

Review of Bat Research at Wind Facilities

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(thanks to Ed Arnett for the loan of slides)

Information to date

- Various monitoring reports from some wind farms around the US and Canada
- Current research going on in Pennsylvania and Alberta Canada

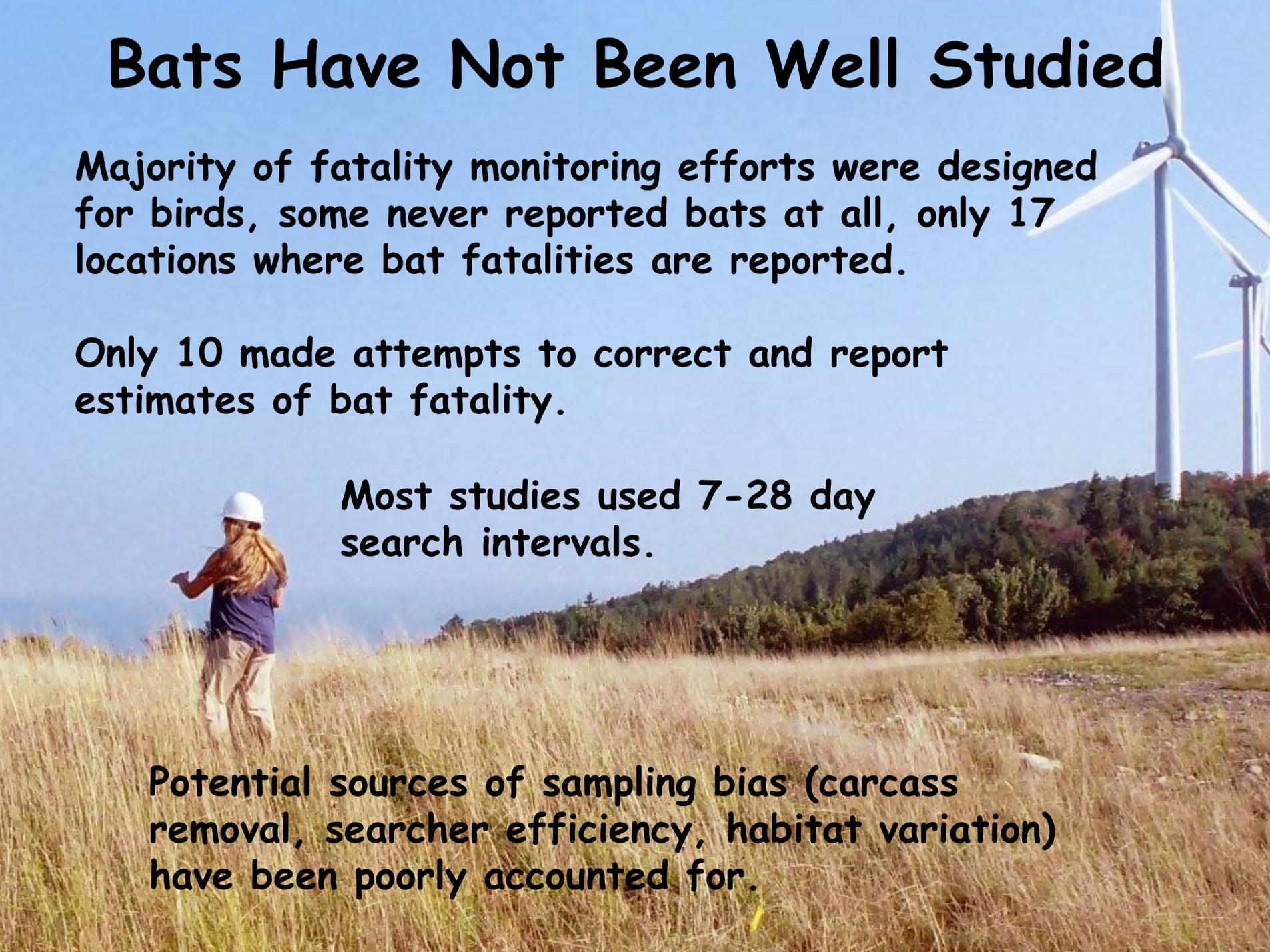
Bats Have Not Been Well Studied

Majority of fatality monitoring efforts were designed for birds, some never reported bats at all, only 17 locations where bat fatalities are reported.

