

**Mike Schreiner, Leader of the Green Party Ontario**

[mschreiner-co@ola.org](mailto:mschreiner-co@ola.org)

[mschreiner@ola.org](mailto:mschreiner@ola.org)

**Legislative Office (Queen's Park)**

Main Legislative Building, Unit 451

Queen's Park

Toronto, ON M7A 1A8

**Guelph Constituency Office**

173 Woolwich Unit 102

Guelph, ON N1H 3V4

519 836 4190

Abhijeet Manay, GPO Deputy Leader

[admin@gpo.ca](mailto:admin@gpo.ca)

Jaymini Bhikha

**Executive Director**

[jbhikha@gpo.ca](mailto:jbhikha@gpo.ca)

Jason LaChappelle

**Communications Manager & Press Secretary**

[media@gpo.ca](mailto:media@gpo.ca)

Candice Lepage

**Director of the Leader's Office**

[leader@gpo.ca](mailto:leader@gpo.ca)

Craig Cantin

**Director of Development**

[ccantin@gpo.ca](mailto:ccantin@gpo.ca)

Matthew Chisholm

**Organizer (GTA, Central and East)**

[matthewchisholm@gpo.ca](mailto:matthewchisholm@gpo.ca)

Maureen Balsillie

**Organizer (Southwest, Horseshoe and Northern)**

[maureenbalsillie@gpo.ca](mailto:maureenbalsillie@gpo.ca)

Calvin Winter

**Director of Technical Services**

[calvinwinter@gpo.ca](mailto:calvinwinter@gpo.ca)

A. J. Lockhard  
**Administrative Officer**  
[ajlockhard@gpo.ca](mailto:ajlockhard@gpo.ca)

January 29, 2020

Letter delivered by Email and Registered Mail to Mr. Schreiner

C.c. Honorable Premier of Ontario, Doug Ford, Leader of the Opposition, MPP Andrea Horwath, MPP John Fraser, Interim Leader of the Liberal Party, Honorable Minister Greg Rickford, Honorable Minister Jeff Yurek

C.c. Ms. Bonnie Lysyk, Auditor General of Ontario

C.c. Interested parties

---

Dear Michael Schreiner, Leader of the Green Party, Ontario, and Staff

Thank you for representing Ontario, and for your policies that include the importance of caring for Nature and encouraging responsible stewardship.

However, your message about “renewables” is erroneous, and misleading, and needs to reflect new realities. For example, in the message today from Mr. Manay, your party is reflecting on the cost of wind and solar as compared with nuclear and hydro. The numbers are unfortunately, incorrect. The underlying subtext, that “renewables” deserve a larger slice of the pie in providing energy for the Province, is incorrect. Not cheaper, not cleaner, for sure.

From your media release:

*Hi .....*

*We need your help to stop the Premier’s war on renewable energy.*

*He’s cancelling contracts and literally ripping windmills out of the ground while keeping Pickering open well past its best before date.*

*He’s pouring billions into rebuilding aging nuclear reactors.*

*This makes no sense when there are cleaner and cheaper alternatives.*

*Rebuilt nuclear power from Darlington is pegged to cost at least 16.5 cents per kWh in 2025.*

As a businessperson, you would think Premier Ford would choose one of these better deals:

15.7 cents/kWh: The cost of solar energy in 2016

8.6 cents/kWh: The cost of wind energy in 2016

5 cents/kWh: The offer from Quebec for excess hydro power

2.1 cents/kWh: The cost of electricity conservation measures

**Choose Cheaper Energy**

Xxxx, nuclear will be part of the electricity mix for years to come.

But does it really need to supply over 50% of our electricity when we can transition to cheaper and cleaner options?

[Join me in telling the Premier to choose a better energy deal.](#)

This kind of misleading and disingenuous material, will not help Ontario to get out of the economic disarray caused by the Ontario Liberal PLUNGE into renewables, leaving frantic manufacturing leaders to re locate in the US and sadly, some long headed for bankruptcy. (As an aside, yes, Mr. Schreiner, we do need nuclear, and there are newer developments in Nuclear that are going to rock the socks off the energy world.)

To focus: Your newsletter of today, January 29<sup>th</sup>, tells Ontarians that in 2016 we paid:

- 15.7 cents/kWh: The cost of solar energy in 2016
- 8.6 cents/kWh: The cost of wind energy in 2016

However, Ontario has been locked into highly damaging contracts with wind and solar producers for many years. I quote at length from the [Fraser Institute](#).

*Studies show between November 2016 and October 2017, the rate paid to wind generators in Ontario was 14 cents per kWh, which is more than eight times the rate bid by wind generators in Mexico. The rates paid to solar generators over the same period was much higher, at 48 cents per kWh. Biofuel generators received 13.1 cents per kWh.*

*Nuclear and hydro generators in Ontario, despite providing the majority of electricity output, received much lower rates compared to renewable generators. Specifically, the*

*rate paid to solar generators was more than seven times the rate paid to nuclear generators and more than eight times the rate paid to hydroelectric generators.*

*These results show there's a substantial price difference between rates paid to wind, solar and biofuel generators and those paid to other generators. The high cost for renewable sources is even more extreme when you consider that in 2016, combined solar, wind and biomass generated less than 7 per cent of electricity in Ontario.*

*Clearly, Ontario's electricity system was not designed to pursue low-cost renewable energy sources and the government shows no interest in switching to a more competitive market-based system.*

*As a result, Ontarian households and industries are struggling to pay high electricity bills. From 2008 to 2016, residential electricity prices in Ontario increased by 71 per cent—more than double the national average. To make matters worse, a recent study shows Ontario's skyrocketing electricity prices cost the province more than 74,000 manufacturing jobs between 2008 and 2015.*

