# Georgia Low Impact Solar Siting Tool (LISST)
# Technical Details
Revised November 2021

## Process Summary

Research and outreach to the solar developer community as well as natural resource agencies was conducted to identify the most relevant physical land characteristics that would impact large-scale solar potential as well as quantify the relative environmental sensitivity of these areas. A weighted analysis of the solar characteristics was performed to assess overall solar suitability across the state of Georgia. Characteristics for solar suitability include solar insolation, slope, aspect, proximity to transmission lines, and land cover/land use data.

Initial analysis for environmental sensitivity used the same weighted methodology and included protected and conservation lands, gopher tortoise habitat, prime farmland, sensitive land use classifications as well as lands identified as more resilient to climate impacts. After additional analysis of results, a revised dataset and methodology was implemented. Updated methodology compared relative rankings of environmental sensitivity through a process that retained the highest sensitivity rankings across a wider range of parameters via more holistic datasets. Characteristics in the revised analysis that were added to the more holistic reach of the revised base datasets were gopher tortoise habitat suitability, eastern indigo snake habitat suitability, and freshwater stream buffers.

Land Use Conflict Identification Strategy (LUCIS) modeling was used to combine the overall solar suitability and environmental sensitivity outputs to create a bivariate conflict map. The LUCIS map provides a matrix to overlap both the relative solar suitability and environmental sensitivity of a given area. Each ranking combination was then given an overall preference ranking for low impact development based on the severity of the environmental sensitivity and the relative solar suitability.

## Overview of Solar Suitability Analysis

Solar Suitability data layers are as follows:

| Layer Name | Data Source | Scale | Years Acquired |
|---|---|---|---|
| Solar Insolation | NASA Prediction Of Worldwide Energy Resources (POWER) | Global | 2017 2019 |
| Slope | Digital Elevation Model from United States Geological Survey | Degree Block | 2019 |
| Aspect | Digital Elevation Model from United States Geological Survey | Degree Block | 2019 |
| Transmission Lines | Homeland Infrastructure Foundation Level Data (HIFLD) | Nationwide | 2017 2019 |
| Land Cover/Land Use | United States Department. of Agriculture CropScape | Nationwide | 2017 2019 |

Relative weighting of each input category is as follows:
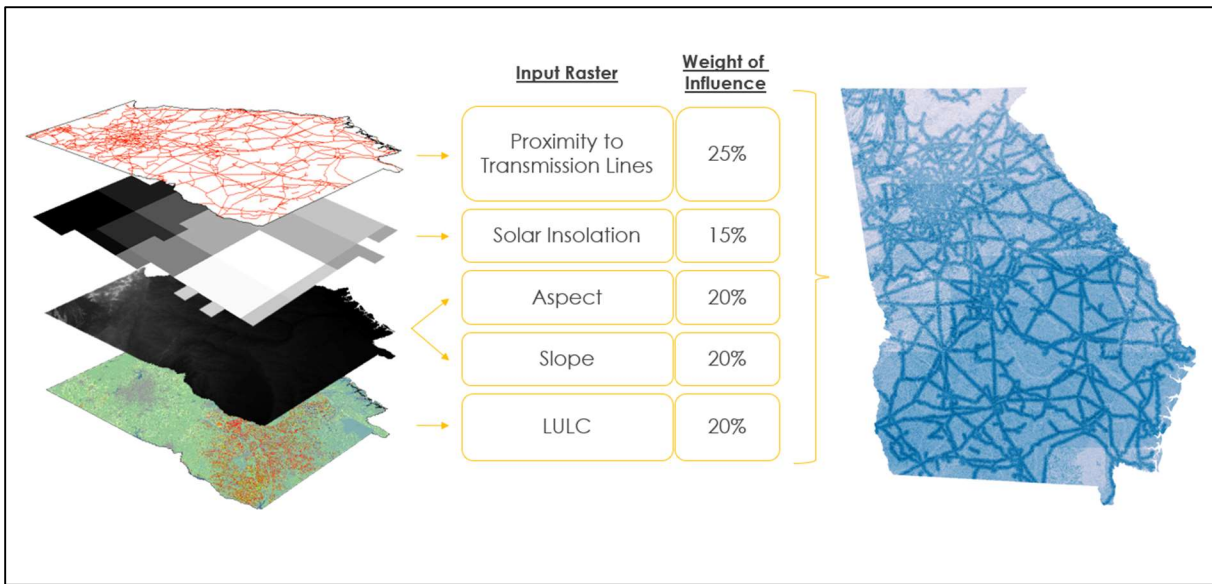


