October 8, 2021

Comments Regarding the September 13, 2021
Department of Energy
Office of Energy Efficiency and Renewable Energy
Solar Energy Technologies Office
Request For Information on Solar Impacts on Wildlife and Ecosystems

Submitted by:

Energy and Wildlife Action Coalition

Filed electronically to the attention of:
Department of Energy – Solar Energy Technologies Office
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The Energy and Wildlife Action Coalition ("EWAC") submits these comments in connection with the Department of Energy's Office of Energy Efficiency and Renewable Energy's ("EERE") Solar Energy Technologies Office ("SETO") September 13, 2021, request for information on the current practices related to siting large-scale solar energy plants and how stakeholders evaluate the impacts these plants may have on the surrounding environment ("RFI").[1]

EWAC is a national coalition, formed in 2014, whose members consist of investor-owned electric companies, rural electric cooperatives, public power en`tities, independent power producers, electric transmission providers, renewable energy developers, and related trade associations. The fundamental goals of EWAC are to evaluate, develop, and promote sound environmental policies for federally protected wildlife and closely related natural resources while ensuring the continued generation and transmission of safe, reliable, affordable, and increasingly clean electricity. EWAC supports public policies based on sound science that protect wildlife and natural resources in a reasonable, consistent, and cost-effective manner.

By the end of the second quarter of 2021, 127.8 GW of wind and 108.7 GW of solar capacity had been installed in the United States and its territories. Additionally, approximately 200,000 miles of high voltage transmission lines and 5.5 million miles of distribution lines have been installed throughout the continental United States. EWAC member assets comprise a significant portion of this renewable energy generation and transmission and distribution infrastructure across the country, and as a result, will play a significant role in developing, building, and operating land-based and off-shore wind, solar, and storage, and expanding or modernizing electric transmission and distribution infrastructure in the coming decade in accordance with the Biden Administration's clean energy and climate change initiatives.[2]

Given the role EWAC members will play in the clean energy transition and with respect to solar energy development and operations in particular, EWAC has a vested interest in engaging in the discussion regarding the industry's impacts to wildlife and their habitats. The information provided by this letter is drawn from the knowledge and experience of EWAC's membership and is intended to assist SETO as the office begins to evaluate what the impacts of solar development and operations on those resources might be, how to weigh those impacts against the benefits associated with solar energy, and what, if any, avoidance, minimization, and mitigation solutions should be considered.

1. Future RFIs should consider the benefits of solar energy development and generation

EWAC appreciates SETO's desire to understand the potential impacts of solar energy on wildlife and ecosystems, and to find practical, cost-effective measures to reduce the impacts associated with the development and operations of solar facilities; however, we are concerned that the RFI appears to presuppose a negative relationship between solar energy, wildlife, and wildlife

[1] EERE T 540.111-02: Request for Information; found at: https://eere-exchange.energy.gov/FileContent.aspx?FileID=6eedce8e-f7fe-4b82-a63c-9bea72fd46db.

[2] *See, e.g.*, Executive Order 14008: Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 7619 (Jan. 27, 2021); Executive Order 13990: Protecting Health and the Environment and Restoring Science to Tackle the Climate Crisis, 86 Fed. Reg. 7037 (Jan. 25, 2021).

habitats. EWAC notes that all forms of development, including energy generation, have some level of impact to the environment.

Wildlife and ecosystem impacts caused by a particular technology should be viewed holistically and include an assessment of both the costs and benefits of such technology over the long-term and whether a particular impact is acceptable from a policy perspective or whether that impact should be addressed or ameliorated. Solar energy development is a relatively low-impact, impermanent form of land use that is compatible with land and species conservation goals[3].

While EWAC recognizes that development and operation of solar energy has the potential, depending on the siting of a given project, to cause some degree of localized impacts to wildlife and their habitats, we suggest these impacts be weighed against the impacts to wildlife, habitats, ecosystems, and the myriad other natural resources caused by global climate change, which solar energy will inarguably play a role in combatting.

