

## WHAT HAVE STUDIES OF COMMUNICATIONS TOWERS SUGGESTED REGARDING THE IMPACT OF GUY WIRES AND LIGHTS ON BIRDS AND BATS?

This presentation outlines lessons that have been learned from research on communications (*not* cell) towers, about the impacts of guy wires and lights on birds and bats as well as other issues.

### ***Wind Turbines and Avian Risk: Lessons from Communications Towers***<sup>27</sup>

by

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There are three key variables associated with risk to migrating birds at communication towers: height; guy wires; and lighting. First, the height of a tower in relation to the height of migration is important. Secondly, it is the guy wires that support these tall structures that are the primary source/cause of collisions. Third is lighting, which may attract birds when there is fog, low clouds, and/or light rain. Some of these lights are requested by the FAA<sup>29</sup> for air traffic safety purposes, while others are non-FAA lights such as sodium vapor lights and spotlights.

Large-scale avian fatality events occur at communication towers taller than 500 feet, with FAA lights and guy wires. Single and small-scale bird fatality events have occurred at towers less than 500 feet with guy wires and FAA lights.<sup>30</sup> (The presence of sodium vapor and other bright lights seem to be the confounding variable causing fatalities at shorter communication towers.) Large-scale avian fatality events have not occurred at wind turbines, which are mostly less than 300 feet tall, with the newest ones being 300-380 feet. Virtually all collisions at communication towers are with guy wires. To date there have been no studies published that document birds being killed by unguyed meteorological or communication towers. Wind turbines are mostly unguyed, although meteorological towers associated with wind facilities often are guyed. Because of the collision risk associated with guy wires, it is recommended that wind developers build unguyed meteorological towers.

FAA lighting on communication towers has been identified as a key issue in terms of bird impacts. FAA obstruction lights on towers can attract nocturnally migrating birds. In addition, bright lights such as ceilometers, spotlights, sodium vapor lamps, light houses,

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<sup>27</sup> Note that this presentation discusses impacts from communication towers, not cell towers.

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<sup>29</sup> During an earlier session, it was explained that the FAA has no authority to require lighting, but only to request it. Local permitting authorities may, however, require FAA-requested lights as a condition of permitting.

<sup>30</sup> A new study comparing 475 and 1,000 ft. comm. towers is looking at lighting, guy wires, and height as factors in avian mortality risk (Gehring 2004). Statements about communication towers less than 500 feet in height are based on the author's review of original communication tower studies in literature.

and streetlights can also attract nocturnally migrating birds. The question is whether FAA obstruction lights on wind turbines attract night migrating birds in the way that communication towers lights do. There is evidence that suggests that different types of lighting schemes may differentially attract birds. Flashing lights appear to be less of an attractant than steady-burning lights at night. Whereas the FAA usually requests three flashing red lights and 4-6 steady-burning red sidelights on communication towers 351-700 feet tall, and 5-7 flashing red lights and 9-12 steady-burning lights on communications towers 1,000-1,400 feet tall, wind turbines of any size over 199 feet require only two (side-by-side) red flashing lights, and no steady-burning lights. By contrast, it seems that tall communication towers with steady-burning red lights and guy wires essentially act like large bird nets in the sky.

A “large” fatality event occurred at the Mountaineer, WV wind energy site in late May 2003 when a carcass search study was being conducted (Kerns and Kerlinger 2004). The Mountaineer site has 44 wind turbines along a high ridge; 12 turbines are lit with FAA red strobe lights, and 32 turbines are not lit at all. There is also one guyed and one unguyed meteorological tower. On May 23, 2003, there were about 30 fatalities found at turbines #22, 23, 24 and the nearby substation. The substation at turbine #23 had sodium vapor lamps on it. During the same day, fog in the area caused a 100-car accident on Route 68, demonstrating the severity of the weather. Other turbines at the wind site were not involved, despite having FAA (flashing) lights. Also, almost all the dead birds were found at turbine #23 (the closest to the substation) and at the substation. The lights at the substation were turned off on May 25, 2003, and there were no other major fatality events during the study period. This event suggests that bright sodium-vapor lamps were the cause of the large fatality event at Mountaineer, WV, and that the red flashing lights on the other turbines did not attract birds, despite thick fog.

Similar events have been documented at some communications towers, water towers, and ski lifts. Night migrant carcasses found in searches of unlit and lit turbines at other wind energy sites around the country are presented in the table below.

### Night Migrant Carcass Search Findings

Location	Turbines (lit)	Height	Study period	Migrants found	Reference
Foote Creek Rim, WY	69 (0)	239 ft	1 year	~59	Johnson et al., 2001
Searsburg, VT	11 (0)	192 ft	5 mos. (1 summer; 1 autumn)	no avian fatalities found	Kerlinger, 2002
Vansycle, OR	38 (11 lit)	243 ft.	1 year	~5	Erickson et al., 2000
Stateline, OR/WA	394-399 (111)	243 ft.	18 months.	~28	Erickson et al., 2003
Ponnequin, CO	44 (Phase I: 29 incand., ½ w/red blinkers; Phase II: 15 end-of-row turbines with red strobes)	259 ft.	5 years	< 5	Kerlinger et al., unpublished
Wisconsin (2 sites)	31 (¾ with red strobes)	292 feet	3 migration seasons	~5	Howe, Evans et al., 2002
Buffalo Ridge, MN	353 (76 “solid red”)	max 249 ft.	4 yrs’ study (3 phases)	~ 40 (600-700 killed per year); Event: 14 birds found in one night at 2 turbines – one lit, one unlit.	Johnson 2000
Buffalo Mountain, TN	3 (3 w/white flashing strobes)	290 feet	3 years (completed to date)	~ 8 per turbine per year	Nicholson 2004 (unpub. pers. comm.)
Green Mountain, PA	8 (4 w/red flashing incandesc.)	295 feet	1 year	No fatalities found	Kerlinger 2001 (unpub.)
Madison, NY	7 (7 w/red strobes)	328 feet	1 year	3	Kerlinger 2002 (unpub.)
Toronto, Ontario	1 (1 w/red strobe)	308 feet (lakefront)	1 year	No migrants	James and Coady, 2003
Pickering, Ontario	1 (1 w/red strobe)	384 feet (near lake and wetland)	1 year	2	James 2002

Overall, there have not been any large-scale bird fatality events at wind turbines like those documented at some communications towers. It seems that red flashing FAA lights on wind turbines do not attract birds migrating at night in the way that steady-burning lights do. In addition, turbines are shorter than communications towers that cause large-scale bird mortality. It is not clear whether rotating turbine rotors function as analogues of guy wires in terms of bird mortality.

## Reference

Gehring, J. 2004. Pilot study for Michigan Public Safety Communication System towers. Presentation to U. S. Fish and Wildlife Service Communication Tower Working Group, February 11, 2004.

Kerns, J., and P. Kerlinger. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual report for 2003. Prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee.

## ***Discussion, Questions and Answers***

*How is a “large-scale” fatality event defined?*

*Response:* At Mountaineer, “large-scale” refers to an event involving more than seven birds.

*How do fatality rates relate to weather conditions (i.e., cloud ceiling, flight altitudes)?*

*Response [from workshop participant other than the presenter]:* It appears that as flight altitudes go down, fatality rates go up. Ceiling height (weather/clouds) does affect flight altitudes. It is relatively easy to predict major migration nights in the east based on weather conditions and prevailing winds.

*Response [P. Kerlinger]:* It is not necessarily the case that a lower cloud ceiling means lower flight altitudes; for example, radar has sometimes shown that birds fly at higher altitudes in response to fog.