REWI Renewable Energy Wildlife Institute

Solar, Wildlife, & Ecosystem Research Priorities for the Southeastern United States

WHAT IS THIS INITIATIVE?

REWI and the University of Georgia's Carl Vinson Institute of Government collaborated to identify research priorities on solar, wildlife, and ecosystems in the Southeastern United States (Southeast). Specifically, we sought to identify the research questions most needed and likely to inform decision-making on solar energy development and wildlife/ecosystem conservation in the region, and that were feasible to answer within a relevant timeline. We met this objective by engaging a diverse stakeholder group (including government agencies, the solar energy industry, conservation organizations, consultants, and researchers) through workshops and surveys to brainstorm, discuss, and evaluate research questions.

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The result of this process is a short list of priority research questions under three topic areas:

1. Wildlife interactions with typical solar installations ("Wildlife Interactions")
2. Onsite action and mitigation effectiveness ("Onsite Action & Mitigation")
3. Environment and ecosystems at typical solar installations ("Environment & Ecosystems")

WHY IS THIS IMPORTANT?

The United States is vast, and its biodiversity, habitats, climates, and ecosystems vary considerably across regions. As a result, solar energy development in each region presents unique challenges, risks, and opportunities. **The Southeast has exceptional biodiversity and is rapidly expanding solar energy, but research on interactions among solar facilities, wildlife, and ecosystems remains limited.** Additionally, research funding is limited, and solar development is proceeding rapidly. This knowledge gap impedes decision-makers tasked with supplying affordable and reliable energy, managing land, or conserving wildlife and other natural resources. Focusing efforts on vetted research questions will provide the best opportunity for evidence-based decisions.

HIGHEST PRIORITY RESEARCH QUESTIONS

Wildlife Interactions - What are the long-term effects of large-scale PV solar facilities on populations of conservation-focused wildlife and their habitat?

> *Example: Monitor gopher tortoise abundance, survival, reproduction, and movement within and near solar developments for over 10 years.*

Onsite Action & Mitigation - What is the direction and magnitude of species, biodiversity, and ecosystem responses to various construction practices at different stages post-construction?

> *Example: Compare how construction practices (such as grading, limited grading vs. non-grading; pre-seeding vs. post-seeding) affects animals, plants, and soils at solar facilities during the first 5 years after construction.*

Environment & Ecosystem - How does soil health on PV solar facilities of various ages compare with prior land use?

> *Example: Measure soil characteristics (such as carbon content, water infiltration rate, pH, and microbial biomass and activity) at solar energy facilities and nearby areas representing prior land use.*

HOW TO USE THESE RESEARCH PRIORITIES

These research priorities can help funding organizations, researchers, and advocacy groups guide research efforts toward vetted questions, most likely to inform natural resource management and solar deployment policy decisions.

Funding bodies, including industry groups, government agencies, and foundations, are encouraged to incorporate these priorities in future calls for proposals and research objectives.

Researchers can enhance the impact and saliency of their work by tailoring projects to address these key questions.

Conservation and advocacy organizations can also motivate government agencies and other funders to align their activities. Increased coordination among these groups will accelerate answers to critical questions.

View the Full Report for Details on Methods, Results, and Conclusions

www.rewi.org/resources/solar-wildlife-ecosystem-research-priorities-for-the-southeastern-united-states/



Summary of the priority research questions evaluated under each topic area

Topic	Research Question	Priority Ranking	
		Workshop Participants	*Survey Responses*
Wildlife Interactions			
Long-Term Population	**What are the long-term effects of large-scale PV solar facilities on populations of conservation-focused wildlife (particularly keystone species [e.g., gopher tortoise] and species of concern) and their habitat (vegetation community)?**	**High**	**Highest**
Habitat Change	How do solar farms affect habitat change (including loss and creation), fragmentation, and connectivity in landscapes with existing anthropogenic disturbances (e.g., roads, agriculture, oil/gas, urban development)? Do they amplify or mitigate these issues, and at what magnitude?	Highest	Low
Demographics	How are demographic rates and population structure (e.g., sex ratio, age class, etc.) of species of concern affected by PV solar facilities, including facility-specific variables or landscape variables?	High	Low
Land Conversion	What landcover types (agriculture/silviculture/pasture lands, native pine plantations, native grasslands, native scrublands) are being converted to PV solar facilities in the Southeast and how does this compare to other anthropogenic conversions (e.g., housing/urbanization, agricultural, etc.)?	Medium	Medium
Species Occupancy	How do species occupancy and detection rates at PV solar farms compare to prior/surrounding land use types?	Medium	Medium
Connectivity	How do solar facilities influence landscape connectivity and movement for vertebrate species that typically cannot access the solar footprint?	Medium	Low
Onsite Action & Mitigation			
Construction Practices	**What is the direction and magnitude of species, biodiversity, and ecosystem responses to various construction practices (grading, removing topsoil, pre-seeding, etc.) at different stages post-construction?**	**Highest**	**Highest**
Fencing	What is the direction and magnitude of species (or groups of species) responses (occupancy and behavior) to semi-permeable fencing (i.e., wildlife-friendly fencing) and what is the return on investment?	Medium	Highest
Vegetation & Management	What is the direction and magnitude of species (or group of species) and ecosystem function responses to seed mix (native vegetation, turfgrass, or a combination of both) and vegetation management (mowing or grazing practices) on PV solar facilities, and what is the return on investment?	Medium	Highest
Movement Passages	What is the direction and magnitude of species (or groups of species) responses to various dimensions of wildlife movement passages (i.e., site layout) and what is the return on investment? (i.e., testing the most effective dimensions of wildlife movement passages)	Highest	Medium
Aquatic Features	What is the direction and magnitude of wildlife, biodiversity, and ecosystem function response to incorporating wetlands (permanent or ephemeral) and/or streams (permanent or intermittent) within the footprint of a solar facility, and what is the return on investment?	Highest	Low
Biodiversity Enhancements	What is the direction and magnitude of species (or groups of species) responses to specialized habitat enhancements (bee boxes, bird nesting boxes, artificial burrows, log and stone piles or hedgerows along the fence) and what is the return of investment?	Low	Medium
Environment & Ecosystem			
Soil Health	**How does soil health (compaction, organic matter, microbial processes) on PV solar facilities of various ages compare with prior land use?**	**Highest**	**Medium**
Carbon Sequestration	How does carbon sequestration in labile and recalcitrant pools on PV solar facilities of various ages and construction practices compare with prior land use?	High	Low
Hydrology & Erosion	How do water infiltration rates and erosion on PV solar facilities of various ages and construction practices compare with prior land use?	Medium	Medium
Microclimate	How do PV solar farms modify microclimates onsite and offsite in the Southeastern United States?	Medium	Low
Nutrient Cycling	How do nutrient cycling rates on PV solar facilities of various ages & construction practices compare with prior land use?	Low	Low