

Collision and Electrocution Challenges Facing Birds and Bats at Power Transmission and Distribution Lines; Helping Solve the Problems

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



***“No Bird Left Behind – Bird Interactions with Tall Structures and How to Reduce the Risk”
Ho-Chunk Conference Center, Baraboo, WI
Afternoon Panel, October 13, 2006***

Introduction

- **Power lines –**
 - (a) tall-tower, high-tension, high-voltage **transmission lines** ($\geq 115,000$ volts/115 kV), and
 - (b) shorter, pole-supported lower voltage **distribution lines** ($\leq 69,000$ v/69kV) create **3 problems for birds and bats** (although impacts to latter Order [bats] hardly been assessed):
 1. **collision mortality,**
 2. **electrocutions, and**
 3. **habitat fragmentation, disturbance, and avoidance.**



Challenge 1: Collisions

- B/c power lines so infrequently monitored, **mortality estimates** very sketchy. FWS used to conduct mortality reporting, but discontinued 1975.
- **Mortality estimates**: **Strikes** primarily w/ high-voltage **transmission lines**: could range from hundreds of thousands up to perhaps 175 million/yr., based primarily on extrapolations – but b/c so little power grid assessed, estimates not particularly meaningful (Manville 2005). Currently > 500,000 miles bulk transmission line U.S. and growing.
 - Local [WI] **Trumpeter Swan** mortality assessments: 15.5% power line collision mortality, 1987-2005 (WI Trumpeter Swan Recovery Program).
 - Audubon NWR, ND, causeway transmission line **collision mortality study**. 2002 pedestrian survey: **883 birds retrieved > 75 species**. Through July 2006: at least 279 birds retrieved. Currently testing Bird Strike Indicator (BSI) – Rick Carlton.

Challenge 2: *Electrocution*

- **Electrocutions primarily w/ lower voltage distribution lines and infrastructure.**
- **Electrocution Mortality estimates: Tens of thousands to hundreds of thousands or more birds killed/yr., representing very rough approximations based on very limited data (Manville 2005). Estimated > 116 million distribution poles in U.S. 2000 (Williams 2000) and growing.**



Challenge 3: *Habitat Fragmentation, Avoidance, Disturbance*

- All species “prairie grouse” are declining, some severely – including Attwater’s Prairie-chicken, Lesser and Greater Prairie-chickens, Gunnison Sage-grouse, Greater Sage-grouse, and Columbia Sharp-tailed Grouse.
- Grassland and sage-steppe-obligate songbirds (e.g., Sage Sparrow, Brewer’s Sparrow, Sage Thrasher, and Black-chinned Sparrow) all showing serious population declines. Grassland songbirds fastest declining suite birds in N. Am.
- Much research been conducted impacts high tension transmission and electric distribution lines on prairie grouse, providing detailed body literature (e.g., Connelly *et al.* 2000, Braun *et al.* 2002, Hagen 2003, Wolfe *et al.* 2003, Pitman 2003, Hagen *et al.* 2004, Patten *et al.* 2004, and Connelly *et al.* 2004).

Challenge 3: *Fragmentation, Cont.*

- **Prairie grouse** did not evolve w/ tall structures present.
- **Grassland and sage-steppe-obligate wildlife** **tend avoid vertical structures** – may serve as raptor (esp. Golden Eagle and Raven) roosting and hunting platforms.
- **Greater Sage-grouse (Lassen County, CA) study** documented significant impacts from overhead transmission and distribution lines out to 3.7 mi. (Hall 2004).



Electrocutions – *Background*

- Since 1860s, birds documented die electrocutions and collisions overhead **telegraph wires** U.S., esp. West. Development U.S. power grid late 1880s and subsequent expansion witnessed electrocution numerous avifauna power distribution lines and collisions w/ transmission lines. Published literature replete w/ references. Fast forward to present, cumulatively, **how many birds fall victim** electrocutions and strikes in WI today **pure conjecture**. Just do not have data b/c so few lines assessed.
- Electrocutions eagles, hawks, and owls in 1970s were especially problematic CO and WY. Resultant research M.W. Nelson and others avoiding electrocutions resulted in 1975 and 1981 publications, ***Suggested Practices Raptor Protection on Power Lines***.
-
- 1983, ad hoc group stakeholders including several investor-owned utilities (IOUs), Natl. Audubon Soc., and FWS initiated dialogue address strikes and electrocutions. 1989, group officially formalized into **Avian Power Line Interaction Committee (APLIC)**. APLIC updated ***Suggested Practices*** in 1996, first definitive work raptor electrocution avoidance.



Power Line Collisions -- Background

- Far larger numbers bird species die collisions w/ power transmission lines than electrocuted at distribution lines – including **songbirds, waterfowl, herons, cranes, swans, pelicans, shorebirds, raptors, and others susceptible.**
- In 1994, APLIC published voluntary guidance to the industry on avoiding power line strikes, ***Mitigating Bird Collisions with Power Lines: State of the Art in 1994.*** APLIC currently discussing **update** this document, based more recent research w/ marker balls, bird diverters, paint, and other bird avoidance devices – some which shown significant reductions in mortality published scientific literature.

