

# EXECUTIVE SUMMARY

## Recommended practices for the Responsible Siting and Design of Solar Development in Georgia

*Produced by the Georgia Department of Natural Resources (GA DNR) and the U.S. Fish and Wildlife Service (USFWS) in partnership with the Georgia Utility Scale Solar Siting Initiative*

The acceleration of solar energy development in the United States is crucial to meet the nation's growing demand for clean renewable energy. Renewable energy development can support local economies and serves an important role in mitigating climate change impacts experienced by wildlife, other natural resources, and communities. Large-scale solar energy development can provide a range of economic benefits to communities through revenue, jobs, and workforce development, but these projects also require a significant quantity of land. Appropriate site selection, construction, and maintenance of solar facilities are critical to sustainably grow solar resources while also protecting and enhancing natural resources and biodiversity.

This executive summary provides an overview of the [Recommended Practices for the Responsible Siting and Design of Solar Development in Georgia](https://georgiawildlife.com/environmental-review#solar)<sup>1</sup>, which provides voluntary guidance on a range of recommended practices for photovoltaic (PV) solar facility developers to consider that can help maximize opportunities to develop PV solar facilities in a sustainable way for the natural resources of Georgia. Through proactive planning and partnership between project developers, federal and state agencies, and local planners or resource specialists, PV solar development can help meet Georgia's renewable energy needs, minimize impacts to natural resources, and maximize opportunities to increase co-benefits to the local environments of Georgia. Open, transparent, and ongoing conversations will continue to be key as trends and practices evolve in the siting and design of PV solar facilities.



<sup>1</sup> <https://georgiawildlife.com/environmental-review#solar>

## Summary of recommended practices for PV solar development

### Site Selection Considerations

- **Prioritize siting on previously disturbed or degraded lands whenever possible.** Avoid conversion of forested and sandhill habitats that provide important ecosystem services such as flood and stormwater mitigation, groundwater recharge, erosion and sedimentation controls, carbon sequestration, nutrient management in addition to potential habitat for endangered, threatened, and other species of concern.
- To minimize habitat fragmentation and support conservation corridors, **avoid siting next to lands that are already conserved for biodiversity or that provide connectivity** between such protected lands or priority corridors.
- **Identify stream and wetland resources on or near the site and develop plans to avoid and minimize impacts whenever possible.** For sites with possible impacts to nearby streams or wetlands, plan for the required vegetative buffers and consider increasing the buffers around these resources when feasible.
- If **significant land clearing will be required** or if a site contains **highly erodible or steeply sloped soils**, anticipate and plan for a **higher stormwater runoff potential**.
- **Avoid conversion of highly productive agricultural lands.** If agricultural areas are being considered, prioritize siting on lands that are idle, lower production, or those that currently require significant irrigation.
- **Engage the local planning department as well as Land Trust or Riverkeeper organizations early** to understand unique local challenges and priorities that may need to inform planning for site development and construction.
- **Utilize available agency expertise and desktop resources earlier** during site selection to avoid or minimize resource impacts to the extent practicable.

### Site Design Considerations

- **Reduce barriers to wildlife movement** through thoughtful consideration of retention of unfenced passageways or wildlife-friendly fencing practices.
- Minimize watershed impacts through **avoidance of wetlands and increased vegetative buffers around wetlands and streams where possible.** Consider practices such as incremental increases in panel spacing, especially in areas with erosional soils, significant land clearing, or highly sloped sites.
- **Provide on-site habitat** through avoidance of unnecessary vegetation clearing, purposeful retention of habitat diversity, and incorporation of native vegetation wherever practicable on all or a portion of a site.
- **Increase engagement with local communities** to understand local priorities and challenges and how those priorities could be incorporated into your site design choices. Consider providing more detailed plans that demonstrate these efforts during the application process, even if not strictly required by local planning and zoning regulations.
- Where appropriate, **consider site design elements that can allow integration of solar with agricultural operations**, such as grazing livestock or growing specialty crops that perform well under solar panels.

### Site Preparation and Construction Considerations

- **Implement approved plans** for construction and stormwater management at all phases of site development. **Communicate plans with contractors or sub-contractors** that will be responsible for site preparation and construction.
- **Prior to beginning any land disturbing activity**, approved erosion control measures (silt fencing etc.) should be placed between the disturbed area and any nearby waterways and maintained in a

functioning capacity until the area is permanently stabilized. Prioritize topsoil protection and management on sites with steeper slopes.