*Repealing existing long-term contracts and subjecting renewable generators to market competition would be a step in the right direction, as it would likely reduce electricity prices for Ontarians. The Ontario government should follow the example of many European countries, including Germany, France and Spain, and reform the costly commitments it made to renewable generators. For instance, in 2013, the government in France cut the guaranteed rate offered to solar generators by 20 per cent.*

*Another approach to mitigate Ontario's high costs is to enact legislative changes to rollback costs associated with renewable contracts. The general principle behind this idea is that the government can write laws that, once passed in the legislature, nullify contracts the government itself signed previously.*

*Ultimately, the Wynne government should repeal the high-cost guaranteed contracts offered to renewable generators, and instead focus on switching to a more competitive market-based electricity system. We urge the government to pursue meaningful reforms to produce real reductions in electricity prices in Ontario.*

<https://www.fraserinstitute.org/blogs/high-cost-of-renewables-a-made-in-ontario-problem>

**Please note the suggested remedies:**

- Repeal existing long-term contracts and encouraging renewable generators to compete with market level producers
- Follow European countries, including Germany, France and Spain and reform the costly commitments
- Create Legislative changes to rollback costs

Wind and solar will never supplant nuclear, hydro or gas plants. The limited if any power produced does not add to our ability to provide cleaner power to the grid. In fact, the regulations provide for FIRST SERVE access to renewables, wind and solar to the grid, requiring ramping up and down at the whims of the wind, literally, causing havoc and even deeper costs to energy ravaged consumers. At this time,

Ontario has an excess of power and dumps, yes, wind and solar power first, to the US at a cost of about \$2 Billion per year (Two Billion Dollars).

While it may appear surprising to some that Premier Ford has undertaken to [cancel 758 solar and wind contracts in the pipe](#), and recently the Minister of Environment, Conservation and Parks, Jeff Yurek, has had the foresight to cancel an in-development, “illegal” wind project, [Nations Rise](#), with four already contaminated wells from construction (it is fairly clear that the water contamination in the province from formerly pristine wells is directly related to construction and massive vibration of shaking towers on Karst lands), it is not surprising to most. We have an energy system that is already dumping excess power, with clear evidence also of widespread harm to wildlife and people who cannot live in homes (40 plus that we know about), and to many if not most, this advantage that the PCs are giving to Ontarians must be supported. Supported with facts, supported with knowledge of the current egregious levels of harm, supported with a commitment to future generations for fair pricing of an energy essential service, and yes, a commitment to the beleaguered and disappearing wildlife, which no one seems to be counting, save the developers.

If these actions appear “stunning” to some, we assure you they are common sense to most. If you use the basest level of purposeful and meaningful action, **cost**, you can note that the Province will save about \$2 Billion (Two Billion Dollars), lifetime, by this cancellation. That alone, given again the ravages of the Ontario economy, should be reason to celebrate.

However, there are even deeper consolations in this notable decision of Mr. Yurek.

The ignoble decisions of the Environmental Review Tribunal (with respect to wind) which has been hearing wind cases for years, about 40 plus, having given air space to countless thousands over ten years, hearing anguished community members attempting to abort train wreck wind turbines in their midst, has failed miserably to make decisions that are valid and true, and protective of wildlife and people. Failed Miserably. (We could provide reasons for these faulty decisions, but that is more space than today’s schedule allows.) Any review of multiple websites in Ontario that note the uncountable costs of human life, suffering, bird and bat mortality, landscapes not to be recovered for hundreds of years, will show what every legislator should avail him or herself of: a very acute picture and understanding of the harm of industrial wind (and solar). This adventure in Ontario into Renewables, is a complete, utter disaster. (Please see [this link](#) for a partial list of objectors and concerned citizens, some of whom now are imploded with monster machines.)

Worldwide perspective is always useful. Europe has indulged much longer in the “green” fantasy. Please see this article today from an Australian blog.

<https://stopthesethings.com/2020/01/29/long-road-to-run-fossil-fuels-powering-the-planet-now-for-generations-to-come/>

*The article today features the buildout in China of coal fired plants.*

*Renewable energy rent seekers have turned the ‘it’s a climate catastrophe’ dial all the way to 11 in an effort to convince us that our only salvation is an all sun and wind powered future.*

*One well beat up myth used in an attempt to spook sensible investors is that China has already snubbed coal-fired power generation in favour of wind and solar. Except that the Chinese have done just the reverse.*

*Instead of worshipping nature’s wonder fuels, China is flat out building hundreds of high-efficiency, low-emissions coal-fired plant, in a concerted effort to drag itself out of the grinding agrarian poverty which, not so long ago, gripped the country fast. If costly and chaotic wind and solar were ever in favour in the People’s Republic, they’ve clearly fallen out of favour now: [Full-Steam Ahead: China & Japan Snub Intermittent Wind & Solar to Build Hundreds of New-Age Coal-Fired Plants](#)*

We need to mention the Finish study that indicated recently that ILFN (Infra and Low Frequency Noise) travels beyond 15-20 kilometres. (Ontario’s “safe setback” is 550 meters. Ontario only measures weighted audible sound. It is now established that pulsation and low frequency noise are the most impactful. Where are the health saving measurements, where is the government demanding new standards and compliance? *World standards are currently recommending ten times height of turbine, even for merely audible sound.*)

We could further mention the chaos of the German grid and the French objectors, or any of those in Europe and Asia who are reeling and revolting, and policy makers who are waking. Please again [see this reference to the German experiment:](#)

*Germany’s wind and solar experiment has failed: the so-called ‘Energiewende’ (energy transition) has turned into an insanely costly debacle.*

*German [power prices have rocketed; blackouts and load shedding are the norm;](#) and idyllic rural communities are now industrial wastelands (see above).*

*Hundreds of billions of euros have been squandered on subsidies to wind and solar, all in an effort to reduce carbon dioxide gas emissions. However, that objective has failed too: CO2 emissions continue to rise.*

We mention these features and facts because Ontario now has a government that knows the fallacies of wind and solar, and shows it has the apparent “guts” to create a new energy landscape, a resurrection at least in the infancy, and we should we feel, heed the experiences that have caused this grief worldwide.

