

Threats from industrial wind turbines to Ontario's wildlife and biodiversity

Keith Stelling, MA, MNIMH, Dip. Phyt., MCPP,
Friends of Arran Lake, Central Bruce-Grey Wind Concerns Ontario

Scott Petrie, PhD,
Executive Director, Long Point Waterfowl;
Adjunct Professor, University of Western Ontario

Threats from industrial wind turbines to Ontario's wildlife and biodiversity

Introduction

The precautionary principle outlined in *The Bergen Agreement*, signed by Canada in 1990, has become, over the past fifteen years, part of customary international law and has been included in virtually every recently adopted treaty and policy document related to the protection and preservation of the environment. It states: "policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, ***lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation***".

The unprecedented rapidity with which industrial wind turbine developments are being proposed and constructed in Ontario, raises major concerns about the efficacy of the *Green Energy Act* which has allowed and promoted this phenomenon.

1. Adverse environmental effects from industrial wind turbines

Industrial wind turbines do not have a benign environmental foot print as has been claimed.

- Biologists¹ are observing **habitat fragmentation** and **habitat loss**, wildlife **disturbance** and **life history disruption** when turbines are placed in natural habitats.
- **Bird and bat abundance declines** at wind turbine sites and this can become **more pronounced with time**.
- **Disruption of ecological links** results in **habitat abandonment** by some species.
- The **loss of population vigour** and **overall density** resulting from **reduced survival** or **reduced breeding productivity** is a particular **concern for declining populations**.
- **The cumulative effects of multiple on- and off-shore wind developments have not been considered**.
- **Collision mortality** resulting from turbines and new transmission lines is increased during adverse weather conditions and migratory seasons. Especially vulnerable are raptors, passerines (songbirds), monarch butterflies, and bats. The consequential cost to agriculture from loss of pollination and natural insect control is a concern.
- In addition there are **serious concerns that turbine noise impacts within- and between-species communications, including predator defence**.

¹ Major studies include: Barrios and Rodriguez 2004; Stewart et al. 2004; Kingsley & Whittam 2005; Manville 2005; Desholm 2006; Stewart et al. 2006; Everaert and Kuijken 2007), Kunz et al. 2007 among many others.

- Offshore installations have the added risk of causing **waterfowl and waterbird displacement** from feeding areas and migratory corridors, **contaminant upwelling**, and changes in fish communities.
- Placing turbines in close association with coastal wetlands can severely compromise movements and foraging of migratory waterfowl.²

2. Ontario bird and bat mortality studies: Wolfe Island

Almost all post operational studies of wildlife mortalities from turbines in Ontario have been unavailable to the public, allowing government and industry to contend that wind turbines kill very few birds. The avian mortality records from Wolfe Island, however, have now disclosed the highest recorded rate of raptor casualties outside California. Each of the 86 industrial wind turbines on Wolfe Island killed an average of 13.4 birds during the first year of operation. Some of the species killed are already experiencing population declines: for example, the Tree Swallow and the Bobolink. **Until we have public access to *independent* mortality studies, we will not know the full impact.**

Albert Manville, Senior Wildlife Biologist, Division of Migratory Bird management at the U.S. Fish and Wildlife Service has warned: "The numbers of Bird Species of Conservation Concern killed by wind turbines is increasing, and that's troubling. These species are already declining, in some cases rather precipitously."

² Long Point Waterfowl data clearly indicate that fields within 2 km of coastal wetlands are used readily by large populations of field feeding waterfowl (as well as many other species of migratory and non-migratory wildlife) and that these are also critical corridors for wildlife movements. For information on the importance of the lower Great Lakes for migratory and wintering waterfowl, also see: Dennis et al. 1984; Prince et al. 1992; Petrie et al. 2002; Petrie and Wilcox 2003; and Schummer 2005.

3. Serious flaws in the Green Energy Act

The government pushed through the *Green Energy Act* (2009) with negligible legislative or public discussion. The Act exempted renewable energy projects from much of Ontario's existing environmental legislation.

- One of its amendments to existing statutes, "Schedule G", exempts renewable energy projects from the *Environmental Protection Act*, frustrating the purpose of that Act.
- Another, "Schedule K", removes planning authority from local municipalities and precludes compliance with the *Provincial Policy Statement*.
- "Schedule L" removes approval rights from Conservation Authorities preventing them from stopping renewable energy projects on their lands.

One of the most troubling provisions of the GEA is the **reversal of onus clause** that requires citizens to prove a project's harm to the environment or human health. The Chatham-Kent tribunal demonstrated that confronting government and proponent lawyers is well beyond the financial means of most Ontarians, making a mockery of the *Statement of Environmental Principles* which insists that the need for public engagement and public consultation is vital to sound environmental decision-making. It also debilitates the *Environmental Bill of Rights* (1994) which encouraged "enhanced ongoing engagement with the public as part of environmental decision making".

