

## Brox Environmental Citizens

### *Working to Save Wetlands & Wildlife at Special Places*

October 14, 2020

TO: Site Evaluation Committee (via email to Admin@sec.nh.gov)  
 COPIED TO: Counsel for the Public Attorney Heather Neville (NH DOJ)  
 COPIED TO: Ms. Jody Carmody, Docket Supervisor NHPUC  
 FROM: Suzanne Fournier, Coordinator of Brox Environmental Citizens (Milford)  
 RE: Closing Comments on Chinook Solar's Application

Dear Chairwoman Martin & Members of the S.E.C.,

Now near the end of the Site Evaluation Committee's review of the Chinook Solar application, I submit these comments to communicate to the Committee several environmental concerns: (a) effects of acceptance of environmental degradation of the habitat of threatened & endangered wildlife species (T&E) that sets a poor example for the rest of NH; (b) lack of necessary study of the T&E's use of the site area (with reference to the NH Supreme Court's comments); and (c) there are better sites within NH – environmentally-speaking -- than this one when compared with siting guidelines for solar developers as provided by experts (discussed in a White Paper titled Solar Arrays for NH's Public Good: Filling a Need for Low-Impact Siting Guidelines).

A. Effects of acceptance of environmental degradation of the habitat of threatened & endangered wildlife species (T&E) that sets a poor example for the rest of NH.

"The ... Project area has been logged heavily for a number of years by the property owners, which likely has had a *significant impact on the diversity of wildlife and plant life*, and which, if this Project is not approved or built, is *likely to continue into the indefinite future.*" [emphasis added] [Applicant's Closing Argument, page 8]

With these words the applicant admits to a great deal of past and ongoing environmental damage suffered at the site because of mainly logging by the landowners. The logging and other acts (e. g. the projects attorney suggested during cross-examination that the rock piles – bat habitats – might be disturbed, if the project is not granted a certificate) are expected to continue if no certificate is granted, thereby continuing the degradation.

The admission that there has been (and would continue to be) significant impact on the diversity of wildlife and plants is followed by the applicant's argument that there would be less environmental damage going forward with the solar project development under the certificate than there would be if the project does not get approved. However, the solar project itself would disturb the earth for the solar arrays to a much greater extent than logging alone. Therefore, it may or may not be true that the project's earth disturbance along with the 300+ acre conservation easement and the eventual cessation of logging would be less environmentally destructive.

Either way, the unfortunate lesson of Chinook Solar is acceptance of high-impact environmental degradation. A better scenario for the rest of NH seeking large-scale solar arrays for green energy goals is to site projects for low-impact, as discussed in comment C below.

B. Lack of necessary study of the T&E's use of the site area (with reference to the NH Supreme Court's comments).

In 2019 the NH Supreme Court issued an order in Case No. 2018-0617 [Appeal of Suzanne Fournier and a.] that included discussion of the importance of studying how T&E wildlife actually utilize a property prior to designing a project. [see p. 5]. The Court's order is enclosed as part of this comment.

In November 2020 Chinook Solar reported the results of a desktop assessment of T&E, but conducted no on-the-ground study of T&E movements, movements such as the traversing of forests and fields by Blanding's Turtles who need to make their way to the vernal pools. Without such a study the applicant cannot know how to design the project so as to best avoid negative impacts to T&E. In the 2019 case involving T&E, the NH Supreme Court admonished both DES and F&G for not preventing adverse impacts in the design. A study in that case would have shown both agencies the clear path for the applicant to avoid the adverse impacts to the T&E.

In her separate concurring opinion, Justice Hantz Marconi added that: "regardless of whether the [NH DES] rule is construed to require that projects be designed in a manner that results in no adverse impacts, or to merely require that they be designed to result in minimal adverse impacts, *given the lack of studies conducted prior to the issuance of the permit there is insufficient evidence that the project was designed to meet either standard.*" [emphasis added] [see p.7]

The same is true about insufficient evidence in the application of Chinook Solar. As a result the conditions placed on the project by the Nongame & Endangered Wildlife Program of Fish & Game were not informed by a necessary study of the T&E's patterns of use of the project site, leaving open the question -- what are the true impacts to T&E species?

There ought to have been a study of the T&E animals' use of the Chinook Solar site to better inform the project's design. The survival of these species in NH is already imperiled. It behooves all state agencies to do what they can to help assure their survival and their return to secure status. The success or failure of T&E survival is a public-good issue. In addition to the reduction in the State's biological diversity when species are made less secure, it costs much more for NH's Nongame & Endangered Wildlife Program to restore lost species than it does to save them in the first place.

- C. There are better sites within NH – environmentally-speaking -- than this one when compared to the siting guidelines for solar arrays as provided by experts (discussed in a White Paper titled – Solar Arrays for NH's Public Good: Filling a Need for Low-Impact Siting Guidelines).

In early 2020 Brox Environmental Citizens issued Solar Arrays for NH's Public Good: Filling a Need for Low-Impact Siting Guidelines (enclosed). The paper provides guidance from experts about what defines a location as a good site for solar and why some types of sites are a mistake environmentally.

The story of Chinook Solar appears to be a case of site selection that was less focused on characteristics of a low-environmental-impact solar site than on other factors. In cost-benefit terms, it is, sadly, the T&E species who are burdened with the true cost.

Thank you for your consideration of these comments.

Respectfully submitted,

*Suzanne L. Fournier*

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Enclosed by email:

NH Supreme Court Case No. 2018-0617 [Appeal of Suzanne Fournier and a.]

