Raptor Research Foundation’s *Raptors and Energy Session*: Steps to Avoid or Minimize Take and Disturbance of Raptors at Power Lines and Commercial Wind Turbines

Albert M. Manville, II, Ph.D.
Senior Wildlife Biologist and National Avian-Structural Lead
Division of Migratory Bird Management, USFWS
4401 N. Fairfax Dr. MBSP-4107
Arlington, VA 22203
(o) 703/358-1963
Albert_Manville@fws.gov

Invited Presentation
*Raptors and Energy Session*
Saturday, September 25, 2010,
Fort Collins, Colorado; Updated
October 6, 2010
Issues to Be Briefly Addressed:

- Avian population status and potential impacts.
- Raptor collisions and fragmentation issues at power distribution and transmission lines, and at land-based commercial wind facilities.
- Development of Avian Protection Plans (APPs) for collision and electrocution avoidance.
- Federal Advisory Committee wind turbine recommendations to DOI, and status FWS development draft final guidelines.
- Avian Bat Protection Plans (ABPPs) and APPs for eagles and other raptors.
- Next steps.
Avian Population Status

- In 1995, FWS designated 124 “nongame species of management concern,” including raptors – out of then 836 protected birds. Represents early warning system since possible next step is designating birds as “candidates” under Endangered Species Act – scenario we’d prefer to avoid.

- 2002, FWS published “birds of conservation concern,” as mandated by law. Number bird populations in trouble increased from 124 to 131 species. 2008, FWS published updated list “birds conservation concern” – now with 147 species – not good news. In addition, 77 endangered and 15 threatened birds included under ESA – numbers continue to increase including declining numbers some raptors.

- USFWS now must manage 1,007 different bird species (50 CFR 10.13, List of Mig. Birds). Of these species, > 239 in trouble – including raptors. In addition, Service essentially lacks data on status 1/3 N. Am. bird populations. Management challenge!
Potential Impacts from Power Lines and Wind Turbines

- **Direct effects from power lines and turbines.**
  - Electrocution, bird and bat collisions.
  - Direct habitat loss/modification.
  - Interior forest, grassland habitat loss.
  - Habitat fragmentation, increase in edge.
  - Increase in nest parasitism and predation.
  - Water quality impacts. Other impacts.
  - Barrier effects.

**Indirect effects.**
- Reduced nesting/breeding density.
- Loss population vigor and overall density.
- Habitat and site abandonment, increased isolation b/w patches.
- Loss of refugia.
- Attraction to modified habitats.
- Effects on behavior including stress, interruption, modification.
- Disturbance, avoidance, displacement, habitat unsuitability.

**Cumulative effects.**
Collisions and Electrocutions of Raptors at Power Lines

- 2006, APLIC and FWS updated the 1996 *Electrocution Avoidance* suggested practices manual to include all suites of impacted birds, but w/ improved focus on *raptors* – especially Bald and Golden Eagle electrocution reduction.

- A new collisions manual, updating *Mitigating Bird Collisions with Power Lines: State of the Art in 1994* currently under major rewrite by APLIC biologists and this author. The senior editors include Misti Shriner (WAPA), Nikki Heck (AltaLink) and Kara Donohue (SCE). Update initiated 2009; draft is being readied for discussion upcoming November 2010 APLIC meeting in Jupiter Beach, FL.

- FWS raptor and avian biologists will have opportunity to conduct Service-wide peer review once final draft becomes available. Publication anticipated sometime 2011.
• Current revision collision manual focuses on those suites of birds – e.g., cranes, swans, and songbirds – most susceptible to transmission and distribution line collisions.

• While raptor electrocutions at power lines appear to be greater continuing problem than collisions, a more careful review of raptor literature since 1994 is being conducted along with any new information on raptor power line collision issues.

• These updates and new findings are being included in the collision manual. Fragmentation impacts from power line placement are also being assessed.
When assessing collision impacts to raptors at power lines, there are a number of additional issues which are being considered. These include:

- incidence of inclement weather;
- power line presence or planned construction in proximity to raptor nests, communal roosts, important foraging areas (breeding and wintering), concentration sites, migration paths, and stopover areas – collectively called “raptor use areas”; 
- specific impacts from transmission static wires and distribution line spans in proximity to all the above-referenced raptor congregations;
- more effective bird deterrent devices (where they exist) for raptors; and
- any related wire risk factors or mitigation options (e.g., tree wire, bundled wires, undergrounding, lightning arrestors – all of which are being carefully reviewed.
Raptor Collisions with Power Lines: 3

• With the new BGEPA 50 CFR Part 22.26 regulation, disturbance and “take resulting in mortality” for Bald and Golden Eagles will now require “take” permits, currently under development by FWS (Diana Whittington discussed these).

