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New York Wind Energy Guide for Local Decision Makers:

Birds and Bats: Impacts and Regulation



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Heavy construction work, common to development of all power generating facilities and other major structures, will affect ecological resources during construction and operation. Common ecological concerns related to any type of construction include loss or change of habitat for foraging, wintering, migrating, and nesting birds, as well as change in vegetative cover types. Other concerns are specific to wind projects and include injury to or death of birds and bats due to collisions with turbine/tower structures.

From federal laws to State surveillance and monitoring guidelines, there are many requirements in place to protect these ecological resources. Depending on the level and type of wildlife impact estimated for a proposed wind project, appropriate avoidance, minimization, or mitigation strategies can be developed.

Bird Impacts

Early wind projects, notably in California, experienced a high number of avian strikes as a result of turbine design and poor siting. Modern-day projects are constructed with turbines designed to reduce the potential for avian perching and collisions, and locations are more intensely scrutinized. In addition, newer turbines are much larger in capacity, requiring fewer turbines to achieve a desired overall capacity.

Still, according to the American Wind Wildlife Institute, (AWWI) “The potential for biologically significant impacts to wildlife continues to be a source of concern as populations of many species overlapping with proposed wind energy development are experiencing long-term declines as a result of habitat loss and fragmentation, disease, nonnative invasive species, and increased mortality from numerous other anthropogenic activities.” (American Wind Wildlife Institute, 2016). Since the early experience with bird fatalities, the wind industry, scientists, and state and federal agencies have been working together to understand the relationship of birds to wind turbines and how to better site and operate turbines while still receiving an adequate wind resource. Lessons learned from that time are being applied to today’s proposed and operating projects.

Bird mortality due to human activity is not limited to wind turbines. Studies show that wind turbines, on average, are less harmful than some other human-made structures, or even domestic cats (Figure 1). It is not the intent of this graphic to diminish the impact wind turbines have on local bird populations in light of the expansion of wind power development, but it does put the impact in perspective.

In reviewing 170 North American wind facility collision-fatality-monitoring studies, the AWWI reports that most studies report fatality rates of three to five birds per megawatt (MW) per year, inclusive of all affected species (American Wind Wildlife Institute, 2016). The highest fatality rate reported was 14 birds per MW per year.

Top human-caused threats to birds (Ordered by median estimate of bird mortality annually – in millions)

Hazard Type	Min. Range	Max. Range	Median Avg. Estimated
Cats	1.4 M	3,700 M	2,400 M
Collision - Building Glass	7 M	600 M	303.5 M
Collision - Vehicles	89 M	340 M	200 M
Poison			72 M
Collision - Electric Lines	8 M	57 M	25 M
Collision - Communication Towers			6.5 M
Electrocution	.9 M	11.6 M	5.4 M
Oil Pits	.5 M	1 M	.75 M
Collision - Wind Turbines	.14 M	.5 M	.174 M

Figure 1

(Source: U.S. Fish & Wildlife Service)

Bat Impacts

Bat fatalities have also been associated with wind turbines and are typically caused by collisions. Some earlier evidence suggested that rapid changes in air pressure near the rotating blades may be responsible for bat deaths, but more recent studies have suggested that such occurrences are not common (American Wind Wildlife Institute, 2016). Like birds, bats are known to collide with other man-made structures, such as lighthouses, television towers, communication towers, large windows, tall buildings, power lines, and barbed-wire fences. The numbers of bats killed from specific incidents at these types of structures appear to be small.

A 2013 review of 75 North American post-construction studies found that the highest mean bat fatality rates have been documented at wind power projects in the Midwest and the Eastern Forest Region (Hein, 2013). Although many of these documented fatalities were at wind power projects associated with long treed ridgelines in the Mid-Atlantic Appalachian Mountains, the high rate of bat mortality in the East may be attributable, in part, to other factors (Arnett, 2008). According to the AWWI, there have been no consistently established patterns of mortality related to landscape types, but, on average, fatality rates have been lower at wind farms located in the Western U.S. (American Wind Wildlife Institute, 2016).

Studies have identified several other patterns associated with bat fatalities, without definitively identifying any one factor. The fatalities were found to be skewed toward migratory bats and consistently peak in midsummer through fall. The studies found that the fatalities were not concentrated at any one turbine location (they were distributed across the facility), and FAA lighting (red strobe lights) did not seem to have any influence on the collisions (American Wind Wildlife Institute, 2016).



