

Current Efforts to Reduce Mortality and Address Habitat Impacts – *U.S. Fish and Wildlife Service Concerns and Involvement with Wind Development*

**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**



**“Toward Wildlife-Friendly Wind Power: a Focus on the Great Lakes Basin”
Dana Conference Center, Toledo, OH
June 29, 2006**

Issues to Be Briefly Addressed During This Presentation:

- **Avian population status.**
- **Potential impacts from wind facilities.**
- **Brief review FWS involvement with wind energy.**
- **Issues of concern to Service: direct, indirect, cumulative impacts.**
- **Selecting most bird- and bat-friendly sites.**
- **Why pre-construction monitoring is important.**
- **During- and post-construction monitoring and assessment.**
- **What's needed to address the challenges.**
- **Research needs of interest and concern to FWS.**
- **Other Service issues/activities related to wind development of interest to States.**
- **Opportunities for coordination and alignment re: wind development.**

Avian Population Status

- Status U.S. bird populations of concern. 1995, FWS listed 124 “nongame species of management concern.” Represents early warning system since possible next step is listing birds as “candidates” under Endangered Species Act – scenario we’d prefer to avoid.
- 2003, FWS published “birds of conservation concern,” as mandated by law. Number bird populations in trouble increased from 124 to 131 species – not good news. In addition, 77 endangered and 15 threatened birds included under ESA – numbers continue to increase.
- Recapping, 836 species, > 223 in trouble. In addition, Service essentially lacks data on status 1/3 N. Am. bird populations. Management challenge!

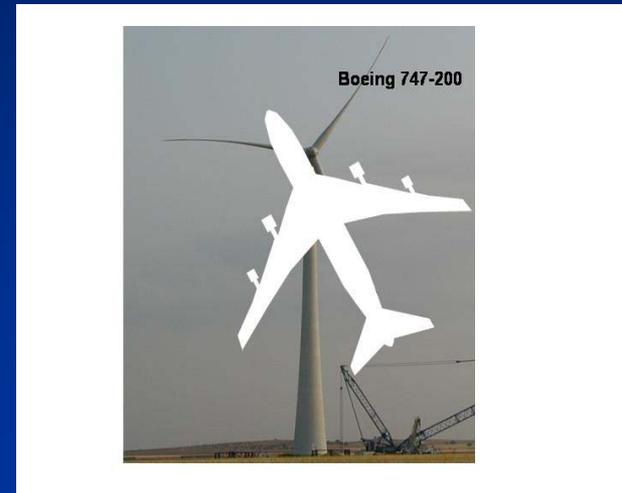
Potential Impacts from Wind Facilities

- **Direct effects of individual turbines and project.**
 - Bird and bat strike mortality.
 - Direct habitat loss/modification.
 - Interior forest, grassland, sage-steppe habitat loss.
 - Habitat fragmentation, increase in edge.
 - Increase in nest parasitism and predation.
 - Water quality impacts.

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.



Brief History of Service Involvement with Wind Power

- **National Wind Coordinating Committee (NWCC)** created 1994 under Pres. Clinton's Global Climate Change Action Plan E.O.
- FWS joined Avian Subcommittee (now **Wildlife Workgroup**) NWCC 1995. DMBM (Manville) been member since 1997.
- 1999 NWCC published "**Metrics and Methods – Studying Wind Energy/Bird Interactions: a Guidance Document**" (Anderson et al. 1999) peer-reviewed by DMBM (Manville) for Service.
- Around late 2001, Service discussions began re: need for **guidance**.
- Interior Secretary's 2002 Renewable Energy on Public Lands Initiative, with request to Service to fast-track development of **siting guidelines** to minimize impacts to wildlife and habitats.

History, *cont.*, and Guidance

- July 2002, DMBM (Manville) chaired Service committee to begin developing Service's "***Voluntary Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines.***"
- Published NOA in *Federal Register* July 2003, with **public comment period** open until July 2005. DHRC (Willis) senior author.
- **25 public comments** provided on guidance.