4. Regulations

An essential flaw in the Regulations is the “fast tracking” provision for environmental assessments which allows the proponents of renewable energy projects to submit their own environmental screening report by hiring an accommodating consultant.

Many questions have been raised as to the scientific rigour of these reports:

- Consultants often lack the proper qualifications, specialized knowledge and technical expertise to provide sound advice (for example, pertaining to waterfowl).
- Studies lack scientific rigour and fail to adequately consider existing peer reviewed literature.
- There is an insufficient use of local expert knowledge during the planning process and not enough use of available/historic data.
- Relative to Europe and the United States, there has been insufficient pre-construction monitoring at proposed wind turbine sites in Ontario (often days/months as opposed to years).
- Post-construction studies lack scientific rigour and are not standardized.
- Times chosen to make observations are often unsuitable (e.g. after or before migratory seasons and during daylight hours while most migrations of birds and bats take place at night).
- Radar observations are not being used to monitor nocturnal migrations and aerial observations are not being used for determining waterfowl populations even though these are the best methods for accurate assessment.
- Most “studies” are based on casual observations done over an insufficient number of days, seasons, and weather conditions and they do not include

the multi-seasonal or multi-year observations necessary to determine effects on fluctuating populations.

- The methodology of the reports has been questioned and serious omissions pointed out: for example, they fail to set any *a priori* criteria for determining if the wind development in question will have adverse impacts on birds or bats.

Proponent-commissioned reports have generally been rubber-stamped by the Ministry of the Environment and the Ministry of Natural Resources. The Wolfe Island project, for example, was approved despite its location on a major migratory bird corridor adjacent to provincially significant wetlands, staging areas and an Important Bird Area (IBA).

Although the industry continues to claim that it avoids placing turbines near sensitive habitats, far too many projects have been constructed, approved or proposed near critical ecosystems which support threatened species, provincially significant ANSIs and provincially significant wetlands—e.g. Wolfe Island, Ostrander Point, Arran Lake, Point Pelee National Park, coastal wetlands associated with Lake St. Clair, and Manitoulin Island among them. Numerous wind turbines have been proposed for construction in close association with coastal wetlands along the lower Great Lakes (Lakes St. Clair, Erie, and Ontario). Coastal wetlands provide critically important staging habitat for nearly 30 species of migratory waterfowl. In fact, millions of waterfowl use these wetlands each spring and fall to rest, feed and acquire the body fat necessary for migration and reproduction. Approximately 85% of our coastal wetlands have already been drained and converted to agriculture and urban development; those that remain are regularly being compromised by additional human impacts and invasive species. Consequently, it is critically

important that we do our utmost to conserve and protect all remaining coastal wetlands.³

There are other problems and inconsistencies with the Regulations and Guidelines.

- **The 120 metre setback** from Significant Wildlife Habitat (compared to 550 metres from human habitations) **is not biologically defensible**. The regulations even allow proponents to place developments within Significant Wildlife Habitats when they claim they can “mitigate” adverse effects.
- The "Bird Habitat Assessment Process” requires post construction monitoring of avian mortality but **does not require an adequate assessment of wildlife displacement**.
- **Cumulative impacts** of onshore and offshore industrial wind turbines (including those being proposed for American waters) **are not being considered**.
- Guidelines don't consider bird mortality to be significant until 18 birds/turbine/year are killed. This is 7.2 times the NA average and is not biologically defensible.
- Guidelines don't consider the mortality of raptors of provincial conservation concern (i.e. Bald Eagles) to be significant unless 0.2 raptors/ turbine/year are killed. Therefore, a development with 100 turbines that killed 19 Bald Eagles per year would not require mitigation.
- Community consultation (a requirement of the Green Energy Act) has been a dismal failure with proponents ignoring and evading community concerns

³See the following for information on the importance of coastal wetlands: Herdendorf 1992; Crowder and Bristow 1988; and Petrie 1998.

and refusing to hold public consultation meetings in preference for open house product showcases.

5. Advice of international biologists

Repeatedly biologists around the world have stated the obvious and simple warning: industrial wind turbines must be kept well away from sensitive natural habitats, including important migratory corridors.

