Solar Siting: Encouraging Thoughtfully Sited Renewable Energy Development

Agricultural Stakeholder Group June 3, 2021

Maine -Audubon

Sarah Haggerty



Maine Audubon and Renewable Energy Siting

Our mission: Maine Audubon works to conserve Maine's wildlife and wildlife habitat by engaging people in education, conservation, and action.

- Climate change is currently the most significant threat to Maine's wildlife and habitats, and 2/3 of all North American birds are at risk.
- Approximately one-third of the plant and animal species and their habitats found in Maine are affected by climate-change related threats.





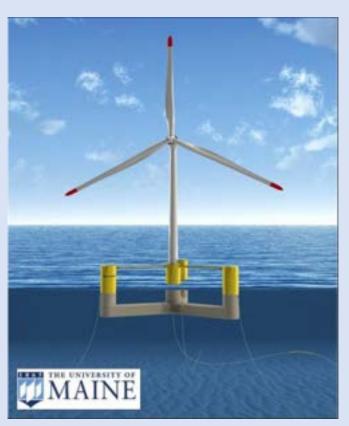


Climate Change and Wildlife

Maine Audubon supports policies that transition Maine to a clean energy economy. Advancements in solar, wind, and other renewable energy technologies mean that achieving 100% renewable energy in Maine by 2050.







In 2019 Maine
 Audubon published a
 report looking at the
 intersection of
 renewable energy
 and wildlife and
 habitats

- Scientific literature review
- Focused on solar, terrestrial and offshore wind, and transmission



 MAINE AUDUBON
 Renewable Energy and Wildife in Maine

November 2019

Avoiding, Minimizing, and Mitigating Impacts to Wildlife and Habitat from Solar, Wind, and Transmission Facilities





https://maineaudubon.org/ advocacy/climate-energy/

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Renewable Energy and Wildlife in Maine

Avoiding, Minimizing, and Mitigating Impacts to Wildlife and Habitat from Solar, Wind, and Transmission Facilities



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EXECUTIVE SUMMARY



The biggest and most pervasive threat to Maine's wildlife and habitat is climate change driven by

carbon pollution. To abute this threat, Maine must meet its recently adopted goals to reduce annual greenhouse gas emissions by at least 45% below the 1990 annual emissions level by 2030, and by 80% below the same level by 2050. This can be achieved, in part, by meeting the stare's commitment to procuring 80% of retail electricity sales from renewable energy sources by 2030 and 100% by 2050. By replacing fossil fuels used to generate electricity with renewable energy sources such as wind and solar, we can significantly reduce the stare's greenbouse gas emissions and give our wildlife and habitat a chance to theive.

To generate this new, clean energy, Maine must develop and operate trnewable energy facilities. But any development—even development that will help us address climate change—can have negative consequences for wildlife if it is not sited and operated thoughtfully. We must act swiftly, but we must also act strategically so we don't degrade the very same plant and animal species and habitats we seek to protect.

Maine Audubon is confident, based on our research, that Maine can meet its renewable energy goals while protecting wildlife and habitat. To achieve this, new renewable energy development must unive to first avoid and then minimize impacts to wildlife, and only in rare cases compensate for unavoidable impacts. If improvements are made to the planning, siting, operations, and maintenance of future enewable energy projects, their considerable climate benefits will not be diminished or negated by unnecessary harm to wildlife and habitat.





Solar Coalition



- Initially for solar legislation, shifted to getting solar projects on the ground
- Mix of Env NGOs, Solar Developers, Ag NGOs, natural resource agencies, etc.
- Siting was early topic of discussion
- Needed spatial tool to know where resources are
- SOLAR SITING TOOL



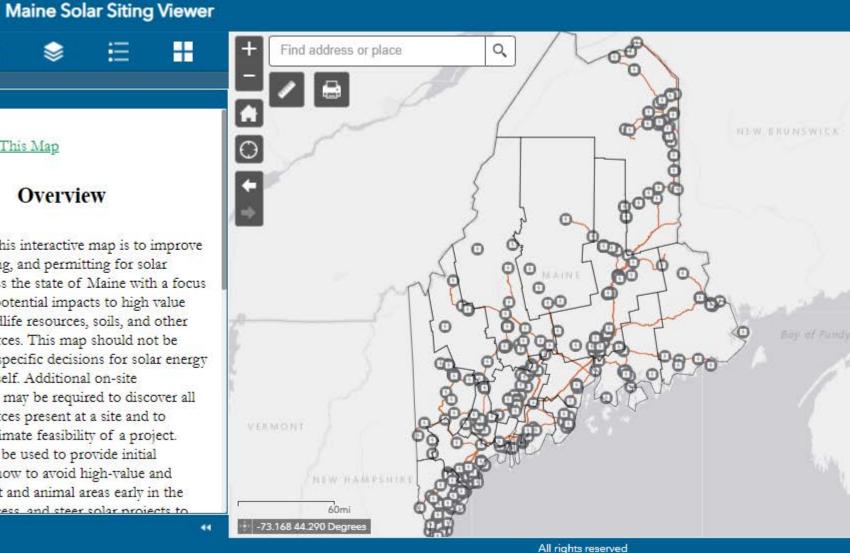


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Solar Siting Map – 2020

maineaudubon.org/solar

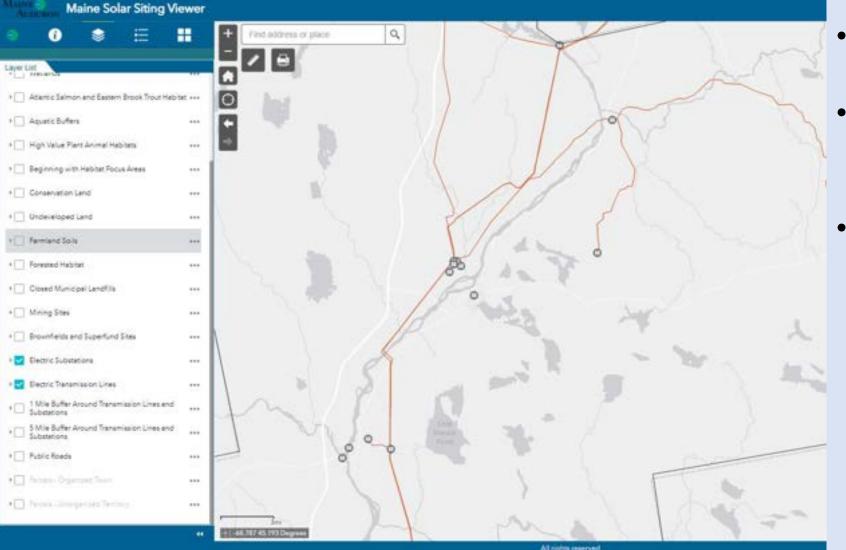
-Overview How To Use This Map Overview The goal of this interactive map is to improve planning, siting, and permitting for solar projects across the state of Maine with a focus on reducing potential impacts to high value plant and wildlife resources, soils, and other natural resources. This map should not be used for site-specific decisions for solar energy projects by itself. Additional on-site investigations may be required to discover all natural resources present at a site and to determine ultimate feasibility of a project. Rather, it can be used to provide initial guidance on how to avoid high-value and sensitive plant and animal areas early in the planning process and steer solar projects to



- Focus is on existing electric infrastructure
- Margins low for solar, so must be within short distance of infrastructure
- Shows High Value Habitats within 5 miles of electrical infrastructure