Using Service Land-based Interim Guidelines to Help Minimize Impacts to Wildlife

- Guidelines developed allow FWS Field Offices help wind developers avoid future take of migratory birds and Federally-listed threatened and endangered species, as well as minimally impact wildlife habitats. Do this by:
 - Proper **evaluation** potential sites.
 - Proper **location & design** turbines, associated infrastructures.
 - **Pre- and post-construction research and monitoring** to identify and assess risk and potential impacts to wildlife.
- Like real estate, location of wind facilities critical: **“good”/wildlife friendly** vs. **“bad”** sites.

Guidance, *next steps*

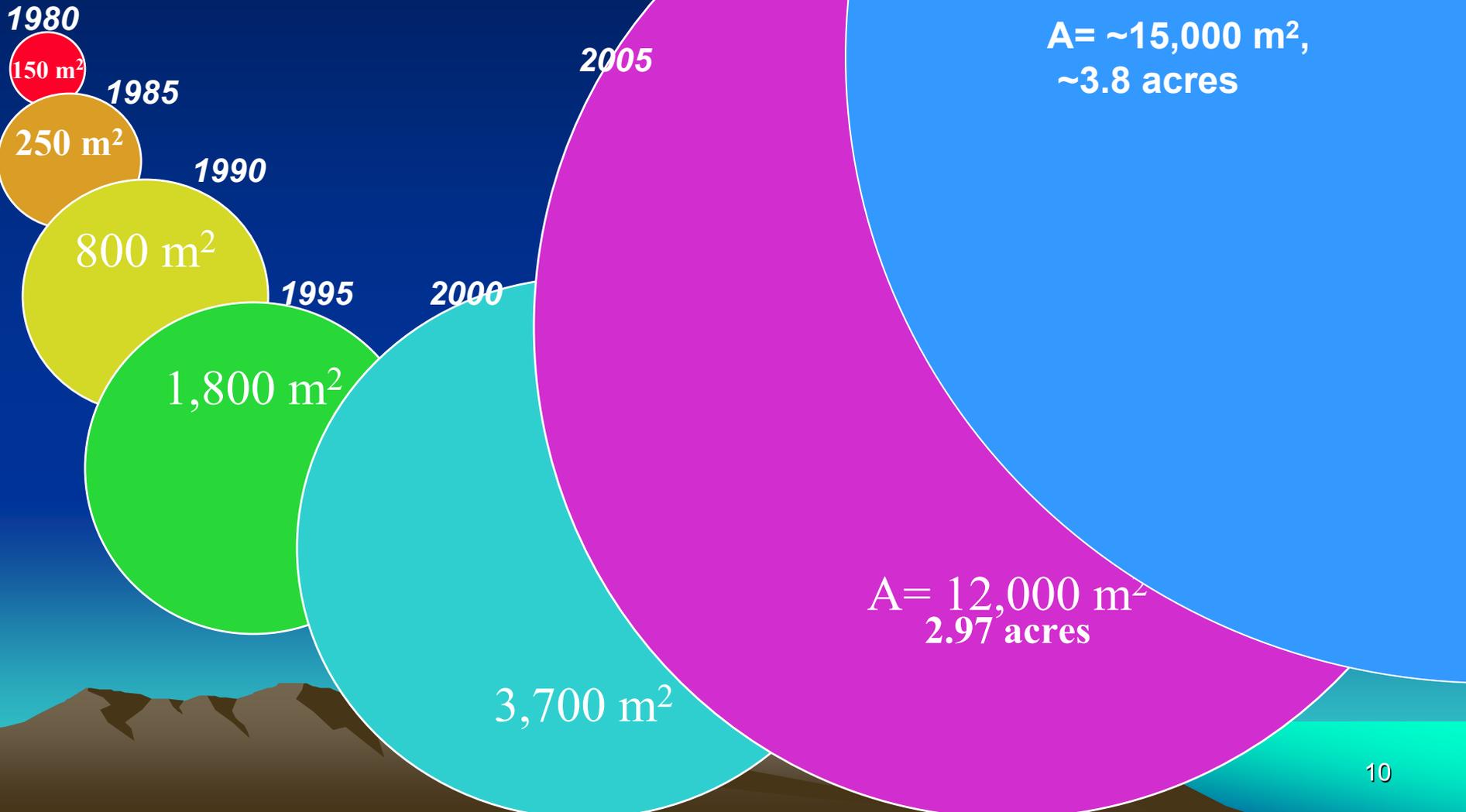
- January 2006, FWS, AWEA, Clean Energy States Alliance, National Audubon Soc., and AFWA met to begin discussion **how best to reduce impacts of wind power development on wildlife.**
- Discussion w/ public to continue **Feb. 2006** to review next steps.
- Threat of litigation under **Federal Advisory Committee Act** resulted postponement of discussion.
- Service currently working with DOI Solicitors, General Law, Office Dispute Resolution, and FWS Directorate to determine most **appropriate course of action** to meet the intent of discussion group, and spirit and intent of FACA and Administrative Procedures Act. Working to finalize recommendation on how to soon proceed.