We believe it is equally important to consider that solar energy facilities generate affordable, reliable, and clean electricity without the use of water or emission of air and water pollutants, and do not require the extraction of fuel or disposal of waste from the generation process – all of which represent benefits to the environment, which should also be balanced against any perceived or actual impacts.

In short, we urge SETO to consider the significant benefits of solar energy on the ecosystem, rather than singularly focusing on impacts to wildlife and habitat, as framed by the RFI, without taking into account beneficial effects. Additionally, EWAC respectfully requests that SETO, whose mission is to advance solar energy deployment, be mindful of all this when framing future RFIs and research agendas.

2. Input Specifically Requested by the RFI

With respect to the specific questions raised in the RFI, EWAC offers the following feedback on those issues relevant to our membership.

Category 1: Solar PV Trends and Siting

1. What impacts and benefits are not well-understood? How do poorly understood impacts and benefits affect solar project development?

The solar energy industry has grown rapidly in the United States over the past 10 years and that growth is expected to continue in the coming decades. This growth is, in part, driven by the Biden Administration's goal to decarbonize the power sector by 2035. Large areas of land will be needed for this massive deployment of new renewable energy generation and/or transmission of the same. In addition to generating clean energy, regulators and the regulated community are considering ways to manage these lands for other environmental co-benefits, which may help in

[3] Walston, L.J., Y. Li, H. M. Hartmann, J. Macknick, A. Hanson, C. Nootenboom, E. Lonsdorf, and J. Hellmann. 2021. Modeling the ecosystem services of native vegetation management practices at solar energy facilities in the Midwestern United States. Ecosystem Services 47 (2021):101227

achieving sustainability goals; however, the practicality of doing so should be further and more fully evaluated.

Most solar projects are sited on agricultural land and, as a practical matter, many assume that solar generation on these lands has more conservation potential and benefit to natural resources than the former intensive agricultural use of the land. However, there currently is no body of evidence to demonstrate this value or the extent of the realized added benefits (e.g., 10, 20, 50, 100% increase over baseline) when solar project sites are managed for other environmental co-benefits. Similarly, there is little data on the true cost of implementation and maintenance of the site design elements required to achieve these benefits.

If such data were available, it would help facilitate discussions with agencies and other key stakeholders, and allow developers, owners and operators to take an evidence-based approach when determining which environmental co-benefits make sense for a given project. For example, what are the benefits of planting native grass versus turf grass beneath a solar array? How does this impact wildlife, soil stability, carbon sequestration and downstream water quality? How does including pollinator planting in perimeter areas of the project impact the same variables? Can these impacts be quantified over the life of a solar project? In the absence of this type of knowledge, agencies are making blanket requirements for solar projects that are in many cases not technically or economically feasible and could, in fact, impede the successful deployment of solar energy. One such example is encouraging plantings benefitting pollinator species, as described in greater detail below.

The idea of planting vegetation at solar facilities that supports pollinator species is a co-benefit that is increasingly being considered by many different advocacy groups and regulators. Pollinators can include a wide variety of insects as well as some birds and bats, and many of these species—whether or not protected by federal law or regulation—have seen broad declines in their populations due to anthropogenic factors, including large-scale habitat loss associated with agricultural practices, the extensive use of insecticides, and diseases such as white nose syndrome. While on the surface encouraging pollinator plantings on solar sites may seem both reasonable and feasible, to the extent planting vegetation aimed at attracting pollinators is successful and attracts pollinators protected by federal law (e.g., the Endangered Species Act), solar energy companies (and ultimately the underlying landowner leasing their land for the solar development) may end up facing regulation and permitting requirements, significant additional costs, and litigation risk.

Fully understanding the costs and benefits associated with each environmental co-benefit that might be provided by a particular solar facility, and then being able to weigh those against the overall environmental benefits (mentioned above) of generating electricity from a solar plant will be critical as the industry grows. Failing to fully analyze the costs and benefits of a particular desired co-benefit could lead to undesired policy outcomes and either increase the levelized cost of energy for solar, act as a barrier to deployment, or both.