Only 10 made attempts to correct and report estimates of bat fatality.

Most studies used 7-28 day search intervals.

Potential sources of sampling bias (carcass removal, searcher efficiency, habitat variation) have been poorly accounted for.



Bat fatality estimates are conditioned upon many factors and need to be interpreted carefully



Post-construction fatality study duration varies, but rarely long-term

To date, no pre- or post-construction assessments on bats have been reported from the southwestern US (e.g. Arizona, New Mexico, and Texas)...and only 1 to date from California.

14 of the 17 studies reporting bat fatality were conducted in open prairie or croplands where current data appear to suggest lowest fatality...

What information do we have so far?

- Species most commonly affected
 - Hoary
 - Red (eastern and western)
 - Silver-haired
 - Mexican free-tailed

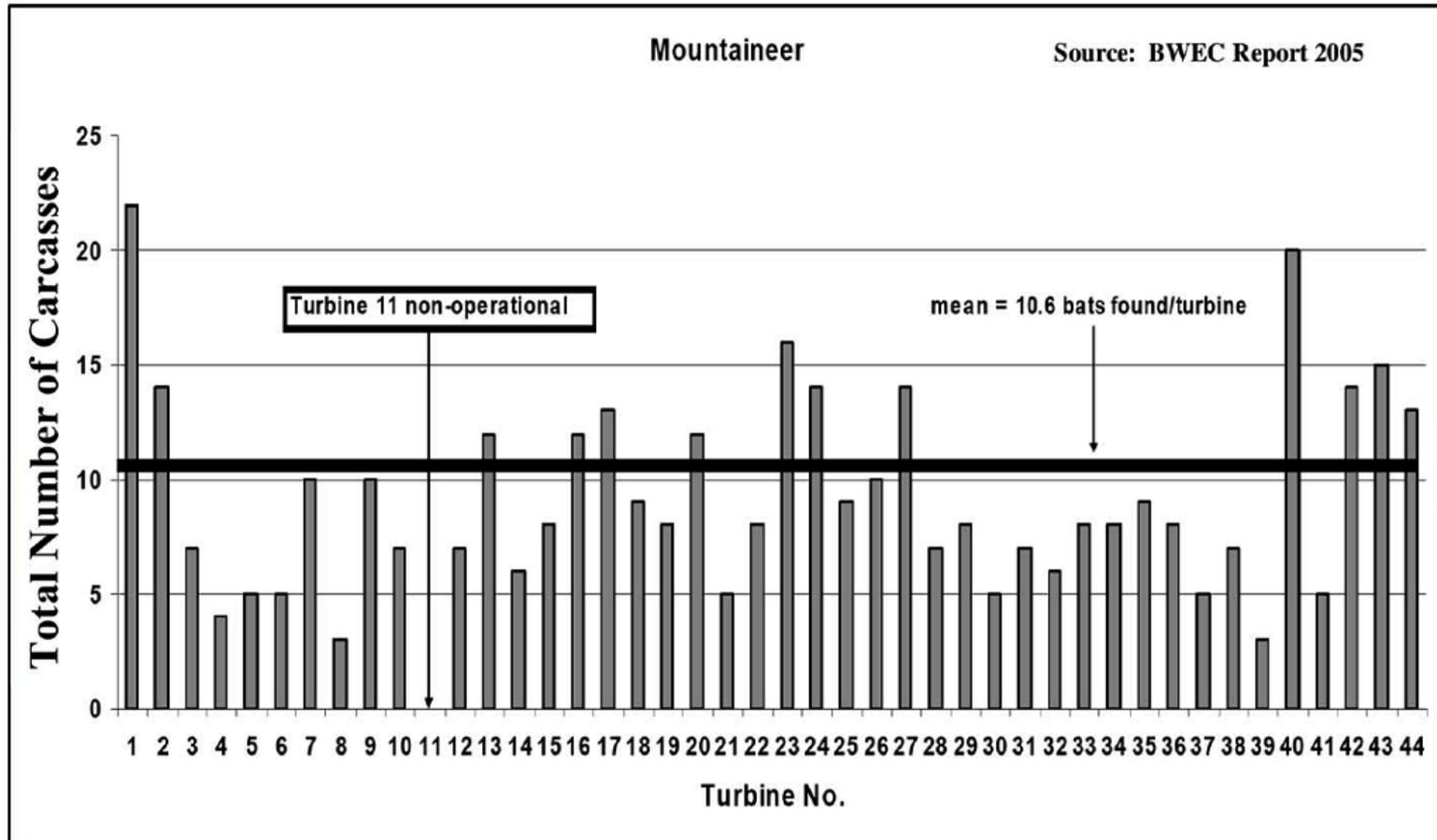


Photo by E. Pierson

- Problem of bat fatality is not limited to wind farms on forested ridgetops in the east
 - Southern Alberta
 - Baerwald, et al. found high mortality (mostly hoary, silver haired and red bats) at Summerview wind farm, a 75 MW facility.
 - 2005 : 532 bats found (~13 bats per turbine)
 - 2006 : 611 bats found (~16 bats per turbine)
 - California
 - High Winds in Solano County
 - 2003 and 2004
 - Oklahoma
 - ...among others

- Fall migration seems to be the “riskiest” time
 - but there have been few surveys encompassing the entire “bat activity” season of April-November
 - High Winds (Solano County, CA) did year-round surveys
 - peak of bat fatalities was in the fall, with a much smaller spike in the spring

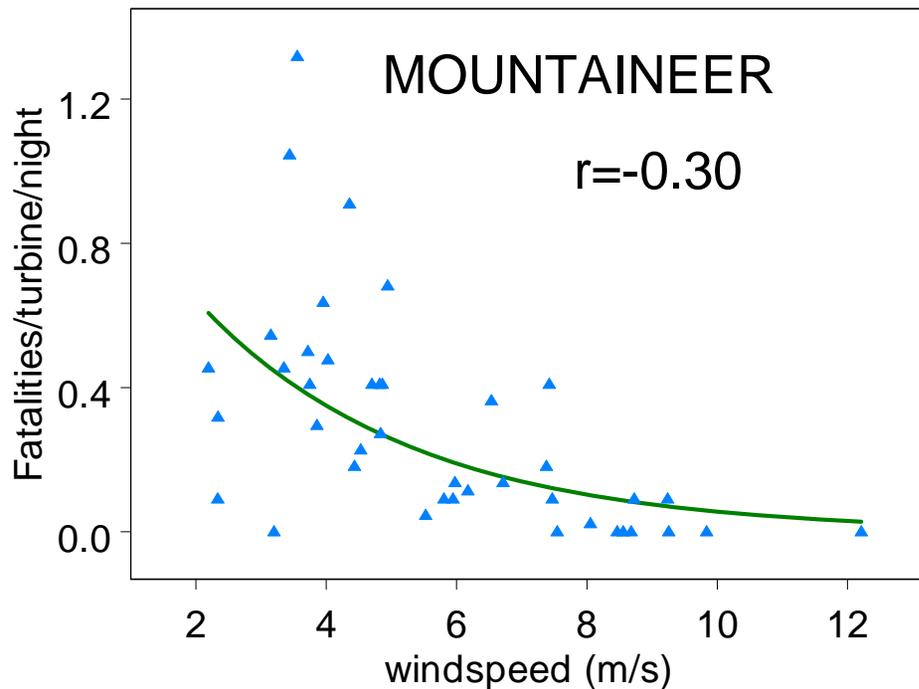
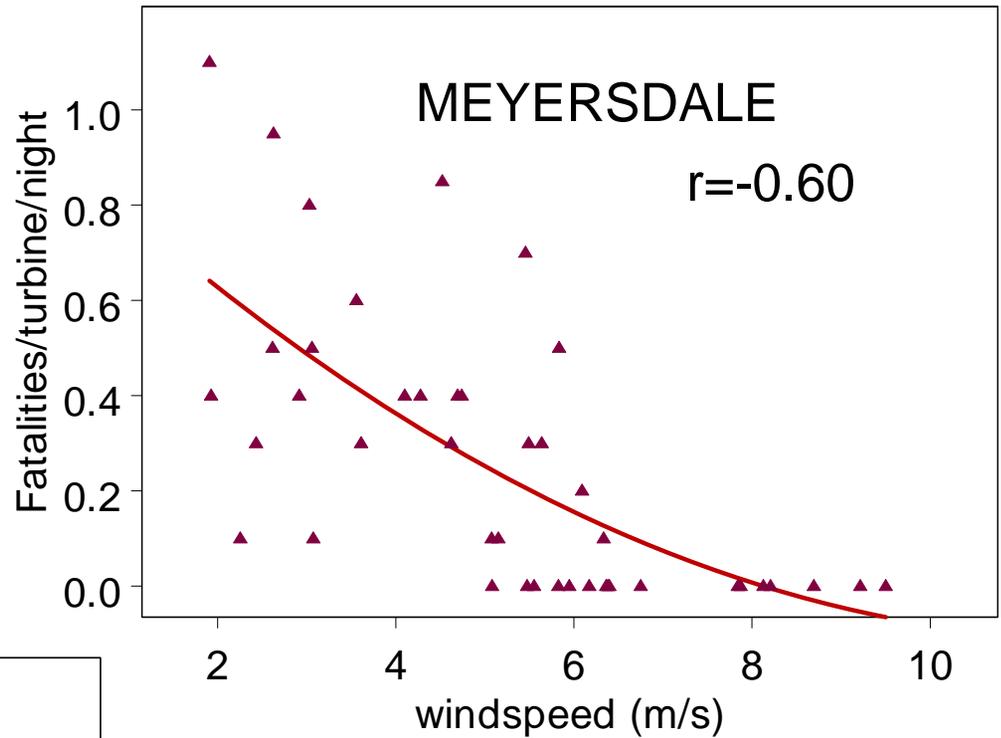
Evidence that bats are not simply running into turbines