- **Avoid unnecessary removal of topsoil or vegetation removal** to minimize long-term impacts to soil health and hydraulic conductivity. Tree clearing in preparation of solar development should be handled as a development project rather than as silviculture. Unnecessary removal of trees should be minimized, and any tree clearing activities should stay out of all mandated stream buffers (or streamside management zones).
- **Incorporate conservation practices into vegetation management.** Use native and local ecotype seed mix sources when practicable to restore and/or augment the herbaceous vegetation.
- **To prepare for site planting, existing invasive, agricultural weeds and non-native vegetation should be eliminated prior to planting,** taking into consideration past use of pre-emergent herbicides or persistent pesticides. Awareness of past herbicide practices can better inform weed control approaches and seed mix selection. Depending on the composition of existing vegetation, selective herbicide application following all label specifications prior to planting may be necessary.

### Maintenance and End of Life Considerations

- **Ensure construction and operation plans that incorporate conservation practices are communicated with the contractors** involved in site maintenance. Post informational signage to clarify the process of establishing native or pollinator-friendly habitats.
- **Consider the long-term benefits of establishing native vegetation.** Practice conservation mowing such as not mowing vegetation lower than 6 inches, especially when using native or pollinator-friendly vegetation. Mow in a mosaic pattern in March (ideal) or sporadically during winter if necessary. Employ selective spraying for unwanted woody vegetation on a limited basis when necessary to avoid impacts to wanted native species.
- **Georgia law requires developers to provide a decommissioning plan as well as financial assurances for decommissioning activities.** The plan should specify what needs to be removed, who is responsible for these actions, and to what condition the site will be restored.
- **Recycle solar panels and other solar equipment** at the end of its useful lifespan whenever possible and encourage adoption of viable recycling programs.

## **Summary of conservation considerations for focal species of concern**

### Conservation Measures for Reptiles and Amphibians of Concern

1. Ensure species-specific surveys for the [Eastern indigo snake](#)<sup>2</sup> and gopher tortoise are completed per agency guidance when appropriate.
2. Ensure appropriate agency consultation is completed if project may affect listed species. Adherence to agency guidance is recommended to avoid a determination that the project is “likely to adversely affect” listed species, which may require additional review/ permitting with USFWS in order to receive authorized take and avoid violation of Section 9 of the Endangered Species Act.<sup>3</sup>
3. Implement the [Standard Protection Measures](#)<sup>4</sup> for the Eastern indigo snake during all phases of construction activities. While these measures state that handling or harassment of an Eastern indigo snake is not allowed, moving a snake out of harm’s way during project construction activities may be authorized under certain circumstances outlined in an Incidental Take Statement or Permit. If an Eastern indigo snake is discovered, the snake should not be handled (without an Incidental Take Statement or Permit already in place) and the USFWS should be contacted immediately.
4. Coordinate early with GA DNR if gopher tortoise burrows are present on site. Before any site disturbance can begin, burrows should be marked, and a Scientific Collection Permit must be obtained to scope burrows or to capture or translocate impacted tortoises. If burrow excavation will be required, ensure coordination with GA DNR includes a plan to address additional commensal species of concern that may be discovered utilizing a burrow.
5. Implement a policy that prohibits killing or harming snakes during construction or site maintenance activities. Ensure that workers familiarize themselves with the defining characteristics of the snake species that may be present. If any are encountered, photograph for identification and record date and detailed location information.
6. Construction areas should be clearly marked or staked to designate the limits of clearing and earth works. If there are staging areas, then those areas should be clearly marked to establish a controlled area for construction material and equipment. For sediment and erosion control during construction, use wildlife friendly silt control products that do not contain plastic netting or similar material that could entangle reptiles.
7. A qualified biologist should be present during gopher tortoise excavation activities. All gopher tortoise burrows, active or inactive, should be evacuated via methods pursuant to [Florida Fish and Wildlife Conservation Commission \(FWC\) excavation guidance](#)<sup>5</sup> prior to collapsing any burrow. Commensal species encountered during excavation should follow the plan developed during coordination with GA DNR. Generally, it is suggested that commensal species be released on-site over a physical barrier separating them from development activities or allowed to escape unharmed.
8. Holes, cavities, and snake refugia (including artificial materials such as construction materials or abandoned pipes) other than gopher tortoise burrows should be inspected each morning before resources are manipulated, dismantled, or moved.

