

Ask Natural Life: Are Wind Turbines Dangerous? *by Wendy Priesnitz*

Q: What is your opinion of wind energy's environmental and health effects?

A: First let us say that we very much favor wind power and all other sources of environmentally friendly, renewable energy. They are crucial alternatives to fossil fuels, which are major contributors to global warming, and to nuclear reactors, which, among other problems like heavy water usage, have an unsolved dangerous waste hazard. We have found that many of the criticisms of wind energy are inflated. And a much greater threat to birds, animals and humans comes from allowing climate change to create floods, drought, forest fires, severe storms and other catastrophic occurrences.

The controversy that sometimes surrounds wind energy often relates to scale. As in many situations, small is often better. For the past few decades, there have been many research studies about the effects of wind farms on bird mortality and the quality of life for nearby residents.

In the U.S., these studies were prompted by the relatively high number of raptors that were found dead at the Altamont Pass Wind Farms near San Francisco – a situation that even prompted an unsuccessful lawsuit by the Center for Biological Diversity in 2004.

The Altamont Pass site was one of the first locations in the U.S. to be developed for commercial wind energy generation. Recent research indicates that the large-scale bird kills at that site are an unusual and possibly unique phenomenon caused by a number of factors, including bad siting and the particular wind turbine and tower technology used when it was built in the early 1980s. The wind farm consists of lattice-like towers, which provide attractive perches for birds, supporting 4,800 small turbines, as opposed to newer farms consisting of larger turbines constructed on taller tubular towers.

Properly sited, today's wind farms seem to present much less danger to bird populations. Nevertheless, studies show that in the U.S., turbines kill between 40,000 and 70,000 birds per year. However, these numbers must be put into perspective with the generally far greater hazards posed by land clearing due to residential sprawl, road traffic, large buildings, power lines, traffic, hunting and agricultural pesticides, which together account for billions of bird deaths annually. One study estimates that each year 57 million birds are killed by cars and 97.5 million by collisions with plate glass. Domestic cats are reported to be responsible for the demise of hundreds of millions of songbirds and other species every year. The numbers must also be compared to the dangers from other forms of energy generation – for instance, the Exxon Valdez oil spill alone is estimated to have killed between 375,000 and 500,000 birds.

In other parts of the world, where the wind industry is better developed, the research is relatively positive. Danish radar research, for instance, shows that most birds tend to change their flight route some 100 to 200 meters (109 to 219 yards) before they arrive at a turbine, passing above at a safe distance, research that has been confirmed at several Australian wind farms. One of the more comprehensive pieces of research is the eight-year Danish Offshore Wind Study on Key Environmental Issues, which looked at pre-construction and post-construction data on the effects of off-shore wind farms on birds, marine mammals, fish and the people living in neighboring coastal communities. It found that there were virtually no negative impacts of the offshore wind farms to birds, and noted that tagged birds altered their flight paths around the turbines.

In the U.K., the Royal Society for the Protection of Birds supports wind farms, concluding that, "The available evidence suggests that appropriately positioned wind farms do not pose a significant hazard for birds."

A new report, issued this past May, by the National Academy of Sciences in the U.S., suggests that bats have far more to fear from wind generators than birds do. The scientists suggested that the wind-power turbines generate sounds and, possibly, electromagnetic fields that lure the acoustically sensitive creatures into the spinning blades. A reduction in bird and bat impacts is expected to evolve as research results in improvements in turbine design and wind farm location.

However, as the number of offshore wind farms increases and they move further into deeper water, there is a concern that the noise and vibrations generated by the turbines could be transmitted via the tower structure to the water...and that that could become significant enough to harm sea mammals. The Danish Offshore Wind study found no impact on seals and fish in shallow waters. However sound injected into deeper water will travel much further and will be more likely to impact bigger creatures like whales, which tend to use lower frequencies than porpoises and seals. A recent study found that wind farms add around 100 decibels to the existing low-frequency ambient noise and this could impact baleen whales' communication and stress levels.

In some areas, nearby residents have complained of noise that causes high levels of human stress. However, it's in manufacturers' best interests to design blades that are increasingly aerodynamic because that increases turbine efficiency, with the side benefit of reducing noise. One report from Greece's Centre for Renewable Energy Sources claims that the level of audible noise from a modern wind turbine is, at a distance of 200 meters (219 yards,) "lower than the background noise level of a small town in the countryside." In December 2006, a jury in Texas denied a suit for private nuisance against FPL Energy for noise pollution after the company demonstrated that noise readings were not excessive, with the highest reading reaching 44 decibels, which was characterized as approximately the same noise level as a light wind.

Concerns are sometimes expressed about the health effects from electromagnetic fields. The electrical generator and transformer do emit electromagnetic radiation, but it's confined to a very short distance from the turbine housing, which is located high above the ground. If there is any danger on that score, it's likely from the power lines rather than the turbines, and power lines are a necessity of any sort of power distribution.

The National Academy of Sciences addressed the aesthetic downside of wind farms in its report. "Not everyone considers [turbines] beautiful," the authors wrote. They cited marred mountain ridges and disrupted views, and other complaints that have related to the industrialization of rural areas due to the concentration of wind turbines.

For a variety of reasons, wind farms – like most other large-scale developments – have a tendency to divide communities. For instance, residents of the eastern Ontario community of Wolfe Island are currently split about a wind power project that will earn millions of dollars annually for their township, but that some fear will industrialize their rural landscape. Dozens of residents have agreed to allow wind turbines on their property in exchange for royalties worth thousands of dollars per turbine, and claim that most people opposed to the project are either newcomers or don't even live there.

The Greek report *Environmental Impacts of Wind Farms: Myth and Reality* cites EU research that found people who are favorably disposed to the development of wind energy accept wind turbines much more easily than people who are opposed. In the same studies, it was also found that wind farms are visually more acceptable to people who have been informed of the benefits derived from their use.

While there have been many studies conducted on the effects of commercial- scale wind installations, we haven't been able to find any on the impact of home-sized wind systems. Wind energy advocate and entrepreneur Mick Sagrillo, who writes regularly for the American Wind Energy Association (AWEA,) says that's because it's just not an issue, "especially when 'big' wind's impact on birds is considered biologically insignificant [to birds]."

As for noise pollution, a typical residential- scale turbine is estimated by the AWEA to make less noise than the average washing machine. As for those large-scale wind farms, there is no doubt they need to be planned and constructed carefully. The National Academy of Sciences report criticized "the lack of any truly coordinated planning" in the rapid growth of wind farms and called on federal, state and local governments to

pay more attention to the effects of turbines on wildlife and scenic landscapes. And that seems prudent.

However, problems with wind turbines must also be compared to the damage wrought by other power sources. For instance, a 2004 Irish study found that wind-generated electricity reduces carbon dioxide emissions between 0.59 and 0.33 tonnes per megawatt hour (MWh) over other methods of electricity generation. Of course, conservation is the most desirable way to mitigate global warming. But wind energy appears to us to be a safe, clean and sustainable replacement for some of the energy generated by non-renewable, greenhouse gas generating technologies.