Issues of Concern to the Service: *Direct Impacts*

- Trend toward *larger turbines* producing more megawattage, but w/ much *larger rotor-swept area*, and blade-tip speed still ≥ 180 mph range at speed – much greater potential for bird and bat strikes.
- Current larger, slower-moving blades *much taller* and rotor swept area *much higher in airspace* – greater likelihood collisions w/ birds and bats, esp. for birds in inclement weather.

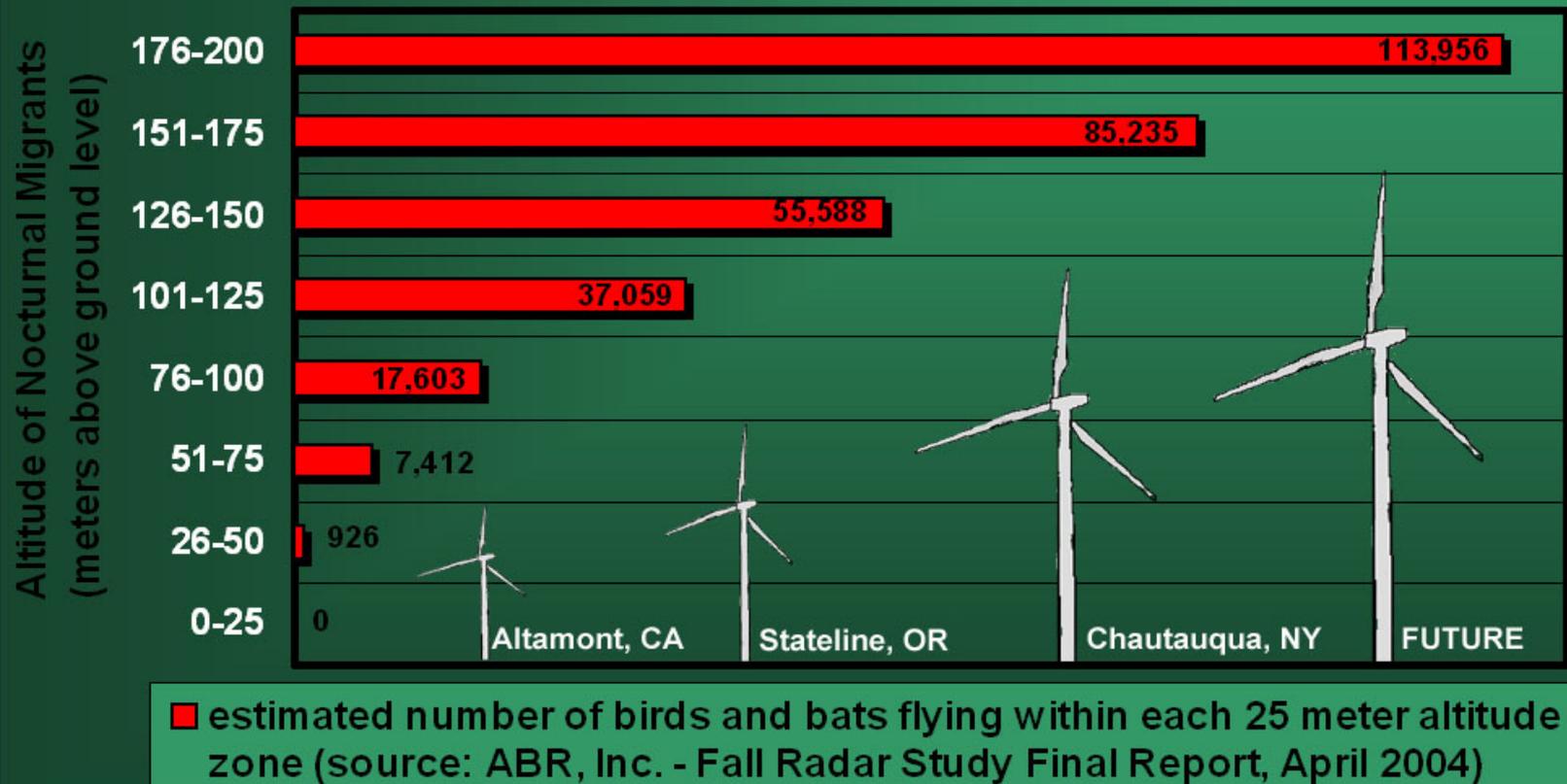
The area swept by turbine rotors is increasing.

