

BATS & WIND ENERGY

Impact Avoidance, Minimization, and Mitigation

INTRODUCTION

The signing of the Paris Agreement and the commitment to limit the amount of warming to well below 2°C has led to increased interest in more sustainable and renewable forms of energy production, such as wind energy.

Research studies and guidance documents have demonstrated the negative impacts associated with wind energy facilities to bat populations.

How can these adverse impacts be avoided and mitigated in order to make wind energy more ecologically sustainable?



IMPACTS TO BATS

Approximately 500,000 bats are killed annually at wind turbine facilities in Canada and the US¹.

Migratory Species Most Affected²

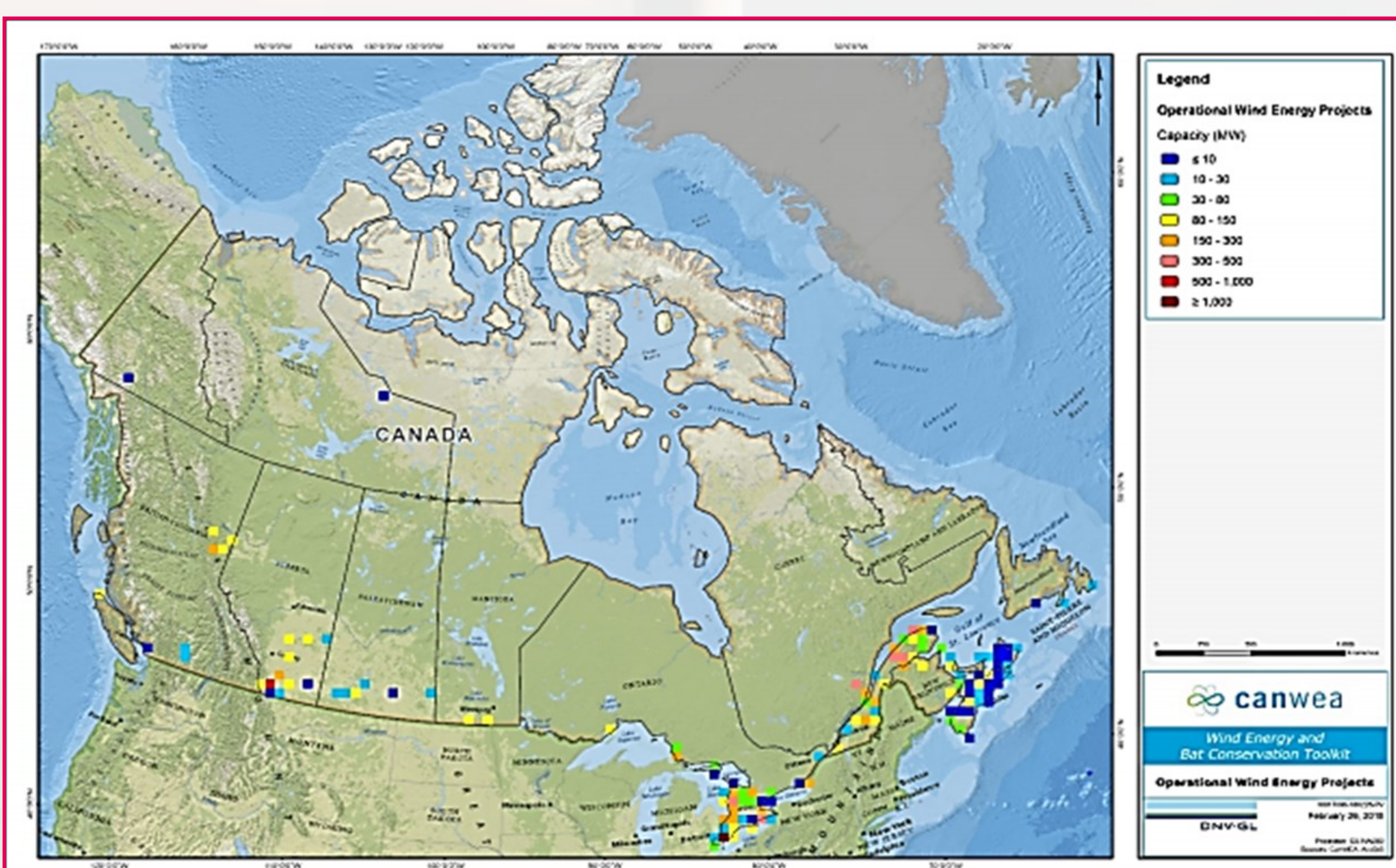
- A. Hoary Bat (*Lasiurus cinereus*)
- B. Silver-haired Bat (*Lasionycteris noctivagans*)
- C. Eastern Red Bat (*Lasiurus borealis*)

Direct impacts include injuries and fatalities from collisions and mortalities caused by barotrauma³.