Category 2: Species and Habitat Impacts

4. What species and habitat benefits can solar PV development provide?

The primary purpose of solar energy facilities is first and foremost the safe and reliable generation of affordable clean energy; however, solar energy facilities can sometimes also be managed with other environmental co-benefits in mind.

As mentioned above, in order to assist in ameliorating growing threats to all wildlife (including pollinators) and their habitats caused by the damaging effects of climate change and other anthropogenic factors, solar energy developers are exploring ways to re-vegetate lands disturbed during construction in order to provide a variety of environmental co-benefits. The intent is to establish vegetation to support one or more ecosystem services or environmental co-benefits (e.g., wildlife habitat, soil retention and rehabilitation, carbon sequestration, groundwater filtration and recharge, etc.) throughout the operational life of the facility. However, the benefits of simply converting working lands to grasslands (which require no pesticides, tilling, etc.), and how that in turn benefits various wildlife – including pollinators, other insects, birds, bats, aquatic species, etc.—in measurable ways is not known and should be more fully evaluated and considered before solar developers/owner-operators are required to do even more at their facilities.

Selecting and installing the "right plant in the right place", and for the right purpose, is necessary to achieve desired results, and while the focus on pollinator-friendly vegetation is noteworthy, such plantings can include regionally adapted native grasses and wildflower species as well as a mixture of naturalized grass and clover species attractive to native bees, butterflies, moths, and other pollinator and non-pollinator species. These various vegetative covers need to be evaluated alongside native pollinator-specific mixes to better understand the costs and benefits of each. Regardless of the plant selection, the deep and prolific root systems of these plants may also aid in soil regeneration, carbon sequestration, sustainability during drought, water/sediment retention, and competition against noxious weeds – all of which provide an environmental benefit over baseline conditions (in most cases, facilities are developed on previously disturbed lands).

While encouraging environmental co-benefits might seem ideal, it may not be appropriate or achievable in every location, and close and careful evaluation should be given to the economic and technical feasibility of achieving these co-benefits. Specific attention should be paid, on a project-by-project basis, whether the targeted co-benefits can be maintained in a cost-effective manner over the long-term operational life of a solar facility, and what the ultimate disposition of these habitats will be at the end of the functional life of the solar facility.

4a. What research is needed to better understand these benefits?

At the highest level, any research that deepens our understanding of solar environmental co-benefits (e.g., improved wildlife habitat, soil health, soil stability, soil carbon sequestration capacity, stormwater retention and groundwater recharge, downstream water quality, etc.), including the associated costs and benefits to achieve them, is warranted and needed.

Using the example of pollinator plantings at solar facilities, the question is (or should be) how the industry can prioritize pollinator efforts to meet conservation needs while maintaining the ability to generate or transmit power in a cost-effective manner. Similar questions would apply to each of the potential environmental co-benefits mentioned above that might be considered for incorporation into a solar site design. For example, if agricultural land is converted to grassland type cover within a solar facility, would that improve biodiversity in the project and surrounding area long-term? What improvements to the soil and water health could be expected and how does that benefit local wildlife? How does various wildlife interact with large-scale solar facilities– do they move around it, do they avoid it, do they fly over it, do they nest under it? Answers to these types of questions are necessary to inform the types of impacts, if any, wildlife may experience– whether positive and negative. This kind of data should then be used to make informed decisions on siting and integrated vegetation management strategies.

With the forgoing in mind, EWAC suggests that answering the following questions with respect to pollinator plantings would allow local, state, and federal agencies, solar project proponents, and other stakeholders to be better informed for future decision-making.

Landscape context for project design

- Do pollinator scorecards apply a scientific approach that assesses the local/regional need for pollinator habitat enhancement? If no, how can the scorecards better incorporate this information?
- Related, in the development of a given pollinator scorecard, was there a genuine attempt at working with solar energy project proponents to ascertain the existence of limitations given project timeline, financing, and other required components to ensure that measures identified and enacted are compatible with safe and reliable site operations?
- What are the target pollinator species or plants that should be prioritized or managed for?
- How can project-scale be incorporated into the design of pollinator plantings (i.e., recognition of the potentially different conservation opportunities for small versus large projects)?
- What broad strategies or actions can be taken to enhance pollinator-friendly vegetation, and which of these also benefit other wildlife?

