



GPO Box 4499  
Melbourne VIC 3001  
Australia  
website: [www.auswea.com.au](http://www.auswea.com.au)  
email: [info@auswea.com.au](mailto:info@auswea.com.au)  
mob 1: 0412.257.520  
mob 2: 0412.257.521



AUSTRALIA'S PEAK BODY FOR THE WIND ENERGY INDUSTRY

## Wind turbines and birds

**The issue:** In the 1970s a small number of early US wind farms caused unusual numbers of bird deaths, bringing great scrutiny to bear on wind farms with regard to this issue. Properly sited, today's wind farms present minimal danger to bird populations. These potential dangers must also be put in perspective with the generally far greater hazards posed by land-clearing, residential sprawl, road traffic and man-made structures such as tall buildings and power lines. However, the greatest threat of all to birds and other animals is human-induced climate change which is decreasing the habitats of birds worldwide. Higher temperatures, droughts, forest fires and severe storms are occurring now as forewarned by climate experts concerned about rising levels of greenhouse gases.

*"The alternative to using fossil fuels is to generate more electricity from renewable sources such as hydro-power, wind, sewage and landfill gas and solar power. When you join Royal Society for the Protection of Birds Energy you'll be maintaining the amount of renewable energy produced now, and helping to increase the amount of electricity generated from renewable sources in the future."*

Royal Society for the Protection of Birds website

### Summary

Do wind turbines present a risk to birds? Virtually all tall man-made structures present a collision risk to birds, yet the risk from wind turbines is very small when compared to structures like communication towers, tall buildings and transmission towers. And the impact of wind turbines on birds fades into insignificance in comparison with the impact that domestic cats have on wildlife.

Bird collisions with wind turbines are far less frequent than many imagine and, when they occur, are now better understood and documented than for any other type of man-made structure.

Research shows that depending on the site and species of bird, wind turbines can result in bird mortalities, but at an extremely low rate. For example, studies show that wind turbines in the US resulted in only 0.01 to 0.02 percent of total collision-related bird deaths. Danish radar research shows that birds -- by day or night -- tend to change their flight route some 100-200 metres before they arrive at a turbine, passing above at a safe distance. Early research at several Australian wind farms indicates that birds do in fact adapt their behaviour after wind turbines have been erected.

Despite this low level of risk, it is still important to investigate and take bird behaviour into account during the design stage and understand the causes and extent of any fatalities in order to minimise future impact as much as possible. This is why the Australian Wind Energy Association is actively engaged in researching this area in Australia. So far research has found that, although bird strike does occur, the impact of this on bird populations is sometimes exaggerated far out of proportion, especially considering the impact of other sources of bird mortality. Wind farm opponents are well aware that bird strike is a simple concept that can evoke powerful emotional responses, yet the truth is that all wind farm developers need to comply with planning guidelines, particularly the Commonwealth Environmental Protection and Biodiversity Conservation Act (EPBC), in the interests of minimising bird impact.

Risks to birds from wind turbines must further be weighed against the technology's environmental contribution as a clean energy source. For example, the Exxon Valdez oil spill alone is estimated to have killed between 375,000 and 500,000 birds. Climate change also poses a massive threat to birds, and wind power's ability to address this problem is acknowledged by the Royal Society for the Protection of Birds, which actively encourages new wind farm developments through its own green energy product.

### Breakdown of issues and research

#### History: Early US turbines

Early wind energy facilities in the United States were often constructed without an understanding of how bird species used these sites. Bird collision with turbines at these facilities resulted in a number of bird fatalities, including deaths of raptor (bird of prey) species protected by law.

**AUSWEA'S MISSION IS TO REPRESENT THE AUSTRALIAN WIND ENERGY COMMUNITY AND PROMOTE THE SENSITIVE AND APPROPRIATE UPTAKE OF WIND ENERGY.**



GPO Box 4499  
Melbourne VIC 3001  
Australia  
website: [www.auswea.com.au](http://www.auswea.com.au)  
email: [info@auswea.com.au](mailto:info@auswea.com.au)  
mob 1: 0412.257.520  
mob 2: 0412.257.521



AUSTRALIA'S PEAK BODY FOR THE WIND ENERGY INDUSTRY

As a result of these deaths a great deal of scrutiny has been brought to bear on wind farm projects to assess the level of risk that they present to birds, leading to extensive studies on the subject. As a result, bird mortality from wind turbines is probably one of the best researched areas of risk to avian species.

### **New Australian Research**

Some of the first bird studies in Australia performed for Pacific Hydro by Dr. Charles Meredith at three south-eastern Australian wind farms for between one and four years, were presented in July, 2003. Dr. Meredith found bird deaths at the three wind farms to be below levels predicted (and accepted) during the wind farm's approval process. Not a single rare or significant bird species was recorded. The study also found very low mortality for waterbirds and large raptors.

Monitoring of three wind turbines and one wind tower at King Island wind farm since 1998 found only one bird mortality, which the researchers translated into an expected yearly mortality rate of 0.23 birds per year per turbine. Even the highest mortality rate of the three wind farms was calculated by Dr. Meredith to be 1.3-2.7 birds/yr/turbine, lower than the estimates from the US (2.9 birds/yr/turbine).