[after Bonnie Ram]

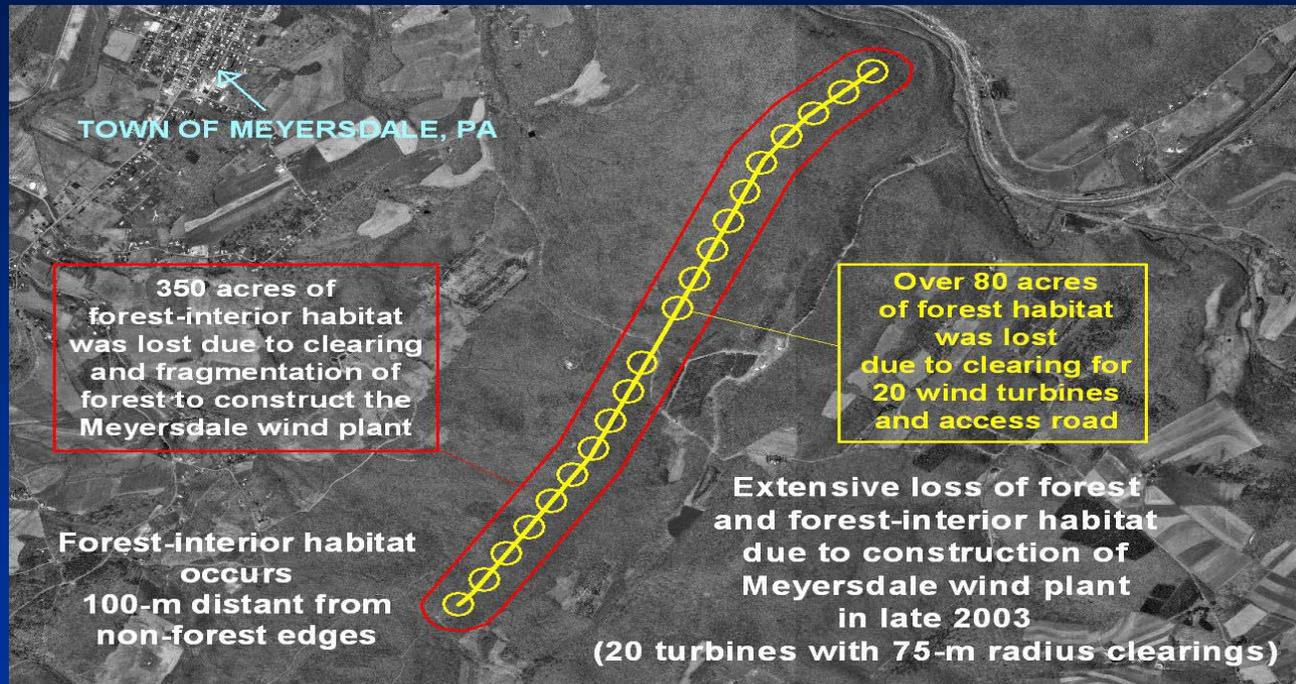


Use of Airspace by Radar Study, Upstate New York, Being Replicated Elsewhere in NY and PA

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



Issues of Concern to the Service: *Indirect Impacts* – *Fragmentation, Disturbance, Site Avoidance*



Must not forget species such as **grass-sage-steppe-obligate songbirds** and **“prairie grouse”** (lek-displaying species) very sensitive to structures, disturbance and habitat fragmentation.