Enhancing the growth of existing native species from roots or the seed bank

- Did pollinator-friendly plants exist at the site prior to construction of the solar facility?
    - How should successful site restoration be defined in these situations? What should be the goal of restoration when pollinator-friendly species occur in the area prior to construction?
    - What particular steps during site preparation and construction are most effective in maximizing regrowth of pollinator-friendly species (e.g., site preparation that includes grading versus “mow and go” or disk & roll techniques, additional or supplemental seeding or plantings)?

  - What timespan is appropriate between site-preparation and vegetation regrowth? When should remedial actions be taken (e.g., when might interseeding or reseeding be necessary)?

  - Might pollinator-friendly plantings be expected to persist within a solar facility given the presence of shading from panels?

  - Will pollinator-friendly plants that might occur at the site prior to construction persist given the long-term need for vegetation management within the solar energy facility (e.g., regular mowing or grazing)? What long-term vegetation management practices might be used to maximize the likelihood of maintaining the presence of pollinator-friendly species over the long-term?

Implementation of the pollinator plantings

- What is the goal of the pollinator planting (i.e., increased biodiversity value of the solar energy facility, habitat for certain species, apiculture)?

- Which seed mixes or planting plans are proven to be long-lived for the locality and can be managed effectively alongside solar panels with a low clearance (18" or less) without reducing operational efficiency?

- How long does it take to establish a pollinator planting and does this vary by region or plant species?

- How should vegetative cover success be defined (e.g., is it "pollinator-friendly")? Is this best done through existing scorecards, by % natives, % flowering cover, # of species, or # of acres? Does this differ by region?
  - This could include a literature review or cross-comparison of existing scorecards and other guidance that could ultimately be used to propose meaningful success criteria.

  - It should also include lessons learned from existing sites with pollinator plantings and their adherence to the existing scorecards.

- When sourcing local seed, what distances are appropriate to be considered "local" to a project and what regions are appropriate for a local area?

- Which methods of site preparation at solar energy facilities are proven to result in the best establishment and lowest maintenance requirements, and does this vary by habitat or plantings?

- Can utility-scale solar energy facilities economically plant and maintain a site to meet the "pollinator-friendly" standards in state scorecards?

- What is the appropriate lifespan of vegetation management requirements associated with encouraging pollinators? The answer to this question should be informed not only be species biology, but also the lifecycle of a project, federal, state, and local regulatory requirements, and any other non-negotiable project requirements.

- How can permitting and/or regulatory assurances be provided for solar facility owner-operators and underlying landowners if installed pollinator plantings act as an attractant for species which are currently or could become listed as threatened or endangered under the Endangered Species Act and/or state-equivalents?
- Could developers and/or facility owner-operators be financially incentivized to voluntarily incorporate pollinator plantings and other ecosystem services into their site designs in order to provide additional environmental benefits while keeping the levelized cost of energy low, and if so, how?

Demonstrating effectiveness of the plantings

- Are there instances when pollinator planting establishment is more cost-effective than typical grass mixes (i.e., site prep + seed cost + reseeding/maintenance)?
- Is it more cost-effective to maintain pollinator plantings vs typical grass mixes in the long-term (i.e., post-establishment costs)?
- Are pollinator plantings more or less resistant to fire, invasive plants, or pests (e.g. agricultural pest vs traditional grass mixes)?
- How is the "success" of state pollinator scorecards best evaluated?
- How is the biological value of pollinator plantings compared to cost best evaluated?

4c. How should ecosystem services, like pollination, biological diversity, carbon sequestration, or erosion control, be considered in solar development?

Answering this question is challenging as the costs of implementing one or more ecosystem services should be weighed against the impacts of a particular solar facility on a case-by-case basis, and a determination made as to whether benefits outweigh the costs. Further, there needs to be a recognition that the primary purpose of these facilities is to provide safe, reliable, and affordable carbon-free electricity and any ecosystem service must be secondary to that purpose and not otherwise impact the operations of the facility or significantly increase the cost of energy.