White Paper: Solar Arrays for NH's Public Good: Filling a Need for Low-Impact Siting Guidelines

# THE STATE OF NEW HAMPSHIRE

## SUPREME COURT

**In Case No. 2018-0617, Appeal of Suzanne Fournier & a.,  
the court on November 14, 2019, issued the following order:**

Having considered the briefs and oral arguments of the parties, the court concludes that a formal written opinion is unnecessary in this case. The appellants, Suzanne Fournier, Rajiv and Debra Garg, Adam Goess, and Gabriela Juocys, appeal an order of the New Hampshire Water Council upholding the issuance of an alteration of terrain permit by the New Hampshire Department of Environmental Services, Alteration of Terrain Bureau (DES) to the Town of Milford (Town). We affirm in part, reverse in part, and remand.

The pertinent facts are as follows. On September 18, 2017, DES issued an alteration of terrain permit to the Town to conduct a gravel mining operation on property referred to as the Brox Community Lands. This town-owned property is a known habitat for certain species that have been identified by New Hampshire Fish and Game (Fish & Game) as threatened or endangered, specifically, the eastern hog-nosed snake, Blanding's turtle, and spotted turtle. One month after the permit issued, the appellants, including a regular visitor to the Brox property as well as owners of land abutting the property, filed a notice of appeal with the Water Council, challenging DES' issuance of the permit. The appeal was rooted in the appellants' concern that the excavation would result in adverse impacts to the threatened and endangered species located on the Brox property. Following a two-day hearing, a majority of the Water Council, in a four-to-three vote, denied the appeal. This appeal followed.

The Town, as well as Northeast Sand & Gravel, the company employed by the Town to excavate the Brox property, are intervenors in this appeal. The appellants contend that the following determinations by the Water Council were erroneous: (1) DES properly applied the standard set forth in its own regulation governing the issuance of alteration of terrain permits when it issued a permit to the Town, see N.H. Admin. R., Env-Wq 1503.19(h); and (2) DES acted lawfully when it issued the permit without including proposed construction work to a haul road located on the property.

Our review of Water Council decisions is governed by RSA chapter 541. See RSA 21-O:14, III (2012). To set aside an order of the Water Council, the appellants must show that the order is "clearly unreasonable or unlawful." RSA 541:13 (2007). All findings of the Water Council upon all questions of fact properly before it shall be deemed to be prima facie lawful and reasonable.

Appeal of Town of Lincoln, 172 N.H. 244, 247 (2019). “[T]he order or decision appealed from shall not be set aside except for errors of law, unless the court is satisfied, by a clear preponderance of the evidence before it, that such order is unjust or unreasonable.” RSA 541:13. We review the Water Council’s rulings on issues of law de novo. Appeal of Town of Lincoln, 172 N.H. at 247.

The crux of the appellants’ primary argument on appeal is that DES applied the incorrect standard in issuing an alteration of terrain permit to the Town. Pursuant to DES’ rules governing the issuance of such permits, “[t]he department shall not issue [a] permit unless the applicant demonstrates that . . . [t]he project has been designed in a manner that will not result in adverse impacts to state- or federally-listed threatened or endangered species.” N.H. Admin. R., Env-Wq 1503.19(h) (emphasis added). The appellants argue that DES failed to comply with Env-Wq 1503.19(h) when it issued a permit for a project designed to minimize adverse impacts, rather than prevent them. We agree.

When interpreting administrative rules, we apply the same principles of construction that pertain to our interpretation of state law. Petition of Parker, 158 N.H. 499, 502 (2009). We ascribe the plain and ordinary meanings to words used, looking at the rule or statutory scheme as a whole, and not piecemeal. Id. Although we accord deference to an agency’s interpretation of its own regulations, that deference is not total. Id. We still must examine the agency’s interpretation to determine if it is consistent with the language of the regulation and with the purpose that the regulation is intended to serve. Id. We review the Water Council’s interpretation of administrative rules de novo. See Appeal of Morton, 158 N.H. 76, 78 (2008).

DES and the intervenors argue that DES’ interpretation of Env-Wq 1503.19(h) — that the project is in compliance with the regulation if it is designed merely to minimize impacts to threatened or endangered species — finds some support in the language of the Endangered Species Conservation Act (ESCA), which directs “state departments and agencies” to “take such action as is reasonable and prudent to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such species.” RSA 212-A:9, III (2019). DES contends that the department took reasonable and prudent action when it promulgated Env-Wq 1503.19(h), and when it issued the permit to the Town. DES asserts that its issuance of the permit was reasonable and prudent because its interpretation of the rule ensured that the department’s action in issuing the permit “d[id] not jeopardize the continued existence of [threatened or endangered] species,” as required by RSA 212-A:9, III.

To adopt DES’ reasoning, however, would, for all practical purposes, read DES’ regulation out of existence. See Appeal of Morrissey, 165 N.H. 87, 96-97

(2013) (stating that we will not interpret an administrative rule in a manner that would render it meaningless). Once DES chose to promulgate Env-Wq 1503.19(h), it then became the department's responsibility to comply with the plain meaning of its regulation. DES cannot now side-step its own regulation by relying, instead, on the language of the ESCA. Importantly, for the purposes of this appeal, we are not tasked with deciding whether DES' interpretation of Env-Wq 1503.19(h) comports with the ESCA, but rather whether DES complied with the regulation itself.<sup>1</sup>

The law is well settled that an administrative agency must follow its own rules and regulations, and that an agency's interpretation of its own regulations is erroneous as a matter of law when it fails to embrace the plain meaning of its regulations. Appeal of Union Tel. Co., 160 N.H. 309, 317 (2010); Attitash Mt. Service Co. v. Schuck, 135 N.H. 427, 429 (1992); Appeal of the City of Nashua, 121 N.H. 874, 876 (1981). Ascribing to each word in the regulation its plain and ordinary meaning, see Petition of Parker, 158 N.H. at 502, we are not persuaded by DES' and the intervenors' argument that there is no material difference between, on the one hand, designing a project that will minimize impacts to threatened or endangered species, and, on the other hand, designing a project so that it will not adversely impact such species.