It is not a time to chastise important ground-breaking decisions by the sitting government because our ideological differences do not mate. Please also see: <https://nationalpost.com/opinion/randall-denley-it-makes-sense-to-cancel-wind-and-solar-contracts-in-over-powered-ontario-heres-why>

*Ontario could introduce more wind and solar, but it would do nothing for emissions because that power would be replacing either hydro or nuclear. Besides, more wind in the province’s baseline power supply would mean more natural gas needed for back up, too. In environmental terms, the PC government was inarguably right when it decided to cancel unneeded wind and solar projects.*

It is important we feel, at this juncture, to recognize, openly and clearly, that the recent decision by Minister Yurek to cancel Nations Rise, which had built six of the projects 33 turbines, is one of the most significant to occur in decades. Worldwide there is renewed interest in environmental damage of industrial wind: [“Planning permission](#) for a 14-turbine wind farm between two villages in Cork and Kerry has been quashed by the High Court over its potential impact on the hen harrier.” (Irish Times)

The harm to the environment and wildlife is increasingly resonating as a reason to close doors on wind projects, because it is universally known that the damage to bats (and birds) is like the canary in the mine. The loss of even one female bat, of any species, can impact/kill an entire colony. And we do not have ample to spare. This is without any doubt, an environmental catastrophe. Unfortunately, we have been in critical mode for dozens of years now. Coupled with population stresses of loss of habitat and White Nose Syndrome, the addition of the [MOST harming proliferation of slicing and lung popping](#) wind turbines has led and is leading to a ginormous loss of one of Nature’s most perfect companions and executors of balance.

If you are not aware of the damage to the bat populations of the world from industrial wind, it would be very useful to study this, immediately. The levels of harm are so serious, so completely irrevocable for generations, possibly forever, as some species are going extinct and yes, wind is the number one cause. There is corollary damage to humans, impaired control from mosquito borne disease, harm to eco webs, agricultural costs from depleted bat populations, and lost benefits from the bats that consume over 1000 insects per hour, and so on. Ontario communities have given the ERT judiciary ample proof of harm to bats, and this decision affirms that someone with ultimate authority, has listened. Finally. At least on this environmental issue. (We compare this decision to the [closing of the Cod Fisheries](#) by then Minister John Crosbie.)

Needless to say, there are so many reasons why Nations Rise needed to be aborted. It has a certain elegance and clarity that the inevitable harm to bats, imperiled in Ontario, should be one of the

documented reasons at this time. (The harm to human health is also something that needs to be recognized by the government and all parties. This goes without saying, it is so obvious.)

We ask that you support the Government's new direction. Please advocate in the legislature for energy policies that are based on reasonable knowledge, current up to date information, and energy savvy, not ideological land locked obsolete dogma.

### Facts:

- CO2 is not a green house gas. Nonetheless, CO2 has increased not in spite of, but DUE to the proliferation of wind and solar.
- We are not in a climate crisis. The world has experienced many fluctuations in climate, and it is generally understood that [Anthropogenic reasons for “weather” changes, are not scientifically authenticated.](#) *“Since human activity does not account for a major input of carbon dioxide into the atmosphere, it is difficult to link carbon dioxide directly to the increase in average global temperature. [Globalwarming.org](#) says that recent climate changes are not caused by increasing carbon dioxide concentrations in the atmosphere. [4] Some models show that the cooling effect of fossil fuels, such as the haze emitted from sulfate aerosols, may be between .4-8 times that of the heating effect. [1] Deforestation and alternate land usage, while anthropogenic, are not direct emissions as burnt fossil fuels are. Thus carbon dioxide is not directly linked to average global temperature increases.”*
- Ontario's development of “renewables” has been disastrous; no one will dispute this.
- Wind and solar are intermittent, “not in a million years” capable of supplanting base load power of gas, nuclear, hydro. They always require 100% back up 100% of the time.
- Land required for wind and massive solar arrays is obscenely wasteful. Often massive tracts of prime natural space, historic at times, valuable agricultural land the envy of many countries, are imploded with shaking polluting machines.
- The true debacle of clean up of wind turbine parts such as blades, non recyclable, solar panels with highly toxic elements breaking down in as little as six years, leaching into the earth, is beginning to be seen. How will Ontario prepare for the end of cycle damages?
- The people of Ontario have been and are being harmed: there is zero question. Please see [Wind Victims Ontario](#). The lack of response to these harms is in our view, “criminal.”
- [CanWEA's assertions](#) of lower cost for wind is a misleading chimera: *“Ontario's **most recent competitive procurement was in 2014,** but even then the result was an average 20-year price of 8.45 cents per kilowatt hour (kWh), with one contract as low as 6.45 cents – all well below the average cost of electricity generation.”* The fact is that older contracts are yet the largest gobble of electrical pricing, as noted by the Fraser Institute, taking 14 Cents per kWh for wind, and 48 Cents for Solar. This gouging has not been rectified and is an outstanding number one on the TO DO list.
- Wildlife impacts are measured scantily and insincerely by developers. This lie is likely the largest lie of the entire renewables scam. We do not know what the true impacts are really in Ontario, save that many are reporting they no longer see bats in their areas, they note disappearance of regular visitors to banding stations along the Huron and Erie shores, there are known misrepresentations of mortality by developers, aided by Ministries' silence, with evidence accruing that for bats, for example, the “threshold” of ten per turbine per year, is exceeded eight

or ten fold, but who really knows. The harm is another “Silent Spring” unfolding under our eyes. It seems so silent that few are even “talking” yet. But Minister Yurek is.