• Where APPs such as those developed by individual electric utilities are voluntary (unless court-ordered), permits for “take” under BGEPA are not – unpermitted take is illegal.

• FWS strongly encourages electric utilities, wind and solar developers, oil and gas developers, and others to work closely with us to select wildlife- and habitat-friendly sites that will avoid or minimize impacts to raptors, other protected birds, and other wildlife.

• This, of course, can be huge challenge if existing power transmission lines are problematic, e.g., lines located along ridge tops where Golden Eagle and Peregrine Falcon migration occurs along the Kittatinny Ridge, PA; or where California Condors collide or are electrocuted from existing or potentially from planned power lines.
We still know very little about the collision impacts to raptors – and other avifauna for that matter – from power lines.

This not only includes a lack of knowledge about collision impacts to their populations, but their cumulative effects as well.

Since so few power lines are systematically monitored in the U.S., our FWS mortality estimate is a very loose one – hundreds of thousands to 175 million birds killed/yr, based on extrapolations (Manville 2005, 2009).

Raptor disturbance and habitat fragmentation impacts are even less well understood – such as from road development, infrastructure placement, construction traffic, and other disturbances. This strongly suggests the use of the precautionary approach when attempting to address collision impacts – including from all sources of development.
Avian Protection Plans (APPs)

• Since 1996 when the APP concept was introduced and since circa 2002 when voluntary APPs were first suggested by representatives of the electric utility industry as an alternative to MOUs, the Service and the Avian Power Line Interaction Cmt. publicly jointly released a template for APPs in 2005 to be used voluntarily by the industry for company-wide and/or project specific purposes.

• While the Service does not sign nor officially endorse APPs, we recommend working with the industry to make them bird-friendly and legally sufficient – for our purposes today w/ a focus on raptors.

• W/ evidence pointing to continuing decline of the western pop. of Golden Eagles, potential impacts to the Sonoran pop. of Bald Eagles, potential impacts to a growing pop. of Bald Eagles in the East, and risk to small pop. Golden Eagles in the East, FWS is especially concerned about cumulative impacts to eagles – and other raptors – as well as potential additive mortality.

• As my colleagues from Canada reported, there are > 100 APPs in the U.S. and Canada today, vast majority in U.S.
Some examples of APPs include those developed, implemented or being refined by Pacific Gas & Electric, S. CA Edison, AltaLink, PacifiCorp, AEP, Duke Energy, Puget Sound Electric, FL Power & Light, Dominion Power, and others.

Some of the ongoing issues and challenges w/ APPs include:

- BGEPA 22.26 “take” and the permitting are not voluntary;
- The robustness and scientific validity of APP components;
- Buy in and accountability, especially by company executives, responding to problem poles and other bird-unfriendly infrastructure;
- Adaptive such that an APP will include new Suggested Practices as they become available; and
- The priority b/w agents of FWS’s Office of Law Enforcement in overseeing APPs and their implementation.

FWS working w/ company at the get-go is thus very important.
Avian Bat Protection Plans (ABPPs)

- The commercial wind generation industry has expressed interest in developing ABPPs following completion of Iberdrola’s company-wide ABPP in 2008 – developed in coordination with FWS. Other ABPPs have or are being developed by Iberdrola and other commercial wind generation companies for project-specific or company-wide use.

- ABPPs include both birds and bats since turbines impact both classes of flying vertebrates, and bats generally are declining although many species are not yet listed – thus the effort to avoid this situation.

- Our CA/NV Migratory Bird Office (Eric Kershner) developed an ABPP matrix earlier this year focused on wind development in California. The Washington [DC] Office of Migratory Birds is expanding the document for use nationwide for Bald and Golden Eagles, other avifauna, and bats at commercial wind facilities – currently still in draft form.

- Another document – the Standards and Criteria for development of wind projects, to be used on ARRA (stimulus bill-funded) BLM fast-track wind projects and at other wind development sites – is also still in draft form. The criteria are primarily intended to address Bald and Golden Eagle issues until FWS finalizes and implements its wind development guidelines and until a programmatic permit process under 22.26 is developed and implemented.
Federal Advisory Committee (FAC) Wind Recommendations, FWS Next Steps

- Recommendations from a wind energy FAC were submitted to Interior Secretary Salazar earlier this year following > 2 years of crafting, discussion and negotiation. They provide a tiered approach to addressing risk. I had privilege of serving as Technical Scientific Advisor to the FAC.

- FWS has designated a team of wind energy specialists from Migratory Birds, Fisheries & Habitat Conservation, Ecological Services, Refuges, T&E Species, and Law Enforcement to begin developing draft Service guidance. Recommendations from the FAC will serve as framework for developing our draft guidelines – currently being initially crafted.

