

Avian Conservation and Wind Power

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Alternative Energy Regulatory Advisory Panel
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What Do We Know?

- Birds are killed at wind power sites
- The impacts on local and total populations can be significant or insignificant
- Bird usage and risk vary among sites
- Bird usage and risk may vary within a site
- Raptors are high risk species at some sites
- Nocturnal migrants may be a high risk group at some sites
- Avoidance of areas with high bird use is the only way to reduce avian mortality

*Source: Proceedings of the National Avian-Wind Power Planning Meeting
PNAWPPM, 2001*

Potential Impacts

- Direct Bird Mortality
 - Turbine Strikes
 - Electrocution
 - Other Structures
 - Meteorological towers, buildings, transmission lines
- Local Usage Effects
 - Short-term Displacement
 - Habitat Changes
 - Activity disruption
 - Increased usage
- Population Effects
 - Local Populations
 - Total Populations

Cumulative Impacts

Potential *cumulative* effects on birds are broader than just those from direct collisions. In particular:

- increased energetic costs of migration,
- avoidance of preferred migration pathways, and
- change or loss of migration habitat

“Environmental impacts need to be investigated and quantified at both the site and regional scales so that well informed decisions can be made about where bird-friendly wind energy facilities can be constructed.”

Source: [Raptors and Wind Energy Development in the Central Appalachians](#) 2008

Due to its position in the center of the Appalachians, Virginia's mountains are ***critical to hundreds of species of migrant birds***, especially diurnal raptors (Hill 1984). The mountains provide updrafts that make migration energetically efficient for raptors (Johnsgard 1990). This makes the mountains of Virginia an important flyway for raptor migration.

Although many raptors migrate through the mountains and along the coast, ***it is rare for birds to switch routes***: birds banded in the mountains are generally only recovered in the mountains and vice-versa (Hill 1984).*



How Much Mortality?



- National estimates of mortality range from approximately 1.8 to 2.2 bird deaths per turbine per year or about 30,000 birds killed annually in the US

(Erickson et al, 2001)

- Local estimates from the TVA sites may be four to five times higher than the national average

(TVA, 2002)

How Much Mortality?

Compared to other forms of bird mortality:

Tower kills: 4-50 million

Vehicle kills: 60-80 million

Window strikes: 98-980 million

Transmission line kills: 10,000-174 million

(Erickson et al, 2001)



The Altamont Pass in California is known for its outdated turbines and high avian mortality rate.



Newer turbines, like those on Tug Hill in New York, have a larger surface area and cause fewer bird deaths.

Green Energy and Wildlife

“The push for a massive expansion of renewable sources of energy has tremendous potential for improving environmental conditions and moving us towards the goal of energy independence,” said Steve Holmer, American Bird Conservancy’s Director of Public Relations. “But we must make sure that in the rush for sustainable power we do not sacrifice sensitive habitats and bird migration corridors, or impact bird and bat populations through needless fatal collisions with spinning turbines. Green energy is only going to be green if we take into account all the environmental factors.”

Source: <http://www.abcbirds.org/newsandreports/stories/090612.html>

What Do We Need to Know?

- How many birds use potential sites?
- What kinds of birds use potential sites?
- How is usage related to time of year?
- How is usage related to time of day?
- What are the species of special concern at each site?
- Will development have impacts on local or total populations?
- Can we address these impacts to mitigate them on the front end?

What Birds Use the Mountains?

- Mountains host wide variety (225+ species)
- Mountains are primary migration route for passerines and raptors
- 58 Bird Species of Greatest Conservation Need are found in the mountains*



*Virginia's Comprehensive Wildlife Conservation Strategy

When Do Birds Use the Mountains?



- Highest diversity is during migration (spring and fall)
- 160 breeding species in summer
- 60-75 wintering species
- Maybe two times as many individual fall migrants as in spring

What Birds Use the Coast?

- Waterbirds/Marshbirds: herons, egrets, ibis', rails
- Passerines: perching birds: warblers, vireos
- Shorebirds: sandpipers, plovers, gulls and terns
- Birds of Prey: eagles, hawks, falcons
- Waterfowl: ducks, geese and swans
- Pelagics: gannets, petrels, jaegers, shearwaters, skuas

When Do Birds Use the Coast?

A wide variety of birds utilize the coast year round: in the spring and fall as migration corridors; in the winter as wintering grounds; and in the summer as breeding grounds