- **“Avoid locating wind farms in regional or internationally important bird or bat areas and/or migration routes”**. *Everaert and Kuijken 2007*.
- **“Developers should avoid sites that are important to wildlife”**. --*Dr. Mark Avery, Royal Society for the Protection of Birds, U.K.*
- **“Wind turbine developments should not be placed within 1000 meters of waterfowl roost sites; not be placed within 1 kilometre of staging areas; not be placed in flight corridors between roosts and feeding grounds; not be placed on major migratory corridors, and not be erected in areas where the wind turbine development +500 m buffer zone occupies more than 1% of the known feeding areas at a site; not be placed in agricultural fields traditionally used by large flocks of waterfowl”**. -- *Bjarke Laubek, M.Sc., Waterfowl Biologist with extensive experience working on waterfowl and turbine placement in Denmark.*
- **“Wind turbine developments should not be sited near populations of birds of conservation importance, particularly Anseriformes”**. --*Stewart, et al. 2004.*
- **“Avoid placing turbines in documented locations of protected wildlife, known local bird migration pathways or near wetlands and staging areas and avoid known daily movement flyways between roosting and feeding**

areas, as well as **bat breeding and nursery colonies or migration corridors**.

--*U.S. Fish and Wildlife Service*.

- **“Wind turbine developments must no longer be built in *any* natural areas”.**

--*Spanish Ornithological Society*.

- “If we are to save our emblematic bird species from this new threat, it is urgent to impose a moratorium on windfarm construction and to call for a **fully independent** commission to investigate the whole windfarm matter, starting with the effectiveness of this intermittent, unreliable, and ruinous form of energy”. – *Mark Duchamp, Save the Eagles International*.

6. Recommendations

Revision of the Green Energy Act and its Regulations and guidelines is imperative to bring it into compliance with pre-existing environmental protection legislation.

- Amendments must be made to loopholes in the Act which exempt renewable energy projects from the *Planning Act* (and Provincial Policy Statements), the *Environmental Protection Act*, and the *Conservation Authorities Act*, and Regulations which change the purpose of the *Statement of Environmental Principles* and the *Environmental Bill of Rights*.
- Regulations must be revised to reflect the recommendations of scientists and biologists as outlined above. Regulations, guidelines and procedures must be revised to require *independent* mortality and displacement studies and avoid the problems related to proponent-commissioned environmental surveys outlined above. Biologically defensible setback restrictions and mortality levels must be established for wildlife habitats and migratory corridors.

- Industrial wind turbines must not be placed within 2 km of coastal and other provincially significant wetlands and should not be placed on major migratory corridors or in agricultural fields traditionally used by large concentrations of wildlife.
- All post and pre-construction monitoring must be made available to the public to allow for participation in environmental decision making as required under the *Statement of Environmental Principles* and the *Environmental Bill of Rights*.

The onus of proof of environmental damage must be reversed to make developers of renewable energy projects responsible for their actions and bring these projects into compliance with the *Provincial Policy Statement*.

7. Questionable effectiveness in saving GHG emissions

Here we discuss wildlife issues related to poorly regulated industrial wind turbine development but the rationale for building the turbines should also be examined.

The ideology behind industrial wind turbine installation has not been validated by experience. It is now apparent that wind turbines will not diminish Ontario's carbon footprint just as they have failed to do anywhere else in the world.

Government advisors and ministers did not listen to the warnings of electricity generation professionals who pointed out the practical complications of adding intermittent and unpredictable wind energy to the grid. Stability can only be maintained by running fossil-fuelled plants inefficiently on standby to back up all potential wind production.

European experience has demonstrated that coal plants cannot be closed in exchange for non-base load wind energy. Germany, which has installed over 20,000 industrial wind turbines, has *increased* CO₂ and other GHG emissions and new coal plants have had to be built to compensate for the destabilizing effect of wind energy.⁴ Ontario is building more gas plants for this same reason.

Bennet & McBee (2011) were the first to systematically assess the emission reduction performance of wind generation based on hourly generation and emissions data from Colorado and Texas in the Bentek study. It shows that previous claims were significantly overstated and that actual CO₂ reductions are either so small as to be insignificant or too expensive to be practical.

Summary

The dwindling areas of wetland and other specialized ecosystems which provide habitat for threatened and endangered species are especially vulnerable to disturbance and degradation from this form of rural industrialization. Migratory avian species including raptors, waterfowl, waterbirds, passerines and bats are particularly vulnerable to displacement from critical habitats and collision mortality. Government and developers have downplayed the negative environmental footprint of wind turbines. However, as developments proliferate, post construction monitoring points to **unforeseen cumulative effects** and many looming

⁴ The Irish Electricity Supply Board (ESB) National Grid study of installed wind power in Ireland (2004) concluded: "The evidence shows that as the level of wind capacity increases, the CO₂ emissions actually increase as a direct result of having to cope with the variation of wind-power output". Similar reports corroborating this conclusion include the Tallinn Technical University study (2003), the Rhine-Westphalia Institute for Economic Research study (2009), and the Bentek study (2011). Advice to the Ontario government from The Ontario Power Authority (OPA), *Integrated Power System Plan*, (October, 2007) warned that the use of wind turbines "would result in higher greenhouse gas emissions".

environmental concerns. Ontario's *Green Energy Act* with its inadequate regulations and guidelines governing the siting of renewable energy installations is urgently in need of revision. Better information on the effects of industrial wind turbines must be obtained through rigorous study and the precautionary principle of the Bergen Agreement adhered to before further construction proceeds and incalculable irreversible damage is done to Ontario's natural heritage.