We respectfully request that your platform be re-evaluated, and that you issue a more informed “ask” of your membership, and that you correct the misinformation in today’s release. We need to dial down the rhetoric that we pretty much all fell into for years, and dial up the reality that [there is no such thing as a “renewable,”](#) and that Ontario must turn the infantile, greed driven energy debacle of some years, into a rebirth, a nascence of conservation, an energy savvy, cost benefit driven, nature and human needs driven, policy.

We feel certain the Green Party of Ontario shares these values.

Sincerely,

*Sherri Lange*  
*CEO North American Platform Against Wind Power*  
*Founding Member Toronto Wind Action, Ontario Wind Action*  
*Founding Member Great Lakes Wind Truth*  
*Vice President Canada, Save the Eagles International*  
[www.na-paw.org](http://www.na-paw.org)  
[www.greatlakeswindtruth.org](http://www.greatlakeswindtruth.org)  
[www.savetheeaglesinternational.org](http://www.savetheeaglesinternational.org)

## **Additional Materials**

<https://www.sciencedaily.com/releases/2016/01/160119141919.htm>

Many of the 1,300 species of bat are considered to be threatened and declining. A new analysis reveals trends and causes of death in bats around the world, shedding new light on the possible factors underlying population declines.

In the analysis, 1180 mortality events, each involving more than 10 bats, were represented in a detailed canvassing of the literature dating from 1790 to 2015, and could be divided into 9 categories.

Prior to the year 2000, intentional killing by humans caused the greatest proportion of mortality events in bats; the reasons for killing varied with region, but bats were killed as pests, for food, for vampire bat control, and to protect fruit crops. Since 2000, collisions with wind turbines and white-nose syndrome (in North America) have been the leading causes of mass mortality in bats.

<https://news.mongabay.com/2017/08/nearly-one-third-of-bat-species-in-north-america-are-on-the-decline/>

...a new study published in the journal [Biological Conservation](#) this month finds that those conservation gains have been all but reversed over the past decade and a half.

Scientists with NatureServe, an international biodiversity conservation NGO, looked at the conservation status of the 45 species of bat that occur in North America north of Mexico. Using a methodology for assessing conservation status developed by NatureServe, the researchers determined that, as of 2015, more than 30 percent of the species included in the study qualified as vulnerable, imperiled, or critically imperiled.

<https://healthypets.mercola.com/sites/healthypets/archive/2016/03/22/threatened-bat-population.aspx>

- Habitat loss, disease and wind turbines are causing many bat populations to plummet

**By Dr. Becker**

**Declines in U.S. populations of bees** and **butterflies** make regular headlines, but bats, which are another, albeit lesser known, pollinator, are also threatened. Habitat loss and the spread of disease, including White-Nose Syndrome, are primary threats to bat populations.

The U.S. National Wildlife Health Center estimated that northeastern bat populations have declined by 80 percent.

“The true ecological consequences of large-scale population reductions currently underway among hibernating bats are unknown,” the Health Center explained,<sup>1</sup> as many people underestimate the importance of bats to the environment.

## **Bats’ Pest-Control Services Save Farmers More Than \$1 Billion**

One of bats’ claims to fame, aside from pollination, is their voracious appetite for insects. A pregnant or nursing bat may eat her own body-weight worth of insects each night, and night-flying insects, including the corn earworm moth, are a favorite food.

The corn earworm moth (or more specifically, the moths’ larvae) cause major damage to U.S. corn crops. Researchers from Southern Illinois University (SIU) wanted to find out what happens when bats aren’t allowed to feed freely on the moths, so they built large outdoor enclosures over cornfields in Southern Illinois.<sup>2</sup>

The enclosures were covered in nets that let insects in but kept bats out. The corn grown within the enclosures had significantly more larvae-damaged kernels – by 56 percent – and less fungal damage.

The researchers noted that bats “suppress pest-associated fungal growth and mycotoxin in corn” as well as increased crop yield by 1.4 percent, which adds up to a difference of more than \$3 an acre.

Overall, the study found that bats save farmers more than \$1 billion worldwide – and that’s only for corn crops. The estimate also doesn’t factor in other benefits that bats provide, such as a reduction in pesticide use. Study author Josiah Maine told BBC News:<sup>3</sup>

*“Bear in mind that this figure does not take into account for the impacts of bats on the fungal diseases we found in the corn, or the micro-toxins produced by those fungal species.*

*It also does not account for the reduced amount of pesticides used in fields, as bats could be providing an additional valuable service to agriculture by suppressing pest populations below the threshold where pesticides are necessary.”*

## Loss of Bats Could Cost North American Economy Up to \$53 Billion

<https://batweek.org/threats-to-bats/>

Worldwide, about 24% of bats are considered critically endangered, endangered, or vulnerable. Bat numbers in the United States and Canada have declined dramatically as a new disease, White-Nose Syndrome (WNS), has killed over six million bats in just eight years. This, coupled with impact from wind energy, habitat alteration, and roost disturbances, has caused serious decline in bat populations in North America as well as around the world.