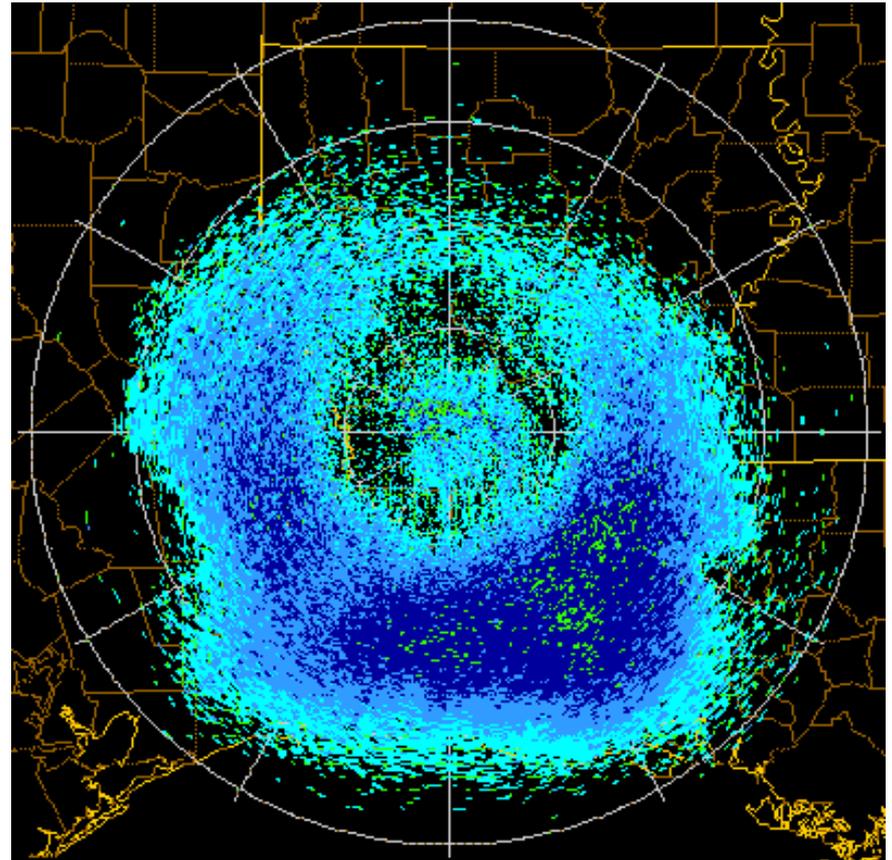


Offshore Factors

- Pre and post construction monitoring is much more difficult in the marine environment
- Avian knowledge going into projects is less than with land based data sets
- Some worldwide conservation concern species are present (i.e., Bermuda Petrel and Black-capped Petrel)
- Grid cabling and vibrational interference impacts to marine mammals
- Birds are known to habituate to the wind farms and avoid sites. While this is good for direct mortality, it creates exclusion zones where birds won't forage. This is particularly important in the north Atlantic if sites are near breeding colonies.

What about Migration?

- Most passerines migrate at night
- Peaks in April-May and September - October for passerines
- Raptors peak in late September and continue into November
- Topographical use of the mountains by migrants poorly understood
- Highly weather dependent
- Wind drift may cause morning corrective flights
- Migrants may become disoriented in foggy conditions and are attracted to lights on towers, turbines, or buildings



A Key Challenge

The key challenge to protecting migrating birds from fatality at wind turbines is that they are a moving target – as individuals and as populations. The intercontinental scale of birds' movement requires scale-appropriate conservation planning. Moreover, because migration is spatially and temporally dynamic, it presents a challenge to traditional conservation paradigms. The demographic consequences of the changing world and its impacts on migratory birds will be knowable over time. Until then, protecting migratory birds requires a conservative approach applied at an intercontinental scale.

Source: Sarah E. S. Mabey, *North Carolina State University*, AVIAN MIGRATION AND IMPLICATIONS FOR WIND POWER DEVELOPMENT IN THE EASTERN UNITED STATES

Recommendations

- Continue to consider avian impacts in the planning process
- Utilize national standards for site surveys and impact studies
- Provide for thorough site study prior to construction
- Utilize our local resources (i.e. CCB, Audubon)
- Provide for long-term monitoring programs
- Work with major bird conservation plans for opportunities and to avoid costly litigation and delay
- Sell to the public the relatively low direct impacts versus regional benefits of “greener” energy

Several management strategies can be used to reduce potential negative impacts to bird populations:

- Develop monitoring protocol to record impacts for adaptive management and mitigation because greatest impacts can be from only a few turbines
- Use radar to detect migrating birds and turn off turbines during poor weather
- Make the turbines more visible to birds
- Align turbine arrays to allow for bird movement
- Ensure proper lighting to avoid collisions (as little as possible, white better than red)

Source: "**Birds, Bats and Coastal Wind Farm Development in Maine: A Literature Review.**" <http://wildbirdsbroadcasting.blogspot.com/2009/06/maine-report-evaluates-coastal-avian.html>

Summary

With proper turbine sighting and proper long-term monitoring, impacts to avian species can be reduced.

We can look to other states, such as North Carolina, Maine and Pennsylvania for guidance.

Incorporate our knowledge into the rule-making process.

Get educated on the issue and conserve energy:

[http://www.governor.virginia.gov/TempContent/
2007_VA_Energy_Plan-Full_Document.pdf](http://www.governor.virginia.gov/TempContent/2007_VA_Energy_Plan-Full_Document.pdf)

Sources

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- Birds, Bats and Coastal Wind Farm Development in Maine: A Literature Review, 2009
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