References

- Barrios, L., and A. Rodriguez. 2004. Behavioural and environmental correlates of soaring bird mortality at on-shore wind turbines. *Journal of Applied Ecology*. 41:72-81.
- Bennet, P., and B. McBee. 2011. *The Wind Power Paradox*: Bentek Market Alert.
- Crowder, A.A., and J.M. Bristow. 1988. The future of waterfowl habitats in the Canadian lower Great Lakes wetlands. *Journal of Great Lakes Research*. 14:115-127.
- Dennis, D.G., G.B. McCullough, N.R. North, and R.K. Ross. 1984. An updated assessment of migrant waterfowl use of Ontario shorelines of the southern Great Lakes. Pages 37-42 in *Waterfowl Studies in Ontario*, S.G. Curtis, D.G. Dennis and H. Boyd, editors. Canadian Wildlife Service Occasional Paper No 54.
- Desholm, M. 2006. Wind farm related mortality among avian migrants – a remote sensing study and model analysis. Ph.D. Thesis, National Environmental Research Institute, Denmark.
- Everaert, J., and E. Kuijken. 2007. *Wind turbines and birds in Flanders (Belgium): Preliminary summary of the mortality research results*: Belgian Research Institute for Nature and Forest.
- Frondel, M., N. Ritter, C. Vance, F. Scheffer, and C. Schmidt. 2009. *Economic impacts from the promotion of renewable energies: The German experience*. Final Report: Rheinisch-Westfälisches Institut für Wirtschaftsforschung (Rhine-Westphalia Institute for Economic Research).
- Herdendorf, C.E. 1992. Lake Erie coastal wetlands: an overview. *Journal of Great Lakes Research*. 18:533-551.
- Irish Electricity Supply Board (ESB). 2004. *Impact of Wind Power Generation in Ireland on the Operation of Conventional Plant and the Economic Implications*: ESB National Grid.
- Kingsley, A., and B. Whittam. 2005. *Wind Turbines and Birds: A Background Review*: Environment Canada / Canadian Wildlife Service, 81 pages.

- Kunz, T., E. Arnett, W. Erickson, A. Hoar, G. Johnson, R. Larkin, M. Strickland, R. Thresher, and M. Tuttle. 2007. *Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses*: Journal of Wildlife Management 71:2449–2486; DOI: 10.2193/2007-270.
- Liik, O., R. Oidram, and M. Keel. 2003. *Estimation of real emissions reduction caused by wind generators*: Tallinn Technical University, Estonia.
- Manville, A.M. 2005. *Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science – next steps toward mitigation*: Proceedings 3rd Internatl. Partners in Flight Conference. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191, Vol. 2: 1051-1064.
- Ontario Power Authority (OPA). October 2007. *Integrated Power System Plan*.
- Petrie, S.A. 1998. Waterfowl and Wetlands of Long Point Bay and Old Norfolk County: Present Conditions and Future Options for Conservation. Unpublished Norfolk Land Stewardship Council Report. Long Point Waterfowl, Port Rowan, Ontario.
- Petrie, S.A., S. Badzinski, and K.L. Wilcox. 2002. Population trends and habitat use of Tundra Swans staging at Long Point, Lake Erie. *Waterbirds*: 25:143-149.
- Petrie, S.A., and K.L. Wilcox. 2003. Migration chronology of Eastern Population Tundra Swans. *Canadian Journal of Zoology*. 81: 861-870.
- Prince, H.H., P.I. Padding, and R.W. Knapton. 1992. Waterfowl use of the Laurentian Great Lakes. *Journal of Great Lakes Research*. 18:673-699.
- Schummer, M. L. 2005. Comparisons of resource use by Buffleheads, Common Goldeneyes and Long-Tailed Ducks during winter on northeastern Lake Ontario. Ph.D. Dissertation. University of Western Ontario. London, Ontario.
- Stewart, G. B., and A.S. Pullin. 2004. *Effects of wind turbines on bird abundance; Systematic Review No.4*: Centre for Evidence-based Conservation, University of Birmingham, England, 49p.