September 30, 2021

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Submitted Electronically to saissolar@ee.doe.gov

Office of Energy Efficiency and Renewable Energy
Solar Energy Technologies Office
U.S Department of Energy

Re: EERE T 540.111-02: Request for Information
Solar Impacts on Wildlife and Ecosystems
DE-FOA-0002583

Dear Secretary Granholm:

American Farmland Trust (AFT) is pleased to submit the following comments regarding the Solar Impacts on Wildlife and Ecosystems Request for Information. Founded in 1980, AFT is the only national organization that takes a holistic approach to agriculture, focusing on the land itself, the agricultural practices used on that land, and the farmers and ranchers who do the work. Because of this diversity of perspectives, AFT is uniquely positioned to offer recommendations for how the Department of Energy (DOE) can pursue a solar-siting strategy that advances the nation's adoption of renewable energy, while minimizing impacts on wildlife and benefitting our nation's working lands and the critical ecosystem services they provide.

As an organization dedicated to mitigating the impacts of climate change, AFT is supportive of the Administration's efforts to increase the adoption of renewable energy. However, poorly-planned solar development represents a major threat to the agricultural land that we depend on to produce food, feed, fiber, and fuel, as well as to provide ecosystem services such as wildlife habitat, carbon sequestration, water filtration, and more. AFT's 2020 Farms Under Threat: The State of the States report showed that we are already losing 2,000 acres of agricultural land *every single day*, a trend that would only be exacerbated by poorly planned solar development.

AFT sees three nexus points between agriculture and solar development that could impact wildlife. First, agricultural lands can serve as critical migration corridors, allowing animals to safely move between territories. Second, agricultural land can possess significant wildlife habitat value, especially land that is under conservation, or regenerative, management.

Conventional solar development in either of these areas would have a significant negative impact on wildlife.[1]

The third nexus is that the potential displacement of agricultural operations from prime to marginal lands due to conventional solar development threatens existing habitats. The nation's best farmland is typically flat, well-drained, open, and near to existing infrastructure – which also makes it highly attractive for solar arrays. Developing this land can push agricultural production into more marginal areas, which—because they are often used as pasture, range, forest, or grasslands (when enrolled in the Conservation Reserve Program)—typically have high habitat values.

Without a comprehensive plan, some of our nation's best agricultural acres could be lost to solar production. However, this does not need to be the case. Properly sited and designed solar arrays can not only coexist with agricultural use, they can actually support viable operations by providing stable income to landowners, thereby preventing the conversion of this land to other forms of development.

AFT recommends that the Department of Energy advance renewable energy policies and programs that avoid, minimize, and mitigate the conversion of agricultural lands for the purpose of food security, ecosystem services, and wildlife habitat. We believe dual-use (agrivoltaics) and smart solar siting are key to any such strategy. As such, we recommend further investments in research and development of non-traditional solar siting strategies and technologies as well as support for local, state, and regional planning that can reduce the land use conflict caused by solar development, while protecting habitats and meeting renewable energy and climate goals.

REQUEST FOR INFORMATION CATEGORIES AND QUESTIONS

Category 1: Solar PV Trends and Siting

Question 3: Can non-traditional siting strategies (e.g., agrivoltaics) or sites (floating PV or contaminated lands) help reduce impacts or increase benefits for wildlife or habitat?

AFT's 2020 Farms Under Threat: The State of the States report shows that during the 15-year period from 2001-2016, 11 million acres of agricultural land (equivalent to all U.S. farmland devoted to fruit, nut, and vegetable production in 2017) were paved over or converted to uses that threaten the future of agriculture.[2] This includes 4.4 million acres of "nationally significant land," our nation's most productive, versatile, and resilient land. Lost with these acres is not just the production of food, feed, fiber, and fuel, but also the ability of that land to function as a carbon sink, critical habitat, and as wildlife corridors.

