Wind Power & Wildlife in Maine:
Executive Summary

Advocating for wildlife protection in an era of climate change

Maine Audubon's mission is to conserve wildlife and wildlife habitat. Global climate change presents one of the biggest threats to our wildlife and habitat in Maine. Increasingly, warmer and shorter winters affect many of our iconic species, such as moose, lynx and our state bird, the Black-capped Chickadee. Research from National Audubon has found that nearly 60% of the 305 bird species in North America have shifted their ranges northward by an average of 35 miles. Warmer stream temperatures will threaten Maine's native brook trout and endangered Atlantic salmon, and sea level rise will erode our state's coastal habitats, affecting endangered birds like the Piping Plover and Least Tern.

Maine Audubon advocates for investment in regional renewable energy, including wind power, because carbon emissions from fossil fuels represent the largest contributor to climate change. At the same time, we strive to understand the impact of wind power development on wildlife and wildlife habitat, and support siting of renewable wind energy in places that minimize those impacts.

Wind Power & Wildlife in Maine serves to open dialogue on the subject of wind power and impacts on wildlife in Maine across the landscape and over the long-term as we move towards meeting the State's energy goals. The location and siting of wind developments is a complex issue, and while there is a broad array of important concerns—impacts to the local economy, tourism, outdoor recreation, regional power supplies, local residents, and scenic views—Maine Audubon has always focused its concern on wildlife and habitat.

This report does not eliminate the need for site-by-site analysis to determine how individual wind development projects will impact wildlife and habitat. It does however, present options for where wind turbines could be sited that are likely to avoid adverse impacts to wildlife resources and move through the permitting process with greater certainty.

We believe that by working together with our partners, developers and the public, rightly-sited wind turbines can be a viable renewable energy resource for the region, slowing the pace of climate change while protecting Maine's wildlife and habitat.

Two primary goals of this study:

- Identify areas of the state that are most appropriate or least appropriate for commercial wind development in terms of impact to wildlife and wildlife habitat;
- Determine if Maine has the capacity to meet its goal of 3,000 MW (megawatts) capacity of electricity from land-based wind power by 2030 while avoiding critical wildlife resources (as outlined in the 2008 Wind Act).

Approach

To determine where the state's windy areas and wildlife resources overlap, we overlaid a series of Geographic Information Services (GIS) maps of the windiest areas in Maine, expedited and non-expedited permitting areas (see page 5), coastal areas, current wind developments and eleven different wildlife resources, including Significant Wildlife Habitat, the presence of rare or endangered species and water and wetland resources.

Limitations

The availability of some wildlife data is limited, so this report does not take into account all possible wildlife resources, nor does it take into account species that are being considered for listing under the State Endangered Species Act (such as the little brown and northern long-eared bat). This is a dynamic report and as more wildlife and habitat data becomes available, GIS map layers can be updated to reflect current information.

Please see the full report for a complete description of the GIS layers used in our research.

Where do our wind and wildlife resources overlap?

We estimate there are 1.1 million acres in Maine with enough wind for development (excluding existing conservation land, developed land and steep slopes).

Of this acreage, approximately 177,000 acres (16%) overlap with the mapped wildlife and habitat resources. About 112,800 acres lies in the expedited permitting area and 64,100 acres lies in the non-expedited permitting area. Approximately 933,000 acres do *not* overlap with the wildlife resources we mapped (418,000 acres in the expedited permitting area and 515,000 acres in the non-expedited permitting area). This means that 84% of the windy acres may be suitable for wind power development with minimal impact on the wildlife resources we analyzed.

The mountainous areas of northern and western Maine and our coastline stand out as areas with a lot of wind and wildlife resource overlap. Wind resources located within two miles of the coast accounts for approximately 14% of the windy areas analyzed in this study, but makes up only 7% of the State's land base.

Did you know?

What does wind turbine capacity mean?

Installed capacity refers to the energy that a wind turbine is capable of producing if wind remained consistent and steady twenty-four hours a day.

Actual capacity is what the wind turbine produces on the ground. Because wind is variable, wind turbines do not operate at their full (installed) capacity. A high-performing turbine will generate 30-40% of installed capacity; many turbines generate around 20% of their installed capacity.