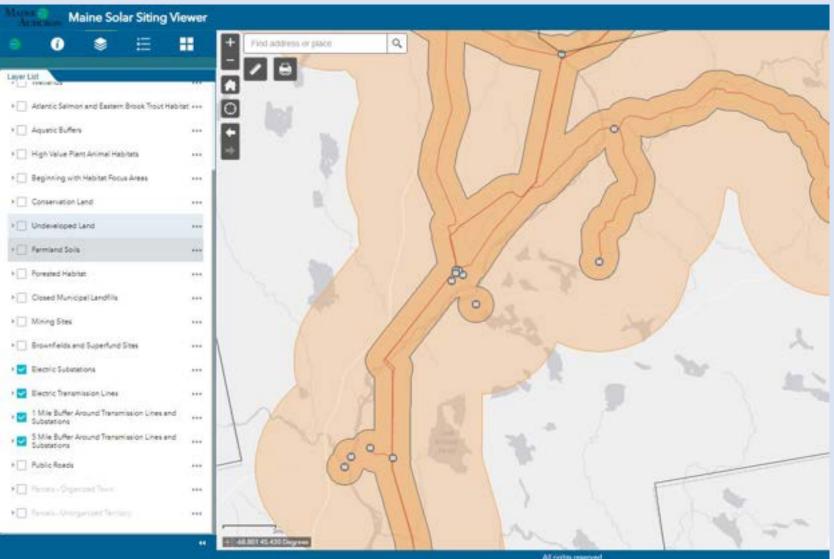
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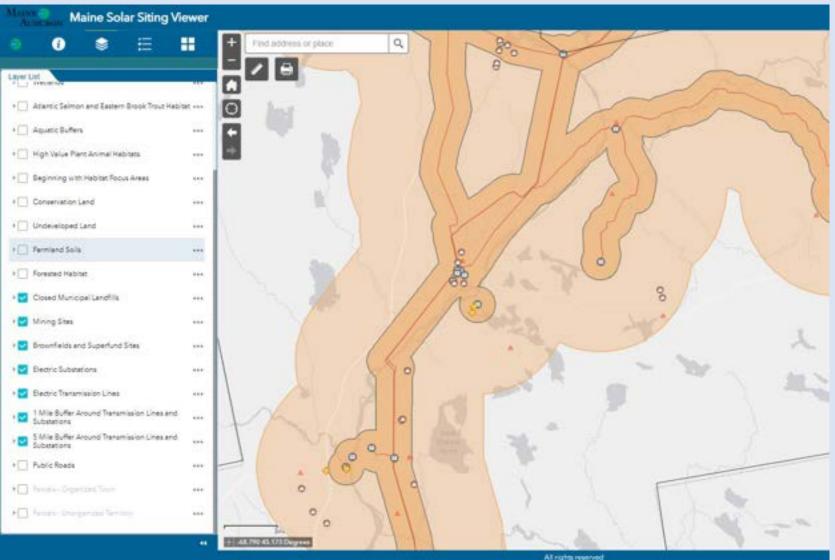
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Solar Siting Map – 2020



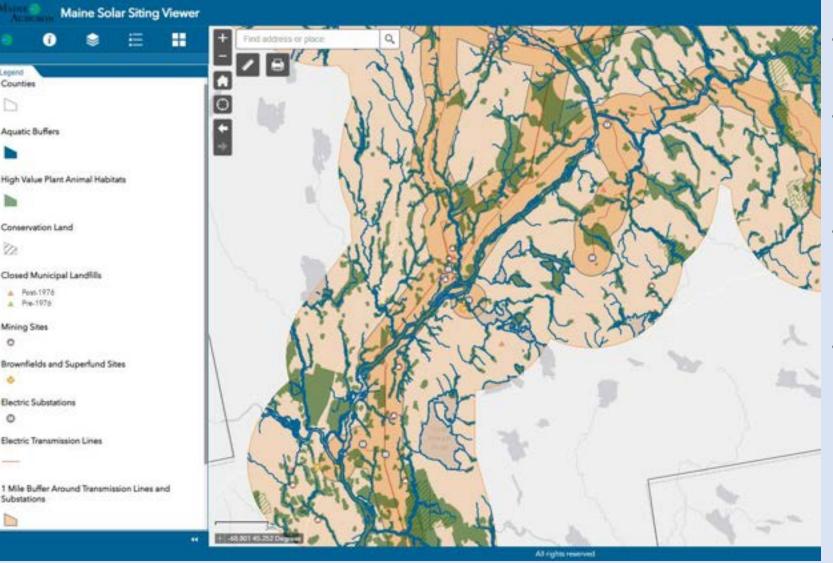
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- Includes point locations of capped landfills, gravel pits, brownfields

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Solar Siting Map – 2020

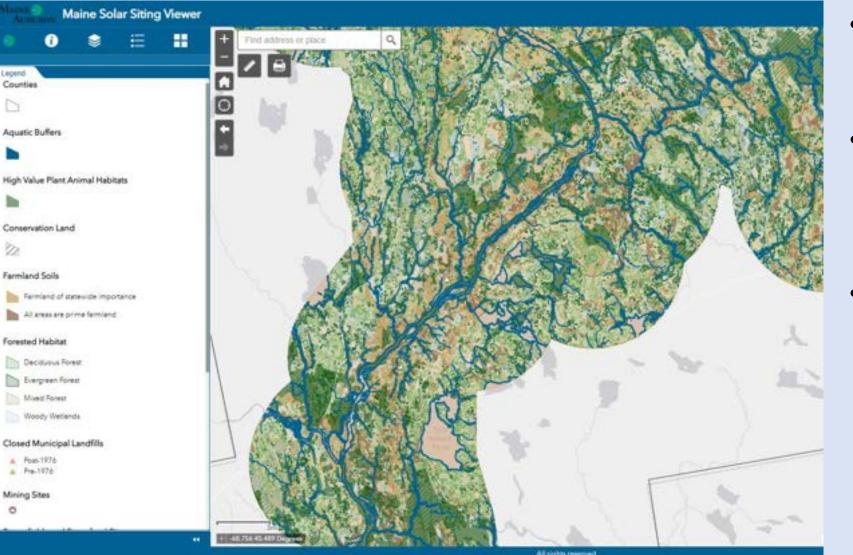


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Solar Siting Map – 2020



- Designed to be a tool to provide basic information
- Limited to areas within 1and 5-miles from electric substations and transmission lines
- No guidance offered

- Solar Siting BMPs
- Developed with conservation and agricultural NGOs
- For siting solar in Natural Areas
- For siting solar in Agricultural Areas
- BMPs for all solar development

maineaudubon.org/solar



BEST PRACTICES for Low Impact Solar Siting, Design, and Maintenance Avoiding and Minimizing Impacts to Natural and Agricultural Resources

Increasing renewable energy production in Maine is critical to mitigating the impacts of climate change on Maine's natural resources and agricultural and natural resource based economies. Solar projects that follow these low-impact best practices will help Maine people, businesses, and communities realize solar's climate and economic benefits, while avoiding or significantly reducing undue impacts to wildlife, farming, and critical natural resources such as clean water.

The purpose of this document, authored by Maine-based environmental and agricultural nonprofit organizations, is to advise solar developers, municipalities, and the public about ways to avoid or minimize development conflicts. It is not meant to supercede required federal, state and municipal permitting: likewise, we recommend using these best practices regardless of permit requirements. It is also important to note that solar development is subject to other considerations, including interconnection, project economics, and other siting constraints.









- Prioritize disturbed or developed lands
- Avoid high value wildlife habitats
- Avoid high value agricultural soils
- Stay near existing infrastructure and population centers
- Engage with local communities

Natural Resource Siting Best Practices

(1) Preferentially use disturbed, developed, or degraded lands. This includes landfills, brownfields', readway' mediato and edges, parking lots, rooftops, idle or underatilized industrial or commercial sites, and sand and gravel pits. Utilizing disturbed lands avoids new forest clearing, minimizes soil disturbance, and takes advantage of unutilized or understillared space.