Humans need bats. Worldwide, there are more than 1,400 species of bats—that’s almost 20 percent of all mammal species. Bats live almost everywhere on Earth except the most extreme desert and polar regions. So, no matter where you live, it is almost certain that there are bats living near you. Bats are amazing animals that are vital to the health of our environment and economy. Although we may not always see them, bats are hard at work all around the world each night. Most bats in North America eat insects, including moths, beetles, aquatic insects, and flies. **A single bat can eat up to its body weight in insects each night. Eating all these insects helps protect our food crops and forests from insect pests, saving farmers and forest managers billions of dollars each year.**

Consider these fascinating bat facts:

- Bats come in all shapes and sizes, from the tiny, adorable bumblebee bat that weighs less than a penny to the big, beautiful flying foxes that can have a wingspan of up to six feet.

- Bats are the only mammal that can truly fly (although some other mammals “glide”). A bat’s wing is actually a modified hand—similar to yours.
- Contrary to popular belief, bats actually have good eyesight (similar to that of humans), but for most species, their main technique for navigating or locating prey is using echolocation (not all species echolocate!): emitting very high- pitched sounds that bounce off obstacles in their path, like trees, other bats, buildings, and food. main target—delicious insects. Not all bats that echolocate are insectivores!
- Bats eat lots of different things. Although almost 70% of bat species feed primarily on insects, some bats are carnivorous, eating meat like rodents, frogs, and fish. Only three species of bats feed on animal blood, with two of these species specializing on bird blood. Many other bats eat pollen, nectar or fruit—these bats are vital for pollinating flowers and spreading seeds that grow new plants and trees.

[https://www.researchgate.net/publication/231965635\\_A\\_review\\_of\\_the\\_global\\_conservation\\_status\\_of\\_bats](https://www.researchgate.net/publication/231965635_A_review_of_the_global_conservation_status_of_bats)

There are 1,001 species of bats, almost a quarter of which are globally threatened. The Chiroptera Specialist Group of IUCN's Species Survival Commission has produced two Action Plans examining conservation issues for all species and detailing recommendations for action to conserve the most threatened species and habitats. These Plans are aimed principally at key decision makers as well as organisations and individuals who are promoting bat conservation issues. The underlying threat to bats is pressure on resources from increasing human populations that leads to the loss or modification of foraging habitats and roosts (Our note: modification to habitat includes wind turbines, to which bats are attracted.)

<https://www.wind-watch.org/news/2019/09/22/hoary-bat-numbers-decline-amid-wind-turbine-expansion/>



The cause of the hoary bat decline is believed to be the wind turbines on industrial wind farms, a growing phenomenon in Oregon and Washington state.

Oregon and Washington combined have 3,600 wind turbines with 6,300 megawatts of installed generating capacity. In both states, the majority of the wind farms are clustered near the Columbia River Gorge, east of The Dalles. Other farms in the region can be found near Ellensburg and Walla Walla in Washington, and Baker City in Oregon.

While collisions with the propellers on wind farms cause many of the deaths, barotrauma is another problem.

Barotrauma can occur when bats fly through low pressure zones created by the spinning blades of a wind turbine. The sudden change in pressure causes their lungs to expand faster than the bats can exhale, resulting in burst vessels that fill their tiny lungs with blood, said Rodhouse, an ecologist with the National Park Service and a courtesy faculty member at OSU-Cascades. Courtesy faculty members serve on the faculty but are not paid by the university.

“This and direct collisions with the turbines has resulted in millions of bat deaths over the last two decades,” said Rodhouse.

Hoary bats fly straight into the danger zones, usually while migrating south for the winter, because their sophisticated sonar capabilities are unable to detect the pressure drops, said Rodhouse.

The physiological effect of barotrauma is not unlike the bends – also known as decompression sickness – that divers experience. The lungs of birds are tube-like and more rigid, with strong capillaries, making them less vulnerable to the pressure changes near wind turbines.

White-nose syndrome, a deadly disease that has affected bat populations in other parts of the country, is not affecting the hoary bat, said Rodhouse. This disease kills some bat species in winter during hibernation, but hoary bats migrate to warmer climates instead of hibernating.

“Wind energy is devastating the migrating species that aren’t affected by white-nose syndrome. So it’s kind of a double whammy in terms of two new threats that, in sum, are hitting pretty much all our bats,” Rodhouse said.

<https://awwi.org/wp-content/uploads/2018/11/AWWI-Bats-and-Wind-Energy-White-Paper-FINAL.pdf>

To further understand the ecological significance of collision fatalities for bat species, it is important to understand both bat population numbers and trends, and bat population structure. The latter refers to whether there is structuring of populations into sub-populations – or groups – within a species’ range due to limited exchange between sub-populations. One or more of these sub-populations may be at risk while others are not, and increased mortality due to collision fatalities may be more of a threat to subpopulations at risk. Alternatively, a species may represent one well-connected population. Some bat species, such as Townsend’s big-eared bat (*Corynorhinus townsendii*), appear to have discrete, geographically separate populations, while others, such as some species of migratory tree bats, may effectively have one single population (Korstian et al. 2015).

Obtaining estimates of population numbers of migratory tree bats is even more difficult because these species tend to be cryptic and more solitary than cave-hibernating bats. Recent studies have used genetic analysis to estimate effective population sizes,  $N_e$ , which is defined as the number of individuals contributing offspring to the next generation. For example, genetic analysis indicates that both the eastern red bat (*Lasiurus borealis*) and hoary bat (*L. cinereus*) have “large, well-connected populations, with  $N_e$  numbering in the hundreds of thousands to millions” (Korstian et al. 2015, Vonhof and Russell 2015).  $N_e$  is assumed to be smaller than the actual population size, and to reflect attributes of the population from the past, rather than the present.