Legal Actions

- 1999, Moon Lake Electric Cooperative criminally prosecuted DOJ electrocution 16 raptors violation Migratory Bird Treaty Act (MBTA) and Bald Golden Eagle Protection Act (BGEPA) – failing take advice FWS Special Agents employ inexpensive electrocution avoidance devices (e.g., insulators, perch guards, and non-conductance equipment).
- Moon Lake reached plea agreement w/ DOJ and FWS, fined \$100,000, company executives given 3 years probation, required develop and implement electrocution avoidance plan, sign and implement MOU, and retrofit many power poles. Message got attention industry. Where conservation measures available to minimize or eliminate avian mortality, we recommend industry use them.
- Agreements to avoid or reduce bird “takes” (under MBTA and BGEPA) b/w IOUs, individual cooperatives, or Federal power administrations and FWS were previously done by MOUs, through law enforcement, or both. However, MOU process – viewed both by industry and FWS -- time-consuming, legally cumbersome, and stodgy. In 2003, APLIC and FWS agreed to new direction.

New Direction

- Idea to **partner** rather than regulate industry.
- Began whole **new process** with industry in development of **template for Avian Protection Plans (APPs; 2003-2005)**. Industry and FWS both very pleased w/ this direction.
- As tool to encourage industry to **use Suggested Practices** documents, **voluntarily report bird mortality** to FWS, and **minimize power line risks** to birds, **APLIC finalized template for an industry-specific APP** released to public at FWS-APLIC ceremony April 2005. FWS – including this biologist – worked closely w/ electric utility industry to develop that template.
- DMBM and OLE also been teaching “**short courses**” to utility linespersons, most recent workshop 2004.
- Have had privilege representing FWS on **APLIC** since 1997. Now K. Garlick (Special Agent, Office Law Enforcement) and I co-represent FWS on committee.

New Direction – Cont.

- **APP template** and companion ***Suggested Practices documents*** are being touted as model for all electric utilities and other industries to follow. Industry – at least members in APLIC-- seem to have embraced APP issue. FWS congratulates APLIC for being proactive in its efforts to reduce avian mortality.
- **Message is powerful one:** industry can and is working with the State and Federal regulatory agencies, conservation community, and public to protect wildlife trust resources. It is **model** for other industries to proactively follow.

Next Steps

- **APPs developed or implemented Pacific Power (PacifiCorp), Southern California Edison, and FPL Energy. Good news.**
 - APPs utility-specific,
 - Voluntarily tabulate and report mortality electronically to FWS,
 - Provide “tool box” for mitigation measures,
 - Illustrate latest construction design advancements,
 - Provide necessary information on permitting, and
 - Include issues regarding training, outreach, collaboration.
- **2006 update, *Suggested Practices to Avoid Bird Electrocutions at Power Lines*, in press. Designed protect all birds, not just raptors. Will include recommendations state-of-the-art phase-to-phase and phase-to-ground wire spacing based on mock-up bird testing, protective cutouts and surge arresters, proper location of insulation for jumper wires, placements for perch guards, others tested and published in scientific journals.**

Recommendations to Avoid Power Line Strikes and Electrocutions

- Strongly encourage use 2006 *Suggested Practices to Reduce Avian Electrocutions at Power Lines* and 1994 *Mitigating Bird Collisions at Power Lines*.
- Specifically use **techniques** (e.g., phase-to-phase or phase-to-ground line spacing) and **tools** (e.g., bird deterrents tested and published in refereed journals) been shown scientifically significantly reduce mortality. Many products on market; many not scientifically assessed.
- Use guidelines to avoid unnecessary avian mortality at **all structures that contain power lines**: communication towers, wind turbines, buildings, towers, transmission and distribution lines.



Recommendations – Cont.

- **Minimize transmission and distribution line placement in native prairie grasslands and native sage-steppe habitats to avoid disturbance and fragmentation.**
- **Strongly encourage all coops, IOUs, USDA Rural Development Program, Federal administrations (Western Area Power Admin. and Bonneville Power Admin.), others to develop and implement utility-specific APPs.**
- **More membership.** APLIC today grown to some 20+ utility members, the National Rural Electric Cooperative Association (NRECA), BPA, WAPA, Electric Power Research Inst., Edison Electric Inst., and FWS. Need continue recruit, esp. IOUs.
- **Strongly encourage industry work w/ 78 FWS Ecological Services Field Offices around country.**

Concluding Remarks

- **FWS applauds industry's motivation and initiative to help solve 3 problems facing migratory birds in proactive way.**
- **Other industries need to look closely at the APP process and use of voluntary *Suggested Practices* to minimize avian impacts.**

In Summary...

The Service favors:

conservation of wildlife in the public trust;

**development of renewable energy that is bird and bat friendly;
and**

**use of informed decisions based on adequate environmental
assessment and sound science.**



Thank you