- Increasing turbine height maybe moving turbines into migratory space used by more nocturnal migrants (birds and bats)

Fall 2005 radar study by ABR, Inc. looked at numbers of nocturnal migrants in each 25m altitude zone above a proposed wind farm in Highland County, VA

Negative correlation: fatalities and wind speed



- Acoustic monitoring at ground level is NOT adequate to assess impacts of turbines on bats
 - A number of studies have shown that both number of bats detected and species detected are different at ground level and up on a tower
 - Arnett, et al. found mostly Myotis species at ground level and low frequency bats (likely hoarys) at 22 meters in Pennsylvania.
 - Baerwald, et al. finding similar differences in detection between ground and elevated acoustic systems.
 - Anecdotal and preliminary evidence in CA

New Research

- Two studies underway now to correlate pre-construction surveys with post-construction fatality information
 - Pennsylvania
 - Alberta, Canada
- Mitigation experiments – “feathering”

New Research

- Deterrents
 - Acoustic deterrent (Szewczak and Arnett 2006)
- Population genetics
- Banding

New Research

- Determining the level of effort required for both pre- and post-construction monitoring to be sure that estimates of risks to bats and bat fatality estimates are as accurate as possible
- Efforts to develop guidelines that will allow comparison of projects in different areas.

Additional References

Arnett, E. B., et al. Submitted. Patterns of fatality of bats at wind energy facilities in North America. *Journal of Wildlife Management*.

Johnson, G. D. 2005. A review of bat mortality at wind energy developments in the United States. *Bat Research News* 46: 45-49.

Two part series in on bat fatality and wind facilities in *Frontiers in Ecology*:

Kunz, et al. (Problems, Perspectives, and Hypotheses)

Larkin, et al. (Methods and Matrices)

The Wildlife Society is publishing a technical review of wind energy impacts on wildlife