In support of their argument that DES applied the correct standard in issuing the permit, DES and the intervenors point to evidence in the record that both DES and Fish & Game were aware of the actual language used in Env-Wq 1503.19(h). This awareness means little, however, when the record makes clear that Fish & Game's acknowledged goal in suggesting revisions to the proposed plans was not to design a project that would "not result in adverse impacts," as required by the rule, but rather to "minimize" and "reduce" impacts to threatened or endangered species.

In an effort to validate the misapplication of its own regulation, DES asserts that the ESCA confers upon Fish & Game primary jurisdiction over threatened and endangered species in New Hampshire, as it "empowers and directs [Fish & Game] to conduct investigations, adopt and enforce rules, and perform other functions to protect threatened and endangered species." See RSA 212-A:2, II (2019); :5 (2019). DES argues that, given Fish & Game's authority and expertise in this area, DES defers entirely to Fish & Game to determine whether a project is designed in a manner that will protect such species. DES contends that, once Fish & Game determines the conditions and revisions to be included in the permit, DES' responsibility is merely to enforce

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<sup>1</sup> The question whether the rule comports with the ESCA, or whether it might be ultra vires as written, is an issue for another day. See Bach v. N.H. Dep't of Safety, 169 N.H. 87, 94 (2016) (declaring as ultra vires administrative rules that "add to, detract from, or modify the statute which they are intended to implement") (quotation omitted)). It has not been raised by the parties, nor do we have the record before us to decide the issue.

compliance with the conditions set forth in the final permit. However, DES fails to acknowledge that this approach is missing a necessary step: that DES ensure that Fish & Game applied the correct standard when evaluating and modifying the project design. That it may be generally appropriate for DES to defer to Fish & Game's expertise in revising the project's design does not in any way lessen DES' responsibility to review Fish & Game's proposed modifications to ensure that Fish & Game has applied the proper standard as set forth in the rule — that the project has been designed in such a way that it will not result in adverse impacts to threatened or endangered species.

Moreover, there is ample evidence in the record that DES itself adopted and applied the less demanding “minimization of impacts” standard. In a request for more information from the Town, DES stated that it was the department's “understanding that further discussions with [Fish & Game were] required to determine what should be done to minimize any impacts to threatened and endangered species on the site.” (Emphasis added). In addition, DES staff consistently referred to the “minimization of impacts” standard in testimony before the Water Council. For example, at the hearing, the DES employee responsible for reviewing the Town's application testified that the goal of discussions between DES, Fish & Game, and the Town was to determine how “best to minimize . . . any issues with the threatened and endangered species.” Most notable, however, is that the “minimization” language used by Fish & Game throughout the permitting process also appears on the approved site plan. Operations and conditions listed on the plan itself include the following language: “To minimize the impacts to the species this project will be excavated in phases”; the town will take certain measures to “minimize direct impacts to threatened and endangered wildlife”; and the town will take steps in the future “to ensure that impacts to threatened and endangered wildlife are minimized.”

In further support of the department's argument that there is no substantive difference between a project designed to minimize impacts to threatened or endangered species versus one designed in a manner that will not result in adverse impacts to such species, DES points to testimony from a Fish & Game employee involved in reviewing the Town's permit application. At the hearing, the Fish & Game employee testified that a “take”<sup>2</sup> of threatened or endangered species “is possible in both scenarios”: whether a project is designed to avoid all adverse impacts or merely to minimize impacts. DES asserts that while “the intent is always avoidance of adverse impacts, [Fish & Game] often uses the language of minimization in recognition of the fact that no project can avoid all impacts to [threatened and endangered] species.”

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<sup>2</sup> “Take,” as defined by RSA chapter 207, General Provisions as to Fish and Game, includes pursuing, hunting, and trapping wildlife, as well as “lesser acts,” such as disturbing and worrying wildlife. RSA 207:1, XXVII (2019). It also includes “every attempt to take and every act of assistance to every other person in taking or attempting to take wildlife.” *Id.*

Although the argument posed by DES is not without basis, we cannot discern how the possibility of actual adverse impacts after implementation of a project has any bearing on whether DES has ensured that the project has been designed in a manner that will not result in adverse impacts to threatened or endangered species. As the appellants correctly point out, a project designed to minimize impacts contemplates some level of impact, while a project designed to not result in adverse impacts has the goal of avoiding adverse impacts entirely. Whether, after implementation, impacts actually result from either design should not in any way relieve DES of its responsibility to comply with the “no adverse impact” rule.