Indirect impacts include effects on important habitat features and affects to bat behavior⁴.

GUIDANCE DOCUMENTS

In Canada, wind energy facilities exist in almost all provinces and territories.



As seen above, most wind energy facilities can be found in the southern portions of the provinces (CANWEA 2018, p. 10-247).

There is no official guidance sanctioned by the federal government specifically pertaining to wind energy and bats.

Eight of the ten provinces have wind energy guidance documents⁵.

Table 1 – Impact Avoidance, Minimization, and Mitigation in Wind Energy Guidance Documents in Canada

| Jurisdiction | Federal | British Columbia | Alberta | Saskatchewan | Manitoba | Ontario | Québec | New Brunswick | Nova Scotia |
|---|---------|------------------|---------|--------------|----------|---------|--------|---------------|-------------|
| Impact Avoidance Measures | | | | | | | | | |
| Avoidance of Significant Areas | X | X | X | X | X | X | X | X | X |
| Setbacks and Buffers | X | X | X | X | - | X | X | X | - |
| Relocation | X | - | X | - | - | - | - | - | - |
| Abandonment | X | - | - | - | - | - | X | - | - |
| Impact Minimization Measures | | | | | | | | | |
| Minimization of Lighting | X | - | X | X | - | - | - | - | - |
| Clearing of Favourable Features Near Turbines | X | X | - | - | - | X | - | - | - |
| Limiting Construction Activities | X | X | X | - | - | X | - | - | - |
| Reducing Turbine Heights | X | X | X | - | - | X | - | - | - |
| Mortality Thresholds | - | X | X | X | - | X | - | - | - |
| Impact Mitigation Measures | | | | | | | | | |
| Deterrents | - | X | - | - | - | - | - | X | - |
| Curtailment | X | X | X | X | - | X | X | X | - |
| Temporary Shutdowns | X | X | X | X | - | X | - | X | - |
| Compensation | X | - | - | X | - | - | - | - | - |

CONCLUSIONS

Great variability exists in the quality of wind energy guidance documents between Canadian jurisdictions.

Research on effectiveness of current avoidance, minimization, and mitigation measures must be continued.

Cumulative impacts of wind energy facilities must be considered in guidance documents.

Investing in more sustainable and renewable forms of energy production should not be at the expense of ecological sustainability.

References: 1. Frick, W.F., et al. (2017). Fatalities at wind turbines may threaten population viability of a migratory bat. *Biological Conservation*, 209(2017): 172-177. 2. Voigt, C.C., Straka, T.M., & Fritze, M. (2019). Producing wind energy at the cost of biodiversity: A stakeholder view on a green-green dilemma. *Journal of Renewable Sustainable Energy*, 11, 063303 (2019); doi: 10.1063/1.5118784. 3, 4. Parisé, J., & Walker, T.R. (2017). Industrial wind turbine post-construction bird and bat monitoring: A policy framework for Canada. *Journal of Environmental Management*, 201(2017): 252-259. 5. CANWEA. (2018). Wind energy and bat conservation – A review by the Canadian Wind Energy Association. [PDF]. Retrieved from: <https://canwea.ca/wp-content/uploads/2018/08/windenergyandbatconservationreview.pdf>.

Images: A. Merlin D. Tuttle, (n.d.). Hoary Bat. [Image]. Retrieved from: <https://www.eopugetsound.org/articles/hoary-bat-lasiurus-cinereus> B. Jason Butler. (October 24, 2012). *Lasionycteris noctivagans* Silver-Haired bat. [Image]. Retrieved from: https://www.flickr.com/photos/jason_butler/8158672719 C. Joel Sartore, (2019). A female Eastern red bat (*Lasiurus borealis*). [Image]. Retrieved from: <https://pbs.twimg.com/media/DyUWKoMX0AExEpX.jpg>