(2) Avoid where practical, and minimize as much as pessible, impacts to sensitive wildlife habitats and high-value natural resources. This includes all habitant identified as "Significant Wildlife Habitats" under Maine's Natural Resources Protection Act, as well as additional areas and natural communities deemed to be rare or particularly sensitive to encroachment.3 Other sensitive habitats include threatened and endangered species habitat, rare plant populations, cold-water fish habitat, wetlands, erlgtass beds, rate nararal communities, Focus Areas of Statewide Ecological Significance, forested areas that have not previously been cleared for agriculture, and resilient and connected landscapes."

There is no comprehensive statewide inventory that includes all Rate. Threatened, and Endangered species occurrences and habitant, Significant Wildlife Habitans, and important natural resources. Though many resources are included on data layers and resource maps, the completenew of such varies by habitat type, location, and previous survey efforts. Thus, such tools should be considered preliminary until otherwise noted by the appropriate resource agency.

A desktop evaluation of these resources should not take the place of detailed, site-specific investigations of any proposed site to identify any unsrupped habitant, species, or resources present at the site. Likewise, it should be recognized that GIS mapping may not be accurate and site specific investigations may supercode GIS mapping.

In all circumstances, preference should be given to avoidance, with minimization and compensation utiliand only where avoidance is not possible.

(3) Avoid where practical, and minimize as much as possible, impacts to intact forest landscapes. Intact forest landscapes are areas with no significant human development or long-term habitat fragmenication and that previde relatively underturbed habitat conditions. They are critical for increasing carbon storage, harboring biodivensity, regulating hydrological regimes, and

providing other essential convistent functions.

(4) Allow for habitat connectivity by avaiding or minimizing impacts to wildlife corridors; locat projects near caliting transmission and distribinfrastructure, highways and population center co-locating new transmission infrastructures as using wildlife-friendly fencing. Wildlife corrido include migration corridors for treneserial wildlife corridors, and climate corridors utilized by wildli habitans and home ranges shift in the face of clim change. Likely upland and wesland habitat conndepicted on Beginning with Habitat maps, but to migration corridors aren't as thoroughly mapped specific information, as well as conversations with resource agencies and local nonprofit organization be needed to properly avoid impacts.

Co-locate new transmission lines with existing m linear features, wherever possible. If on-location is possible, utilize roures that have the least overlaphigh value natural resources and habitats. Minim of fencing and where fencing is required, use desi allow for wildlife passage.

(5) Protect water quality and avoid crossen. Utilia Smart mad/stream crossings, proper erosion costs techniques, and minimize the number of stream weiland cronings to the greatest degree possible. adequate baffers around wetlands, vetral pools, a other aquastic systems to allow for the natural flat of such systems, including retaining shade for surand providing travel costridors for multiple fids as wildlife species. Adopt stream protection standars ballers and catting developed by the Maine Depa of Inland Fisheries and Wildlife.

(6) If development is proposed in a greenfield size away from existing infrastructure, evaluate pot comulative impacts, including existing develop and potential future development for a site. Th includes the amount of impervious surface and at of vegetation clearing in the area.

(7) Restore or maintain native vegetation in the pr area, including "pollinator friendly" species, a avoid where practical, and minimize as much a possible, the use of pesticides and/or herbicide

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- Mays for these anarcan be found drough the scorecide Regioning with Habita program The location of these habitant can be obtained through the Maine Department of Joland Pulsevies and Wildlift, Maine Department of Matter Resources. Maine Natural Areas
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Agricultural Siting Best Practices

If it is desermined that agricultural land is a responsible site for solar power, the following should be considered to mitigate impacts to the furant productivity of the land:

- (1) Where possible, avoid land identified by the Natural Resources Conservation Service as "Prime Farmland" or "Farmland of Statewide Importance," or otherwise cause productive farmland to be taken out of production, including land leased for agricultural
- (2) Preferentially use previously-developed, disturbed, degraded, or marginally productive portions of the farm property. This includes rooftops, land within and around farmstead areas, sand and gravel pits, and other areas with low utility for agricultural production.
- (3) Encourage dual-use projects, where agricultural production and electricity production from solar installations occur together on the same piece of land.
- (4) Build, operate, and decommission projects in ways that preserve the ability for the land to be farmed in the future and that do not inhibit access to or the productivity of farmland surrounding the solar Installation.
- (5) Minimize the impacts of grid connection on the agricultural resources of the property.
- (6) Where applicable, projects should benefit the farm business directly by providing electricity to meet the energy needs (in whole or in part) of the farm.

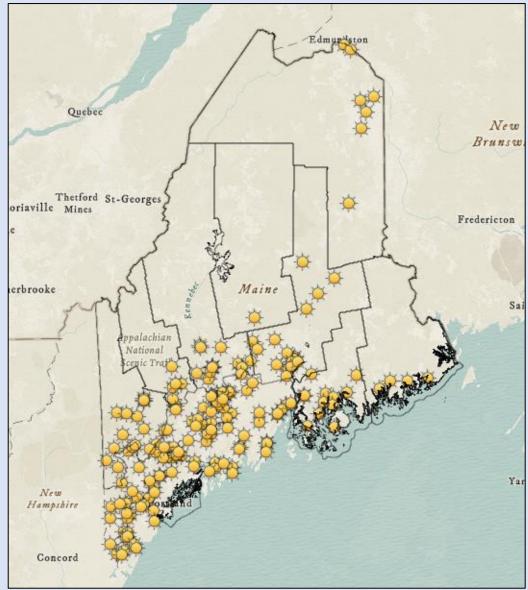


- (1) Use a proactive approach to community engagement. In general, Maine people overwhelmingly support solar power. As specific solar projects are proposed in greater number, at larger scale, and in and around communities, it is important to educare and listen to community members about individual projects as early in the development process as feasible. Informal presentations or open houses are often more effective for genuine engagement than the processes required for local permitting.
- (2) Provide municipalities and community members with information about the performance and beneficial outcomes of projects. Project owners are encouraged us provide information about project performance or ouncomes before, during, and after construction. Information can include: energy generation, financial savings, employment/spending, peoperty tas payments, emission reductions or similar metrics. This information can be shared through signage at the project, newspaper articles, or updates to local government officials.



- In all counties
- Primarily southern ME and Central Coast
- ~180 projects submitted to DEP
- Near existing electric infrastructure

Solar Projects Proposed in Maine

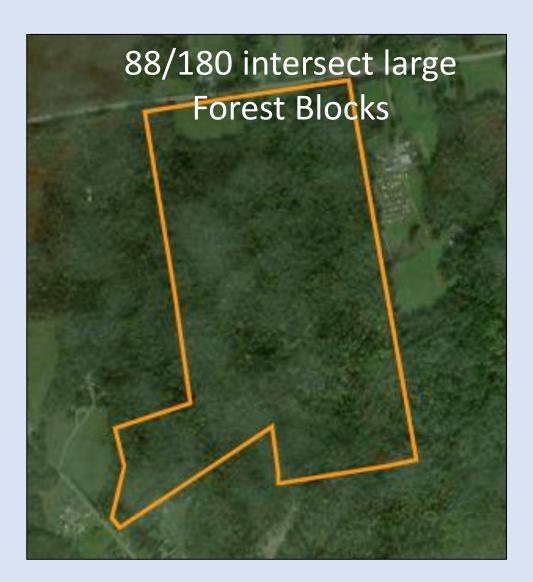


Caveats to Analysis

- Only projects in DEP
- Attrition will happen
- Mapping not exact for projects or resource areas



