**0.00**	1.00	1.00	1.00	1.00	**0.02**	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	0.52	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.93	0.89	1.00	1.00	1.00	1.00	0.08
	7/11/2021	**0.00**	**0.00**	1.00	1.00	1.00	0.57	1.00	0.40
	7/12/2021	**0.00**	**0.01**	1.00	1.00	1.00	0.39	1.00	1.00
MEHD-10	7/7/2021	**0.00**	1.00	0.99	1.00	1.00	1.00	1.00	1.00
	7/8/2021	**0.02**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	1.00	1.00	1.00	0.18	1.00	1.00	1.00	1.00
	7/10/2021	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/11/2021	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/12/2021	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-11	7/7/2021	**0.00**	1.00	0.70	1.00	1.00	1.00	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	0.76	1.00	1.00	1.00	0.08	1.00	1.00
	7/12/2021	**0.00**	0.81	0.41	1.00	1.00	0.44	1.00	0.11
MEHD-12	7/7/2021	**0.00**	1.00	0.13	1.00	1.00	1.00	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.08	0.35	**0.00**	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	0.58	1.00	1.00	1.00	1.00	1.00	1.00

Station	Date	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern small-footed Bat	Little Brown Bat	Northern long-eared Bat	Tir-colored Bat
	7/12/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-13	7/7/2021	**0.00**	1.00	1.00	1.00	1.00	**0.00**	1.00	1.00
	7/8/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	**0.02**	1.00
	7/9/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/10/2021	**0.00**	0.18	0.95	0.99	1.00	1.00	1.00	1.00
	7/11/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/12/2021	**0.00**	1.00	0.91	1.00	1.00	0.13	1.00	1.00
MEHD-14	7/13/2021	**0.00**	0.36	1.00	0.62	1.00	0.42	1.00	1.00
	7/14/2021	**0.00**	1.00	0.09	0.27	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	1.00	0.09	1.00	1.00	1.00	1.00
	7/16/2021	**0.00**	0.55	1.00	0.15	1.00	0.40	1.00	1.00
	7/17/2021	**0.00**	0.84	0.40	**0.00**	1.00	**0.00**	1.00	1.00
	7/18/2021	**0.00**	1.00	0.23	1.00	1.00	1.00	1.00	1.00
MEHD-15	7/13/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	0.40	1.00	1.00	1.00	0.56	1.00	1.00
	7/16/2021	**0.00**	0.71	1.00	1.00	1.00	0.38	1.00	1.00
	7/17/2021	**0.00**	0.10	1.00	1.00	1.00	**0.02**	1.00	0.28
	7/18/2021	**0.00**	1.00	0.86	1.00	1.00	1.00	1.00	1.00
MEHD-16	7/13/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	1.00	0.97	1.00	1.00	1.00	1.00
	7/16/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/17/2021	**0.00**	**0.04**	1.00	1.00	1.00	0.87	1.00	1.00
	7/18/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-17	7/13/2021	**0.00**	1.00	0.72	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	0.10	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	0.99	1.00	1.00	1.00	1.00	1.00
	7/16/2021	**0.01**	0.16	0.80	0.06	1.00	0.44	1.00	1.00
	7/17/2021	**0.00**	1.00	0.12	**0.01**	1.00	1.00	1.00	1.00
	7/18/2021	**0.01**	1.00	1.00	0.91	1.00	1.00	1.00	1.00
MEHD-18	7/13/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/16/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/17/2021	**0.00**	1.00	0.59	1.00	1.00	**0.02**	1.00	1.00
	7/18/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Station	Date	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern small-footed Bat	Little Brown Bat	Northern long-eared Bat	Tir-colored Bat
MEHD-19	7/13/2021	**0.00**	1.00	**0.03**	0.71	1.00	1.00	1.00	1.00
	7/14/2021	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	0.20	0.80	1.00	**0.02**	1.00	1.00
	7/16/2021	**0.00**	0.40	0.72	1.00	1.00	0.42	1.00	1.00
	7/17/2021	**0.00**	0.05	0.36	0.40	1.00	0.63	1.00	1.00
	7/18/2021	**0.00**	0.24	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-20	7/13/2021	**0.00**	1.00	0.09	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	0.83	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	**0.00**	**0.00**	1.00	0.13	1.00	1.00
	7/16/2021	**0.01**	**0.00**	**0.00**	**0.00**	1.00	0.90	1.00	1.00
	7/17/2021	**0.00**	0.08	**0.02**	**0.00**	1.00	1.00	1.00	1.00
	7/18/2021	0.46	**0.05**	0.27	0.70	1.00	1.00	1.00	1.00
MEHD-21	7/13/2021	**0.00**	1.00	1.00	0.18	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/16/2021	**0.00**	0.28	0.22	**0.00**	1.00	1.00	1.00	1.00
	7/17/2021	**0.00**	1.00	0.66	**0.01**	1.00	1.00	1.00	1.00
	7/18/2021	**0.00**	1.00	1.00	0.76	1.00	1.00	1.00	1.00
MEHD-22	7/13/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	0.98	1.00	1.00	1.00	0.31	1.00	1.00
	7/16/2021	**0.00**	1.00	1.00	0.87	1.00	0.13	1.00	1.00
	7/17/2021	**0.00**	0.96	1.00	1.00	1.00	0.06	1.00	1.00
	7/18/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-23	7/13/2021	**0.00**	0.91	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00
	7/15/2021	**0.00**	0.43	**0.00**	1.00	1.00	0.15	1.00	1.00
MEHD-24	7/13/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	0.73	1.00	1.00	1.00	1.00	1.00	1.00
	7/16/2021	**0.00**	1.00	0.59	0.09	1.00	**0.02**	1.00	1.00
	7/17/2021	**0.00**	**0.03**	**0.04**	**0.00**	1.00	1.00	1.00	1.00
	7/18/2021	**0.00**	0.40	1.00	1.00	1.00	1.00	1.00	1.00
MEHD-25	7/13/2021	**0.00**	1.00	0.92	1.00	1.00	0.13	1.00	1.00
	7/14/2021	**0.00**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	7/15/2021	**0.00**	1.00	**0.00**	0.89	1.00	1.00	1.00	1.00
	7/16/2021	**0.00**	**0.01**	1.00	1.00	1.00	**0.02**	1.00	1.00

Station	Date	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern small-footed Bat	Little Brown Bat	Northern long-eared Bat	Tir-colored Bat
	7/17/2021	**0.00**	**0.02**	0.97	**0.05**	1.00	1.00	1.00	1.00
	7/18/2021	**0.00**	1.00	1.00	1.00	1.00	0.13	1.00	1.00

APPENDIX D. RELEVANT STAFF RESUMES

Clinton Parrish
Wildlife Biologist/Ecologist

EXPERIENCE SUMMARY

Mr. Parrish is a biologist with over 18 years of experience conducting wildlife and habitat projects throughout the Northeast and Western U.S. His responsibilities have included working as the lead wildlife biologist on a wide variety of terrestrial and aquatic projects with an emphasis on avian ecology, avian response to wind development, avian and bat acoustic monitoring, vernal pool and wetland surveys, physical and biological stream surveys, habitat assessment and management, and carnivore monitoring. Most recently, Mr. Parrish's work has included conducting bat acoustic surveys, breeding bird surveys, threatened and endangered species surveys, raptor migration studies, vernal pool surveys, and grassland bird surveys. As a component of many wildlife related projects, Mr. Parrish routinely conducts field and desktop related habitat surveys. For example, habitat assessments are part of survey requirements for Northern long-eared Bat Presence/Absence surveys. Similarly, Mr. Parrish frequently evaluates species distributions and habitat availability through research to inform likelihood of occupancy for a species within area of interest. This type of desktop assessment is often associated with threatened or endangered bird species and involves systematic searches of species records as well as citizen science data such as ebird. Mr. Parrish has strong writing and data analysis skills and conducts analysis and reports for a majority of projects he participates in. Mr. Parrish is proficient with data management and analysis using Microsoft Access, geographic information system, and the program R.