In June 2003, AusWEA was awarded a grant from the Australian Greenhouse Office for the Wind Industry Development Project. The project comprises three modules, one of which is to develop bird impact assessment protocols and dataset standards to assist in data recording and analysis for evaluating the level of bird impact and mortality at Australian windfarms. The work will supplement recommendations for bird assessment in AusWEA's Best Practice Guidelines (at [www.auswea.com.au](http://www.auswea.com.au)) and will run for about 18 months. A key component during the development of the protocols will be to consult with a broad range of stakeholders including Commonwealth and State Government agencies, bird experts and non- governmental organisations. For more information contact Rick Maddox at [ariaps@austarnet.com.au](mailto:ariaps@austarnet.com.au)

### **Danish research**

A radar study carried out in Denmark, shows that birds -- by day or night -- tend to change their flight route some several hundred metres before they arrive at the turbine, and pass above the turbine at a safe distance or go around.<sup>1</sup>

### **Canadian research**

A study from the Yukon Territory in Canada over five years found no mortalities at all. A single wind tower was placed on the side of the Yukon River valley where tens of thousands of waterfowl migrate, following the river valley. The tower was situated on the inside of a turn which the birds had to navigate. There was great concern for this site because about 10 percent of the world's trumpeter swans fly down this corridor. In five years of searches (daily during peak migration and weekly over the year) and observations of flying birds (on 24 hour watches), not only were no waterfowl killed, but also none were observed flying close to the turbine<sup>2</sup>.

### **US Research**

A US study<sup>3</sup> published in 2001 carried out by Western Ecosystems Technology for the National Wind Coordinating Committee puts wind turbine collisions into perspective with bird collisions with other structures. This review of existing studies and data dealing with avian (bird) collision mortality produced the following figures for avian collisions:

- Vehicles: 60 million - 80 million
- Buildings and Windows: 98 million - 980 million
- Powerlines: tens of thousands - 174 million
- Communication Towers: 4 million - 50 million
- Wind Generation Facilities: 10,000 - 40,000

<sup>1</sup> Tulp, et al (1999) Nocturnal flight activity of sea ducks near the wind farm Turno Knob in the Kattegat. Bureau Waardenburg Project No 98., Utrecht.

<sup>2</sup> [Wind Turbine Environmental Assessment- Draft Screening Document](#). Prepared by Dillon Consulting Limited for: TREC and Toronto Hydro Energy Services Inc, Appendix B, p. 3.

<sup>3</sup> National Wind Coordinating Committee (NWCC) Resource Document: Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States.

**AUSWEA'S MISSION IS TO REPRESENT THE AUSTRALIAN WIND ENERGY COMMUNITY AND PROMOTE THE SENSITIVE AND APPROPRIATE UPTAKE OF WIND ENERGY.**



GPO Box 4499  
Melbourne VIC 3001  
Australia  
website: [www.auswea.com.au](http://www.auswea.com.au)  
email: [info@auswea.com.au](mailto:info@auswea.com.au)  
mob 1: 0412.257.520  
mob 2: 0412.257.521



AUSTRALIA'S PEAK BODY FOR THE WIND ENERGY INDUSTRY

The study estimates that the number of avian fatalities, for all species combined in the US is 2.9 per turbine, per year. This equates to a figure of wind turbines causing one in 5,000 to 10,000 collision related deaths for avian species, or 0.01 to 0.02 percent. (The total number of fatalities from all sources is estimated at a staggering 200-500 million birds killed annually by collisions in the US.)

This estimate includes the fatalities at wind facilities such as the Altamont, California wind farm which is sited in areas of high avian usage. The figure would be lower for turbines located outside of these areas.

It should be noted that the figures for fatalities from wind turbines are the most accurate estimates of all types of collisions presented in the study, as they are based on the most extensive and accurate data. It is also important to understand that the figures above only deal with avian deaths as a result of collision with various structures. There are also many other significant human-related sources of fatality including hunters, domestic and feral cats, climate change and pollution. US bird experts Curry and Kerlinger have estimated that 100 million bird deaths a year can be attributed to domestic cats.<sup>4</sup> And the Exxon Valdez oil spill alone is estimated to have killed up to 500,000 birds.

### **Regulatory Measures**

Further, all wind farm developments are accountable under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC), which is a powerful piece of legislation prescribing Commonwealth involvement in environmental matters where an action has or will have a significant impact on "matters of national environmental significance". There is specific reference in the Act to consideration of threatened species and listed migratory species.

### **Industry improvements**

Although it is not yet clear that perching increases risk of collision, many of the newer generation turbines are designed to minimise perching and nesting opportunities, with the adoption of tubular towers or fully enclosed nacelles being some examples.

### **Royal Society for the Protection of Birds**

The conclusion which can be drawn from the above is that although wind turbines do present a risk to birds, it is site-specific and very small compared to other human activities and the risks presented by climate change.

The (British) Royal Society for the Protection of Birds, Europe's largest wildlife conservation charity with over a million members, takes this view. The Society actively encourages new wind farm developments by means of its own green energy product RSPB Energy<sup>5</sup> which aims to "maintain the amount of renewable energy produced now, and help to increase the amount of electricity generated from renewable sources in the future".

---

<sup>4</sup> Curry and Kerlinger, consultants, web site: <http://www.currykerlinger.com/birds.htm>.

<sup>5</sup> Royal Society for the Protection of Birds web site: <http://www.rspb.org.uk/products/index.asp>