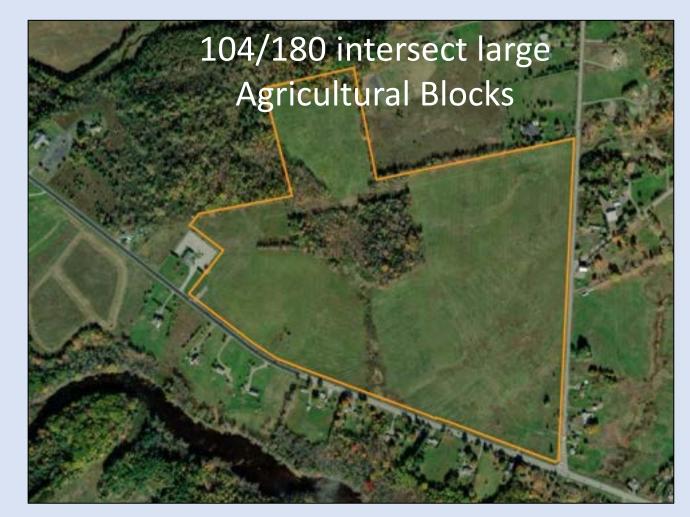
Where Solar Proposed in Maine

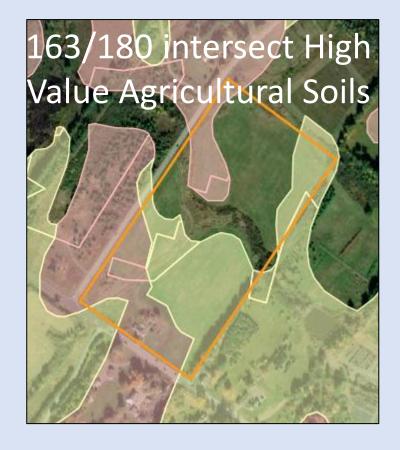


73/180 intersect High Value Plant/Animal Habitats



Where Solar Proposed in Maine







Where Solar Proposed in Maine





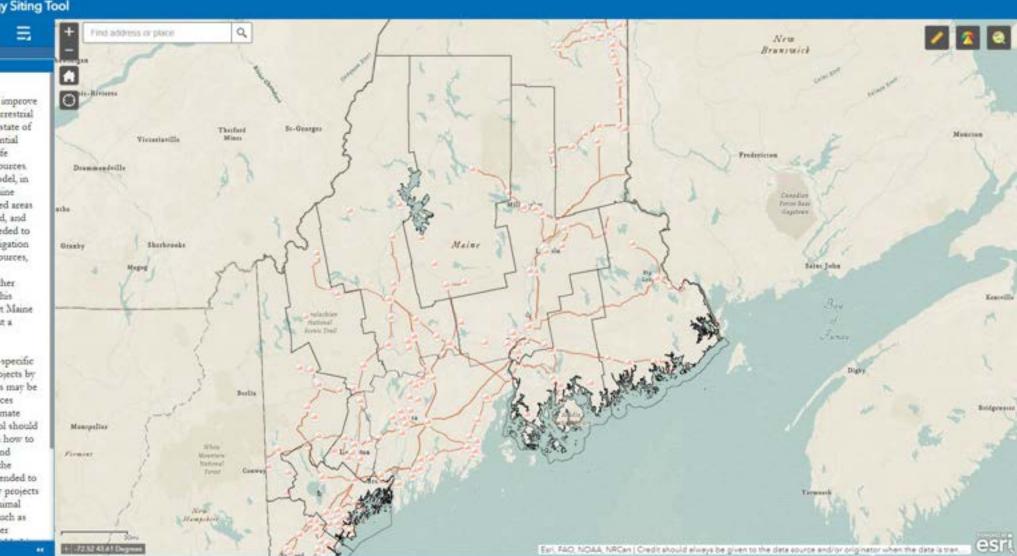
Maine Renewable Energy Siting Tool Coming Soon!



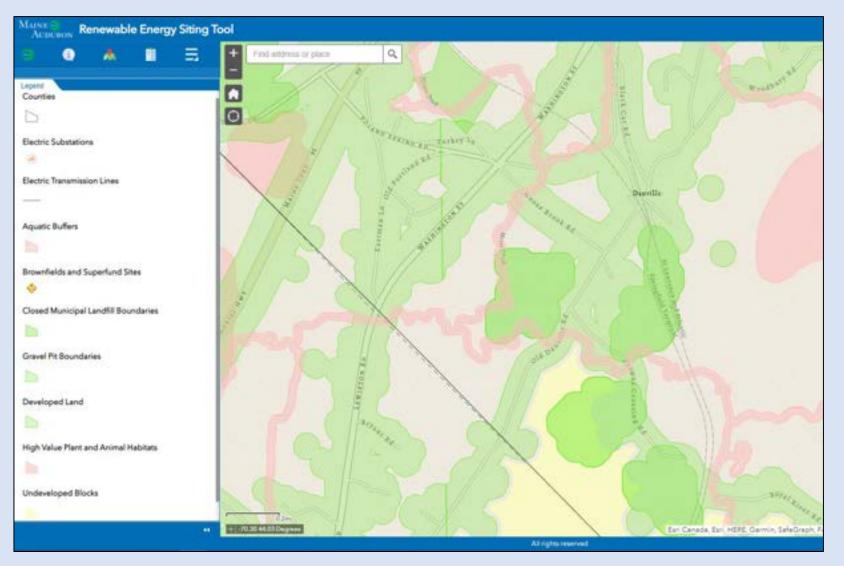
Overview

The goal of this interactive map is to improve planning, siting, and permitting for terrestrial renevable energy projects across the state of Maine, with a focus on reducing potential impacts to high value plant and wildlife resources, soils, and other natural resources. The tool follows the "Stop Light" model, in which green indicates areas where Maine Audubon encourages development, red areas where development should be avoided, and vellow where more information is needed to assess potential impacts or where mitigation may be necessary. Maine's natural resources, agneultural resources, and existing development areas often overlap; further investigation is recommended when this occurs. We encourage users to contact Maine Audubon if they have questions about a specific area.

This map should not be used for site-specific decisions for solar or wind energy projects by itself. Additional on-site investigations may be required to discover all natural resources present at a site and to determine ultimate feasibility of a project. Rather, the tool should be used to provide initial guidance on how to avoid high-value and sensitive plant and animal and agricultural areas early in the planning process. This tool is also intended to help steer terrestrial renewable energy projects to those areas more likely to have minimal impacts to known natural resources such as capped landfills, brownfields, and other



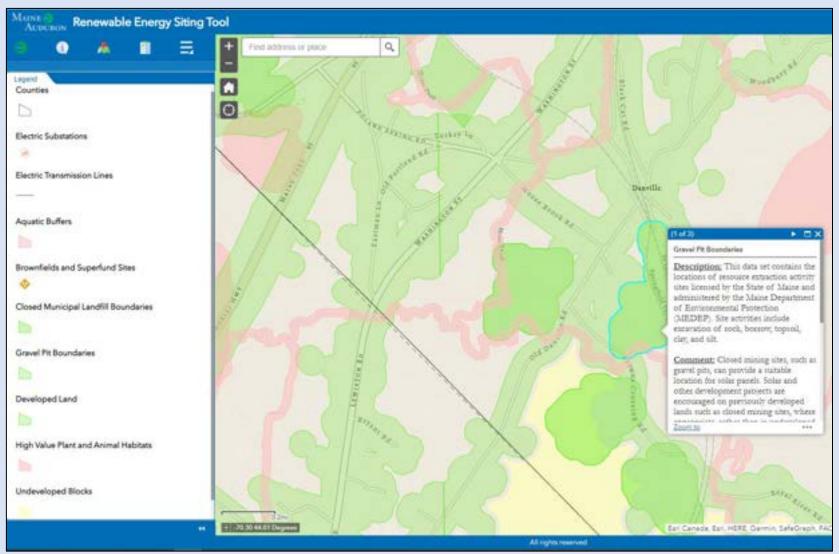
Maine Renewable Energy Siting Tool



Uses "Stop light" approach – red, yellow, green guidance

- "Green" areas primarily developed areas (gravel pits, landfills, etc.) – solar development is okay
- "Yellow" areas sites where more information may be needed
- "Red" areas sites to be avoided
- There may be overlap