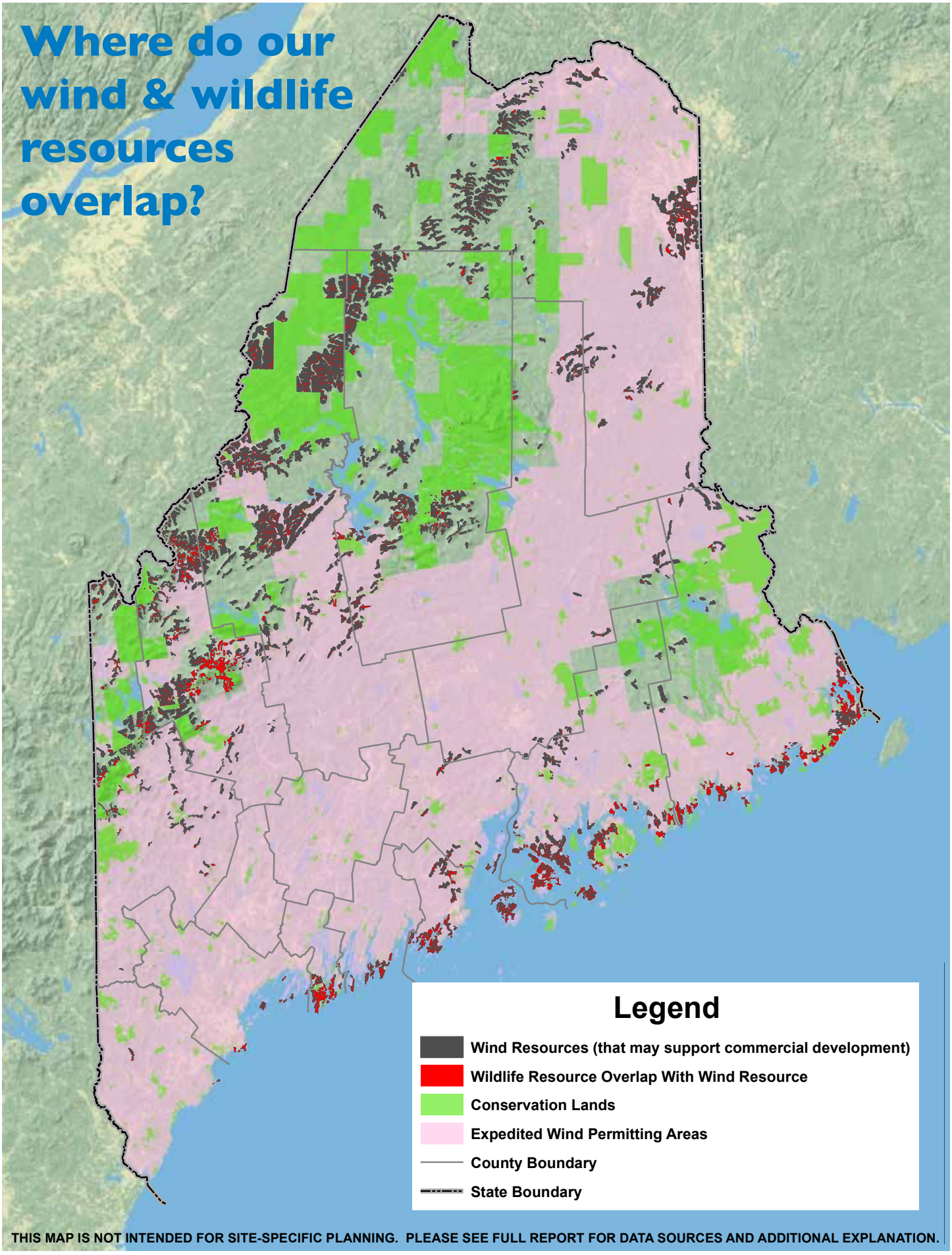
Kibby Mountain Wind Development, Franklin County

Wind Availability at Lower Elevations

Approximately 92 percent of the mapped 1.1 million windy acres have low wind speeds. Because of improvements in wind technology over the past ten years—namely longer blades and taller towers—these areas, mostly at lower elevations, can be viable for wind development.

While this reduces the need to locate turbines in areas with high wind speeds (mostly in high elevation mountain areas that are home to sensitive and rare wildlife species) there are many undocumented and important wildlife resources in these lower-wind areas that could be affected by wind development (such as cold water streams, rare species and tree bats). These conflicts underscore the importance of site-by-site review of proposed wind development projects and their impacts to wildlife resources.

Where do our wind & wildlife resources overlap?



Key Findings:

1.1 million
acres in Maine are viable for commercial wind development.

92% of this windy acreage has low wind speeds. These areas are the focus of most new wind development.

84% of this windy acreage may be suitable for wind power development with minimal overlap of wildlife resources.

15% of the windy acreage would have to be developed to the meet the state goal of 3,000 MW capacity of land-based wind energy by 2030.

600 more turbines need to be constructed to meet this State goal, given current technology.