DES also argues that repeated references by DES and Fish & Game to a “minimization of impacts” standard did not reflect material divergence from the “no adverse impact” standard set out in the regulation, because, in reality, application of a more demanding standard would preclude DES from issuing alteration of terrain permits any time threatened or endangered species are present on a project site. In so arguing, DES relies on testimony of the administrator of the Alteration of Terrain Bureau at the hearing before the Water Council that designing projects to result in “no impact” would lead to “no development.” However, DES fails to address testimony before the Water Council offered by an environmental consultant, who performed a Natural Resource Inventory on the Brox property for the Milford Conservation Commission, that it is indeed possible to design a project so that it will not result in adverse impacts to threatened or endangered species. Focusing on the lack of studies conducted prior to issuance of the permit to the Town, the environmental consultant opined that the project had not been designed to avoid adverse impacts. He explained that this failure could have been remedied if Fish & Game had conducted studies on the Brox property before the Town began excavation, rather than during the excavation as provided for in the permit, to understand how each of the threatened or endangered species use the property. He testified that when these studies take place before implementation of a project, it is possible, based on the information gleaned from the studies, to design around the threatened or endangered species’ use of the property. Although it is unnecessary for the purposes of this order to determine whether the project was designed in a manner that would satisfy the “no adverse impact” standard of Env-Wq 1503.19(h), given this testimony, we are not convinced that application of the more demanding standard in the rule would inevitably result in the denial of alteration of terrain permits whenever threatened or endangered species are present on a project site.

In response to the appellants’ concern that there are greater impacts to threatened or endangered species in implementing a project designed to minimize impacts rather than avoid them, DES contends that this concern is unfounded because alteration of terrain permits, once issued, do not allow for the take of threatened or endangered species. DES asserts that, because



alteration of terrain permits clearly state that the Town is not absolved “from due diligence in regard to state, local or federal laws regarding such . . . species,” and because the ESCA prohibits the take of threatened or endangered species, RSA 212-A:7, I(a) (2019), under the terms of the permit, the Town remains responsible for avoiding an actual take or being liable for the result of its actions. The boiler plate language referred to by DES applies only to unlawful takes that may occur in implementing the project, however, and thus has no bearing on whether DES applied the correct standard in reviewing the design of the project. Because neither DES nor Fish & Game applied the more demanding standard articulated in Env-Wq 1503.19(h) when issuing the Town’s permit, the order of the Water Council upholding the issuance of the permit is unlawful. See RSA 541:13 (2007).

The final issue before us is whether the Water Council acted reasonably and lawfully when it upheld DES’ issuance of a permit that did not include a haul road located on the Brox property. According to DES regulations, roads associated with “areas proposed to be disturbed as part of the total project” must be considered “for purposes of determining the need for an [alteration of terrain] permit.” N.H. Admin. R. Env-Wq 1503.12(a)(1). As DES correctly points out, the portion of the haul road at issue was not associated with the “areas proposed to be disturbed” by the Town’s project. Instead, the Town’s permit application stated that the length of roadway to be included in the proposed project was “[zero] linear feet,” and the Town’s project narrative indicated that the improvements to the haul road would include only reconstruction and upgrading of an existing roadway. Notably, prior to issuing the permit, DES sent a request for more information to the Town, inquiring about where improvements to the haul road would occur and explaining that any improvements to the road not covered by the existing application would need to be added before a permit could be issued. The Town responded that all improvements to the road would be classified as “roadway maintenance . . . not subject to an [alteration of terrain] review.” Following this exchange, DES issued the permit without including the haul road.

The appellants assert that, despite the Town’s representations to DES, the Town has conducted “significant roadway construction” to the haul road that exceeds maintenance of an existing roadway and includes “a striking widening of the road.” The parties agree that, if the appellants’ factual assertions regarding the haul road are true, and the construction is outside the scope of the permit, DES could begin an enforcement action to halt the unpermitted activity. See RSA 21-O:14, I (Supp. 2018) (distinguishing between a “department permitting decision” and a “department enforcement decision”). The parties disagree, however, as to whether the appellants’ appeal of DES’ decision to issue a permit is an appropriate occasion to raise such an argument.

The appellants contend that this appeal is a proper vehicle, as the substantive issue is “whether DES failed to take all appropriate and reasonable steps to ensure that the application was complete when filed.” They argue that, given the Town’s disclosure to DES that the haul road would be used to transport “tri-axles, 10-wheelers, and tractor trailer dump trucks” to and from the excavation site, DES should have realized that more than mere “maintenance” would occur, and, therefore, that it should have included the haul road within the scope of its permit review. However, as DES correctly notes, the department’s responsibility when deciding whether to issue an alteration of terrain permit is not to “make operational decisions for an applicant,” but to review a proposed project to determine whether the criteria for issuance of a permit have been met. See N.H. Admin. R., Env-Wq 1503.19.

Importantly, as noted above, the appellants are not without remedy. Indeed, a DES employee testified at the Water Council hearing that DES relies on individuals like the appellants — those who live near the affected property — to learn of potential permit violations. The employee also testified that it is generally only after these violations are reported that DES conducts a site visit to inspect the property for compliance. Given the appellants’ complaint, DES has now been made aware of the Town’s possible violation and is well-situated to take any appropriate further action.

In conclusion, we affirm the Water Council’s decision that DES properly issued the alteration of terrain permit without including the haul road. We reverse the Water Council’s decision upholding DES’ issuance of the permit under a standard inconsistent with the plain language of Env-Wq 1503.19(h). Because DES and Fish & Game applied the incorrect standard in evaluating the Town’s permit application, we conclude that DES’ grant of the permit was unlawful. We remand for further proceedings consistent with this order.

Affirmed in part; reversed in part;  
and remanded.

HICKS, BASSETT, and DONOVAN, JJ., concurred; HANTZ MARCONI, J., concurred in the result.