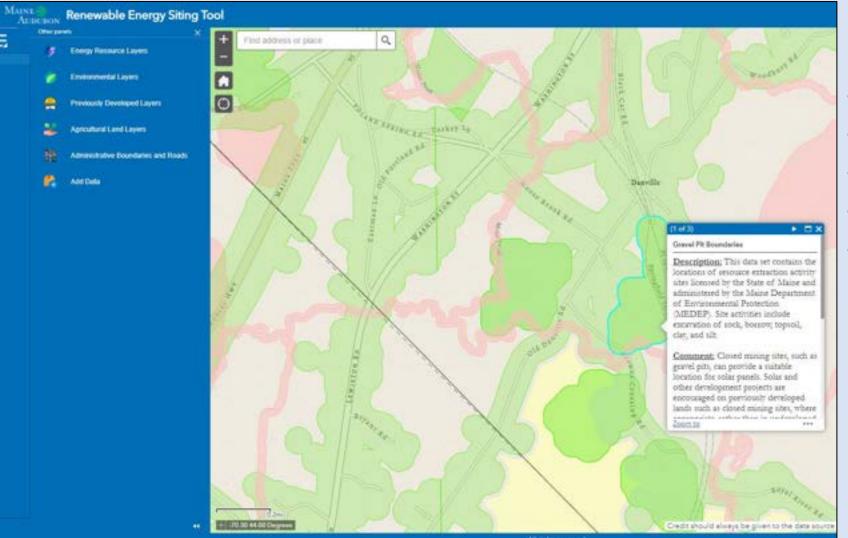
Maine Renewable Energy Siting Tool



Pop-ups provide additional information

- Description describes what data are included
- Comment provides guidance on use or avoidance and why
- Contact provides additional information on regulatory requirements
- Data Source provides a link to the data source where available

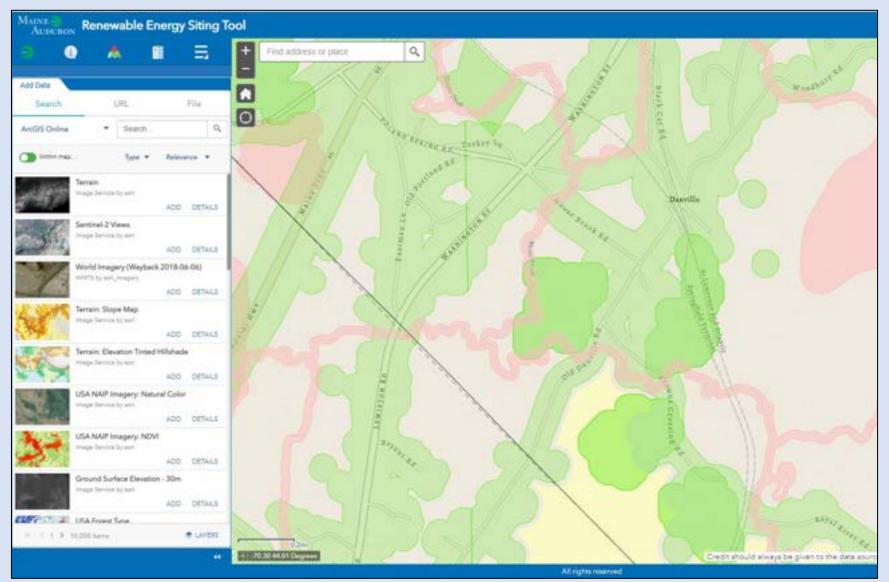
Maine Renewable Energy Siting Tool



Datasets grouped by type

- Energy Resource Layers
- Environmental Layers
- Previously Developed Layers
- Agricultural Land Layers
- Administrative Boundaries and Roads

