

Photo: Patrick Burke

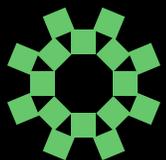
Passive Surveillance Reveals Human- Associated Causes of Bat Mortality in BC



Dr. Kaylee Byers
[@kaylee_byers](#)



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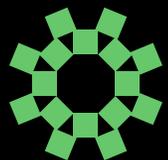


Photo: Cory Olson

Bat Benefits

Critical to healthy ecosystems

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Photo: Cory Olson

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Pollinate plants



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Cycle nutrients in the environment



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Insectivorous bats eat human and agricultural pests



Photo: Cory Olson

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Cycle nutrients in the environment



Insectivorous bats eat human and agricultural pests



\$3.7 billion in economic value in US annually

Threatened Habitats

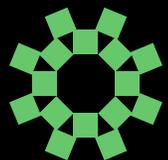
Loss of habitat due to:

- Conversion of land to agriculture
- Urbanization
- Forestry

Photo: Pixabay, OzScott



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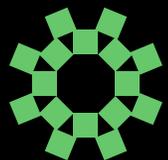
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Pesticide application reduces food available to insectivorous bats

Photo: Pixabay, OzScott



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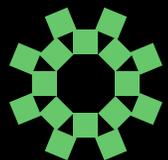
White-Nose Syndrome

- *Pseudogymnoascus destructans* introduced 2006 to North America



Photo: Pixabay, PublicDomainImages

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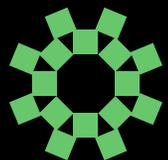
White-Nose Syndrome

- *Pseudogymnoascus destructans* introduced 2006 to North America
- 94% reductions in Eastern Canada:
 - little brown myotis (*Myotis lucifugus*)
 - northern myotis (*Myotis septentrionalis*)
- 6 Million bats in North America



Photo: Pixabay, PublicDomainImages

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- 6 Million bats in North America
- First detection in Saskatchewan, Canada in July 2022
- Also detected in Washington State



Photo: Pixabay, PublicDomainImages

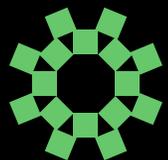


Bats in BC

Greatest species diversity in Canada with
15 of 19 species

Photo: John Saremba

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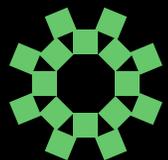
Bats in BC

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Half of BC's species are at risk

Photo: John Saremba

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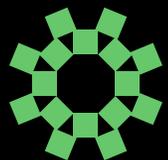
Greatest species diversity in Canada with 15 of 19 species

Half of BC's species are at risk

Two species (little brown myotis and northern myotis) are endangered

Photo: John Saremba

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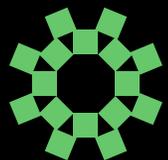
Half of BC's species are at risk

Two species (little brown myotis and northern myotis) are endangered

Very little understanding of health risks posed to bats in the province

Photo: John Saremba

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Passive Surveillance



Imara Beattie

Canadian Wildlife Health Cooperative (2015-2020)

275 bats assessed at Animal Health Centre

Full necropsy by veterinary pathologists

Evaluation of body condition

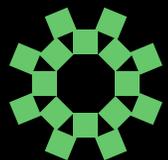
Testing for Pd

Rabies testing by immunohistochemistry of brain sections



Beattie *et al.* 2022. *CanJZool*

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Bats by the Numbers



Synanthropic Species

Species	#
Little brown myotis (<i>Myotis lucifugus</i>)	64
Big brown bat (<i>Eptesicus fuscus</i>)	41
Yuma myotis (<i>Myotis yumanensis</i>)	37
California myotis (<i>Myotis californicus</i>)	29
Long-eared myotis (<i>Myotis evotis</i>)	22
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	15
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	8





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Non-Synanthropic Species

Species	#
Northern myotis (<i>Myotis septentrionalis</i>)	14
Fringed myotis (<i>Myotis thysanodes</i>)	2
Hoary bat (<i>Aeorestes cinereus</i>)	2
Western small-footed myotis (<i>Myotis ciliolabrum</i>)	2