Photo credit: [istock.com/milehightraveler](https://www.istock.com/milehightraveler)

Studies are underway to determine the effectiveness of taking mitigation actions, including curtailing blade rotation at low wind speeds and use of ultrasonic transmitters to deter bats from the blade area as a means of mitigating bat fatalities.

Federal Laws and Requirements

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The Federal Migratory Bird Treaty Act (MBTA) has been in place for nearly a hundred years. It prevents the harm or disruption of any migratory bird without a permit. The Bald and Golden Eagle Protection Act (BGEA), enacted in 1940, provides additional federal protection to these two important species. The U.S. Fish & Wildlife Service (FWS) is in charge of enforcing both of these Acts and is responsible for issuing permits under them. These policies and their application to wind energy development are further described in the FWS [Land-Based Wind Energy Guidelines](#). Developers are required to follow these guidelines and must get the appropriate permits for the “take” of these species before projects are developed.

The FWS is currently considering whether it will modify its approach to regulating the incidental taking of bird species protected by the MBTA and BGEA.

The FWS has a dedicated [website](#) containing information about the MBTA regulatory process, which was started in 2015 and is still underway. As part of the process, the agency is considering options for authorizing the incidental take while reducing bird mortality through conservation measures.

At the same time, several federal district courts have examined the legal question of what activities constitute a “taking” that could be prosecutable under the MBTA or the BGEA. In September of 2015, the Fifth District Court (covering Texas, Louisiana, and Mississippi) ruled in *United States v. CITGO* that unintentional takings of birds are not covered in the MBTA’s lawful jurisdiction; meaning that incidental take permits would theoretically only be required for “deliberate acts done directly and intentionally to migratory birds” and not for otherwise lawful activities or developments, which includes wind energy development. However, incidental takings could still be prosecuted under the BGEA.

In another case, *United States v. FMC Corp.*, the Second District Court (covering New York State, Connecticut, and Vermont) found the manufacturer of pesticides guilty of causing migratory bird deaths under the MBTA. Within this decision, the court did note “construction that would bring every killing within the statute, such as deaths caused by automobiles, airplanes, plate glass modern office buildings, or picture windows into which birds fly, would offend reason and common sense,” and that prosecution for takings be possibly limited to “extrahazardous” developments. The distinction between the Second and Fifth District Court rulings is important for stakeholders to be aware of, as this may set the stage for a Supreme Court ruling.

The BGEA established that a “take, possess[ion], purchase, or barter” would result in criminal penalties. In 2007 the Bald Eagle was removed from the Endangered Species Act (ESA) list of threatened species. In May of 2016, the FWS issued a [Draft PEIS](#) to analyze the possible different take limits for both bald and golden eagles, and to propose revisions to existing permit regulations. A [final PEIS](#) was issued in December 2016. Until any revisions go into effect, the taking of a bald or golden eagle is still prohibited under the BGEA, regardless of intentions.

Endangered Species Act

Species categorized as endangered or threatened by the federal government are protected under the Endangered Species Act, which “ensure[s] that [federal agencies’] actions are not likely to jeopardize the continued existence of these species or destroy or adversely modify their critical habitat.” Guidelines for developers to abide by this Act are also listed in the FWS Land-Based Wind Energy Guidelines.

State Surveillance and Monitoring Guidelines

Environmental assessments of wind energy projects commonly require pre- and post-construction monitoring of the project area to determine the project's impact on avian and bat species. Surveys include researching the biological resources within the project area, migration patterns of birds/bats passing through the project area, and the protective status of migratory and nesting/resident species in an area where turbines are being considered. Bird and bat surveys are often conducted during the spring and fall seasons to identify the migratory patterns of birds and/or bats as they pass through the project area.

In 2008, the New York State Department of Environmental Conservation (NYSDEC) implemented guidance for assessing the potential impacts of commercial wind projects on bird and bat species. In June 2016, NYSDEC released the updated [Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects](#). The guidelines are comprehensive and include measures for conducting both pre- and post-construction impact surveys. They outline the recommendations proposed by NYSDEC for commercial wind developers, including characterizing bird and bat populations at site locations, documenting bird and bat mortality rates, and identifying other indirect effects. By recommending consistent protocols and methodologies, the guidelines will allow for comparison of data across different sites and years, which “may contribute to a statewide understanding of the ecological effects of wind energy generation” (NY Department of Environmental Conservation, 2016).