EMPLOYMENT HISTORY

Tetra Tech, Inc., Biologist, 2013–present

Plymouth State University, Graduate Research and Teaching, 2011–2013

United Stated Department of Agriculture (USDA), Forest Service, Idaho Panhandle NF, Hydrologist, 2008–2010

Idaho Department of Fish and Game, Biological Technician, 2006–2008

USDA Forest Service, Region 5 FIA, Biological Technician, 2004–2005

New England Institute for Landscape Ecology, Biological Technician, 2003

Vermont Institute for Natural Science, Biological Technician, 2003

Student Conservation Association, Great Smokey Mountain National Park, Forest Ecology Tech, 2002

RELEVANT EXPERIENCE

Confidential Client, Pre- and Post-Construction Avian and Wildlife Surveys, Multiple Wind Project Sites, ME. 2014–Present. Served as field lead for completion of pre-construction and post-construction surveys at multiple wind development sites in Maine. Survey work was conducted in support of the permitting process and included surveys for breeding birds; Canada lynx (*Lynx canadensis*); bats; bird and bat fatalities; eagles; raptor migration; migrant stopovers; rare, threatened, and endangered species; and upland sandpiper (*Bartramia longicauda*). Conducted field studies, analyzed data, and prepared reports.

EDUCATION

M.S., Biology, Plymouth State University, 2013

B.S., Environmental Biology, Plymouth State University, 2003

AREAS OF EXPERTISE

Avian Ecology

Bat and Avian Acoustic Surveys

Water and Stream Sampling and Assessments

Habitat Assessments

Biological Assessments

PROFESSIONAL AFFILIATIONS

The Wildlife Society, New England Chapter

Rocky Mountain Elk Foundation

TRAINING/CERTIFICATIONS

Wilderness First Aid, Freeport, ME (2018)

USFWS Qualified Bat Surveyor in VA, PA, NJ (2018)

Personal Survival Techniques, Mass Maritime Academy, Buzzards Bay, MA (2017)

Bat Acoustic Survey Techniques and Analysis, BCM, Canoe Creek, PA (2015)

GIS Certificate, University of Idaho (2012)

NEPA Training (2010)

OFFICE LOCATION

Portland, ME

YEARS OF EXPERIENCE

18

YEARS WITH FIRM

8

Confidential Clients, NLEB Acoustic Bat Surveys, ME, NH, MA, MI, PA and CT. 2014–2021. Deployed hundreds SM3 and SM4 bat detectors for over 20 independent projects and conducted habitat assessments at each location in accordance with United States Fish and Wildlife Service (USFWS) Indiana Bat Summer Survey Guidelines. Preformed Habitat Assessments, analyzed bat acoustic data, manually vetted recordings to confirm species presence, and summarized data for reports

Grassland Bird Surveys Cutler, ME Massena, and Rouses Point, NY. 2016–2021. Conducted grassland bird surveys following the New York State Department of Environmental Conservation Survey Protocol for state-listed Breeding Grassland Bird Surveys. Point count surveys were conducted throughout breeding June and July. All bird species encountered were identified and recorded. Vegetation surveys using a Robel pole accompanied all point count surveys. Prepared reports on avian use and vegetation response to management actions on this solar mitigation parcel.

Multiple Clients (Navy, Commercial, Private Landowners) Deer Winter Area (DWA) surveys, Cutler, ME; Hartland, ME; Gardiner, ME and Greenville, ME. 2016–2020. Task lead for multiple projects to assess potential Deer Winter Areas (DWAs) throughout Maine. Developed methodologies to meet project objectives. Used a combination of desktop analysis and field surveys. Conducted spring pellet count and browse intensity surveys to spatially quantify use intensity on the landscape. Conducted winter track surveys to determine level of use and identify habitat types. Classified stands based on MDIFW DWA classifications. Prepared reports of findings.

Confidential Client, Vernal Pool Surveys, Hartland, ME; Bingham, ME; Winslow, ME and Winchendon, MA. Spring 2018–2021. Vernal pool inventory team member for five large proposed solar projects in northern Massachusetts and central Maine. Surveys followed established survey protocols available from the Maine Association of Wetland Scientists and the Maine Department of Environmental Protection (Winslow site), and the Massachusetts Division of Fisheries and Wildlife Guidelines for Certification of Vernal Pool Habitat (Winchendon site). Vernal pools and potential vernal pools were located, delineated, mapped, and monitored in the spring/early summer. Described vegetation and habitats associated with vernal pools.

US Navy, USACE, Shorebird Surveys, Cutler, ME, Jersey shore, NJ. 2014–2016. Conducted ISS shorebird surveys in 2014 and 5 surveys in 2016 in accordance with International Shorebird Survey (ISS) protocol with a focus on Red Knots. Monitored the occurrence, distribution, relative abundance, behavior patterns and age distribution of migrating red knots using six Corps project areas on the coast of New Jersey. Managed and analyzed ISS shorebird data collected during the first year of USACE beach nourishment projects.

Plymouth State University, Department of Biology, Graduate Research Assistant, Plymouth, NH. 2011–2013. Lead investigator for study "Assessing the influence of Wind Development on high elevation avian species in northern New Hampshire". As the project lead, hired, trained, and supervised five field technicians, and conducted and supervised all survey efforts in 2011and 2012, including: point counts for avian species, capture and radio tracking of Bicknell's thrush (*Catharus bicknelli*), and vegetation sampling.

USDA, Forest Service, Biological Science Technician, Idaho Panhandle National Forest, Sandpoint, ID. 2008–2010. Performed a variety of hydrologic and habitat related duties. As an inspector, evaluated best management practices of road decommissions and improvements, and road and culvert evaluations to determine watershed functionality and potential risks; and timber harvests to ensure practices were in accordance with contractual obligations and National Environmental Policy Act guidelines. Also carried out stream surveys in accordance with Rosgen protocol for physical characteristics and R1 /R4 protocol to determine fish habitat suitability for monitoring and to establish baseline data prior to timber sales.

Idaho Department of Fish and Game, Wildlife Technician, ID. 2006–2008. Worked on multiple projects including: 1) winter surveys for fisher (*Martes pennanti*) by snow tracking, remote camera trapping, and establishing hair snare stations., 2) and as technician for the Pend Orielle Wildlife Management Area, conducted pair and brood counts for various waterfowl species; maintained and serviced waterfowl nesting structures; quantified vegetative communities using Habitat Evaluation Protocol. and 3) spawning Kokanee salmon (*Oncorhynchus nerka*) at an in-stream fish trap and then transporting eggs to be reared in Cabinet Gorge Fish Hatchery.

USDA Forest Service, Biological Science Technician. R5 Porterville, CA. 2004–2005. Participated in long-term monitoring program in the Sierra Nevada Mountains for forest carnivores with fisher and marten (*Martes americana*) as the primary target species. Participated in with Pacific Southwest Research Station pilot study to determine effects of forest management (timber removal, controlled burns) on fisher distribution. Thorough vegetation sampling and study testing effectiveness and permeability of hair snare designs was part of responsibilities.