Without adequate consideration, policies, and planning, expansion of solar energy production could translate into the loss of additional millions of agricultural acres and related habitat. This is because the typical characteristics of high-quality farmland – flat, dry, open, and close to

[1] D. Murphy, "Challenges to Biological Diversity in Urban Areas." 1998. In E.O. Wilson and F.M. Peter (editors), *Biodiversity* (chapter 7). Washington DC, National Academies Press. https://www.ncbi.nlm.nih.gov/books/NBK219328/

[2] J. Freedgood, M. Hunter, J. Dempsey, and A. Sorensen, "Farms Under Threat: The State of the States." American Farmland Trust, 2020. https://farmland.org/project/farms-under-threat/

existing infrastructure – are the very characteristics that make land highly suitable for solar development.[3] Recent research confirms that rural areas are the most likely target for solar expansion. The September 2021 Department of Energy Solar Futures Study indicates that for solar capacity to reach 45 percent of total US generation needs by 2050, 90 percent of utility-scale solar development would need to be installed in rural areas. A 2021 Cornell study similarly concluded that 80-85 percent of solar development in New York is likely to take place on agricultural land.[4]

Nevertheless, AFT supports shifting our economy and energy supply away from the carbon-based fuels that drive climate change, and toward renewable energy. AFT believes that "dual-use solar" (also known as agrivoltaics) could play an important role in striking a balance between agricultural use—including its related wildlife benefits—and energy generation. For AFT, the term "dual-use" refers to a solar installation that integrates solar arrays and farming activity on the same ground. To be considered dual-use, AFT believes a solar installation cannot displace farming activity. Rather, farming activity must be maintained throughout the life of the solar facility in a manner that is consistent with commercial agricultural production as appropriate to the capacity of the land.

Dual-use is different from simple co-location. AFT believes that dual-use solar should be designed and constructed in a manner that:

1. Retains or enhances the land's agricultural productivity, both short-term and long-term.
2. Is built, maintained, and has decommissioning provisions to protect the land's agricultural resources and utility.
3. Supports the viability of a farming operation.

In addition, after a solar installation is decommissioned, the land must be in a condition suitable for a variety of farming operations, similar to what was possible before the installation. When these conditions are met, the operation not only maintains agricultural production, but also can gain a secondary source of income through lease payments.

As our country drives forward a massive—and necessary—expansion of renewable energy, using non-traditional and smart solar siting practices can help minimize the loss of high-quality farmland, avoid land use conflicts, facilitate rapid deployment of renewable energy, and protect the habitat and wildlife corridors provided by agricultural land.

Question 4: What questions related to wildlife at non-traditional sites still need further research?

AFT supports dual-use solar installations, but also recognizes the need for continued research to determine their efficacy and maximize their benefits. Such research should include:

1. Identifying and understanding crop production systems and wildlife habitats that are most compatible with solar arrays and will support economically viable farm operations across different climates.

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[3] T. Grout and J. Ifft, "Approaches to Balancing Solar Expansion and Farmland Preservation: A Comparison across Selected States." Cornell University, 2018. https://s30428.pcdn.co/wp-content/uploads/sites/2/2020/09/Cornell-Dyson-eb1804.pdf

[4] V. Venktesh, J. Sward, A. Worsley, and K. Zhang, "Strategic Land Use Analysis for Solar Energy Development in New York State." Renewable Energy, 2021. https://doi.org/10.1016/j.renene.2021.03.128

2. Examining ways to improve array design by increasing the amount of solar radiation captured by the plants below, or by making it easier to share the land with crops and livestock such as by raising panels further off the ground.
3. Exploring opportunities to create solar installation systems that allow the land to be more easily reclaimed for agriculture and natural habitats, such as panels that do not disturb large portions of land, or panels that do not require deep footings.
4. Studying the impacts of, and establishing standards for, different construction, operation, and decommissioning practices that ensure the agricultural viability of the land after the life of the project.