The implementation of the 2008 guidelines has resulted in the completion of over 20 post-construction monitoring surveys that were ultimately submitted to NYSDEC. Department staff reviewed the data to assess impacts of the operating commercial wind projects on avian and bat species. The results of the surveys were utilized to update and revise the guidelines in 2016. The post-construction reports regarding the impacts on avian species from operating New York State commercial wind farms are consistent with the 2016 results collected by AWWI. The results of the post-construction studies regarding bat mortality are also consistent with the AWWI 2008 review of projects throughout North America; bat mortality at projects in New York State are greater than projects located in the western part of the U.S.

New York Threatened and Endangered Species Listings

The FWS maintains a [list](#) of all threatened species, endangered species, and critical habitats by state in which they occur. As of August 2016, thirteen animals and eight plants found in New York State are listed as either threatened or endangered by the FWS. New York State maintains its own [list](#) of endangered and threatened species that contains additional species to the FWS list. It's important that project sponsors consult these lists early on during site selection of their wind project. An environmental consultant can refer to these lists and advise the project sponsor about the likelihood of potential impacts. Ultimately, it's the responsibility of the agencies to make a determination whether any of the species on either list may be at risk of being impacted, and what level of surveys and analyses are required to determine that risk.

The New York State Natural Heritage Program maintains a [database](#) on the locations of rare plants and animals, and significant natural communities found within New York State. Proposed development sites should be screened against the database. The screening focuses on identifying rare species and significant natural communities at or in the vicinity of the proposed project site, and on identifying rare species of birds and bats within a larger area around the site. NYSDEC staff can also provide useful insight on the occurrence of listed species or species of concern in a proposed development area. Local birding groups may also provide information on migrant and resident bird species in a local area.

Habitat Impacts

Loss of habitat and vegetation can occur during the construction process as a result of increased human presence, noise, motion, and alteration of the terrain for roads, buildings, foundations, or other permanent site-infrastructure elements. Although developers generally try to select sites with minimal tree cover, tree removal does occur at most projects for construction needs and access roads. Selective tree removal to improve exposure to the wind can also result in a loss of forested habitat.

Site topography and project layout have the largest impact on loss of habitat issues. Construction in steep areas can produce more disturbances due to the need for more cut-and-fill excavation work. Loss of habitat can be mitigated through revegetation actions or through setting aside other sections of land from development. Plans for site work should be reviewed to ensure sufficient soil and water quality control measures, like those required for other construction projects, are in place.

Surveys of habitat and vegetation often focus on:

- Landcover types and condition of the habitat
- Whether any threatened or endangered vegetation exists in the proposed development area
- Whether the area is already fragmented
- What species are thought or known to require that habitat or vegetation for survival (critical habitat)

Strategies for Lessening Bird and Bat Impacts

Depending on the level and type of wildlife impact estimated for a proposed wind project, appropriate avoidance, minimization, or mitigation strategies can be developed. Examples of these strategies include:

- Relocate turbine (depending on topography, wind resource, and access to land) or remove from the proposed project layout if there are no suitable alternatives.
- Minimize impacts of electrical wires on birds by burying cable when practical and installing bird diverters on overhead lines.
- Minimize lighting at operation and maintenance buildings, substation, and interconnection facilities.
- Prevent birds from flying into guy wires on meteorological towers by using bird diverters (not applicable for turbine towers).
- Alter operations, such as shutting down turbines during certain times (e.g., bird and bat migration seasons) to reduce turbine strikes.
- Replace or rehabilitate lost habitats in nearby areas.

The FWS Land-Based Wind Energy Guidelines include general guidelines for mitigation of and compensation for adverse impacts. In addition, the [Bats and Wind Energy Cooperative](#) describes ongoing studies on new techniques to mitigate harm to bat species.

References

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- U.S. Fish & Wildlife Service. (2012). [Land-Based Wind Energy Guidelines](#). Retrieved August 3, 2016
- U.S. Fish & Wildlife Service. (2015, February 13). [Listed species believed to or known to occur in New York](#). Retrieved August 3, 2016

Additional Resources

- [The Journal of Wildlife Management: Behavioral Responses of Bats to Operating Wind Turbines](#)
- [NYDEC: NY Natural Heritage Program](#)
- [NYDEC: Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects](#)
- [NYDEC: List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State](#)
- [Manomet: Bird and Bat Studies Conducted at Proposed or Existing Windpower Facilities](#)
- [The Nature Conservatory: Wind and Wildlife Landscape Assessment Tool \(interactive map\)](#)