Populations of most North American bat species are thought to have declined due to anthropogenic activity, including habitat loss and persecution, and more recently, direct and indirect impacts of pesticides/insecticides. For example, 19th and early 20th century accounts report large, diurnal flights of eastern red bats, which are not reported today (Barbour and Davis 1969). Long-term mist-netting records and rabies submissions also suggest that many bat species are in decline (e.g., Whitaker et al. 2002, Winhold et al. 2008). In the past 10 or so years, some populations of cave-hibernating bat species are thought to have declined approximately 75 to 95% from White-nose syndrome (WNS; see below). Recognizing the importance of accurate data on population size and

trends for bats, the U.S. Geological Survey (USGS) created the USGS Bat Population Data Project (BPD), defined as “a multi-phase, comprehensive effort to compile existing population information for bats in the United States and Territories” (USGS 2017). The BPD compiles various components of bat population data from 1855-2001, including counts of bats at colony locations and location attributes, while providing a bibliography of bat publications for the U.S. and its Territories. Concerns about declines in bat numbers have continued, and the added threats of WNS and wind energy development have resulted in efforts to update and expand the usability of the BPD.

## Impacts of Wind Energy on Bats Collision fatalities at wind energy facilities are considered by many to be one of the greatest threats to bat populations in North America and Europe

(O’Shea et al. 2016), and several hypotheses have been put forward to explain this high collision risk (see Barclay et al. 2017 for a recent summary of the status of these hypotheses). The summary of collision impacts of wind energy on bats in this white paper is based on a detailed review of bat fatality incident and adjusted fatality estimate data contained in the American Wind Wildlife Information Center (AWWIC; Allison and Butryn 2018). AWWIC is a cooperative initiative of AWWI Partners and Friends intended to expand the availability of wind-wildlife data for analysis to improve our ability to predict risk and estimate impacts of wind energy development and operation on wildlife. For more than 20 years, wind energy companies have undertaken hundreds of fatality monitoring studies to assess collision impacts to bats and birds from wind energy projects. Many of the data are publicly available, but other data are confidential, and until recently have been unavailable for analysis. AWWIC stores public and confidential proprietary wind-wildlife data with the intention of increasing the amount of data for analysis while maintaining data confidentiality. *(Please note: our note: wind companies do the counting, and other data are “confidential.” We wonder why.)*

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6490962/>

Hundreds of thousands of bats are killed annually by colliding with wind turbines in the U.S., yet little is known about factors causing variation in mortality across wind energy facilities. We conducted a quantitative synthesis of bat collision mortality with wind turbines by reviewing 218 North American studies representing 100 wind energy facilities. This data set, the largest compiled for bats to date, provides further support that collision mortality is greatest for migratory tree-roosting species (Hoary Bat [*Lasiurus cinereus*], Eastern Red Bat [*Lasiurus borealis*], Silver-haired Bat [*Lasionycteris noctivagans*]) and from July to October. Based on 40 U.S. studies meeting inclusion criteria and analyzed under a common statistical framework to account for methodological variation, we found support for an inverse relationship between bat mortality and percent grassland cover surrounding wind energy facilities. At a national scale, grassland cover may best reflect openness of the landscape, a factor generally associated with reduced bat activity and abundance that may also reduce turbine collisions. Further representative sampling of wind energy facilities is required to validate this broad pattern. Ecologically informed decisions regarding placement of wind energy facilities involves multiple considerations, including not only factors associated with bat mortality, but also factors associated with bird collision mortality, indirect habitat-related impacts to all species, and overall ecosystem impacts. **(Our note: it is not hundreds of thousands, it is millions. In the US alone, between 13 and 31 MILLION birds and bats are killed by wind turbines.)**

Determining cumulative effects of wind energy facilities on bats is difficult because there is limited information about bat population abundance and trends (Cryan 2011). However, wind turbine collisions may threaten population viability for some frequently killed species, such as the Hoary Bat (*Lasiurus cinereus*) (Frick et al. 2017).

[https://www.fs.fed.us/psw/publications/weller/psw\\_2017\\_weller001\\_frick.pdf](https://www.fs.fed.us/psw/publications/weller/psw_2017_weller001_frick.pdf)

A critical question for conservation planning is whether these fatalities could drive populations to dangerously low levels or even extinction.

<https://wildlife.org/rapid-declines-raise-concerns-about-hoary-bats-future/>

## Rapid declines raise concerns about hoary bat's future

By David Frey

Posted on September 13, 2019



The hoary bat, the species of bat most frequently found dead at wind power facilities, is declining at a rate that threatens its long-term future in the Pacific Northwest, according to a recent study. ©National Park Service

Hoary bat numbers are plummeting in the Pacific Northwest, according to a recent study, raising concerns about the ability of the species to survive throughout the United States as growing numbers are found dead at wind power facilities.

But researchers say conservation measures, including new wind turbine technology, could turn around those declines.

“There are multiple lines of evidence from different studies that are all pointing to the same likely scenario, which is, hoary bats are in trouble,” said National Park Service ecologist Tom Rodhouse, the lead author on the [study](#) published in *Ecology and Evolution*. “What’s unique about our study, though, is this is really the first time that anyone’s been able to actually quantify population trends for the species. It’s one thing to count dead bats below wind turbines, but you never really know, what does that mean? How does that manifest itself out on the landscape across a broad region?”

Rodhouse and his team found hoary bats (*Lasiurus cinereus*) in Oregon and Washington appear to be dropping about 2 percent a year, based on modeling of field survey data collection that began in 2003.