New England Institute of Landscape Ecology, Ecological Biological Technician, Cannan, NH. 2003. Assisted with a territoriality study of Canada warbler (*Wilsonia canadensis)* during breeding season, including mist-netting with use of playbacks, banding, daily monitoring of individual birds, nest searching/monitoring, habitat sampling, geographic information system mapping, and data entry.

Vermont Institute of Natural Science, NH Habitat Sampling, NY, VT. 2003. Conducted habitat sampling using transects in remote high-elevation locations compliment point counts for Mountain Bird Watch.

Student Conservation Association, Forest Ecology (Bio tech), Great Smoky Mountain National Park, TN. 2002. Conducted full survey of all vascular plant species, measured volume of coarse woody debris, and collected soil samples at long-term inventory sites as part of the Great Smoky Mountain National Park Forest Ecology Crew.

TETRA TECH

Mao Teng Lin
Wildlife Biologist/Environmental Scientist

EXPERIENCE SUMMARY

Mr. Lin is a wildlife biologist and environmental scientist with over 17 years of experience providing natural resource assessments and environmental permitting support for local, state, federal, and commercial clients. His field skills include performing wildlife habitat assessments, conducting wildlife surveys, and delineating natural resources. Mr. Lin has written, reviewed, and edited numerous natural resource reports. Prior to Tetra Tech, Mr. Lin worked for the U.S. Fish and Wildlife Service as a natural resource planner, wildlife biologist, and outreach specialist (2005–2014); and as a naturalist and educator in Massachusetts (2004) and Georgia (2003–2004). He currently serves as the Program Chair for the Maine Chapter of The Wildlife Society and previously served as Chapter President (2015) and Board Member (2014–2019).

RELEVANT TETRA TECH EXPERIENCE

Confidential Solar Energy Project; Confidential Client; Slate Hill, New York; 2021. Assessed habitat for the federal and state-listed Indiana bat and northern long-eared bat and deployed SM-4 bat acoustic detectors.

Confidential Energy Infrastructure Project; Confidential Energy Company; Agawam, Massachusetts; 2021. Field biologist conducting post-construction monitoring of a right-of-way for invasive species, wetland recovery, riparian buffer zone revegetation, and general vegetative cover and stabilization.

Western Maine Renewable Energy Project; Western Maine Renewables; Moscow, Maine; 2020–Present. Deputy project manager, task lead, and field biologist for natural resource surveys for a proposed wind energy project. Surveys included northern long-eared bat summer and winter habitat assessments, wetland delineation/verification, vernal pools, rare natural communities, rare plants, invasive plants, bald and golden eagles, raptors, Canada lynx, Roaring Brook mayfly, northern bog lemming, and northern spring salamander. Incidental observations of insect pollinators were also documented. Prepared, reviewed, or edited all technical reports and related permit sections.

Massachusetts Department of Transportation; Statewide, Massachusetts; 2015–Present. Field biologist for transportation-related projects including northern long-eared bat habitat assessments, bat acoustic detector deployments (SM-3, SM-4), vernal pools, and raptor nest monitoring.

Saddleback Ridge Wind; Patriot Renewables; Carthage, Maine; 2016–Present. Deputy project manager, task lead, or field biologist for natural resource surveys for an existing 12-turbine wind energy project and proposed four-turbine expansion. Surveys include northern long-eared bat habitat assessments, rare natural communities, post-construction fatality monitoring, bald and golden eagles, raptors, rare plants, invasive plants, and northern bog lemming. Prepared, reviewed, or edited all technical reports and submitted them to the client and appropriate agencies.

Confidential Solar Energy Project; Confidential Client; Hartland, Maine; 2021. Assessed habitat for northern long-eared bat, deployed SM-4 bat acoustic detectors, conducted vernal pool surveys, delineated streams, and surveyed for rare and invasive plants.

EDUCATION

Environmental Studies-Conservation Biology, Antioch University New England

BA, Environmental Studies, Binghamton University, 2002

AREAS OF EXPERTISE

Habitat Assessments

Wetland Delineations

Vernal Pool Surveys

NEPA and State Environmental Policy Support

Endangered Species Act Compliance

Invasive Species Surveys and Management Plans

Rare, Threatened, and Endangered Plant and Wildlife Species Surveys

Construction Compliance and Monitoring Support

Aerial Surveys

Electronic Field Data Collection

PROFESSIONAL AFFILIATIONS

The Wildlife Society (Maine Chapter, Program Chair)

TRAINING/CERTIFICATIONS

OSHA 30 HR Construction

Wilderness First Aid (2021)

CPR, AED, First Aid (2021)

Bat Acoustic Detection (2017)

OFFICE LOCATION

Portland, ME

YEARS OF EXPERIENCE

17

YEARS WITH FIRM

7

Canton Mountain Wind; Patriot Renewables; Canton, Maine; 2016–2021. Deputy project manager, task lead, or field biologist for natural resource surveys for an eight-turbine wind energy project. Pre-construction surveys included a Phase I environmental site assessment, wetland delineation, and vernal pools, and re-flagging natural resource boundaries and buffers prior to construction. Post-construction surveys include fatality monitoring, avian radar, and invasive plants. Prepared, reviewed, or edited all technical reports and submitted them to the client and appropriate agencies.

Confidential Solar Energy Project; Confidential Client; Clinton, Fairfield, and Benton, Maine; 2018–2020. Field biologist for natural resource surveys for three potential solar energy projects and associated connector lines. Surveys included bat habitat assessments, SM-3 bat acoustic detector deployment, wetland delineation, vernal pool documentation, natural community identification, and rare plant verification/mapping. Summarized results of the rare plant and natural community survey in a technical memorandum.

U.S. Navy; Northern Long-eared Bat Presence/Absence Surveys and Reports; Northeast and Mid-Atlantic U.S.; 2015–2020. Wrote or provided technical review and editing of northern long-eared bat mist-netting and presence/absence survey reports for multiple survey efforts throughout the northeast and mid-Atlantic. Also provided data management support and assisted with mist-net surveys. Reports were written, reviewed, and edited to ensure compliance with U.S. Fish and Wildlife Service guidelines.

Various Commercial Wind Energy Clients; Northern Long-eared Bat Presence/Absence Survey Reports; Various U.S. Locations; 2015-2020. Provided technical review, editing, and data management support for northern long-eared bat presence/absence survey reports for multiple survey efforts throughout the U.S. Reports were reviewed and edited to ensure compliance with U.S. Fish and Wildlife Service guidelines.

U.S. Navy; Natural Resource Assessments; Maine; 2015–2018. Performed a variety of natural resource services at three installations in Maine including erosion assessment, wetland delineation, vernal pool surveys, invasive plant species mapping and assessment, bat habitat assessment, bird and bat fatality monitoring, rare natural community mapping, and the development of a wild edible plant guide.

Maine Department of Transportation; Natural Resource Assessments; Maine; 2016–2017. Field Biologist. Completed bridge, roost tree, desktop, and field-based habitat assessments; deployed Wildlife Acoustics SM-3 bat acoustic detectors; and completed associated technical memoranda for the northern long-eared bat at multiple road and bridge improvement sites throughout Maine. Work was completed following guidelines from U.S. Fish and Wildlife Service, Federal Highway Administration, and Federal Railroad Administration. Assessed culverts and wetland boundaries along a major interstate highway.

Confidential Development Company; Wildlife Habitat Study; Dedham, Massachusetts; 2017. Conducted a wildlife habitat study with technical memorandum for northern long-eared bat and other species in a residential area slated for development.