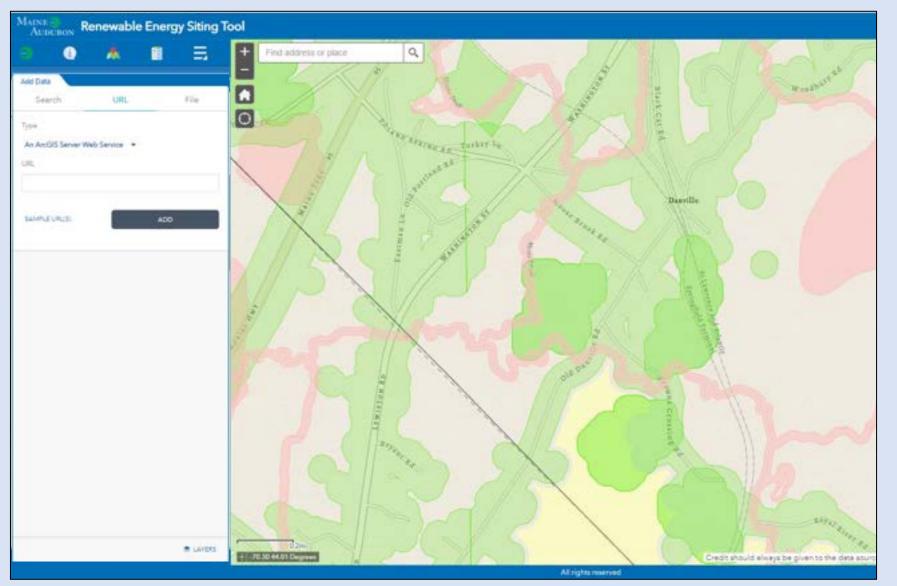
Maine Renewable Energy Siting Tool



Add additional data

• From ArcGIS online

Maine Renewable Energy Siting Tool

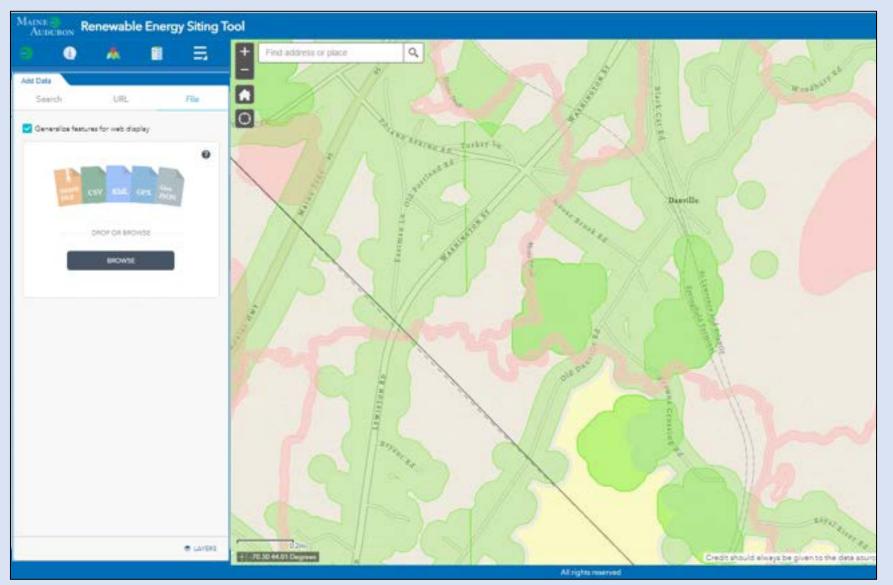


Add additional data

- From ArcGIS online
- From a web service

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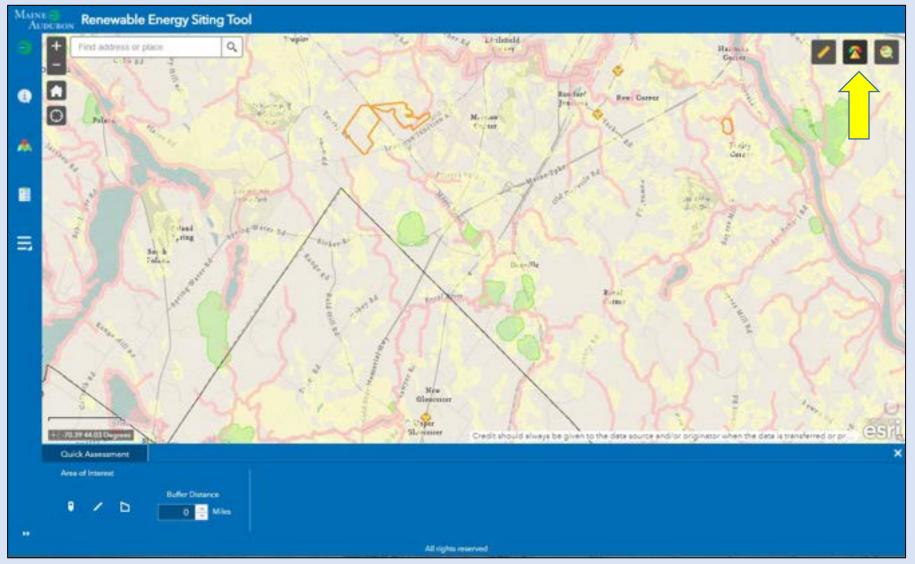
Maine Renewable Energy Siting Tool



Add additional data

- From ArcGIS online
- From a web service
- From your own files



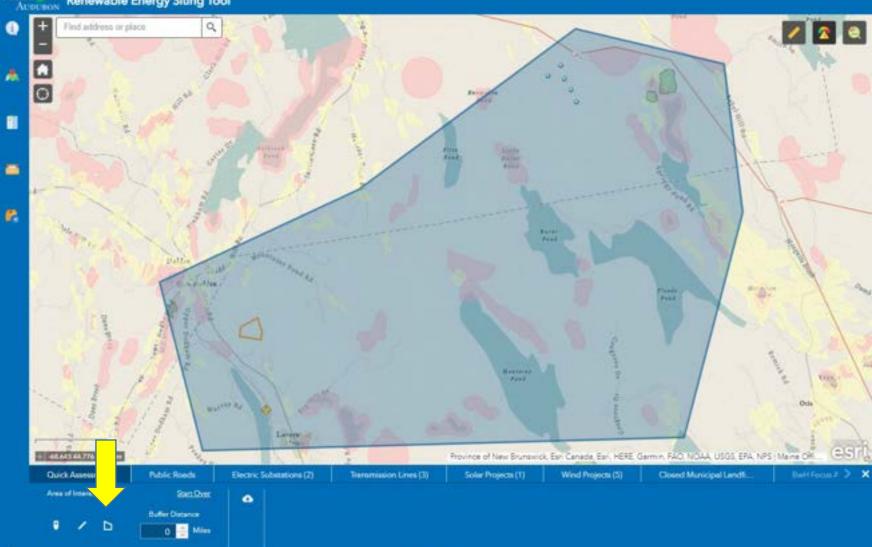


Quick Assessment Screening Tool

Allows user to evaluate pre-defined resources in a particular area

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Maine Renewable Energy Siting Tool

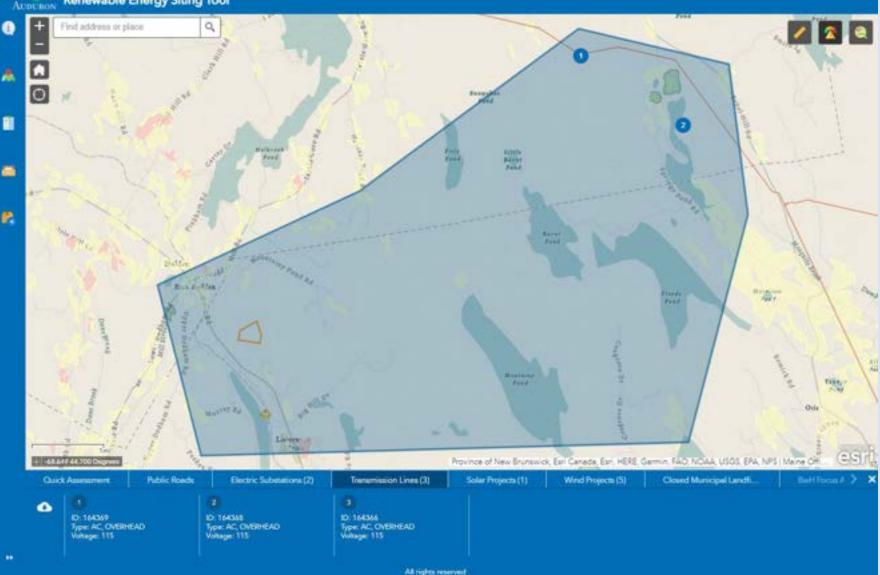


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- Allows user to evaluate pre-set resources in a user-defined area (drawn polygon, downloaded shape, or buffered point)
- Useful for assessing existing renewable energy capacity of an area

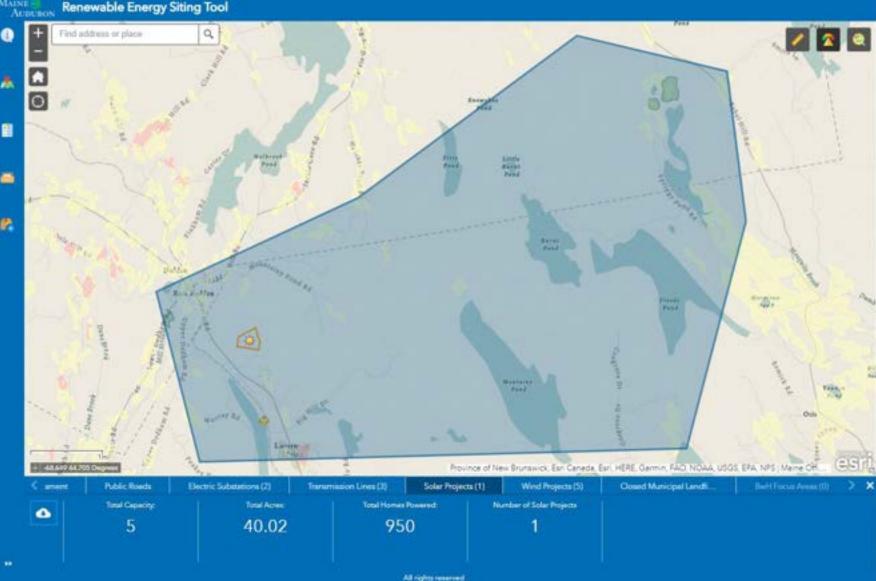
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Maine Renewable Energy Siting Tool