HANTZ MARCONI, J., concurring in the result. While I think it may be possible to construe Env-Wq 1503.19(h) in the manner urged by DES, I would not reach that issue. Instead, I would hold that, regardless of whether the rule is construed to require that projects be designed in a manner that results in no adverse impacts, or to merely require that they be designed to result in minimal adverse impacts, given the lack of studies conducted prior to the issuance of the permit there is insufficient evidence that the project was designed to meet either standard. Accordingly, I concur in the result.

**Eileen Fox,  
Clerk**

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# **Solar Arrays for NH's Public Good: Filling a Need for Low-Impact Siting Guidelines**

## **Introduction**

New Hampshire is presently experiencing the push for development of large utility-scale solar projects, as are other New England states. In NH numerous projects are in various stages of being realized, among them are: 35 megawatts in Webster & Hopkinton on forested land, green space and degraded land; 30 megawatts in Fitzwilliam on mostly forested land with concern for state-listed wildlife species; 16 megawatts in Milford on forested and active farmland with concern for state-listed wildlife species; and 10 megawatts in Londonderry on a Superfund site.

Based on site characteristics generally, the projects on degraded land and Superfund projects have greater potential to have low negative impact on the environment, while the projects on forested and active farm lands with endangered wildlife have the greater potential to have high negative impact on the environment.

In order to make informed choices about site selection in specific cases, potential sites can be assessed according to relevant criteria proposed by experts in the field. To that end, this White Paper summarizes authoritative guidance from experts on characteristics of the types of places where large solar arrays should be sited and where they should not.

This White Paper is intended to advance the discussion as to where in NH and New England utility-scale solar projects could be sited for maximum public good that takes into account not only the benefits of producing megawatts of solar energy, but also the environmental costs, which can potentially be prohibitively high when situated on unsuitable sites.

Because environmental impacts vary depending on location, the following guidelines are provided to stakeholders involved with solar to assist them in selecting the best sites in their community to achieve a desirable low-impact project while generating benefits of renewable solar energy for the public good. After the guidelines section, the supporting experts' concerns, advice and guidance are presented.

## Expert Guidelines for Selecting Best Low-Impact Sites

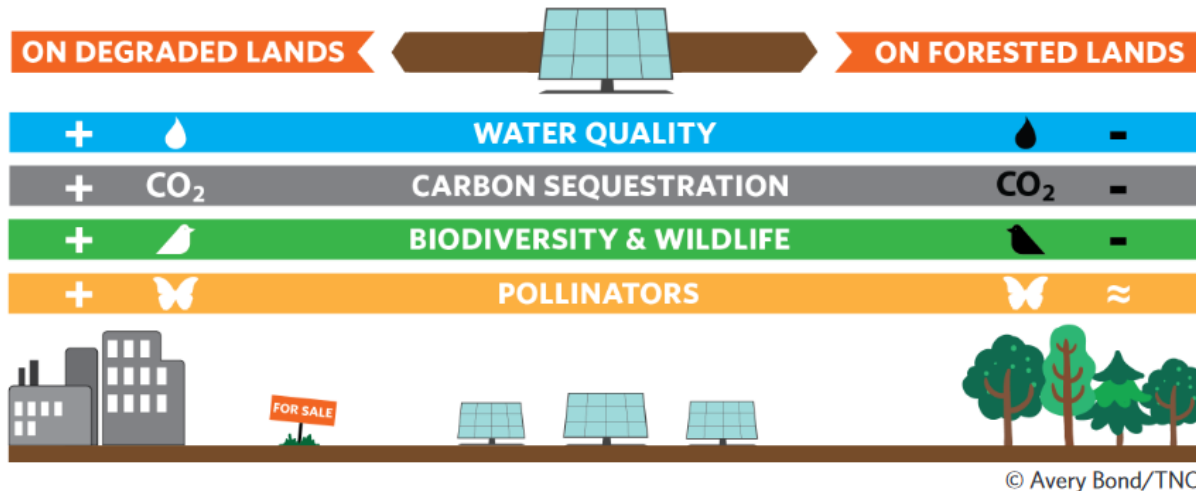
Always avoid. . .

- Areas of high native biodiversity and high quality natural communities.
- Wildlife habitat fragmentation and loss of connectivity.
- Ecosystems with slow rate of recovery.
- Facility development in areas with potentially high wildlife activity.
- Abutting preserved farmland.

Always seek to. . .

- ✓ Take steps to improve climate resilience.
- ✓ Identify and protect climate refugia (i.e. places where life is already climate-resilient);
- ✓ Allow for wildlife connectivity now and in the face of climate change.
- ✓ Protect ecological and conservation resources, preserved open space, and sensitive ecosystems.
- ✓ Protect important natural areas from development.
- ✓ Protect wilderness.
- ✓ Protect wildlife habitat from land clearing, coverage with structures and fencing.
- ✓ Protect habitat of rare, threatened and endangered wildlife and plant species.
- ✓ Protect river and stream wildlife corridors.
- ✓ Protect forests and their environmental benefits that include: sequestered CO<sub>2</sub> (carbon dioxide), water management, cooling, and climate moderation both globally and locally.
- ✓ Protect all types of wetlands – forested, shrub, floodplain, seasonally-flooded, vernal pools, etc. -- and protect wetland buffers.
- ✓ Protect productive farms and other agricultural areas and uses.
- ✓ Protect historic districts, scenic viewsheds, cultural resource areas, archeologically sensitive areas, and prime recreational land.

## The Effects of Solar Farm Development



- ❖ The above chart compares the effects on water quality, carbon sequestration, biodiversity & wildlife, and pollinators of a project built on degraded lands versus one built on forested lands.