## Overview of Environmental Sensitivity Analysis

Environmental Sensitivity data layers are as follows:

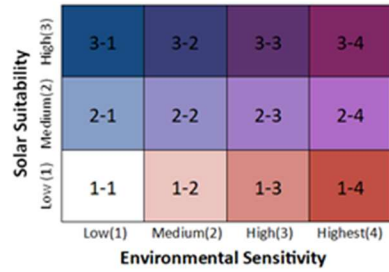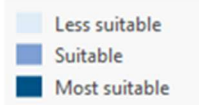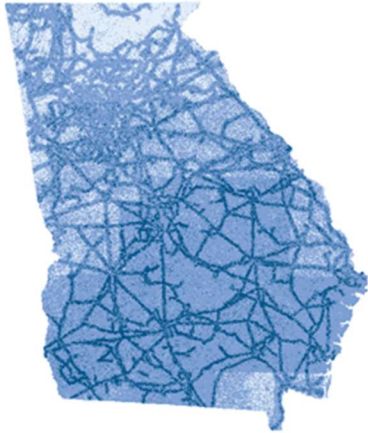| Layer Name | Data Source | Scale | Years Acquired |
|---|---|---|---|
| Conservation Blueprint | South Atlantic Conservation Blueprint | South Atlantic | 2021 |
| Resilient and Connected Lands | The Nature Conservancy Resilient Landscape Dataset | Eastern Coast | 2016 |
| Gopher Tortoise-Suitable Habitat | United States Geological Survey | Southeastern Region | 2019 |
| Gopher Tortoise-Population Survey | Georgia Department of Natural Resources | Statewide | 2020 |
| Gopher Tortoise-Sandhill Survey | Georgia Department of Natural Resources | Statewide | 2010 |
| Eastern Indigo Snake | The Orianne Society - Eastern Indigo Snake Connectivity Modeling | Southeastern Region | 2021 |
| Rivers - Medium Rivers | United States Geological Survey National Hydrography Dataset (NHD) | National | 2020 |
| Rivers - Active River Area | The Nature Conservancy - Active River Area Dataset | Southeastern Region | 2019 |

The ranking analysis classifications are as follows:

| Environmental Sensitivity Rankings | Environmental Sensitivity Data Layer Classifications | | | | |
|---|---|---|---|---|---|
| | Conservation Blueprint Data | Resilient and Connected Lands | Gopher Tortoise | Eastern Indigo Snake | Rivers |
| Highest (4) | Highest priority | Resilient with confirmed diversity; climate flow zones with confirmed diversity; climate corridor with confirmed diversity | Population survey | Conservation Units | Medium level rivers (200ft buffer) |
| High (3) | High priority | Secured resilient areas; secured climate flow zones; secured climate corridor | Suitable habitat | Modeled habitat within current USFWS range boundary | N/A |
| Medium (2) | Medium priority; priority connections | Unsecured resilient areas; vulnerable climate flow zones; vulnerable climate corridor | Sandhill survey | Modeled habitat outside current USFWS range boundary | Active River Areas |
| Low (1) | Not of concern | Vulnerable | N/A | N/A | N/A |