- Not necessary for datalayers to be turned "on" for tool to work
- Highlights datalayer in question as you click each results tab
- Results include tallies or sums of data intersected (not clipped) by the shape being analyzed

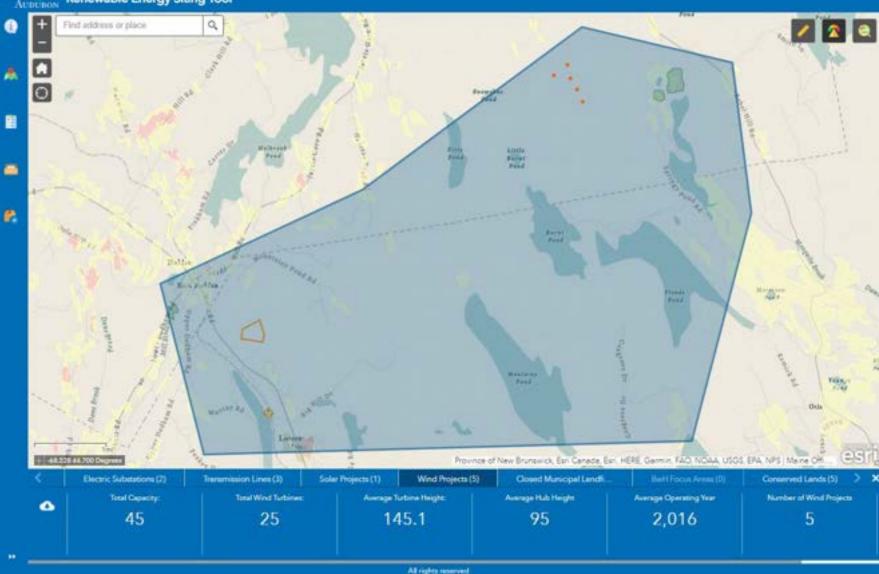
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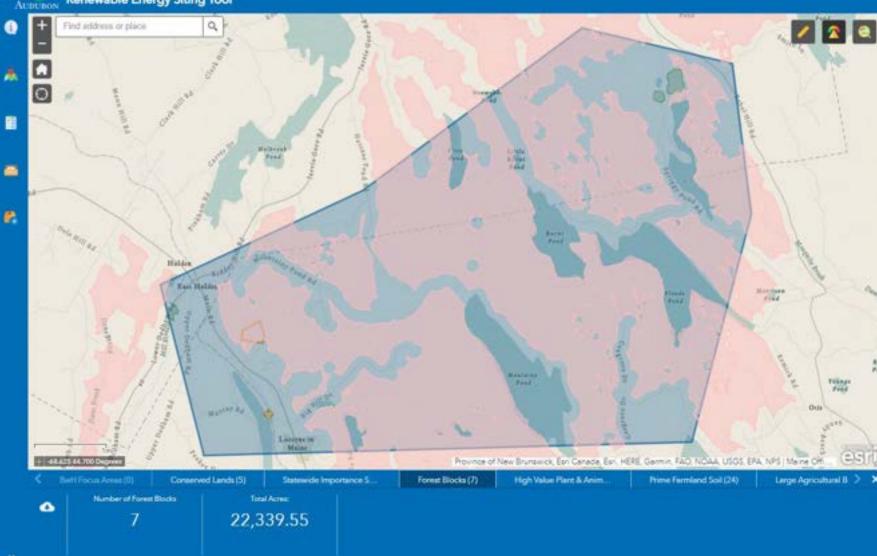
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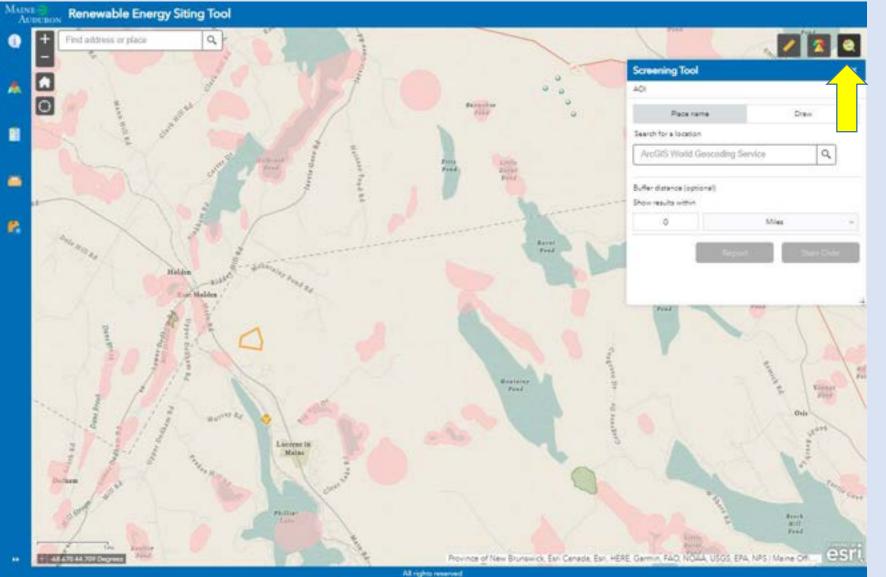
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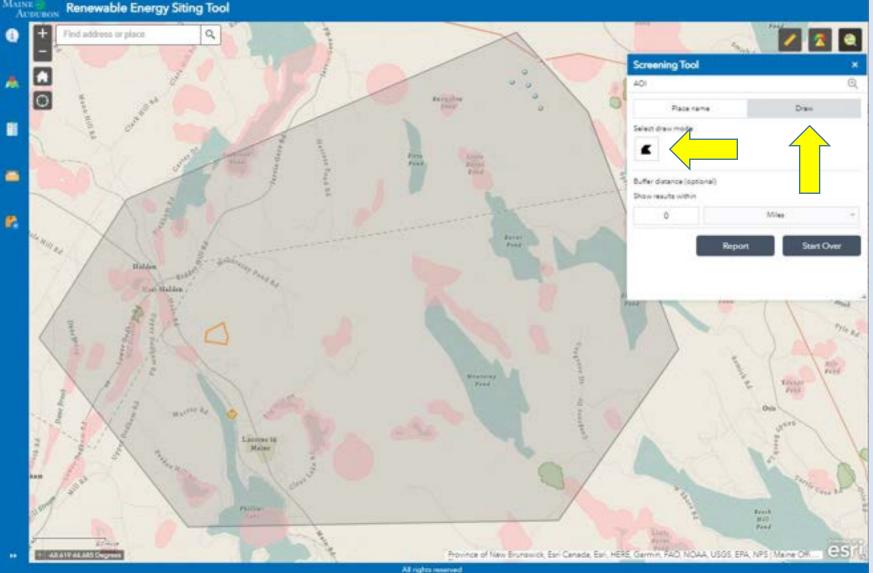
Maine Renewable Energy Siting Tool



