

## **PRAIRIE PASSERINES AND OTHER MIGRATORY BIRDS**

### **Background and Identification of Interaction with Wind Development**

This BMP addresses migratory birds that rely on grasslands and wetlands in eastern Colorado. Continentally, grassland breeding bird populations have been declining faster in the past 40 years than bird species that rely on other habitat types, partly due to habitat loss and fragmentation.<sup>1</sup> According to available studies, most bird fatalities at wind turbines are migratory passerines<sup>2</sup>.

Less than three percent of the surface area of Colorado was originally composed of wetlands, of which approximately 40 - 60% (1 - 3 million acres; 0.4 - 1.2 million hectares) have been lost.<sup>3</sup> Fifteen percent (37 of 240 species) of Colorado's breeding bird species are dependent on wetlands.<sup>4,5</sup> Additionally, Colorado wetlands provide important stopover and wintering locations for numerous waterfowl species. Over-wintering duck numbers in southeastern Colorado routinely average above 60,000 individuals.<sup>6</sup>

To understand the potential impact of wind energy development on grassland and wetland birds several factors are important to consider.

- Inclement weather: Most birds migrate at night at altitudes between 500 and 1,000 feet (152.4 - 304.8 m).<sup>7</sup> However, nights with inclement weather, low cloud cover, or strong winds often cause birds to fly at lower altitudes and may bring them in range of the rotor swept area of a turbine.<sup>8</sup>
- Species-specific behavior: Behaviors such as focused aerial foraging, aerial courtship displays, and interactions with other species while in the rotor-swept area may increase collision risk.<sup>9</sup>
- Guyed towers may increase the risk of collision fatality for birds.<sup>10</sup>
- Lighting on associated infrastructure may increase risk of collision mortality for birds.<sup>11,12</sup>
- Bird Concentration Areas are areas on the landscape where large numbers of birds concentrate at high densities for a period of time. These include: wetlands, lakes, playas, narrow movement corridors, migration staging areas, nesting colonies, communal roosting sites, and feeding concentration areas.

Vegetation clearing, grading, and other habitat-disturbing activities may result in the destruction of birds, nests, or eggs if conducted during the breeding season. Construction of wind turbines, roads, and other associated infrastructure result in short and long-term loss and fragmentation of habitat.<sup>13,14,15</sup> Placing power lines near bird concentration areas may increase the risk of electrocution of large birds.<sup>16</sup>

### **Migratory Bird Treaty Act Compliance**

The federal Migratory Bird Treaty Act (MBTA) prohibits activities that may harm migratory birds, their young, or their eggs, including the removal of active nests that results in the loss of eggs or young. In Colorado, most non-game birds except for European Starling, House Sparrow, and Rock Pigeon (pigeon) are protected under the MBTA (§§ 703-712).

### **Endangered Species Act Compliance**

Federally-listed threatened and endangered bird species are protected under the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 et seq.). Significant adverse effects to a federally-listed species or its habitat require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 or 10 of the ESA.

### **State of the Science**

#### *Risk of collision with wind turbines*

Outside of California, 82% of all bird fatalities at wind turbines were migratory passerines (average = 2.19 birds/turbine/year).<sup>2</sup> The risk of bird fatalities from collisions with wind turbines is a function not only of bird abundance, but also behavior.<sup>2, 9,17,18,19</sup> In addition, about fifty percent of the fatalities are nocturnally migrating birds, primarily passerines.<sup>13</sup> Several studies suggest that inclement weather contribute to avian collisions because nocturnally migrating birds vary their flight heights depending on weather conditions.<sup>2,8,11,20</sup> However, observed nocturnal migrant mortality was very low relative to nocturnal passage rates of birds at wind energy developments where both mortality and nocturnal radar studies were conducted.<sup>2</sup>

Large flocks of geese are occasionally observed at some wind energy sites in agricultural areas during winter, yet collision of geese with wind turbines appears to be a rare event.<sup>2,21</sup> Some birds, such as passerines and medium to large geese, have been shown to alter their flight patterns to avoid operating turbine blades.<sup>21,22</sup>

There is little evidence that lighted wind turbines result in large-scale mortality events similar to those observed at communications towers. However, nocturnal migrant songbirds are apparently attracted to steady-burning lights<sup>23</sup>, and lighting at communications towers and other structures has been associated with high avian fatality rates.<sup>11,12</sup> Studies have demonstrated that fatalities at lit and unlit towers are similar<sup>17,24</sup>. However, lighting on associated infrastructure may attract nocturnally migrating birds into the rotor swept area, particularly on nights with low cloud cover.<sup>12</sup>

#### *Indirect effects*

The indirect displacement effects of wind energy facilities on birds are not well understood, although studies indicate that some species of birds may avoid habitat adjacent to wind turbines<sup>15,17,22,25,26</sup>. It is hypothesized that lower bird densities could be due to human activity, noise, the physical movement of the turbines, and access roads<sup>15</sup>. Some species of colony-nesting birds may abandon nests and entire rookeries if repeatedly disturbed by humans, especially early in the breeding season before eggs are laid,<sup>27,28</sup> however, habituation to certain types of human activity may occur.<sup>29,30</sup> Little information is available to indicate whether birds habituate to disturbance created by wind turbines over the long-term.

