



Mitigating Songbird Collision Risk with Project Infrastructure due to Light Attraction

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October 17, 2018

AGENDA

- 1. Bird Migration & Night-Lighting
- 2. Mitigation Strategy
- 3. Monitoring Program
- 4. Monitoring Results



Shedding Light on the Problem

MIGRATION AND NIGHT-LIGHTING



Many songbirds migrate at night, using celestial cues for navigation.

Artificial lights can interfere with navigation, attracting birds to brightly-lit buildings and structures.

Light attraction is intensified during inclement weather such as rain, fog, or heavy overcast.



Magnitude of the Problem

NATIONAL MORTALITY ESTIMATES

Annual bird mortality estimates from building collisions:

- USA = 550 million (Erickson et al. 2005)
- Canada = 25 million (Machtans et al. 2014)

Large single-night mortality events of thousands of birds at single buildings or structures are not uncommon.

In Canada, bird mortalities are regulated under the Migratory Bird Convention Act.

References:

Machtans CS, Wedeles CHR, Bayne EM. 2013. A first estimate for Canada of the number of birds killed by colliding with building windows. Avian Conservation and Ecology. 8(2):6.

Erickson WP, Johnson GD, Young Jr., DP. 2005. A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions. In: Ralph, C. John; Rich, Terrell D., editors 2005. Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. 2002 March 20-24; Asilomar, California, Volume 2 Gen. Tech. Rep. PSW-GTR-191. Albany, CA: U.S. Dept. of Agriculture, Forest Service, Pacific Southwest Research Station: p. 1029-1042





Several songbird mortality events were documented at a potash project in south-central Saskatchewan in 2014 and 2015.



Reducing Collision Risk

MITIGATION TACTICS

Mitigation Objectives	Implemented Mitigation Tactics
Reduce Illuminance	Bi-annual light assessmentLight output monitoring
Reduce Light Trespass	Fully-cut off and shielded light fixturesOn-demand and portable lights
Lights Out Procedure	 Weather forecast monitoring for inclement weather Extinguish lights during high collision-risk conditions, where feasible



Quantifying Mortality



Monitoring during spring migration (May 1 to June 7) and fall migration (July 25 to October 7)

Six collision search transects around perimeter of buildings.

Searches conducted daily at sunrise.



Controlling Bias

SEARCHER EFFICIENCY TRIALS AND SCAVENGER REMOVAL TRIALS

Scavenger removal trials: estimate proportion of bird carcasses that are scavenged overnight before they can be detected during collision searches.

Scavenger removal rate = 15% (2018) to 37% (2017)





Controlling Bias

SEARCHER EFFICIENCY TRIALS AND SCAVENGER REMOVAL TRIALS

Searcher efficiency trials: estimate proportion of bird carcasses that go undetected during collision searches.

Weighted searcher efficiency value ranged from 76% (2017) to 93% (2018).





Quantifying Mortality

MONITORING RESULTS







Single-Night Mortality Event AUGUST 16, 2018



Species Involved

PRIMARILY NEOTROPICAL MIGRANTS IN THE WOOD-WARBLER AND VIREO FAMILIES

TENNESSEE WARBLER

BLACK-AND-WHITE WARBLER

MAGNOLIA WARBLER

RED-EYED VIREO

OVENBIRD

AMERICAN REDSTART



Bird Mortality Modeling: 2016 to 2017

EXPLANATORY VARIABLES



Bird Mortality Modeling: 2016 to 2017

EXPLANATORY VARIABLES





Bird Mortality Modeling: 2016 to 2017



Model that described bird mortality as a function of additive effects of average overnight wind direction and day of year had the best support.

It predicted an increase in bird mortality counts when average overnight wind ranged from northwest to northeast (315° and 45°, respectively), between mid-August and mid-September.

SUMMARY

- Night-time collisions with infrastructure due to light attraction is a significant risk to migrating songbirds.
- High collision risk exists from mid-August to mid-September, especially during nights with northerly winds.
- Mitigation to reduce collision risk includes reducing illuminance, reducing light trespass and implementing a lights out procedure, where feasible, particularly during periods and conditions with high collision risk.
- There remains need for more research by industry and partnering biologists to further understand and mitigate migratory songbird collision risk due to light attraction.





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Thank you.

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