<sup>2</sup> <https://www.fws.gov/media/visual-encounter-survey-protocol-eastern-indigo-snake-drymarchon-couperi-georgia>

<sup>3</sup> <https://www.fws.gov/laws/endangered-species-act/section-9>

<sup>4</sup> <https://www.fws.gov/story/eastern-indigo-snake-conservation>

<sup>5</sup> <https://myfwc.com/license/wildlife/gopher-tortoise-permits/permitting-guidelines/>

### Conservation Measures for Bats of Concern (including gray bat, Indiana bat, Northern long-eared bat, tricolored bat, and little brown bat)

1. Follow seasonal tree clearing restrictions for Indiana and northern long-eared bats if a proposed project is within the range of these species in North Georgia. Avoidance of tree clearing is preferable at any time when Indiana and northern long-eared bats are likely to be found roosting in trees (April 1-October 15), but at a minimum the non-volant pup season should be avoided (May 1-July 31). If not possible, please coordinate with the USFWS's Georgia Ecological Services Field Office ([gaes\\_assistance@fws.gov](mailto:gaes_assistance@fws.gov)) to determine if a presence or absence survey is appropriate.<sup>6</sup> Adherence to seasonal tree clearing restrictions (or surveys if not possible) is recommended to avoid a determination that the project is "likely to adversely affect" listed bat species, which may require additional review and permitting with USFWS in order to receive authorized take and avoid violation of Section 9 of the Endangered Species Act.
2. Tricolored bats are located statewide in Georgia. Tree clearing should be avoided during the non-volant pup season (May 1- July 31). Much of the state of Georgia is also within the year-round active area for this species. In those counties with potential year-round populations, tree clearing should also be avoided during the winter hibernation period (December 1- February 28). Please contact the USFWS's Georgia Ecological Services Field Office ([gaes\\_assistance@fws.gov](mailto:gaes_assistance@fws.gov)) if these timeframes for tree clearing are not feasible.
3. Avoid noise or disturbance activities within a half-mile of a known roosting cave of the gray, Indiana, northern long-eared, or tricolored bat.
4. Avoid activities negatively impacting aquatic ecosystems within the range of the gray bat as this could reduce prey availability and harm this species.
5. When surveys are warranted, follow the bat survey guidance provided by GA DNR.<sup>7</sup> Mist net and cave surveys (especially during winter months) should be done with care to avoid the spread of WNS. Do not disturb hibernating bats if encountered during cave exploration.
6. Reduce lighting to only that which is required for safe operation of the facility. Required lighting should be shielded or pointed downward to avoid attracting bats or birds.

### Conservation Measures for Birds of Concern (including migratory birds)

1. Review nationwide guidance from USFWS on conservation measures for reducing impacts to birds and their habitat: <https://www.fws.gov/media/nationwide-standard-conservation-measures>.
2. Co-locate collector lines and generation tie lines with existing infrastructure or below PV panels whenever reasonable.
3. All new powerlines within high-risk avian areas should be constructed using avian-safe pole designs that follow the established Avian Protection Plan to minimize the risk of electrocution.
4. When significant vegetation clearing (i.e., tree removal, grading of vegetated areas, etc.) is necessary, try to limit clearing during peak bird breeding season for that location.

### Conservation Measures for Plant Species of Concern (including hairy rattleweed)

Avoid impacts to rare plant species whenever possible. If avoidance is not possible, coordinate with State and/or Federal agencies to develop a plan for plant relocation.

<sup>6</sup> <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>

<sup>7</sup> <http://www.georgiawildlife.com/BatSurveyGuidance>

### Conservation Measures for Pollinator Species (including the Monarch butterfly)

1. Create or preserve suitable habitat on idle lands or set-asides in proximity to site. Consider brush removal to promote habitat that can support native milkweed and native nectar-producing plants.
2. Consider planting (recommended) or seeding of native milkweed and native nectar plants with an aim for diversity of species and bloom timing. Organically grown Georgia-sourced plants are preferred. Common milkweed (*Asclepias syriaca*) is not native to Georgia and is an invasive concern, and tropical milkweed (*Asclepias curassavica*) is also not native and potentially harmful to monarch butterflies.
3. When practical, incorporate conservation mowing (i.e., mowing only in early March or in a mosaic pattern) into site maintenance plans to enhance native floral resource habitat while providing cover to overwintering pollinators. If standing vegetation cannot be retained throughout the winter, mow in late fall to leave several inches of vegetation for winter habitat.
4. Utilize targeted herbicide treatments (outside the growing season of native milkweeds) to restore suitable habitat and control nonnative invasive species.