#### **Best Management Practices**

1. Wind energy developers should use existing information from National Audubon Society's Important Bird Area (IBA) network<sup>31</sup>, Colorado Division of Wildlife's Natural Diversity Information Source (NDIS)<sup>32</sup>, the Colorado Natural Heritage Program (CNHP) database<sup>33</sup>, and other sources when evaluating sites.
  - The Federal Advisory Committee Draft Recommendations for wind energy development discuss surveys for other bird concentration areas: "Site Visit: to the extent practicable, the site visit should evaluate the topography, physiographic features and uniqueness of the site in relation to the surrounding region to assess the potential for the project area to concentrate resident or migratory birds and bats." (Chapter 3, pages 21-22; Draft Recommendations 3/2010).<sup>34</sup> Site-specific field reconnaissance should be conducted in appropriate seasons to further identify potential bird concentration areas.
2. A pre-project survey that examines species, abundance, and seasonal occurrence of prairie passerines should be conducted at the wind energy development site. Consult with CDOW for appropriate methodology.

#### **Avoid**

1. The Federal Advisory Committee Draft Recommendations for wind energy development discuss avoidance for other bird species potentially impacted by wind energy development: "Avoid locating wind energy facilities in areas identified as having a demonstrated and unmitigatable high risk to birds..." (Chapter 3, page 44; Draft Recommendations 3/2010)<sup>34</sup>
  - Avoid placing turbines and associated infrastructure near known Bird Concentration Areas. To minimize the risk of collision-related fatalities and indirect impacts to birds or their habitat, where feasible establish project set-backs from bird concentration areas in consultation with the U.S. Fish and Wildlife Service (FWS) and the CDOW.
  - Where practicable, site turbines and associated infrastructure away from large, unfragmented and undisturbed tracts of native prairie. Where appropriate, develop in agricultural and other disturbed lands, using existing transmission corridors and roads where possible.
  - Avoid placement of wind turbines and met towers near rivers, open water, or areas prone to fog.

## Minimize

If placement of wind energy development infrastructure in or near large tracts of grassland habitat is unavoidable, then the following recommendations to reduce the likelihood of collision-related mortalities and habitat displacement should be considered.

1. The Federal Advisory Committee Draft Recommendations for wind energy development recommend: "Minimize the number and length of access roads; use existing roads when feasible"<sup>34</sup> To the extent practicable, site turbines, towers, roads, and other facilities to minimize fragmentation and disturbance of native grasslands.
2. The Federal Advisory Committee Draft Recommendations for wind development recommend: "Establish non-disturbance buffer zones to protect sensitive habitats or areas of high risk for species of concern identified in pre-construction studies. Determine the extent of the buffer zone in consultation with USFWS and state, local and tribal wildlife biologists, and land management agencies (e.g., U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS)), or other credible experts as appropriate." (Chapter 3, page 45 ; Draft Recommendations 3/2010).<sup>34</sup>
  - Adjustment of the buffer distance may be appropriate depending on existing disturbance, proposed activities, surrounding topography, and other site conditions, as well as sensitivity of the species concerned.
3. To the extent practicable, conduct habitat-disturbing activities in the non-breeding season. If work activities are planned during the breeding season, consult with the CDOW and other appropriate wildlife agencies.
4. "Avoid guyed communication towers and [guyed] permanent met towers at wind energy project sites. If guy wires are necessary, bird flight diverters or high visibility marking devices should be used." (Chapter 3, page 45; Draft Recommendations 3/2010)<sup>34</sup>
5. "To reduce avian collisions, place low and medium voltage connecting power lines associated with the wind energy development underground to the extent possible, unless burial of the lines is prohibitively expensive (e.g., where shallow bedrock exists) or where greater adverse impacts to biological resources would result:
  - Overhead lines may be acceptable if sited away from high bird crossing locations, to the extent practicable, such as between roosting and feeding areas or between lakes, rivers, prairie grouse and sage grouse leks, and nesting habitats. To the extent practicable, the lines should be marked in accordance with Avian Power Line Interaction Committee (APLIC) collision guidelines...
  - Above-ground low and medium voltage lines, transformers and conductors should follow the 2006 or most recent APLIC "Suggested Practices for Avian Protection on Power Lines." " (Chapter 3, page 44 ; Draft Recommendations 3/2010)<sup>16,34</sup>
6. "Employ only red, or dual red and white strobe, strobe-like, or flashing lights, not steady burning lights, to meet Federal Aviation Administration (FAA) requirements for visibility lighting of wind turbines, permanent met towers, and communication towers. Only a portion of the turbines within the wind project should be lighted, and all pilot warning lights should fire synchronously." (Chapter 3, page 45 ; Draft Recommendations 3/2010)<sup>34,35</sup>
7. "Keep lighting at both operation and maintenance facilities and substations located within one-half mile of the turbines to the minimum required:
  - Use lights with motion or heat sensors and switches to keep lights off when not required.
  - Lights should be hooded downward and directed to minimize horizontal and skyward illumination.
  - Minimize use of high-intensity lighting, steady-burning, or bright lights such as sodium vapor, quartz, halogen, or other bright spotlights." (Chapter 3, page 45; Draft Recommendations)<sup>34</sup>
8. Repair or remove wind turbines and met towers that are no longer operational.<sup>34,35</sup>

9. Conduct scientific studies following recommended guidelines.<sup>36,37,38,39,40</sup> Results will provide valuable information regarding passerine bird response and allow for more precise best management practice recommendations. (Chapter 3, pages 47-63).<sup>34</sup>

#### Conservation Offsets (Mitigation)

1. If wind development facilities may result in significant effects to large, contiguous area of native prairie, consider mitigating for habitat disturbance through ecological restoration, long-term management agreements, and conservation easements to enhance or protect sites of similar ecological quality.
2. If wind development facilities cannot be sited to avoid significant potential effects to bird concentration areas, such as the abandonment of a heronry, consider mitigating for habitat disturbance through ecological restoration, long-term management agreements, and conservation easements to enhance or protect sites with similar or higher ecological qualities and functions to that of the affected bird concentration area.

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