AFT applauds the Solar Energy Technology Office for its current research on many of these topics. This includes the 2020 funding awards to study solar development technologies and the impact of dual-use (or agrivoltaics) on pollinators, pasture grazing, and crop productivity. Given that each of these funding award projects are concentrated within specific US regions, AFT recommends expanding the research and development of these technologies and best practices nationwide, particularly research to integrate agricultural production with solar energy generation. This will provide further opportunities to better understand how dual-use can benefit surrounding local ecosystems, farmland production, and support wildlife habitats.

Category 4: Resources Needed

Question 1: What resources, such as best practices, guidelines, or tools, would make it easier to select and encourage lower-impact sites for solar development? What are the limits, if any, of existing tools, and how could they be improved or modified?

Establishment of Best Practices for Agricultural Dual-Use

The development and promulgation of best practices around dual-use will be critical to balancing agricultural use, wildlife habitat, and solar development. AFT supports the following principles to help guide public policy:

1. Encourage private industry to pursue dual-use solar as the primary form of solar development on farmland.
2. Encourage government policies that advance dual-use solar, such as adopting policies requiring dual-use as the only type of solar project allowed on the most productive, versatile, and resilient (PVR) farmland, or implementing policies incentivizing – financially or otherwise – dual-use over standard solar development on farmland.
3. Ensure that solar energy generation enhances opportunities for agriculture, such as improving agronomic viability of low PVR farmland.
4. Encourage research and development of dual-use design and siting standards to maximize the continuous agricultural production throughout the life of the solar project.
5. Encourage both public and private investment in proof-of-concept research to advance dual-use in different climates and for diverse cropping systems.
6. Explore and refine feasible expectations for sustained agricultural production on dual-use sites.
7. Identify the best ways to expand on-site conservation practices that increase soil health and other environmental benefits as part of a dual-use strategy.
8. Minimize risk for farmers/landowners entering into dual-use leases and production agreements.

9. Promote public policies that encourage new farming opportunities for producers who may not otherwise have access to farmland.

Advancement of Mapping Technologies

Mapping will also be crucial for informing decision-making at all levels, particularly regarding wildlife connectivity corridors, and identifying least-conflict or least-impact sites for solar development. These maps can model where development is likely to occur which can help guide policy-making that balances climate action with conservation priorities. They can also be used by developers and state governments to guide siting decisions.

Since 1986, AFT has been using mapping to target and prioritize land protection efforts. Our latest effort, Farms Under Threat: The State of the States, is a partnership with Conservation Science Partners and USDA's National Resource Conservation Service (NRCS). The Farms Under Threat database depicts the agricultural and forested landscape at 10-meter resolution, including both land cover and land quality (productivity, versatility, and resiliency). It identifies where industrial, urban, and residential development is converting and fragmenting the rural landscape. These maps can be useful in stakeholder collaboration, helping developers and state and local governments identify priority areas for land protection and solar siting.

In fact, the Energy Zone Mapping Tool (EZMT), which was developed by the EISPC Energy Zones Workgroup in collaboration with three DOE National Laboratories, utilizes the Farms Under Threat dataset to identify the most important agricultural lands in each state. It allows stakeholders to better understand the best areas to site clean energy resources by mapping potential site development and corridors, while using existing stakeholder resources that can reduce siting and land use conflicts. Since completing the study in 2013, additional resources have been added to maximize this tool for clean energy developers. There is an opportunity to expand this mapping tool beyond the Eastern Interconnection States and include additional wildlife habitat and corridor datasets.

AFT is also presently mapping important wildlife corridors on agricultural lands. This effort could help identify priority areas for farmland protection to conserve critical habitat, support the USDA NRCS's Working Lands for Wildlife initiative, and identify marginal lands in connectivity pathways.