Bicknell's Thrush

Will the State meet its wind power production goals by 2030?

We analyzed different scenarios to determine if the State's goal of producing 3,000 MW capacity of wind-produced electricity by 2030 without overlapping the wildlife resources studied here is feasible (see page 5). We believe that the most realistic scenario for meeting the State goal will require development of about 15% of the remaining windy area in expedited permitting areas away from wildlife resources. In this scenario, we need to build approximately 600 more wind turbines (based on the capacity of current technology), which is three times as many as we currently have in the state.

Recommendations & Moving Forward

- Given the relatively small overlap of windy acreage with wildlife resources (16% of the land analyzed in this study), Maine Audubon recommends avoiding wind power development in these areas to minimize adverse impacts on documented wildlife and wildlife habitat resources.
- Though 84% of the land analyzed in this study may be suitable for wind power development with minimal overlap of wildlife resources, we recommend siting wind turbines within the 418,000 acres of windy land within the expedited permitting area.
- We recommend that any land-based wind development in the mountainous areas of northern and western Maine and along our coast be carefully studied. These regions stand out as areas with a lot of wind and wildlife resource overlap.
- Maine Audubon believes that the findings of this study demonstrate that we can meet Maine's wind energy goals while avoiding impacts to important wildlife and habitat resources.
- As new wildlife resource maps become available, GIS map layers can be updated to help further understand the overlap of wind and wildlife resources.

Did you know?

How many homes can a wind turbine power?

A single MW provides enough electricity to power 225-300 households. If Maine meets its goal of 3,000 MW capacity by 2030, it would produce enough electricity to power 675,000—900,000 homes in the Northeast (adjusting for actual capacity of 20-40%).

Meeting Maine's Wind Energy Goals

If we develop

100%	50%	25%	15%
12,714 MW	6,357 MW	3,179 MW	1,907 MW

of windy areas that do *not* overlap wildlife resources, we would generate

Maine already has 1,000 MW wind power capacity on the landscape. If we develop 15% of the remaining windy area in expedited permitting areas away from wildlife resources, we can reach the State's 2030 goal of 3,000 MW capacity of wind energy without impact to major wildlife resources.

*Based on wind turbine density of 7.5 MW/km^2

Did you know?

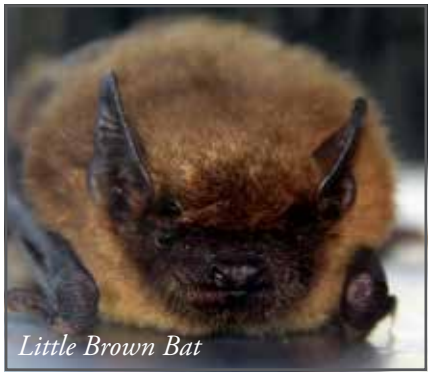
Permitting for Wind Power Development

In 2008, the Governor's Task Force on Wind Power Development developed a map that created expedited and non-expedited permitting areas. While standards for natural resource protection are the same in both the expedited and non-expedited areas, standards for scenic impacts are higher in non-expedited areas and require an additional step of rezoning before the Maine Land Use Planning Commission.

Acknowledgements

This report was funded in part by the Orchard Foundation. The complete report, *Wind Power and Wildlife in Maine: A State-wide Geographic Analysis of Where Wind Power and High-value Wildlife Resources Overlap*, and a complete list of acknowledgements can be found at maineaudubon.org/wind.

Many thanks to the Natural Resources Council of Maine for providing the GIS wind map for use in this study.



Little Brown Bat

Stay Informed:

Visit & sign up: maineaudubon.org/act ***Connect:*** facebook.com/maineaudubon twitter.com/maineaudubon

Maine Audubon is working to help wildlife adapt to climate change

In addition to advocating for energy that reduces carbon emissions, Maine Audubon is working on solutions to prepare wildlife for the effects of climate change.

- We work with citizen science volunteers on conservation projects that document changes to wildlife and habitat caused by climate change.
- We use our research to advocate for sound, science-based climate change policies in Augusta.
- We work with partner organizations to advance climate adaptation policies, including participation in the Sustaining Climate Adaptation in Maine Project (SCAMP).
- We partner with towns and landowners to provide the information and tools they need to replace old road culverts with 'Stream-Smart' road crossings that connect habitats and prevent road washouts caused by increased storms.

Maine Audubon

Wind Power & Wildlife in Maine:

Executive Summary

Maine Audubon
20 Gilsland Farm Road
Falmouth, ME 04105

Nonprofit Org.
U.S. Postage
PAID
Portland, ME
Permit No.92