[Reference #1 – Principles of Low Impact Siting and Design]

### From the Experts:

#### Major Environmental Concerns Associated with Solar Arrays

The following list identifies major environmental concerns associated with solar arrays, presented with information from the experts who explain why it is important to seek out sites for solar arrays that have the potential for low impacts on the environment.

- ✓ **Forest-cut harm to hydrologic functioning of watersheds; loss of CO<sub>2</sub> sequestration; and harm to wildlife habitat.**

“In many regions, upland forests and trees are of key importance to the hydrologic functioning of the watersheds. Forested areas generally have higher groundwater recharge rates than other types of land cover, making them important to the maintenance of aquifer volume and ground water quality. Also, since trees sequester carbon, clear-cutting of forests to produce ‘green energy’ is not sustainable. In addition, land clearing, coverage with structures, and fencing destroy wildlife habitat – a particular consideration in areas of high sensitivity, such as Natural Heritage Priority Sites [in New Jersey], threatened and endangered species habitat and critical grassland habitat.”

[Reference 2: Solar Siting and Sustainable Land Use, p. 6]

<b>Major Environmental Concerns Associated with Solar Arrays (continued)</b>
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- ✓ **Logging lowers the land's natural carbon sequestration rate and negatively affects global and local climate.**

“The removal of the forest changes the land’s natural carbon sequestration rate.”  
 . . . “Recent publications [2011 or earlier] suggest roughly half of the sequestered carbon is quickly returned to the atmosphere via rivers and lakes . . .”]

[**Reference 3:** Environmental Impacts from the Installation and Operation of Large-scale Solar Power Plants, p. 3267]

- ✓ **Forest-cut impacts to water management, cooling and climate.**

Forests are slow to recover and according to the Massachusetts Department of Energy Resources, “significant tree cutting is problematic because of the important water management, cooling, and climate benefits trees provide.” [**Reference 4:** Local Options for Solar Siting]

- ✓ **Loss of forests that reduce CO2.**

If solar facilities are constructed in forested regions, they “will release significantly more CO2 than in desert regions . . . due mainly to clearing of vegetation to make room for the solar power plant but also partly to reduced insolation in forests due to clouds.”

[**Reference 3**, p. 3258]

- ✓ **Sprawl onto farms and forest.**

In Connecticut there is “controversy over siting solar on farm and forestland,” calling the move “energy sprawl.” [**Reference 5a:** New Farmland Harvest – Solar Energy – Creating Political Sparks; “As long as it is faster, cheaper, and more certain to develop on uncontaminated properties, the results are predictable: [we] will watch productive green lands be converted to industrial uses while the abandoned properties sit idle, untaxed and possibly blighted.” **Reference 5b:** Energy Sprawl in Connecticut; Why Farmland and Forests are Being Developed for Electricity Production, Recommendations for Better Siting, p. 10]

If a project “does not unduly remove land from food production,” then a dual use might be added. “Dual use means adding renewable energy production at an agricultural facility while still maintaining the overall agricultural production.” [**Reference 6:** Renewable Energy and Wildlife in Maine, p. 26]

<p><b>Major Environmental Concerns Associated with Solar Arrays</b> (continued)</p>
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✓ **Incompatibility with agriculture, wildlife habitat and wilderness.**

“Unlike wind, large-scale solar PV [photovoltaic] is incompatible with most active agricultural uses, wildlife habitat, or wilderness.” [Reference 7: Siting Renewable Generation: the Northeast Perspective, p. 4]

✓ **Negative impact on wildlife habitat, wetlands and agriculture.**

“Because the primary impacts of solar energy development on wildlife are centered around habitat loss and fragmentation, implementing solar development within the [already] built landscape reduces or eliminates new habitat loss.” [Reference 6: Renewable Energy and Wildlife in Maine, p. 25]

Land trusts see the need to work “to ensure that solar installations minimize disturbances to wildlife habitat, wetlands and productive agricultural areas.” [Reference 8: Siting Solar Projects: The Right Power in the Right Place, p. 14]

✓ **Need to preserve agricultural, ecological and other conservation resources.**

“Stakeholders, including local and state governments and clean energy advocacy groups are exploring how to build a clean energy system, how to accelerate large-scale solar and wind development while also preserving agricultural, ecological and other conservation resources. Land trusts are an increasingly important contributor to these efforts, helping to ensure that land conservation considerations are embedded into decision-making processes, that important natural areas are not developed and that environmental impacts are minimized. In addition, land trusts can work with stakeholders to identify places where siting *is* appropriate, including where conservation and renewable energy development can coexist.” [Reference 8, p.17]

NH’s 10-year energy strategy acknowledges that “while it is technically correct that New Hampshire could produce the necessary electricity to meet our state’s demands with wind and solar (on a sunny or windy day), the land use consequences of such an achievement would be enormous.” [Reference 9: NH 10-year State Energy Strategy, p. 45]

Land trusts are working for greater climate resilience that is not at the expense of existing preserves, historic viewsheds and sensitive ecosystems. [Reference 8, p. 16]



<b>Major Environmental Concerns Associated with Solar Arrays (continued)</b>
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✓ **Habitat fragmentation results in negative effects on species.**

“Among other impacts, long-term ecological studies have demonstrated that habitat fragmentation results in decreased species richness, impaired ecosystem function, increased edge effects, and isolation of resident populations or communities from adjacent patches.” [Reference 10: Solar Energy Development and the Biosphere, p. 398]

