FAA Lighting of Wind Turbines and Bird Collisions

Paul Kerlinger, Curry & Kerlinger, LLC
In collaboration with
Jessica Kerns, Appalachian Center for Environmental Studies
Info provided, in part, by Wally Erickson, Shawn Puzen, Anne Walsh, and others
Issue and Origin

- FAA obstruction lights on communication towers definitely attract night migrating birds
- Bright lights (ceilometers, spotlights, sodium vapor lamps, light houses) definitely attract night migrating birds
- Does FAA obstruction lighting of wind turbines attract night migrating birds in the same way that communication tower lighting does?
Case Study - Mountaineer Wind, WV

- Carcass Search Study – April through mid-November 2003
- 44 turbine site on high ridge in WV
- 12 of 44 turbines lit with FAA red strobes (L-864), 32 not lit (1 guyed & 1 unguayed met tower)
- Weekly Turbine Searches
  - Searcher Efficiency & Carcass Removal Study
- Field work by Jessica Kerns and Keith Lott, M.S., University of Maryland, Frostburg
  (Bats will be covered by Jim Lindsay and Matt Kearns, FPL Energy)
The May 2003 Mortality Event

- Late May 2003 – about 27 fatalities found at #22, 23, 24, and Substation
  - Substation at #23 had sodium vapor lamps!!!
- Fog previous nights – 100 car crash on Route 68
- Other turbines not involved, despite lights
- Lights off after May 25, 2003, no other events
- Bright sodium vapor lamps were cause, just as has occurred at some comm towers, water towers, etc.
Turbines Numbers (each = 3 turbs)

- Turbines 1-3
- Turbines 43-44
- Turbines 22-24 & Substation
Conclusions at Mountaineer

- Total fatalities found for year - ~ 65 attributable to turbines, 21 species (1 raptor, 2 TUVU)
- 28 Night Migrants, excluding May event at 22-24
- Estimate ~180 birds estimated killed for year (including scavenging and observer efficiency)
- Estimate ~ 4 birds killed per turbine per year
- Red L-864 strobes do not seem to attract night migrating birds – despite fog
Results of Empirical Studies at Wind Power Facilities – Data Sources

- Fatalities of night migrating birds (numbers) gathered from existing studies
- Lighting from literature and canvassing plant owners/researchers
- Washington, Oregon, Wyoming (no lights), Colorado, Minnesota, Wisconsin, Pennsylvania, New York, Vermont (no lights), Tennessee
Unlit Turbines

- Foote Creek Rim, WY (Johnson et al. 2001)
  - 69 turbines, 73 m (239 feet)
  - 1 year
  - ~59 migrants found

- Searsburg, VT (Kerlinger 2002)
  - 11 turbines, 58.5 m (192 feet)
  - 5 months of study (1 summer & 1 autumn season)
  - No avian fatalities
Vansycle, OR (Erickson et al. 2000)

- 38 turbines, 74 m (243 feet)
- 11 lit with L-864 red strobes
- 1 year study
- ~5 night migrants found
Stateline, OR/WA (Erickson et al. 2003)

- 394/399 turbines, 74 m (243 feet)
- 111 lit with L-864 red strobes
- 18 months of study
- ~ 28 night migrants found
Ponnequin, CO (Kerlinger et al. unpub.)

- 44 turbines, 79 m (259 feet)
- 29 with incandescent (Phase I) 1/2 turbines lit with L-864 red blinkers
- 15 with (Phase II) – L-864 red strobe – end of row …
- 5 years
- <5 night migrants found per year
Wisconsin – 2 sites (Howe, Evans et al. 2002)

- 31 turbines, 89 m (292 feet)
- Red strobes on ~¾ of turbines
- 3 migration seasons
- ~5 night migrants found
Buffalo Ridge, MN (Johnson 2000)

- 353 turbines, max 76 m (249 feet)
- ~76 lit – “apparently solid red” ????
- Varying heights, 3 phases, 4 years of study
  - Max ~76 m (249’) ??
- ~30-40 night migrants found
- Mortality event – 14 birds in 1 night at 2 unlit turbines!
Buffalo Mountain, TN (Nicholson 2001, unpub)

- 3 turbines, 88 m (290 feet)
- White flashing strobes at night
- 1 year (of 2 year study)
- 11 night migrants found
- 2nd year completed – data not available
- Per turbine rate is highest for night migrants
Green Mountain, PA (Kerlinger 2001, unpub)

- 8 turbines, 90 m (295 feet)
- 4 lit with red flashing incandescents
- 1 year study
- No fatalities
Madison, NY (Kerlinger 2002, unpub)

- 7 turbines, 100 m (328 feet)
- 7 lit with L-864 red strobes
- 1 year
- 3 night migrating birds
Conclusions

- No large scale mortality events at wind turbines as have been found at communication towers.
- FAA lighting guidelines for turbines is different than for communication towers (FAA Obstruction Lighting Circular).
- FAA lighting (red flashing) lights on wind turbines do not seem to attract night migrants.
  - Turbines are shorter than comm towers that cause large scale mortality.
  - Turbines do not have guy wires!!!
RED OBSTRUCTION LIGHTING STANDARDS (FAA Style A)

Day Protection = Aviation Orange/White Paint
Night Protection = 2,000cd Red Beacon and sidelights

1751'-2200'
(533m-671m)

1401'-1750'
(427m-533m)

1051'-1400'
(320m-427m)

701'-1050'
(213m-320m)

351'-500'
(106m-152m)

151'-250'
(46m-76m)

0'-150'
(0m-45m)

- L-854 Flashing Beacon
- L-810 Obstruction Light