- Service’s Wind Guidelines Working Group – the team – has been meeting for several months, planning a face-to-face meeting in late October 2010 to reconcile issues not addressed by the FAC or in need of expansion – e.g., noise impacts, build-no build clarification, fragmentation studies, etc.
FWS Next Steps Re: Draft Guidelines, 2

- At the present expedited pace, Service’s Working Group – co-chaired by Jerome Ford (Mig. Birds) and Jeff Underwood (Habitat Conservation) – hopes to publish a Notice of Availability in Federal Register likely late this fall of Draft Service Guidance, depending on OMB review of the document and FR notice, and other issues.

- We plan to provide a 90-day period for public review and comment of the document which will be noticed in the FR.

- Without making any pre-decisional commitments – but assuming many of you have read the FAC recommendations – the Service will have to significantly update the FAC section on BGEPA, especially Part 22.26, and discuss in more detail the anticipated role and use of ABPPs, including necessary efforts to avoid or minimize “take” of raptors. With the growing documentation and concern of wind turbine blade “take” of Golden Eagles, and recently of Bald Eagles, this effort will be critical.
FWS Final Guidelines: Next Steps

- Pending Service review, assessment and incorporation of public comments from the FR notice, possible OMB additional review, and other issues, Service hopes to publish final guidance sometime in 2011. The timing of course is the $64,000 question. 😊

- With ongoing changes and new research issues being investigated w/ wind development – including additional studies on raptors – we hope to create a document that can easily be updated to include new findings using an adaptive management approach.

- Please stay tuned for the 11:00 pm news for late-breaking developments. Once our final guidance is published, we plan to conduct public briefings, outreach and training to implement it.
Ongoing and New Challenges with Wind

- With the continuing exponential growth of land-based wind energy in North America, the challenges to raptors – and other flying vertebrates and wildlife – are considerable.

- Rotor swept areas continue to increase in size, blade-tip speeds continue at the 170+-mph range, blade wake turbulence and blade tip vortices increase, blade heights are increasing, and turbine project footprints continue to expand in size.

- Like real estate, wind development should be based on 3 issues: location, location and location. We strongly recommend selecting the most wildlife- and habitat-friendly sites, based on sound, validated scientific assessments.

- While the “tools” in our chest of mitigation options are limited for raptors, we need to more closely examine the benefits of blade “feathering” (idling), seasonal shutdowns, change in blade cut-in speeds, turbine set-backs from ridges, pylons replacing “killer” turbines, further studies on blade marking, assess new promising deterrents, and other potential tools.

- The following 3 slides briefly illustrate these challenges.
The area swept by turbine rotors is increasing.

[A= ~15,000 m², ~3.8 acres]

[A= 12,000 m², 2.97 acres]

[A= 3,700 m²]

[A= 1,800 m²]

[A= 800 m²]

[A= 250 m²]

[A= 150 m²]

[after Bonnie Ram]
### Use of Airspace from Radar Studies

Numbers of nocturnal migrants determined via radar to fly below 200 meters over proposed Chautauqua, NY windplant - by 25 meter altitude zones (Fall 2003)

<table>
<thead>
<tr>
<th>Altitude of Nocturnal Migrants (meters above ground level)</th>
<th>Estimated Number of Birds and Bats</th>
</tr>
</thead>
<tbody>
<tr>
<td>176-200</td>
<td>113,956</td>
</tr>
<tr>
<td>151-175</td>
<td>85,235</td>
</tr>
<tr>
<td>126-150</td>
<td>55,588</td>
</tr>
<tr>
<td>101-125</td>
<td>37,059</td>
</tr>
<tr>
<td>76-100</td>
<td>17,603</td>
</tr>
<tr>
<td>51-75</td>
<td>7,412</td>
</tr>
<tr>
<td>26-50</td>
<td>926</td>
</tr>
<tr>
<td>0-25</td>
<td>0</td>
</tr>
</tbody>
</table>

Altamont, CA, Stateline, OR, Chautauqua, NY, FUTURE

- Estimated number of birds and bats flying within each 25 meter altitude zone (source: ABR, Inc. - Fall Radar Study Final Report, April 2004)
We must **not** forget **indirect impacts** on raptors, grassland-sage-steppe-obligate songbirds, “prairie and sage grouse,” bats, and other species.
In Conclusion

• These issues present huge challenges, especially since we still know so little about the impacts of power transmission and distribution lines and commercial wind development on trust resources and their habitats – especially raptors.

• That, however, is changing and we applaud those companies and their consultants working w/ FWS to better understand avian-power line and wind-wildlife interactions. This is a very good thing!
In Summary…

• The Service favors:
  – conservation of wildlife in the public trust;
  – development of renewable energy and its transmission that are bird, bat and habitat friendly; and
  – use of informed decisions based on adequate environmental assessment and sound science.

Thank you
Questions?