“The primary concerns regarding siting and operating solar power are: direct loss of habitat during the creation and maintenance of a solar facility, and fragmentation of habitat from associated infrastructure (such as transmission corridors), as well as infrastructure maintenance.” [Reference 6: Renewable Energy and Wildlife in Maine, p. 16]

✓ **Biodiversity loss through fragmentation and slow ecosystem recovery.**

“Perhaps the least debated ecological impact of displacive solar energy is habitat loss and concurrent habitat fragmentation resulting from its development. This impact is of paramount concern because habitat fragmentation is among the leading causes of global biodiversity decline.” [Reference 10, p. 398] “Ecological impacts of displacive USSE [utility-scale solar energy] development on the biosphere likely are exacerbated when solar facilities are sited in ecosystems with low rates of recovery from disturbances ....” [Reference 10, p. 402]

✓ **Damage to wildlife species and habitats.**

“The potential for damage to wildlife species and their habitats is problematic for wind and solar energy siting and associated operations. Facility siting assessments need to consider the harm infrastructure and facility operations might pose to wildlife.” [Reference 11: Landscape-scale Wildlife Species Richness Metrics to Inform Wind and Solar Energy Facility Siting: An Arizona Case Study, p. 150] “One frequent recommendation has been for developers to avoid or minimize facility development in areas with potentially high wildlife activity ....” [Reference 11, p. 151]

✓ **Negative impact on biodiversity and natural communities.**

While it’s true that “solar facilities contribute towards the mitigation of climate change,” it’s also true that “if sited improperly, [they] can have negative consequences to biodiversity and natural communities.” [Reference 1: Principles of Low Impact Siting and Design, p. 1]

## Advice to Guide Solar Siting Decisions

The list below is advice from experts to help guide decision-making towards low impact siting.

### ➤ **Plan early and follow siting guidelines**

“Various studies have pointed out the utility of siting guidelines as an aid toward avoiding or minimizing damage to species and wildlife habitat during the early planning stage.” **Reference 11:** Landscape-scale Wildlife Species Richness Metrics to Inform Wind and Solar Energy Facility Siting: An Arizona Case Study, p. 146]

### ➤ **Identify and protect safe havens where species are able to withstand climate change**

Because of climate change, “there are risks that species may become extirpated throughout parts of their geographic ranges. One way to prevent some of these losses is to identify and protect climate refugia. Refugia are effectively safe havens on the landscape that provide the diversity of habitats and stability needed to promote persistence of biodiversity as regional biotic and abiotic environmental conditions change. In essence, they are locations that biodiversity can retreat to, persist in, and can potentially expand from under changing climate.” [**Reference 12:** Identify and Protect Climate Refugia, a webpage]

“Resilient landscapes have been identified by The Nature Conservancy as places that are: climate resilient and are most likely to naturally sustain native plants and animals and natural processes, maintaining high natural biodiversity in the face of climate change. Their identification is based on an analysis that includes geophysical setting, landscape diversity, and local connectedness. Maps and additional information on this topic can be found through The Nature Conservancy’s data portal ‘Conservation Gateway’” [**Reference 6:** Renewable Energy and Wildlife in Maine, p. 22]

### ➤ **Minimize environmental impacts**

“Finding a good solar site isn’t always easy. There are many important things to consider – the most important being if the site faces south, providing adequate access to the sun.

But there are also other important considerations, such as avoiding or minimizing impacts to prime agricultural lands, wetlands, floodplains, prime recreational lands, ecologically and archeological sensitive areas, scenic viewsheds, etc.” [**Reference 13:** Siting Solar: Guidelines, Good Practices and Permits, p. 1]

### ➤ Encourage use of appropriate locations

“Encourage ‘**solar arrays**’ to be built on brownfield sites, former sand pits, municipal landfills, public buildings and facilities, schools, libraries, police and fire stations, transfer stations, water and wastewater treatment plants and parks to produce clean and renewable energy and reduce electrical costs for municipal buildings and property owners.” [Reference 14: Solar Friendly Best Planning Practices for New Hampshire Communities, p. 10]

“Prioritize and encourage municipal solar projects across the state. Particularly in rural parts of the state where any new outside energy development would require new transmission lines, locally produced energy eliminates the need for new transmission lines. [Reference 6: Renewable Energy and Wildlife in Maine, p. 25]

“Prioritize and encourage solar development to occur only on low-quality, disturbed sites. These include such areas as landfills, brownfields, floatovoltaics on water treatment facilities, highway medians and road edges, etc. By encouraging large-scale solar development to occur on previously degraded areas, and discouraging large-scale solar development on higher-quality natural wildlife habitat, the destruction of wildlife habitat for renewable energy can be reduced.” [Reference 6, p. 26]

“The EPA has mapped >11,000 potentially contaminated sites and screened them for development of wind, solar, biomass, geothermal. Using this information, they have developed a management plan – ‘RE-Powering America’s Land Initiative Management Plan’ – with three main goals: to provide incentives and technical assistance for siting renewables on contaminated land, to create a unified federal approach to promote renewable energy siting, and to improve communication and sharing of data on siting renewables on contaminated land.” [Reference 6, p. 94]

Massachusetts has a program that “uses financial incentives to guide siting of large-scale solar facilities, including ‘adders’ for projects sited on brownfields, rooftops, parking lots and other disturbed locations and ‘subtractors’ for development of greenfields. See Massachusetts Department of Energy Resources, *Solar Massachusetts Renewable Target (SMART) Program 2019*.” [Reference 6, p. 109]