Tantara Corporation; Northern Long-eared Bat Survey; Portland, Maine; 2016. Deployed Wildlife Acoustics SM-3 bat acoustic detectors, conducted desktop and field-based bat habitat assessments at each deployment site, and conducted visual roost inspections for the northern long-eared bat at Fort Gorges located on Hog Island Ledge in Portland, Maine as part of a hazard mitigation study.

Confidential Solar Energy Project; Northern Long-eared Bat Presence/Absence Surveys; Sanford, Maine; 2016. Deployed Wildlife Acoustics SM-3 bat acoustic detectors and assessed bat habitat at each deployment site. Work was performed in advance of grid-scale solar development and followed U.S. Fish and Wildlife Service guidelines.

RELEVANT PREVIOUS EXPERIENCE

Fish and Wildlife Biologist; U.S. Fish and Wildlife Service; MA and ME; 2005–2014. Conducted ground-based avian censuses, aerial avian surveys, bird banding, monitoring for avian productivity, invasive species control, and predator control. Provided planning assistance, compiled Comprehensive Conservation Plans for the National Wildlife Refuge System, and managed outreach and communication.

Naturalist Educator; Driftwood Education Center; GA; 2003–2004. Led classes, workshops, and field trips for schools in the southeast focused on the ecology of coastal habitats, wetlands, and long-leaf pine forests. Field trips included Cumberland Island National Seashore and Okefenokee National Wildlife Refuge.

EXHIBIT 7-9 CANADA LYNX REPORT

Canada Lynx Survey Report 2021

Hartland Solar Project
Somerset County, Maine

Bobcat at Camera 1

Prepared For:

Hartland Solar Facility, LLC

500 Union Street Suite 625
Seattle, WA 98101

Prepared By:

Tetra Tech, Inc.
Complex World, Clear Solutions™
451 Presumpscot St., Portland, ME 04103 | tetratech.com

Final September 2023

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1.0 INTRODUCTION

Hartland Solar Facility, LLC is working to develop the Hartland Solar Project (Project), a ground-mounted solar photovoltaic system with a capacity of 140 megawatts of alternating current, located in the Town of Hartland, Somerset County, Maine. Hartland Solar Facility, LLC contracted Tetra Tech, Inc. (Tetra Tech) to conduct Canada lynx (*Lynx canadensis*) surveys within an approximately 1,700-acre Study Area (Figure 1) using remote cameras during the winter of 2021. In general, the Study Area can be described as rural and forested and analysis indicates that nearly 71% of the Study Area consists of woody wetlands, mixed forest, and evergreen forest land cover types.

The objective of this survey was to provide information on presence of Canada lynx in representative habitats within the Study Area. This survey report provides details on survey methods, quantitative results, and implications of results. Appendix A includes photos and describes all survey sites. Appendix B summarizes camera checks. Appendix C includes representative photos of Canada lynx and other species of interest detected.

The Canada lynx is a federally threatened species under the 1973 Endangered Species Act (ESA) and a State Species of Special Concern in Maine, occurs in northern and western portions of Maine. Federal listing of Canada lynx as threatened by the U.S. Fish and Wildlife Service (USFWS) has undergone several iterations since the species was first listed throughout the contiguous U.S. in 2000 (USFWS 2017). In 2014, the USFWS revised Endangered Species Act (ESA) protections into six distinct population segments (DPS) and identified critical habitat designations therein. In the contiguous U.S., Northern Maine (Unit 1) is the largest of all units. Designated critical habitat occurs from approximately the southern end of Moosehead Lake east to Interstate 95 (USFWS 2014). In 2018, the USFWS completed scientific review of Canada lynx in the contiguous U.S. and concluded that the species may no longer warrant listing on the ESA and should be considered for delisting (USFWS 2018). However, before a new proposed rule delisting Canada lynx was completed by the USFWS, a suit was brought forth by independent scientists and wildlife advocates stating that protections under the ESA are still warranted and citing concerns that climate change could threaten the long-term stability of lynx populations. On November 1, 2021, a federal judge and the USFWS agreed to uphold the current listing status as threatened. The USFWS will complete a new recovery plan for Canada lynx by 2024 as part of the deal (Brown 2021).

The Study Area is located in Wildlife Management District (WMU) 17, in what is considered Dispersal range of Canada lynx (Vashon and DePue 2004). Lynx have been documented in WMD 17, but observations were associated with telemetry data by two individuals over a 26 and 9-day period, neither of which remained in the area. An incidental take plan and minimization measures for trapping are in place within the lynx range, yet WMD 17 is not currently within the defined lynx range and minimization measures are not required. Although the Study Area lies south of the federally designated critical habitat area of Maine, protections afforded by the ESA apply to all lynx within the range where listed and are protected from "take", which includes harming and harassing animals.

2.0 METHODS

This camera survey followed methodologies developed by Nielsen and McCollough (2009) and Sirén (2014). Camera stations included use of a long-range visual attractant, which consisted of a hanging compact disc (CD); and a short-range attractant, which consisted of a turkey feather attached to a swivel on rigid wire to prevent tangling. CDs were hung in locations where they could be seen from afar (e.g., along skid roads) and turkey feathers were hung closer to the camera station but outside of the camera's

trigger zone. A variety of olfactory attractants (lures) have been used for Canada lynx, including beaver (*Castor canadensis*) oil with catnip and general predator call lure. A combination of beaver castor and catnip lure were used at three of the camera stations and a sunk-scented general predator call lure (Caven's Gusto) was used at four of the camera stations. Multiple lure types were used to serve as a comparative variable to test each lure's efficacy as an attractant for Canada lynx, to broaden target species for all predators, and because Gusto is the preferred lure type for carnivore surveys throughout the northeast. Lures were applied to an approximately 2 x 2-inch carpet square attached to a snow stake, which consisted of a wooden stake marked at 10-centimeter increments. One snow stake was included within the trigger zone at each camera station to provide a size reference for animals detected and to track snow depth throughout the winter.

Cameras were oriented north on a tree 1–2 meters above the ground or snow surface and 3–5 meters from the snow depth. Browning Spec Ops Advantage cameras (featuring 20 megapixels and no glow infra-red flash) and Browning Strike Force Pro XD (featuring 24 mega pixels and dual lens for day and night images) were used for the surveys. Each camera was equipped with 6 AA lithium batteries at survey start. Cameras were checked twice a month to download data, refresh attractants, replace batteries (as necessary), and to ensure cameras were working properly. Camera station locations were selected to provide thorough coverage of representative habitats within the Study Area (original and modified boundaries). In all, seven camera stations were deployed in 2021 (Table 1). Camera station locations and photos were recorded with an iPad using the ESRI Collector application. Photos of the camera stations and surrounding habitats are provided in Appendix A.

All recorded images were reviewed, and animal observations tallied, along with ancillary information including: visit date, camera station location, date, time of detection, the number of images, species detected, and behavioral notes. Each individual detected was recorded as an "event" and received a count of "one." Events better represent the total number of individuals than the number of images because a single animal may trigger multiple images, but they are not an accurate measure of abundance.

In addition to camera surveys, incidental white-tailed deer (*Odocoileus virginianus*) tracks observed in snow conditions were recorded while servicing cameras to inform a concurrent task assessing use of deer winter areas within the project.

Table 1. Camera Station Location and Habitat Descriptions for the Hartland Solar Project, 2021.