All “prairie grouse” are showing declining trends, some in very serious shape (*Wildlife Society Bulletin*, spring 2004 edition). Sharp-tailed Grouse around Grt. Lakes Basin.

Selecting the Most Bird- and Bat-friendly Sites; *What's Needed to Help Make those Determinations?*

- **RANKING SITES AND ASSESSING RISK, PRE-DEVELOPMENT:**
 - FWS attempted in guidance develop process assess and rank sites through Potential Impact Index (PII) protocol.
 - May be helpful as tool or as future concept.
- **SPATIAL AND TEMPORAL USE OF AIRSPACE, PRE-DEVELOPMENT:**
 - Need to know how **birds, bats, and insects** (b/c latter are prey for birds and bats) **use airspace** -- daytime, night, season-to-season, year-to-year, and inclement weather.
 - **Useful tools:** remote sensing radars, acoustic, infrared, night vision; traditional sampling by visual, mist netting, radio telemetry, etc.
 - Need adequate sampling to account yearly and seasonal variability bird, bat, insect, and other wildlife activity.

Why Is *Pre-construction Monitoring* Important?

- >223 species mig. birds showing pop. declines, some may be adversely impacted by wind projects. Where -- during post-construction studies -- find [2003] *Birds Conservation Concern* or birds listed as *Breeding Bird Survey declining*, documented killed at wind facilities, raises concerns w/ FWS. Examples:
 - 12 of 33 BCC species and/or BBS declining documented killed from Buffalo Ridge, MN (Johnson *et al.* 2002).
 - 7 of 19 spp. from northeastern WI (Howe *et al.* 2002).
 - 14 of 37 spp. Mt. Mansfield, VT (Rimmer and McFarland 2000).
 - 9 of 25 spp. Mountaineer, WV (Kerns and Kerlinger 2004)
 - 8 of 24 spp. Buffalo Mt., TN (Nicholson 2003).
- Preliminary conclusion: uncertainty about wind impacts to declining species -- using precautionary approach -- would suggest need to monitor sites pre-construction to assess risk and potential impacts using scientifically valid protocols.

Why Are *Post-construction Monitoring and Assessment* Important?

- **POST-CONSTRUCTION**

- Important perform b/c validates (or negates) hypotheses, conclusions, and recommendations made during risk assessment and pre-construction monitoring processes.
 - *E.g.*, analysis by Stewart *et al.* 2004 (Un. Birmingham, UK) raises troubling concerns about long-term wind facility impacts avian populations in Europe and elsewhere due to population declines. Detailed monitoring can help address these concerns.
- Also can provide scientific data allowing “mid-course corrections” to fix documented problems discovered by monitoring through subsequent use of deterrents, mitigation, or alternate actions.



So What's Needed to Address These Challenges?

- With current exponential growth of wind industry, important to develop widely applicable – including at local level -- scientifically based approaches to assess risk and impacts from wind development on wildlife and their habitats.
- Reliably assessing risk and potential impact prior to construction, and use of scientifically valid pre- and post-construction monitoring protocols – where needed -- are critical.
- Should look to **Great Britain, Denmark, Sweden, Germany, others** to evaluate applicable protocols they've already developed.

Research Needs of Interest & Concern to FWS

- **Pre-construction needs: *potential impacts to wildlife:***
 - Temporal and spatial use of airspace by birds and bats.
 - Applying pre-construction data to risk and impact studies from post-construction monitoring and assessment.
 - Duration and intensity of pre-construction monitoring.
- **Pre-construction needs: *potential impacts to wildlife habitats:***
 - Use of “surrogate structures” (e.g., comm. towers, oil/gas rigs) and their impacts adjacent to proposed wind sites to assess potential impacts from wind development.
 - Review potential indirect impacts and effects – where possible -- proposed wind sites on nesting/breeding densities, loss of population vigor, habitat and site abandonment, increased isolation b/w patches, loss of refugia, attraction to modified habitats, effects on behavior (stress, interruption, and modification), displacement, and habitat unsuitability.