Additionally, AFT is working on the next iteration of the Farms Under Threat project, known as "Farms Under Threat 2040," which will include an analysis and mapping tool designed to protect certain sensitive lands, including high-quality agricultural land, high-value wildlife land, and other land use considerations in the face of climate change. The analysis will include two key products to further support and predict solar development on rural lands, which include:

- A map of technical suitability/conditional transition probabilities for solar development based on inherent factors that determine where it makes sense to site solar from a technological and economic standpoint
- A predictive model that can place new solar development based on the above technical suitability map and other land use characteristics. This model will be able to map where to site solar with or without respect to sensitive lands (PVR, wildlife, etc.)

The forthcoming Farms Under Threat 2040 will use data inputs based on demand (how much), suitability (where), spatial attributes (size, shape, and density), and transition rates (how likely

a given land use is to be developed) to help determine lands most likely to be targeted for solar development, and to provide further tools to support local priorities for conservation.

AFT welcomes the opportunity to put these tools to use and collaborate with the DOE, industry, public and private sector landowners, and solar developers to better understand and guide solar siting and development on rural lands. AFT's goal is to utilize this analysis to better inform solar siting policy and practice through a predictive analysis of baseline and low-cost solar development scenarios, while protecting our nation's most valued lands for agricultural, wildlife, and conservation purposes.

Local Planning Resources

Many local government officials – who often determine land use choices – are scrambling to understand these new technologies and develop land use policies to guide permitting and siting in a way that supports community goals around farmland and wildlife habitat conservation. Having well-vetted, trusted resources to guide their policies and thinking *before* projects are proposed in their communities will help support renewable energy buildout with less community conflict. This is critical to achieving buildout as local conflict and permitting moratoriums have been a major contributor to the slowdown of project permitting to date.

Planning resources should not just concentrate on the advancement of solar. Rather, resources should be developed and promulgated on how communities can support locally identified priorities such as protecting their best farmland from potential conversion. This includes policy tools such as Purchase of Agricultural Conservation Easement (PACE) programs, statewide land use planning and local zoning tools, development of agricultural districts, programs to mitigate farmland loss, and the establishment of FarmLink programs and other policies to facilitate the transfer of farmland from retiring to aspiring farmers.

Other Federal Opportunities for Protecting Agricultural Land

Federal programs can also be instrumental in assuring farmland protection. AFT compiled a suite of federal policies that will help protect our best agricultural lands. This list includes increasing funding for USDA's Agricultural Conservation Easement Program (ACEP), the chief program for permanent farmland protection at the federal level. USDA also administers the Working Lands for Wildlife initiative, which uses a win-win approach to systematically target conservation efforts to improve agricultural and forest productivity which enhance wildlife habitat on working landscapes. These efforts should be viewed by the DOE as an opportunity to collaborate with other federal agencies that have developed programs to minimize the impact on wildlife and wildlife habitat, while maximizing the benefits of working lands.

Additionally, in 2019, the DOE and USDA signed a Memorandum of Understanding (MOU) in order to promote "collaboration and coordination in areas of mutual interest." Within this MOU, the USDA and DOE set a goal of establishing an interagency working group to focus on five major issue areas:

1. Develop and Expand Energy-and Manufacturing Related Businesses, Industries, and Technologies in Rural America
2. Encourage Investments in New or Improved Rural Energy Infrastructure
3. Enhance Capital Access for Energy-Related Businesses and Industries in Rural America
4. Support Rural Community Investments that Anticipate Growth Associated with Rural Energy Investment and Development
5. Encourage, Support, and Invest in Cyber Security Initiatives and Grid Improvements

AFT views this MOU as both an opportunity and vehicle to collaborate across federal agencies on areas of mutual interest and complement areas of expertise as it relates to land use conflict and conservation, while working to achieve renewable energy development in rural communities.

Conclusion

AFT appreciates the opportunity to submit our comments on the solar impacts on wildlife and ecosystems. We look forward to serving as a resource to the Department on these issues and continuing to work with DOE to incorporate the consideration of farmland as part of our nation's solar policy.

Respectfully submitted,
American Farmland Trust