Camera Station	Latitude	Longitude	Lure Type	Camera Station Description
1	44.852065	-69.579316	Gusto	Located off main road in mixed, mid-successional mixed forest.
2	44.862619	-69.58085	catnip/castor	Located along a grown in two-track at the interface of softwood and hardwood stands.
3	44.874489	-69.580531	Gusto	Camera oriented toward main road backed by mixed forest.
4	44.892193	-69.584473	catnip/castor	Located within mature hemlock dominated stand near extensive wetland.
5	44.866045	-69.565713	Gusto	Camera oriented toward main road backed by softwood stand.
6	44.869548	-69.537094	catnip/castor	On the edge of a mixed forest and beaver impoundment.
7	44.871984	-69.603786	Gusto	On the edge of a mid-successional softwood stand beyond landing.

3.0 RESULTS

Seven camera stations were deployed in the Study Area in the winter of 2021. Four camera stations were initially deployed on February 5, 2021, and then three additional camera stations were deployed on February 25, 2021, in response to a revision to the Project's proposed layout and subsequent changes to the Study Area. All camera stations were demobilized on April 29, 2021. Camera stations were fully operational for the entire survey period and resulted in a total of 519 camera nights (Table 2). Several days were missed at camera station 7 prior to demobilization because the data cards were filled on April 27, 2021 (due to numerous false triggers by sun, shade, and wind, which can be common in the spring).

Camera stations recorded a total of 282 individual capture events during the 2021 survey (Table 3). No Canada lynx were recorded during the survey and no incidental tracks of Canada lynx were observed. Snowshoe hare (*Lepus americanus*) were the most abundant species recorded with 75 individual capture events. Camera stations 5 and 4 recorded the most events (n=79; 50, respectively). White-tailed deer was the second most abundant mammal recorded followed closely by coyote (*Canis latrans*).

Although less informative than records of individual capture events, the number of images does provide insight into species behavior near a camera station (Table 4). First, curiosity with foreign objects and scent and second, how much time an animal spends within a microsite demonstrating behaviors unrelated to the presence of the scent station (e.g., foraging or hunting). White-tailed deer generated the most images (n=566) followed by snowshoe hare (n=402). Occasions when a group of deer lingered in front of the camera triggering many images of the same animals lead to the high number of images collected for the species. Snowshoe hare commonly feed along edges at night or interacted with other hares, leading to many images captured of the same individuals. Coyote and bobcat (*Lynx rufus*) both exhibited curious behaviors around the stations.

Although no Canada lynx were detected in the Study Area, bobcat were detected at five of the seven camera stations with the greatest concentration and consistency occurring in March, which also had the greatest number of survey days (3). Most detections (n=9) were recorded at camera station 2, which was located on an overgrown skid road within a large block of dense, softwood dominated forest. In one instance, a bobcat was observed rubbing on the carpet square with Gusto affixed to the snow stake. Representative photos of bobcat, other species detected, and camera stations are included in Appendix C.

Fair tracking conditions were encountered on deployment and check dates and observations of other species such as coyote and deer were collected. An active bait site was located approximately 800 meters west of camera station 5 just south of the road. A high concentration of coyote tracks was observed in this area on multiple visits. Snow was out in the Study Area by the pull date on April 29, 2021.

Table 2. Cumulative Camera Survey Nights at the Hartland Solar Project, 2021.

Camera Station	Dates	Total Camera Nights
1	2/5–4/29	83
2	2/5–4/29	83
3	2/5–4/29	83
4	2/5–4/29	83
5	2/25–4/29	63
6	2/25–4/29	63
7	2/25–4/27	61
Total Camera Nights		**519**

Table 3. Number of Capture Events for Mammal Species Detected at Camera Stations at the Hartland Solar Project, 2021

Species	Camera Station							Species Total
	1	2	3	4	5	6	7	
Black bear					1			1
Bobcat		5		2	5	3	1	16
Coyote	2	2	2	10	26	3	2	47
Fisher	1	2		1	1		2	7
Flying squirrel							2	2
Mink						1		1
Moose			3				1	4
Porcupine	1		2		2			5
Snowshoe hare	16	27	12	1	7	6	6	75
Ruffed grouse	1	2			1	1	3	8
Red squirrel		5		7	2	3	4	21
Eastern wild turkey				2	28	3	2	35
Short-tailed weasel			1					1
Northern goshawk				1				1
White-tailed deer		5	17	27	6		3	58
Station Totals	**21**	**49**	**37**	**50**	**79**	**20**	**26**	**282**

Table 4. Number of Images Recorded by Species at the Hartland Solar Project, 2021

Species	Camera Station							Species Total
	1	2	3	4	5	6	7	
Black bear					3			3
Bobcat		49		6	26	11	2	94
Coyote	6	14	8	24	58	10	3	123
Fisher	4	15		3	1		7	30
Flying squirrel							4	4
Mink						3		3
Moose			64				2	66
Porcupine	3		9		6			18
Snowshoe hare	37	106	126	3	26	13	91	402
Ruffed grouse	1	5			3	1	5	15
Red squirrel		20		13	5	19	5	62
Eastern wild turkey				6	148	7	6	167
Short-tailed weasel			1					1
Northern goshawk				1				1
White-tailed deer		77	188	219	65		17	566
Station Totals	**51**	**287**	**396**	**274**	**341**	**64**	**142**	**1,555**

4.0 DISCUSSION

4.1 Canada Lynx Absence Within the Study Area

Canada lynx were not detected during the 2021 winter survey in the Study Area. However, absence does not mean that it is not possible for Canada lynx to occur within or pass through the Study Area, but it is unlikely that a persistent population occurs in the vicinity of the Project. Other winter camera trap and incidental tracking surveys for Canada lynx performed by Tetra Tech have been very successful documenting presence with a similar level of effort as this survey.

Distribution and abundance of Canada lynx in Maine is a product of several factors. First, the species was historically distributed in boreal areas in areas with greater snow depth (Hoving et al. 2005). As snow depths increase, competition from other predators such as bobcat, coyote, and fisher (*Pekania pennanti*), decline (Mowat et al. 2000, Carroll 2007). Second, habitat and the population of prey base within (snowshoe hare in the case of Canada lynx) is the ultimate driver of Canada lynx distribution and carrying capacity on the landscape (Krebs et al. 2001, Fuller et al. 2007). Canada lynx are dependent on high densities of snowshoe hare for survival (Krebs et al. 2001, Harrison et al. 2013) and therefore share common habitat preferences with snowshoe hare. Both species are associated with spruce-fir forests with dense understory to provide food and cover in deep snow conditions (Mowat et al. 2000, Fuller et al 2007, Simons-Legaard et al. 2016). Forest type in central Maine transitions from hardwood to softwood dominated (Mccaskill et al. 2016), where dense softwood stands, particularly following large clear cuts are more prevalent. In the Project vicinity softwood stands are present but tend to have a strong hemlock component and are more mature, a quality better suited for deer than snowshoe hare and Canada lynx.

Northern Maine (Unit 1) is the largest of all Critical Habitat units in the contiguous U.S. at 28,909 square kilometers. The southern boundary of the final designated Critical Habitat extends approximately from the Canadian border east to West Forks, to the southern end of Moosehead Lake, and then to Interstate 95 near Millinocket. The Study Area is outside of the designated Critical Habitat and south of what Maine Department of Inland Fish and Wildlife (MDIFW) identified core Canada lynx range in Maine by Lynx Wildlife Management Districts (WMD; Vashon et. al 2012), which extends slightly south of the USFWS critical habitat with WMD 14 as a southern most unit. The peripheral range expands south to include WMD 17 where the Project is located. However, credible Canada lynx sightings from 2000 to 2017 indicate only a single observation in WMD 17 where the Project is located (MDIFW 2018). This survey provides strong support for the known southernmost range for Canada lynx in central Maine.