Report Screening Tool

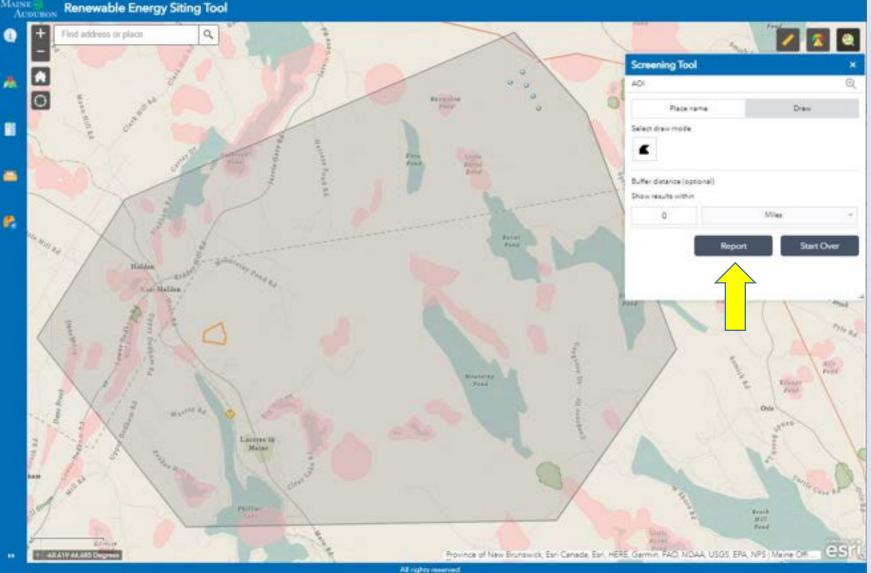
Allows user to evaluate all "on" resources in a particular area

Maine Renewable Energy Siting Tool

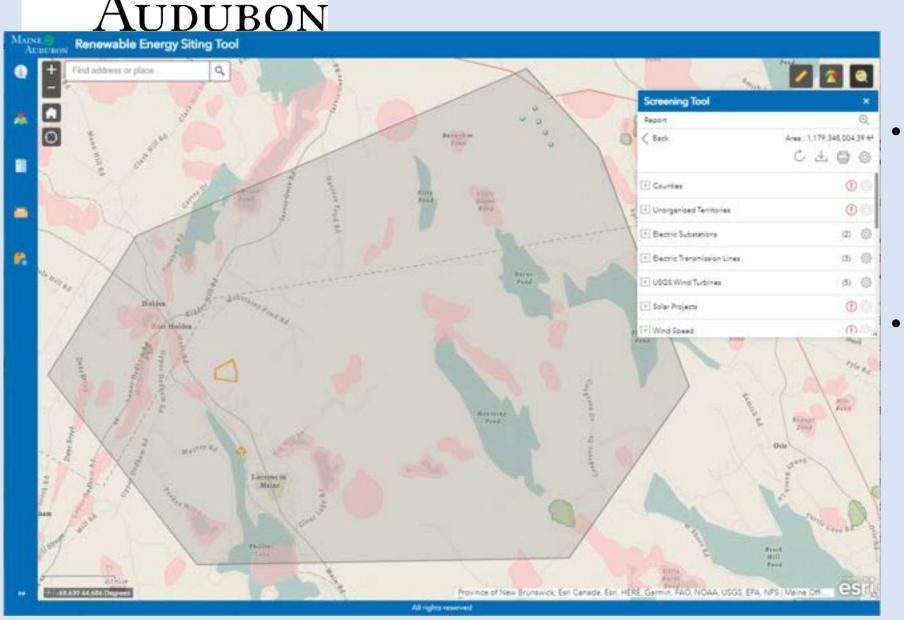


- Allows user to evaluate resources that are "turned on" and that fall within a user-defined area
- Provides report that can
 be printed out

Maine Renewable Energy Siting Tool

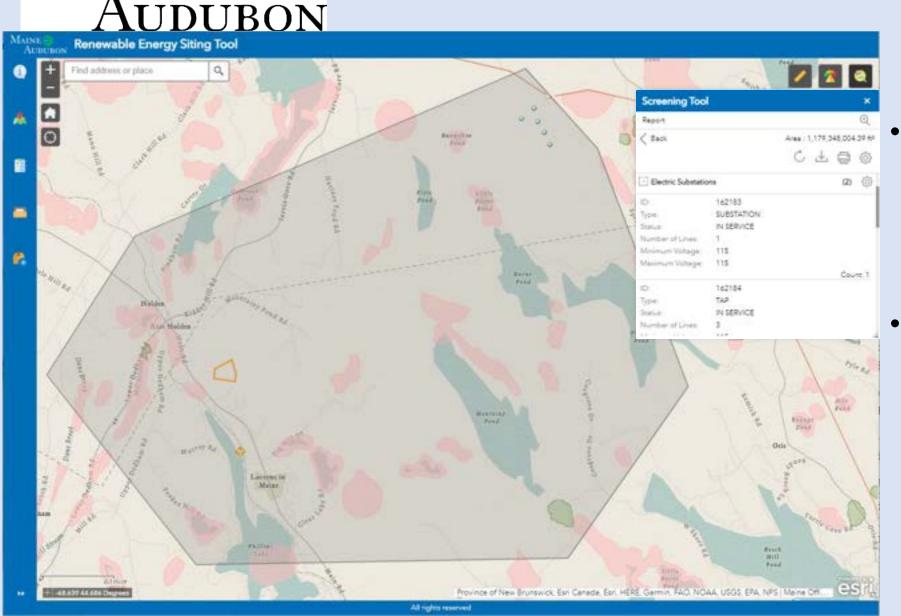


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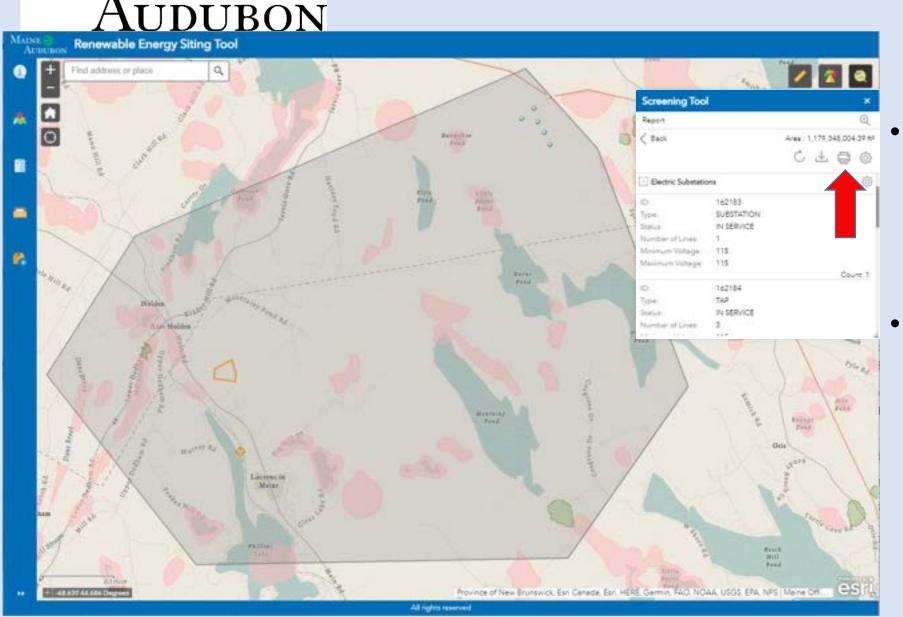
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- Screen shows which layers have results and which don't (!). Only layers "turned on" will have results.
- Similar to Assessment Tool, it tallies layers with results which can be expanded to review



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Report Screening Tool

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Similar to Assessment Tool, it tallies layers with results which can be expanded to review

Maine Renewable Energy Siting Tool

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Report Screening Tool

Printout of report includes inset map and tables of attributes and calculations where applicable

Remember! This tool only analyzes the layers you have "turned on"!



Things to Remember:

- This is for planning purposes only! This is not a regulatory map and it does not include all resources that exist.
- These data are from a variety of sources that are being updated all the time.
- We have utilized datasets that are the most applicable in the real world and that are consistent with other tools.
- Some datalayers will not draw until you are zoomed in to a preset extent. This is to maintain site stability.





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maineaudubon.org/solar



All this information can be accessed through https://maineaudubon.org/advocacy/climate-energy/