To that end, it may be valuable for a cost-benefit calculator to be developed that would allow a developer and other stakeholders the ability to evaluate each potential ecosystem service at a given site in order to evaluate whether or not they are cost-effective. Further, as mentioned above, additional research, asking many of the same questions outlined in the pollinator planting section is needed to evaluate the effectiveness and appropriateness of incorporating these other potential environmental co-benefits into large-scale solar site designs.

Category 4: Resources Needed

2. What are the most important unanswered questions about the impacts on and benefits to wildlife from solar development?

In many instances the impacts associated with solar energy development and operations are not well understood and in the absence of good data, regulators and other stakeholders make blanketed assumptions or attempting to apply data from other land use activities to solar development using a worst-case scenario. This, in turn, often leads to skewed results and misperceptions. In general, rather than focusing on perceived impacts associated with solar development, the focus of future research should be natural resources broadly, and wildlife specifically, and changes in ecosystem function and value, and wildlife behavior in response to solar development, and then those observations evaluated to determine if an impact is positive or negative and to what extent.

Further, evaluation of use patterns needs to occur within various ecoregions and independently evaluated, and not confined to one particular ecoregion type and then blanketly applied nationally (e.g., what may be an impact or benefit in the desert southwest may be different or non-existent in agricultural lands in the Midwest or forested environments in the east).

Some examples of areas needing further evaluation:

- Big game - understanding big game use on the landscape and how herds interact with solar facilities as well as other land uses, including whether big game modify their migratory routes in response to large infrastructure (such as, but not limited to utility-scale solar facilities) and whether these routes evolve over time.
- Avian – evaluation of use patterns of different avian species and how they change over time after solar development, as well as evaluation of common behavior in and around solar sites compared to control sites away from the facilities. For example, do avian species increase or decrease, do we see more birds moving in or being displaced or is the impact neutral, etc.?
- Pollinators - Before–After–Control–Impact (BACI) analysis/comparison of native pollinator plantings vs native grasses, turfgrass, clover and other low-cost/low-maintenance groundcovers to pollinators and wildlife generally in order to determine relative costs and values.
- General revegetation – evaluating the effects on the local ecosystem, including on soil health, water quality, and wildlife where working lands are revegetated with perennial, regionally appropriate grasses.

While EWAC does not have any specific feedback regarding “non-traditional” sites, we caution against any suggestion that these lands are readily available, accessible, or easily developable, particularly at the scale needed for large-scale solar development. Given that development of contaminated lands often represents health and safety concerns during construction and operations, are technically challenging (e.g. inability to compromise previously installed caps and liners), and have potentially legal liabilities under various federal environmental laws for developers seeking to utilize these lands, constructing solar facilities on these non-traditional sites carry an increase cost (e.g. initial analyses indicate brownfield development costs could be as high as 10-25% more than for a comparable greenfield site) and complexity, thereby making development on them less competitive. Additionally, market considerations and access to available transmission may not be ideal for these sites and represent deterrents to their use. So, while it may be technically feasible to accommodate some solar development on brownfield lands, they should not be viewed as a major development opportunity.

3. Conclusion

EWAC appreciates the opportunity to comment on the RFI and SETO's consideration of these comments. We would welcome the opportunity to meet with SETO staff to discuss, in greater detailed, our concerns over the framing of these issues and identify the research priorities necessary to answer many of the outstanding questions regarding solar energy's impacts, and how to best resolve these issues, before they become barriers to deployment, thereby risking to negatively impact the Biden administration's climate goals. Finally, as SETO is aware, the American Wind Wildlife Institute (AWWI) is hosting a solar symposium in early December to identify key concepts around balancing the growing solar market and conservation, and will be evaluating, among other things, mitigating impacts of solar development on wildlife and their habitats, land management and wildlife compatibility, and natural resource considerations. EWAC respectfully encourages your office to hold off on making any decisions with respect to the RFI until after AWWI publishes its white paper, as that work product will likely answer many of the same questions sought in the RFI and/or further inform future efforts supported by SETO.

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