Influences interspecific competition with other carnivores, as related to average snow depths, may play an additional limiting role in Canada lynx abundance. Species such as coyote and bobcat are not typically associated with areas with a deep snowpack because they have higher foot loading ratios (measured in grams per square centimeter), which influences sinking depth and energy expenditure in snow (Buskirk 2000). Whereas the Canada lynx is morphologically adapted to deep snow, as is the snowshoe hare, and can out compete other carnivores in regions with high snowfall. The relationship to bobcat is specifically described as inference competition, as bobcats can exclude the presence of Canada lynx altogether, creating mutually exclusive ranges (Buskirk 2000) as observed by Parker et al. (1983) on Cape Breton Island when bobcat displaced Canada lynx from low lying areas. In central Maine, some overlap in occurrence of bobcat and Canada lynx near the southern range of Canada lynx was documented by Tetra Tech in other studies (Tetra Tech 2022).

Results from other recent winter surveys by Tetra Tech suggest that lure *type* may not be a strong factor influencing detection rates. Habitat and microsite position of the camera likely has a larger influence on

detection rates. It is likely that the *presence* of a lure increases likelihood of predator detection as it incites curiosity and marking behaviors across species thus encouraging more animals within the trigger window of the cameras.

4.2 Non-Target Species Activity and Seasonal Use

Surveys also provided additional information on other predator species within the Study Area. Interspecific competition with other predators including eastern coyote, fisher and bobcat can influence Canada lynx survival and distribution (Buskirk 2000, Guillaument et al. 2015, McLellan et al. 2018, Marrotte et al. 2020). Coyote detections were common throughout the winter survey. Bobcats were observed during the 2021 winter survey and were first detected on March 1, 2021, weeks after the survey was initiated. Detections were then regular through April 20, 2021, when the last bobcat was detected. Findings in 2021 support the notion of mutually exclusive distributions between bobcat and Canada lynx (Marrotte et al. 2020).

Ancillary information for other mammal species on habitat use, seasonal activity, and behavior at camera stations was also generated by camera data. Snowshoe hare, the most important food source for Canada lynx (Krebs et al. 2001) were present at all camera stations. Most hare were recorded in March, which coincides with their breeding period. Based on time stamps and direction of travel, it appeared as though scent trailing, and chasing was occurring during this time frame as well.

White-tailed deer were present in the Study Area but were not detected until March 23, 2021, from which time they were recorded consistently until the cameras were pulled on April 29, 2021. This suggests that deer may not winter within the Study Area when snow depth was greatest and then moved back into the area once the snow receded prior to green up. Moose were recorded on four events with the first on March 7 and last on April 12, 2021. A single black bear was recorded on April 24, 2021, after the snow mostly receded (Appendix C, Photo 7). Another interesting observation included a Northern goshawk recorded on March 9, 2021 (Appendix C, Photo 10).

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FIGURES

APPENDIX A. PHOTOGRAPHIC DOCUMENTATION OF HABITATS AT CAMERA STATIONS

Photo 1: Cam1 – Camera view from edge

Photo 2: Cam1 – Station setup and camera

Photo 3: Cam2 – View from camera to two-track within softwood stand

Photo 4: Cam2 – Station setup and camera along softwood edge

Photo 5: Cam3 – Camera view along edge

Photo 6: Cam3 – Station setup on softwood edge

Photo 7: Cam4 – Camera view

Photo 8: Cam4 – Snow stake within mature hemlock stand

Photo 9: Cam5 – View south and softwood edges along road

Photo 10: Cam5 – Station setup

Photo 11: Cam6 – Camera view (Notice tracks present at set up)

Photo 12: Cam6 – Beaver impoundment east of camera

APPENDIX B. CAMERA CHECK SUMMARY

Date	Station(s)	Lynx Detected at Station(s)	Actions
2/5	1–4	NA	Deployment
2/23	1–4	none	camera check, lure refreshed
2/25	5--7	NA	Deployment
3/17	1–7	none	camera check, lure refreshed
4/2	1–7	none	camera check, lure refreshed
4/29	1–7	none	pulled

APPENDIX C. REPRESENTATIVE CAMERA STATION PHOTOS OF CANADA LYNX AND OTHER SPECIES OF INTEREST

Photo 1: Cam1 – Bobcat interested in scent on snow stake (Note: time and date reset and is incorrect).

Photo 2: Cam1 – Bobcat scent marking carpet square (Note: time and time and date reset and is incorrect).

Photo 3. Cam6 – Bobcat traveling adjacent to beaver impoundment.

Photo 4: Cam7 – Bobcat traveling post snow out.

Photo 5: Cam1 –Snowshoe hare in full winter conditions.

Photo 6: Cam7– Snowshoe hare post snow out and color phase transition.

Photo 7: Cam5 – Black bear traveling down road post snow out.

Photo 8: Cam7 – Fisher captured on camera after snow out.

Photo 9: Cam4 –White-tailed deer curious about scents and feather.

10: Cam4 –Northern goshawk captured in flight.

Photo 11: Cam1– Fisher captured during deep winter conditions.

EXHIBIT 7-10 DEER WINTERING AREA REPORT

Deer Winter Area Survey Report 2021

Hartland Solar Project
Somerset County, Maine

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Table 1. DWA Survey Visit Summary for the Hartland Solar Project, 2021. 4

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Appendix A. Photographic Documentation of Habitats at Camera Stations

1.0 INTRODUCTION

Hartland Solar Facility, LLC (Project Company) is proposing to construct the Hartland Solar Project (Project), a ground-mounted solar photovoltaic system with a capacity of 140 megawatts of alternating current, located in the Town of Hartland, Somerset County, Maine. Project Company contracted Tetra Tech, Inc. (Tetra Tech) to conduct a Deer Winter Area Survey within an approximately 1,700-acre Study Area (Figure 1) during the winter of 2021. In general, the Study Area can be described as rural and forested and analysis indicates that nearly 71 percent of the Study Area consists of woody wetlands, mixed forest, and evergreen forest land cover types. The Study Area is located in Wildlife Management District (WMU) 17, in the vicinity of several mapped DWAs.

As a limiting resource for white-tailed deer (*Odocoileus virginianus*) in Maine, Deer Wintering Areas (DWAs) have been studied extensively and the methods for determining areas that serve as one are well defined (Pekins and Tarr 2008, MDIFW 2010, Wiley and Hulsey 2010). Functional DWAs require specific structural and compositional forest characteristics, size, food sources and connectivity to other DWAs. Areas designated as Primary Winter Shelter provide shelter for deer in severe winter conditions and include softwood stands with greater than 70 percent crown closure and are 35 feet in height. Secondary Winter Shelter has the same characteristics but has less crown closure (50–70 percent) (Maine Department of Inland Fisheries and Wildlife [MDIFW] 2010). Classifying a DWA first requires identifying stands that meet DWA criteria and then verifying use through on-the-ground surveys (i.e., desktop assessment and ground-truthing).

Not all MDIFW mapped DWAs are created equal. In the 1990s winter severity and loss of deer yards was identified as the greatest limiting factor on Maine's deer herd and an effort was made by MDIFW to map and survey all deer yards in northern Maine. Yards were assigned values of low, moderate to high value based on measured characteristics and evidence of use. Deer yards were also mapped in central and southern Maine by aerial imagery. These mapped DWAs were not surveyed and labeled "indeterminant value" (MDIFW, personal communication, agency call February 22, 2021). In effect, mapped DWAs in central and southern Maine are not verified and landowners were not contacted by the state. A two-phase approach should be used to confirm active DWAs in Maine: 1) verify stand characteristics are suitable and 2) verify use by deer.