“Municipalities can anticipate the most appropriate location for large-scale solar facilities through their zoning and planning without compromising productive farmland, forests, and sensitive environmental areas.” [Reference 2: Solar Siting and Sustainable Land Use, p. 1]

At the municipal level, “ordinances can encourage large solar facilities in appropriate places and discourage their installation on farmland, environmentally critical areas, wildlife habitats, and in forested areas among others.” [Reference 2, p. 8]

# **Solar Siting Guidance for Low Environmental Impacts**

## **from Six Expert Sources**

### **Southern New Hampshire Planning Commission**

[Quoted from Reference 14: Solar Friendly Best Planning Practices for New Hampshire Communities, p. 1]

Public buildings, structures and facilities, such as city/town halls and office buildings, libraries, schools, parking garages, police and fire stations, landfills, and parks all have solar potential. Installing solar energy systems at these locations – either attached to the roof or mounted to the ground – can help meet local energy goals, reduce local energy costs, and most importantly provide the community with a long term and sustainable environmental and economic investment in the future.

### **TRC Solutions** [Quoted from Reference 15: Using GIS Technology to Find Solar Development Sites, a webpage]

“In looking for solar locations, project developers must check off a list of attributes to make the project viable and affordable. Developers need sites that are:

- Large, relatively flat, non-forested upland.
- Close to existing utility substations and transmission lines that can receive the power generated by the proposed development, without a significant cost to upgrade.
- Not within or adjacent to:
  - Sensitive habitats
  - 100-year-flood zones
  - Conservation lands
  - Or known cultural resource sites

### **The Nature Conservancy of North Carolina** [Quoted from Reference 1: Principles of Low Impact Solar Siting and Design, p.2]

1. Avoid areas of high native biodiversity and high quality natural communities.
2. Allow for wildlife connectivity, now and in the face of climate change.
3. Preferentially use disturbed or degraded lands.
4. Protect water quality and avoid erosion.
5. Restore native vegetation and grasslands.
6. Provide wildlife habitat.

## Vermont Energy & Climate Action Network

[Quoted from Reference 13: Siting Solar: Guidelines, Good Practices and Permits, pp. 1-2]

Here is more specific information on some of the big, potential issues you might need to consider – or avoid – to advance a good, carefully sited project:

- Wetlands. New solar projects should work to avoid impacts to wetland and wetland buffers....

...

In general, it is best to avoid developing projects in the following wetland conditions due to the high likelihood of impacts to wetland function and value:

- a) Forested Wetlands. [In Vermont] Clearing of forested wetlands is not permitted.
  - b) Shrub Wetlands.
  - c) Wetlands associated with floodplains/floodways.
  - d) Wetlands with seasonally flooded hydrology or longer. This includes wetlands where surface water (i.e. ponding) is present for extended periods, especially early in the growing season, and when surface water is absent, the water table is often near the land surface.
  - e) Wetlands with the following hydric soils as described in the latest version of *Field Indicators of Hydric Soils in the United States*: Histosol, Histic Epipedon, Black Histic, Sandy Mucky Mineral, Loamy Mucky Mineral, or Loamy Gleyed Matrix.
  - f) Exemplary natural communities.
  - g) Areas of significant wildlife habitat.
  - h) Rare threatened or endangered species habitat.
- River and Stream Buffers. [additional info not included here]
  - River Corridors. [additional info not included here]
  - Inundation Flood Hazards. [additional info not included here]
  - Wildlife Habitat. New solar projects should avoid impacts to significant wildlife habitat, such as deer wintering areas, or to areas that support rare, threatened or endangered species (RTE). [additional info not included here]

... It's important to avoid siting solar projects on the very best soil types, known as primary agricultural soils, a rating given by the National Soil Conservation Service ....

## Rhode Island Office of Energy Resources and Division of Statewide Planning

[Quoted from Reference 16: State of Rhode Island Comprehensive Plans & Solar Energy Systems, p. 12]

### Protect Ecological Resources

Rhode Island's wetlands, wetland buffers, streams, forests and preserved open space provide critical public benefits, including wildlife habitat, water filtration and carbon sinks (vegetation and other natural resources that absorb carbon), which in turn support climate change adaptation and resiliency. Ground mounted solar energy system development should minimize impacts to these fragile natural assets.

Sensitive environmental resources and other critical areas that should be considered when siting solar energy projects include:

- Habitat areas for identified wildlife.
- Preserved open space – including parks, preserves and recreational lands – where the development would be incompatible with the property's conservation purposes, such as an existing conservation easement or other existing legal restrictions.
- Streams and stream corridors.
- Wetlands and wetland buffer areas.
- Large, intact core forests as mapped in the [Department of Environmental Management] DEM RI Wildlife Action Plan
- River corridors and floodplains.
- Ridgelines, steep slopes, and
- Hydrogeological formations where there are water quality concerns.

### Association of New Jersey Environmental Commissions

[Quoted from Reference 2: Solar Siting and Sustainable Land Use, p. 5]

Large solar facilities should not be located on existing surface water, beaches and dunes or on wetlands and transition areas, vernal pools and their transition zones .... Cemeteries, public parks and other permanently deed-restricted open spaces and preserved farmland are also questionable locations. Other locations to avoid:

- Wildlife habitats
- Preserved open space
- Stream corridors
- Contiguous forests
- Vacant land in sewer service areas/areas zoned for growth
- Historic districts, especially when "cultural landscape" is a rationale
- Scenic views and vistas
- Land adjoining/abutting preserved farmland or preserved open space

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