Note: The highest rank from any category was retained throughout analysis.
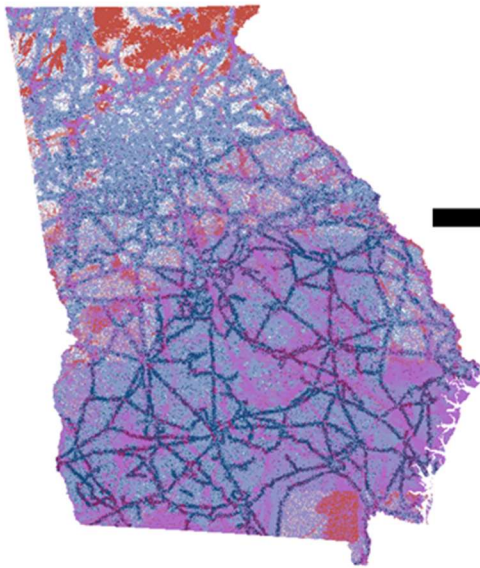

## Overview of Land-Use Conflict Identification Strategy (LUCIS) Modeling

The solar suitability and environmental sensitivity assessments were used as the basis for the conflict analysis. In the first figure, the solar suitability and environmental sensitivity ranking maps are both displayed independently. In the third "Conflict Analysis Map", these categories are combined, with each color representing a unique relationship between solar suitability and environmental sensitivity. The second figure displays the way in which these conflict rankings were simplified into overall preference rankings for low impact development.
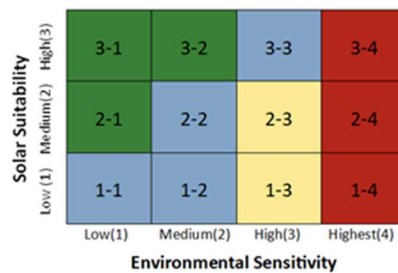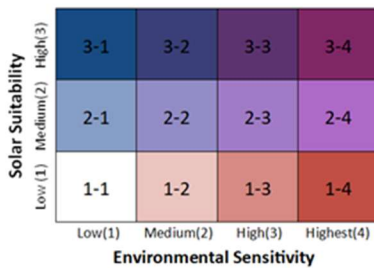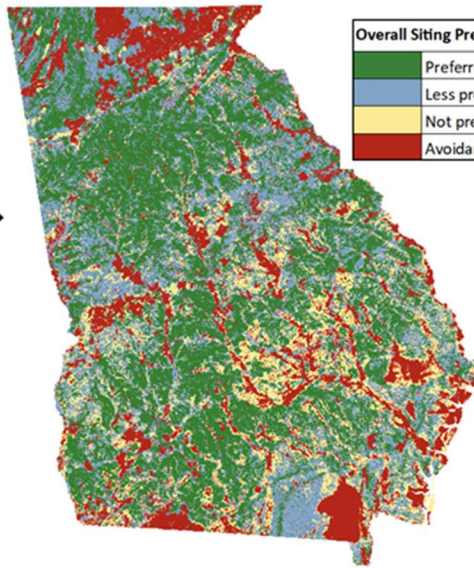
Solar Suitability + Environmental Sensitivity = Conflict Analysis Map

Less suitable
Suitable
Most suitable

Low
Medium
High
Highest

Conflict Analysis Map → Overall Preference Map

Overall Siting Preference
Preferred for low impact
Less preferred for low impact
Not preferred for low impact
Avoidance recommended

## Additional Data Information

The project utilized Aqua Clouds and the Earth's Radiant Energy System (CERES), Landsat 8 Operational Land Imager (OLI), Sentinel-2 Multispectral Instrument (MSI), Terra Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), in conjunction with NASA Prediction Of Worldwide Energy Resources (POWER). This material also contains modified Copernicus Sentinel data (2017, 2018, and 2019), processed by ESA. Conserved lands data (2021) was provided by GA Department of Natural Resources and includes federal lands, state lands, as well as tracts with private protections from NGOs and Land Trusts.