Designation and mapping of DWAs in Maine is solely under the jurisdiction of MDIFW. Therefore, our intent was not to delineate DWAs or conduct stand evaluations, but rather adhere to the general two-phase approach above to determine if a DWA is active. Objectives of this survey was three-fold 1) Assess current forest condition and see if forest composition and structure meet the criteria for what can serve as DWA in Maine, 2) Assess use and determine if mapped DWAs are functional under current conditions, and 3) determine if connectivity exists among mapped DWAs and if this overlaps with the Study Area.

This survey report provides details on survey methods, quantitative results, and implications of results. Appendix A includes habitat photos and evidence of deer use observed during surveys.

2.0 METHODS

A DWA survey was completed in the winter of 2021 to determine the level of use and suitable habitat for white-tailed deer within the four areas mapped by MDIFW as DWAs within or immediately adjacent to the proposed Project. For reference throughout this report, these specific areas will be referred to as DWA A, B, C, and D (Figure 1). Survey efforts were paired with a concurrent camera survey for Canada Lynx

(*Lynx canadensis*) and a total of seven visits were conducted throughout the season. Visits targeted mid-February and mid-March during anticipated peak snowpack periods. Specific survey dates were dictated by weather, such that surveys were conducted in favorable conditions (e.g., five days after previous snowfall with little additional precipitation and wind, thus allowing fresh tracks and sign to accumulate). Meander surveys were conducted throughout the mapped DWAs to document concentrations of deer tracks, pellets, beds, evidence of browse and trails. In addition to meander surveys, transects approximately 656 feet (200 meters) apart will be traversed through DWAs using an iPad and receiver with the Collector Application to ensure thorough coverage. This approach enabled surveyors to identify patterns of highest use within the mapped DWAs, as well as areas with lesser to no use. When possible, surveys classified stands and areas as Primary Winter Shelter, Secondary Winter Shelter, Non-Mature/Future Shelter Stands, Travel Corridors and Winter Foods. In addition, all incidental deer observations were recorded when traveling roads within the Study Area when deploying, checking, and pulling camera stations. Track locations and photographs were recorded using the Collector application on an iPad.

3.0 RESULTS

Deer and evidence of deer use was observed in the Study Area during surveys in the winter of 2021, though not consistently throughout the winter or in high numbers. Survey Results are presented in three categories, 1) Forest Conditions, 2) Observed Use, and 3) Timing of Use.

3.1 Forest Conditions

The first phase of classifying a DWA is determining of the stands meets required composition and structural criteria to provide effective thermal cover and reduce snowpack during severe winter conditions. In general, the Study Area has received multiple timber harvest treatments over the decades and lacks continuous stands of hemlock or mature cedar that would traditionally serve as DWAs. Forest types within the Study Area are currently a mix of young to intermediate spruce, fir, cedar regen with strong components of pine and oak in upland portions. In addition, portions of the mapped DWAs have been clear cut within the last five years and are essentially gone. Historic and recent timber harvests varied throughout the Study Area, therefore forest conditions for each DWA vary to some degree.

3.1.1 DWA A

Nearly half of this smaller DWA had been logged within the previous 5-10 years and was currently mixed early successional forest. A small softwood dominated stand was still present, but no evidence of winter deer use was observed on the February 24, 2021, transect.

3.1.2 DWA B

Nearly two-thirds of this DWA was clear cut approximately 5 years ago (Photo 1). Stands of mature hemlock remain on the far eastern edge, which abuts an extensive wetland (Photo 2). Deer sign was observed along this edge, though on the shoulders of winter (February 5, 2021 and April 2, 2021; Photo 3). Deer were captured on camera within this stand on April 15, 2021 (Photo 4). An intact softwood stand remains in the northwest quadrant of this DWA (Photo 5). It appears the recent clear cut runs up to a property boundary on the east side of this stand (Photo 6). No tracks or sign of deer was observed during a transect through this stand on February 24, 2021. This was likely a functional DWA prior to timber harvests but is no longer.

3.1.3 DWA C

A large swath along the primary road that traverses through the mapped DWA was clear cut in 2020 (Photo 7). A large area within the southeastern quadrant received multiple timber harvests several years prior. A small stand of mature softwoods remains in the far southwest corner near the primary gate that enters the Weyerhaeuser property. Older deer tracks were observed near this gate on the March 18, 2021, visit (Photo 8). Stands to the south and west of the mapped DWA appear to be softwood dominated and mature. 2018 Goggle Earth imagery indicates this stand is contiguous for 1.5 miles to the south, flanking Steam Mill Road to the west. Multiple deer trails crossing access roads were observed throughout the winter (additional details on use in section 3.2).

3.1.4 DWA D

This mapped DWA encompasses a broad, wet area flanking the East Branch of Black Stream. Our survey efforts were focused on the portions of the DWA traversed by the primary access road which may be influenced by transmission and access for the Project. Within this portion of the DWA, a large stand south of the road was harvested within the last 10 years up to the wetland boundary along Black Stream (Photo 9). A swamp/ wetland complex flanks the road as it traverses through the mapped DWA. The forest in this area is mixed, mid-successional and lacked a mature, softwood dominated canopy. The canopy was not sufficient to reduce snowpack and abundant hare sign was observed in this area, though no sign of deer during winter surveys. 2018 Google Earth imagery suggests that mature softwood stands may be present to the north along Black Stream, connecting to open water and wetland complex, but this area was beyond the Study Area boundaries and not surveyed.

3.2 Observed Deer Use

Deer and evidence of use was observed within and adjacent to Study Area during the 2021 winter surveys (Table 1). Two deer were observed in the center of the Study Area on February 5, 2021, as well as evidence of use in the center of the Study Area on February 6, 2021 (Photo 10 and 11; Figure 1). No evidence of deer use was observed within the Study Area on subsequent winter visits, although tracks and trails were observed crossing the access road, immediately west of the Study Area and DWA C, on March visits (Photos: 12 and 13; Figure 1). Images of deer were captured on multiple trail cameras within the Study Area beginning at the end of March into April (Photos: 14 and 15).

3.3 Timing of Use

Evidence of deer use within and adjacent to the Study Area appeared to be influenced by snow depth throughout the 2021 winter season. The snowpack remained low (approximately 32 cm; Photo 16) through early February when cameras were deployed for a winter lynx survey. Deer and evidence of deer browsing were observed on a February 5 and February 6, 2021 outing. Active deer trails were observed west of the Study Area on March outings. However, no evidence of deer were observed within the Study Area again until April when the snowpack receded and images of deer were captured on camera. Based on camera images, the snowpack was largely melted out by March 28, 2021 (Photo 14).

Table 1. DWA Survey visit summary for the Hartland Solar Project, 2021.

Survey Date	Deer Observed?	Deer Tracks Observed?	Deer Observations within Project Area?	Visit Summary
2/5/2021	**Yes**	**Yes**	**Yes**	2 deer observed in road within Study Area while deploying Canada lynx survey cameras. Deer tracks observed within roads at 3 locations
2/6/2021	No	No	No	No tracks observed that were new from previous day
2/23/2021	No	No	No	No tracks observed anywhere including within DWA A and B transect.
2/24/2021	No	No	No	Abundant coyote tracks in the center of Study Area. Found a coyote bait site nearby (included appropriate signage).
3/17/2021	No	**Yes**	No	Deer trail and tracks crossing road west of Study Area
3/18/2021	No	**Yes**	No	Same trails and tracks crossing road west of Study Area
4/2/2021	No	**Yes**	**Yes**	Snow fully melted. Deer tracks in road within DWA B.