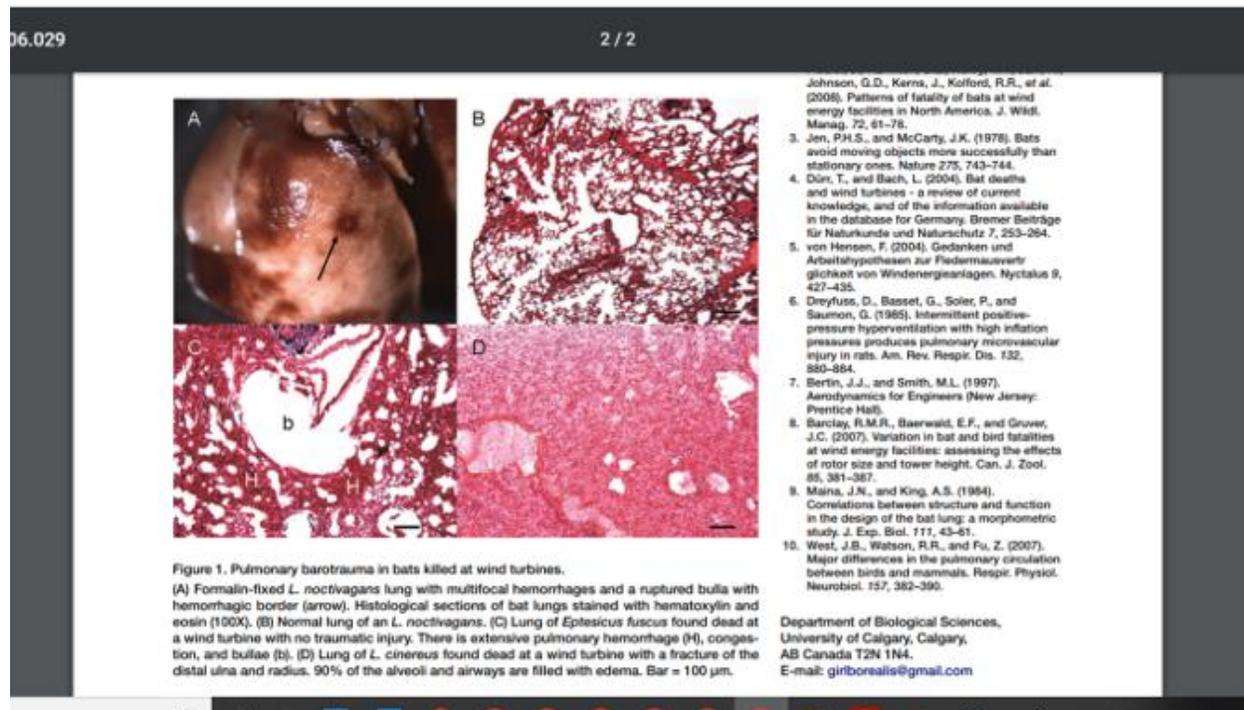
That’s consistent with a [previous estimate](#) that the bats could decline 90 percent in North America in the next 50 years if current trends continue

“I don’t believe it’s an overstatement to say that if this trend that we’re observing empirically holds over the next few years, the risk of extinction is front and center,” Rodhouse said.

Hoary bats occur throughout North America, and although their population has been estimated at about 2.5 million, the species is particularly impacted by wind turbines, with millions turning up dead on the ground below them as wind farms have proliferated in recent decades. Why they’re so affected isn’t clear, Rodhouse said, but because they migrate, they may rely on the same winds the turbines do. Some studies also suggest they are lured to the turbines.

[https://www.cell.com/current-biology/pdf/S0960-9822\(08\)00751-3.pdf](https://www.cell.com/current-biology/pdf/S0960-9822(08)00751-3.pdf)

Table 1. Injuries observed in bats killed at wind turbines in south-western Alberta, Canada. L. cinereus L. noctivagans Other species Total No external injury 38% (103) 55% (77) 75% (8) 46% (188) **Internal haemorrhage 90%** (48) 96% (26) 100% (1) 92% (75) Pulmonary lesions 100% (6) 100% (8) 100% (3) 100% (17) Internal haemorrhage was detected by visual examination of dissected carcasses, while pulmonary lesions were detected using stained histological sections. Numbers in parentheses are sample sizes.



<https://www.newscientist.com/article/dn14593-wind-turbines-make-bat-lungs-explode/>

## Wind turbines make bat lungs explode

“Beware: exploding lungs” is not a sign one would expect to see at a wind farm. But a new study suggests this is the main reason bats die in large numbers around wind turbines.

The risk that wind turbines pose to birds is well known and has dogged debates over wind energy. In fact, several studies have suggested the risk to bats is greater. In May 2007, the US National Research Council published [the results of a survey of US wind farms](#) showing that two bat species accounted for 60% of winged animals killed. Migrating birds, meanwhile, [appear to steer clear of the turbines](#).

Why bats – who echolocate moving objects – are killed by turbines has remained a mystery until now. The research council thought the high-frequency noise from the turbines’ gears and blades could be disrupting the bats’ echolocation systems.

In fact, a new study shows that the moving blades cause a drop in pressure that makes the delicate lungs of bats suddenly expand, bursting the tissue’s blood vessels. This is known as a barotrauma, and is well-known to scuba divers.

“While searching for bat carcasses under wind turbines, we noticed that many of the carcasses had no external injuries or no visible cause of death,” says Erin Baerwald of the University of Calgary in Canada.

Read more: <https://www.newscientist.com/article/dn14593-wind-turbines-make-bat-lungs-explode/#ixzz6CRag6VaH>

<https://electrical-engineering-portal.com/why-bats-are-insanely-attracted-to-wind-turbines>

# Why Bats Are Insanely Attracted To Wind Turbines?

## Bat Kills at Wind Turbines

Recent studies have reported large numbers of bats being killed at wind farms in many parts of North America and Europe. Project monitoring has also discovered significant bat mortality at the Mexico La Venta II wind farm.



Why Bats Are Insanely Attracted To Wind Turbines?

