



Presentation to the Alameda County
East County Board of Zoning Adjustments
Regarding the Wind Repowering Project

Bats and Fatality Issues

Darryl and Susan Mueller

24 March 2016

Bats Worth Billions to Agriculture: Pest-control Services at Risk

The value of the pest-control services to agriculture provided by bats in the U.S. alone range from a low of \$3.7 billion to a high of \$53 billion a year

2011 analysis conducted by scientists from the University of Pretoria (South Africa), United States Geological Service, University of Tennessee and Boston University.

- noticeable economic losses to North American agriculture could occur in the next 4 to 5 years as a result of emerging threats to bat populations.
- the loss of the one million bats in the Northeast has probably resulted in between 660 and 1320 metric tons of insects no longer being eaten each year by bats in the region.

By one estimate, published by Kunz and colleagues in 2007, about 33,000 to 111,000 bats will die each year by 2020 just in the mountainous region of the Mid-Atlantic Highlands from direct collisions with wind turbines as well as lung damage caused by pressure changes bats experience when flying near moving turbine blades.

minimizing these fatalities is critically important to bat conservation

Released: 3/31/2011 U.S. Department of the Interior, U.S. Geological Survey http://www.usgs.gov/newsroom/article.asp?ID=2743#.VvNV3D_8GbO

"Economic importance of bats in agriculture," appears in the April 1 2011 edition of *Science*. Authors are J.G. Boyles, P. Cryan, G. McCracken and T. Kunz

Bat Lung damage Caused by Pressure Changes Turbine Blades

They often fly up to the turbine tower seeking rest.

But when the creatures fly too close to the football-field-sized windmills they enter an area of reduced air pressure

The differing wind pressure between the forward and trailing edges of the turbine blades during the down sweep of a blade causes their lungs to explode

This phenomenon is known as barotrauma and is similar to the bends that afflict divers.

The Washington Times - Monday, March 23, 2009

Wind-turbine operations are associated with bat mortality worldwide

Cut in speed defined as the lowest wind speed at which turbines generate power to the utility system, thereby reducing turbine operation during periods of low wind speeds

Study tested the effectiveness of raising wind-turbine cut-in speed to decrease bat mortality

- Casselman Wind Project in Somerset County, Pennsylvania, over a 2-year period

Observed bat mortality at fully operational turbines was, on average, 5.4 and 3.6 times greater than mortality associated with curtailed (ie non-operating) turbines in 2008 and 2009, respectively.

Relatively small changes to wind-turbine operation resulted in nightly reductions in bat mortality ranging from 44% to 93%, with marginal annual power loss ($\leq 1\%$ of total annual output).

National average cut in speed is 8-9 mph

- Suzlon 97 cut in speed is 7.8 mph (3.5 m/s)

Increasing Cut-in Speed from 8 mph 11 mph of Wind Turbines Results in Fewer Bat Fatalities

[ffany Kaiser](http://www.dailytech.com/Increasing+Cutin+Speed+of+Wind+Turbines+Results+in+Fewer+Bat+Fatalities/article20043.htm) - November 2, 2010 <http://www.dailytech.com/Increasing+Cutin+Speed+of+Wind+Turbines+Results+in+Fewer+Bat+Fatalities/article20043.htm>

Frontiers in Ecology and the Environment, November 2010, Arnett, Edward B and Huso, Manuela MP and Schirmacher, Michael R and Hayes, John P.

Many bat kills occur during low-wind nights

Sustained, high fatality rates from collisions with wind turbines could have potentially significant impacts to bat populations because population growth is slow (Racey and Entwistle, 2000).

Some studies have indicated that tree-roosting bats may be attracted to both moving and non-moving wind turbine blades and that many bat kills occur during low-wind nights (Arnett, 2005). Kunz et al. (2007) describe 11 hypotheses about possible reasons for fatalities at wind energy facilities.

California Guidelines For Reducing Impacts To Bird And Bats From Wind Energy Development

<http://www.energy.ca.gov/2007publications/CEC-700-2007-008/CEC-700-2007-008-CMF.PDF>

Outdated Data in Repowering Documentation in EIR

Failure to review recent scientific data

Impact Analysis Biological Resources APWRA Repowering Final PEIR page 3.4-48 October 2014

- *Historically, the number of bat fatalities detected as part of the avian fatality monitoring program at old-generation turbines in the APWRA has been extremely low, due at least in part to the monitoring program's design, which has focused on bird mortality. **As previous study methods were not designed to generate defensible bat mortality rates, and as new generation turbines may pose novel threats to bats, assumptions of species vulnerability based on extrapolation from the older turbine technologies present in the APWRA are not necessarily valid** (California Bat Working Group 2006).*

As demonstrated there are at least two studies that have been conducted between 2006 and 2014 regarding bat mortality missing in EIR