4.0 DISCUSSION

The MDIFW mapped DWAs in the vicinity of the Study Area do not reflect current forest conditions. Overall, these timberlands have received multiple timber harvest over the decades and the mature softwood stands that remain are limited and occur in ribbons along streams and wetland areas. Several of the recent timber harvests encountered extended directly to boundaries flagged “wetlands”. Much of the Study Area has been previously harvested and is currently a mixed, early to mid-successional forest, lacking a mature softwood canopy closure to meet DWA criteria.

Deer and evidence of deer use were observed within and surrounding the Study Area, but timing of these of observations suggest that functional DWAs are not present as use ceased when the snowpack increased in late winter. Deer trails were observed west of the Study Area during winter, suggesting the area parallel to Steam Mill Road may serve as a corridor between functional DWAs to the north and south of the access road, though no evidence of travel was observed through the Study Area during late winter. It appears that use within the Study Area occurs on the shoulders of deep winter conditions and use relates to an interplay on timing and severity of winter conditions. For example, deer and deer tracks were observed within the Study Area on February 5, 2021 when cameras were deployed for a lynx survey. Snow depth at this time was approximately 32 centimeters. Snow depth was approximately 50 centimeters on the second visit on February 23, 2021, over 16 inches and what is considered severe winter conditions for deer in Maine (MDIFW 2010). The snowpack persisted over 30 centimeters through the third week of April (Photo 14), until the snow quickly melted out in the last week and deer immediately moved back into the area and were detected on multiple cameras (Photos 4 and 14).

In general, the forest within and surrounding the Study Area is excellent deer habitat (e.g., periodic timber harvests and renewed browse, strong oak component, some softwood stands (including mature hemlock), various waterways, wetland complexes and dense security cover). In areas where winter severity is not the limiting factor, deer can benefit from renewed browse because of frequent, active timber harvests. In addition, anecdotal conversations with Weyerhaeuser foresters indicated this area boosts a high deer population and receives a fair amount of hunting pressure.

Our observations suggest that functional DWAs do not occur within the Study Area nor do primary winter corridors traverse the Study Area in periods with deep snowpack. Based on the timing of deer observations, it is likely functional DWAs do occur nearby and deer shift use into these areas during period with deep snowpack and then back into the Study Area when the snowpack recedes.

5.0 REFERENCES

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FIGURES

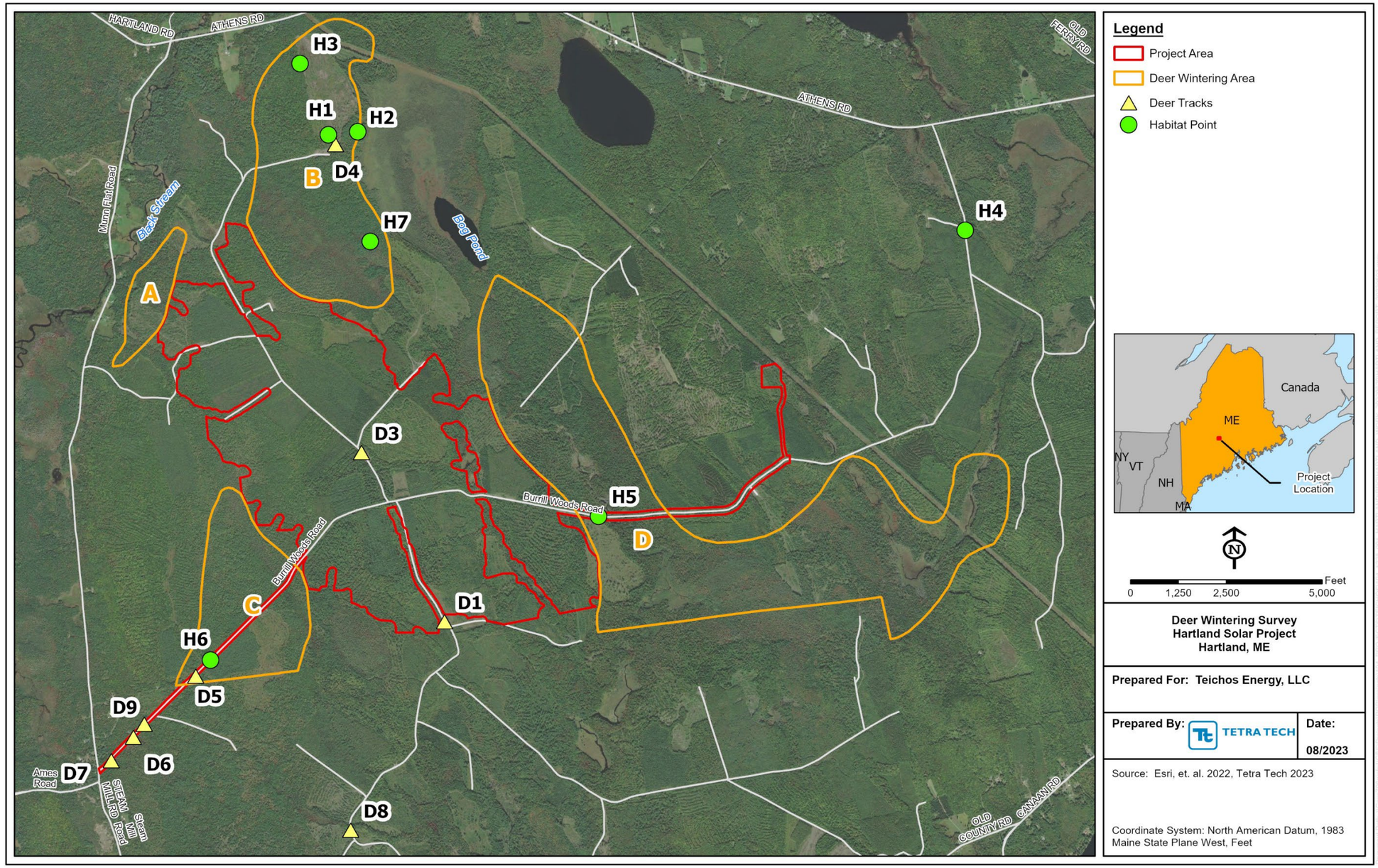

Figure 1. Study Area and Canada Lynx Camera Station Locations at the Hartland Solar Project, 2021.

APPENDIX A. PHOTOGRAPHIC DOCUMENTATION OF HABITAT AND DEER OBSERVATIONS

Photo 1: H1 point View to the North from within DWA B

Photo 2: H2 point View to the south

Photo 3: DT4 point Deer tracks browsing in cut

Photo 4: Camera photo Deer captured on camera within DWA B

Photo 5: H4 point Intact softwood northwest of DWA B

Photo 6: H3 point View south along intact softwood edge and cut

Photo 7: H6 point View northeast along access road

Photo 8: D5 point Deer track crossing road at gate

Photo 9: H5 View west from road

Photo 10: D3 point. Deer observed within Study Area on 2/5/2021

Photo 11: D2 point. Deer tracks in center of Study Area 2/2/2021

Photo 12: D6 point. Deer trail crossing road west of Study Area

Photo 13: D9 point Deer trail crossing access road

Photo 14: Deer captured on camera in center of Study Area

Photo 15: Deer captured on camera along road west of DWA D

Photo 16: Snow depth in Study Area on 2/5/2021

Photo 17: D9 point Deer trail crossing access road

Photo 14: Deer captured on camera in center of Study Area

Photo 15: Deer captured on camera along road west of DWA D

Photo 16: Snow depth in Study Area on 2/5/2021