Bat kills at wind turbines were first discovered in Australia. Small numbers of bats were first recorded in the United States at wind power projects in California during bird monitoring.

Some time ago, an estimated **1,400-4,000 bats** were recorded as killed during 2008 at the Mountaineer Wind Energy Center in West Virginia . High bat mortality at that site has continued since then.

## Bat Mortality from Collisions and Barotrauma



The bat killed by wind turbine blades

Bats that fly too close to [wind turbines](#) are killed by either **direct impact** or from **major air pressure changes** around the spinning rotors.

While bats clearly are killed by **direct collision with turbine blades**, up to 50 percent of the dead bats around wind turbines are found **with no visible sign of injury**.

The cause for this non-collision mortality is believed to be a type of decompression known as barotrauma, resulting from rapid air pressure reduction near moving turbine blades.

Barotrauma kills bats near wind turbines by causing severe tissue damage to their lungs, which are large and pliable, thereby overly expanding when exposed to a sudden drop in pressure.

By contrast, **barotrauma does not affect birds** because they have compact, rigid lungs that do not excessively expand.

## Bat Attraction to Wind Turbines

Many species of bats appear to be **significantly attracted to wind turbines** for reasons that are still poorly understood.

Here we're gonna (sic) try to summarize the more plausible scientific hypotheses that have been advanced to date. By contrast, **birds are not normally attracted to wind turbines**, and simply collide with them by accident. (Our note: birds are often seen to be exhibiting curiosity behaviour with wind turbines, a natural.)



The Eastern Red Bat *Lasiurus borealis* typical of the migratory, tree-roosting bat species that are frequent casualties at some wind farms in North America.

## 9 Hypotheses for Bat Attraction to Wind Turbines

Various scientific hypotheses have been proposed as to why bats are seemingly attracted to and/or fail to detect wind turbines

**The more plausible hypotheses include the following:**

### **1. Auditory Attraction**

Bats may be attracted to the **audible “swishing” sound** produced by wind turbines. Museum collectors seeking bat specimens have used long poles that were swung back and forth to attract bats and then knock them to the ground for collection.

It is not known if these bats were attracted to the audible “swishing” sound, the movement of the pole, or both factors.

### **2. Electromagnetic Field Disorientation**

Wind turbines produce **complex electromagnetic fields**, which may cause bats in the general vicinity to become **disoriented** and **continue flying close to the turbines**.

### **3. Insect Attraction**

As **flying insects** may be attracted to wind turbines, perhaps due to their prominence in the landscape, white color, lighting sources, or heat emitted from the nacelles, bats would be attracted to concentrations of prey.

### **4. Heat Attraction**

Bats may be attracted to the heat produced by the **nacelles of wind turbines** because they are seeking warm roosting sites.

### **5. Roost Attraction**

Wind turbines may attract bats because they are perceived as potential roosting sites.

### **6. Lek Mating**

Migratory tree bats may be attracted to wind turbines because they are the highest structures in the landscape along migratory routes, possibly thereby serving as rendezvous points for mating.

### **7. Linear Corridor**

Wind farms constructed along forested ridge-tops create clearings with linear landscapes that may be attractive to bats.

## 8. Forest Edge Effect

The clearings around wind turbines and access roads located within forested areas create forest edges. At forest edges, insect activity might well be higher, along with the ability of bats to capture the insects in flight.

**Resident bats** as well as migrants making stopovers may be similarly attracted to these areas to feed, thus increasing their exposure to turbines and thus mortality from collision or barotrauma.

## 9. Thermal Inversion

Thermal inversions create dense fog in cool valleys, thus concentrating both bats and their insect prey on ridge-tops.

# Bat Species Most Significantly Affected



Bat killed by wind turbine blades

In North America, **migratory bat species** have been found dead at wind farms much more frequently than the **resident (non-migratory) species**, even in areas where the resident species are more common throughout the summer.

Eleven of the 45 species of bats that occur in North America north of Mexico have been found dead at wind farms, but most studies report that the mortality is heavily skewed towards migratory, tree-roosting species such as Hoary Bat *Lasiurus cinereus*, Eastern Red Bat *Lasiurus borealis*, and Silver-haired Bat *Lasionycteris noctivagans*.

While these three species are not listed as threatened or endangered under the U.S. Endangered Species Act, they are classified as of **Special Management Concern** at the provincial level in Canada. Although the globally endangered Indiana Bat *Myotis sodalishas* not yet been found dead at wind farms, potential new wind farms within this species' remaining strongholds could possibly threaten it.

In Europe, **19 of the 38 species of bats** found within the European Union have been reported killed by wind turbines.

Although **migratory species** are among the most numerous casualties, resident bats are also killed in substantial numbers, particularly in forested areas.

Turbine-related bat mortality has been found in every European country in which bat monitoring has been done, except for Poland where no dead bats were found during monitoring at two sites. The highest numbers of bat fatalities have been found in Germany and France, which is almost certainly due to the more extensive monitoring carried out in those countries.

## Bats and Windfarms 7 January 2013 (VIDEO)

<https://youtu.be/0jGzGcOkYR0>

In Latin America, 19 bat species were represented among the 123 individual bats found dead under wind turbines in 2007-2008 at the La Venta II project in southern Mexico. In 2009, 20 different bat species were involved (INECOL 2009).

Thirteen of these species are **insectivores**, while two feed mainly on nectar, and two on **fruit**.

The most commonly killed species, **Davy's Naked-backed Bat *Pteronotus davyi***, is thought to be resident in the area, although some other frequently killed species at La Venta II are considered to be migratory.

Interestingly, despite the enormous concentrations of mi-gratory birds that pass over or through the La Venta II wind farm (over 1 million per year), monitoring data from INECOL show that a larger number of bats are being killed there than birds.