Research Needs of Concern to FWS, cont.

- **Assessing and Ranking Bird- and Bat-friendly Sites:**
 - Available protocols, their validation through scientific peer review, time and expense needed to perform them, capable being stepped down to regional and local levels.
 - Wind document not unlike electric utility Suggested Practices manuals.
 - Performing scientifically valid and robust risk assessment, validity of current risk assessment models.
- **Post-construction Needs: Direct Impacts to Wildlife:**
 - Tools for counting carcasses; attraction of birds, bats and insects to turbines; role of turbulence; raptor vs. songbird attraction; scavenger removal and searcher efficiency biases.
 - Validating pre-construction assessments to post-construction impacts.
 - Use of Before-After Control Impact (BACI) design to determine significant changes in bird and bat behavior after installation.
 - Levels of “take” documented re: *Birds of Conservation Concern* from turbine strikes, additive vs. compensatory mortality, cumulative impacts.

Research Needs of Concern to FWS, *cont.*

- **Deterrents, Mitigation, *Other Protective Measures:***
 - Efficacy of blade painting, feathering/short-term shutdowns, end-of-row pylons, reducing prey base, minimizing burrowing fossorial mammals, light minimization and type, sound deterrents (ultra- and infrasound), removal of attractions, bird diverters, others.
 - Repowering, turbine relocation, turbine synchronization.
 - Habitat replacement, compensation.
- **Post-construction Needs: *Indirect Impacts to Habitats and Wildlife:***
 - Attempt to quantify reduced nesting/breeding densities, loss of population vigor and overall density, habitat and site abandonment, increased isolation b/w patches, fragmentation, loss of refugia, attraction to modified habitats, effects on behavior, displacement, habitat unsuitability.
 - Effects on grassland-sage-steppe obligate songbirds and “prairie grouse.”
 - Long-term impacts to avian and bat populations.

Other Service Issues/Activities Related to Wind Development of Interest to the States

- **U.S. Gov. Accountability Office (GAO) Sept. 2005 Report to Congress** (DMBM [Manville] Service lead). **Recommendations:**
 - FWS reach out to State and local regulatory agencies w/ information potential wildlife impacts from wind development.
 - Share resources help make wind power development decisions.
- **Technical Meeting:** “Use and Limitations of Radar to Detect Birds in Offshore Settings,” Sept. 2005, USFWS, Hadley, MA. Useful for State offshore and land-based wind development.
- **2nd N. Am. Sea Duck Conference:** “Offshore and Nearshore Wind Development, and Impacts to Sea Ducks and Other Waterfowl,” Nov. 2005. Conference addressed some State concerns re: offshore wind.
- **FWS efforts working with States to help develop guidance:**
 - CA Audubon/ AWEA Jan. 2006 wind workshop.
 - CO Div. Wildlife Wind Power and Wildlife symposium & workshop, Jan. 2006.
 - Upcoming NYSERDA workshop, Aug. 2006.

Other Service Issues/Activities Related to Wind Development of Interest to the States, *cont.*

- **Other meetings/workshops where States will be involved:**
 - “*Applying Radar to Migratory Bird Conservation and Management*” workshop, October 24-26, Albuquerque, NM – FWS-USGS radar ornithology/bat collaborative.
 - NWCC Wildlife Workgroup’s “*Research Meeting VI*,” San Antonio, TX, November 14-16, updating new research discoveries, recommendations since Nov. 2004.
- **Other Wind Reviews that May Be Useful to States:**
 - The Wildlife Society wind energy-wildlife technical literature review, White Paper tentatively to be finalized Sept. 2006.
 - National Academy of Sciences Natl. Research Council wind-wildlife technical scientific review, tentative release of draft Dec. 2006.

Next Steps in Working with States and Regulating Agencies: *Opportunities for Coordination and Alignment*

- How could States-PUCs-PSCs-DNRs in Great Lakes work together to coordinate, develop, and implement consistent, science-based protocols to maximize wildlife-friendly wind development?
- - Currently every State developing and permitting wind differently.
 - Could protocols and process be developed to align efforts?
- Could such an effort serve as model for other areas country, neighbors to North and South, and overseas?

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