### Conservation Measures for Aquatic Species of Concern

1. Riparian buffers provide habitat for aquatic and terrestrial wildlife and protect water quality by stabilizing stream banks and filtering stormwater runoff. When aquatic species of concern may be impacted, consider increasing vegetative buffers to a 50-ft undisturbed native forested buffer along intermittent streams and ephemeral wetlands, and 100-ft wide buffers along perennial streams and wetlands.
2. Implement and maintain best management practices for stormwater management prior to any land clearing, during construction and until final stabilization is achieved and a Notice of Termination is completed.
3. Manage woody species that may shade solar panels with targeted herbicide applications or mechanical- or hand-clearing. If chemicals will be used for site maintenance, direct stormwater runoff to bio-retention areas prior to discharge to streams or wetlands to protect water quality and aquatic and terrestrial wildlife habitats.

## Summary of Seasonal Considerations for Focal Species

Target Species	Survey Timing	Other Timing Considerations
<b>Gopher tortoise<sup>8</sup></b>	Burrow status can be easier to visually ascertain during the active season (March – October) but is not limited to this season when burrows are scoped.	<ul style="list-style-type: none"> <li>• After consulting GA DNR, submit application for Scientific Collection Permit to scope burrows or to relocate/translocate tortoises 4-6 weeks prior to anticipated activity.</li> <li>• Once permitted, burrow scoping should occur during the survey timing period for Eastern indigo snakes of November 1 – March 31.</li> <li>• Permitted gopher tortoise translocations should only occur during late March-May or September-October.</li> </ul>
<b>Eastern indigo snake<sup>9</sup></b>	November 1 – March 31 (Best survey months: December through February)	<ul style="list-style-type: none"> <li>• Ensure all gopher tortoise burrows (below-ground refugia) are identified prior to implementing Eastern indigo surveys.</li> </ul>
<b>Northern long-eared bat<sup>10</sup></b>	Presence/absence surveys: May 15 - August 15	<ul style="list-style-type: none"> <li>• Avoid tree clearing between April 1- October 15 when practicable. At a minimum, avoid tree clearing during the non-volant pup season from May 1 - July 31.</li> </ul>
<b>Indiana bat</b>	Presence/absence surveys: May 15 - August 15	<ul style="list-style-type: none"> <li>• Avoid tree clearing between April 1- October 15 when practicable. At a minimum, avoid tree clearing during the non-volant pup season from May 1 - July 31.</li> </ul>
<b>Tricolored bat</b>	Presence/absence surveys: May 15 – August 15	<ul style="list-style-type: none"> <li>• Avoid tree clearing between May 1 - July 31 (full range).</li> <li>• Avoid tree clearing between December 1 and February 28 in counties with year-round populations.</li> </ul>
<b>Pollinator species</b>	May – September (timing varies by species)	<ul style="list-style-type: none"> <li>• Implement mowing in a mosaic pattern in early March (preferred) or sporadically during winter.</li> <li>• Practice targeted herbicide treatments outside the growing/blooming season of desired pollinator species. Timeframe for native milkweed growth and flowering ranges from April to October (species-dependent).</li> </ul>
<b>Hairy rattleweed<sup>11</sup></b>	Stems and leaves are distinctive throughout the growing season. Flowering: late June – early August. Fruiting: August–October	

<sup>8</sup> <https://www.fws.gov/media/gopher-tortoise-survey-handbookpdf>

<sup>9</sup> <https://www.fws.gov/media/visual-encounter-survey-protocol-eastern-indigo-snake-drymarchon-couperi-georgia>

<sup>10</sup> Protocol for Northern long-eared bat, Indiana bat, and tricolored bat as relevant:

[https://www.fws.gov/sites/default/files/documents/USFWS\\_Range-wide\\_IBat\\_%26\\_NLEB\\_Survey\\_Guidelines\\_2023.05.10.pdf](https://www.fws.gov/sites/default/files/documents/USFWS_Range-wide_IBat_%26_NLEB_Survey_Guidelines_2023.05.10.pdf)

<sup>11</sup> [https://georgiabiodiversity.org/profile/profile?group=None&es\\_id=20990](https://georgiabiodiversity.org/profile/profile?group=None&es_id=20990)