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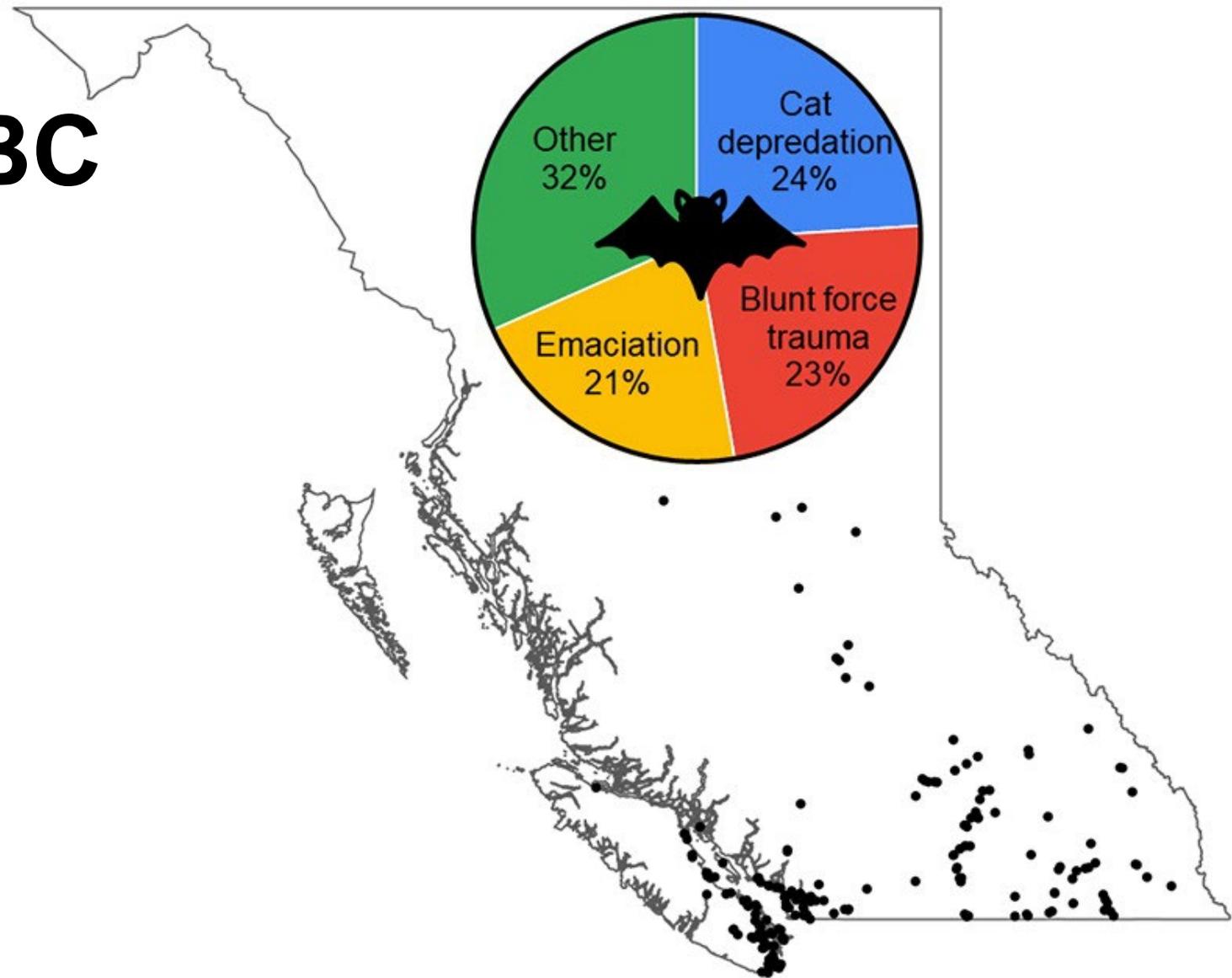
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12 species

>90% of bats from synanthropic species



Bat Mortality in BC



Bat Mortality in BC

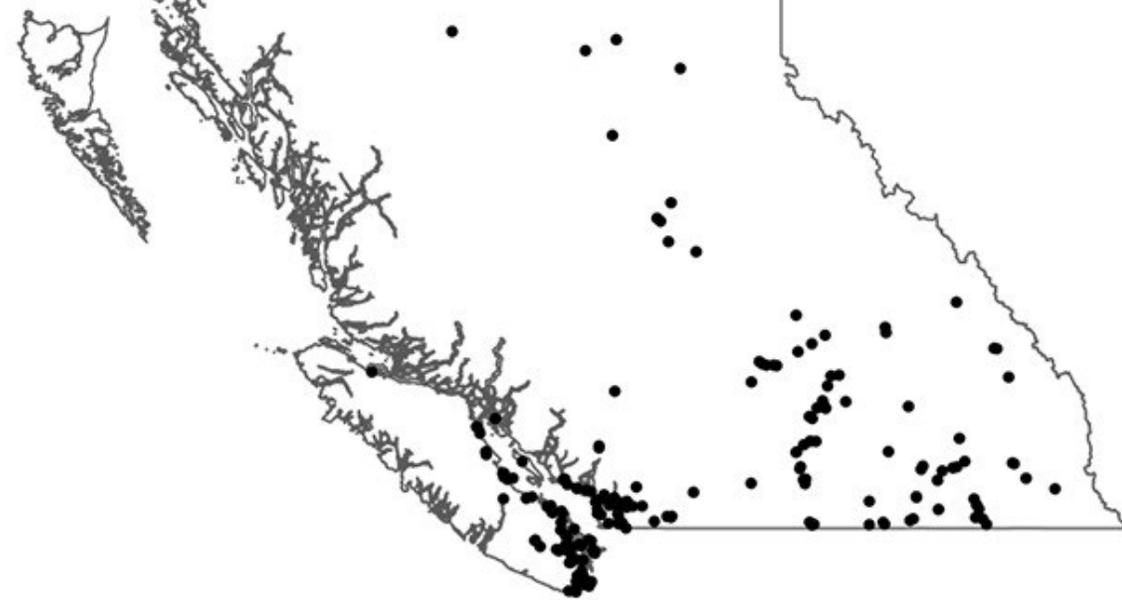
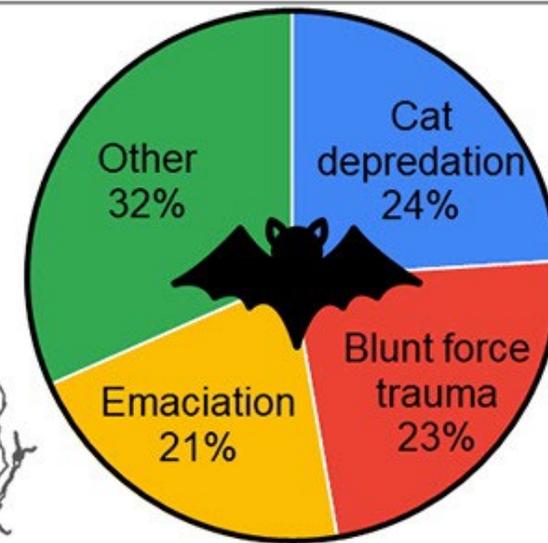
Seasons:

☁ Spring = 112

☀ Summer = 111

🍂 Fall = 30

❄ Winter = 20



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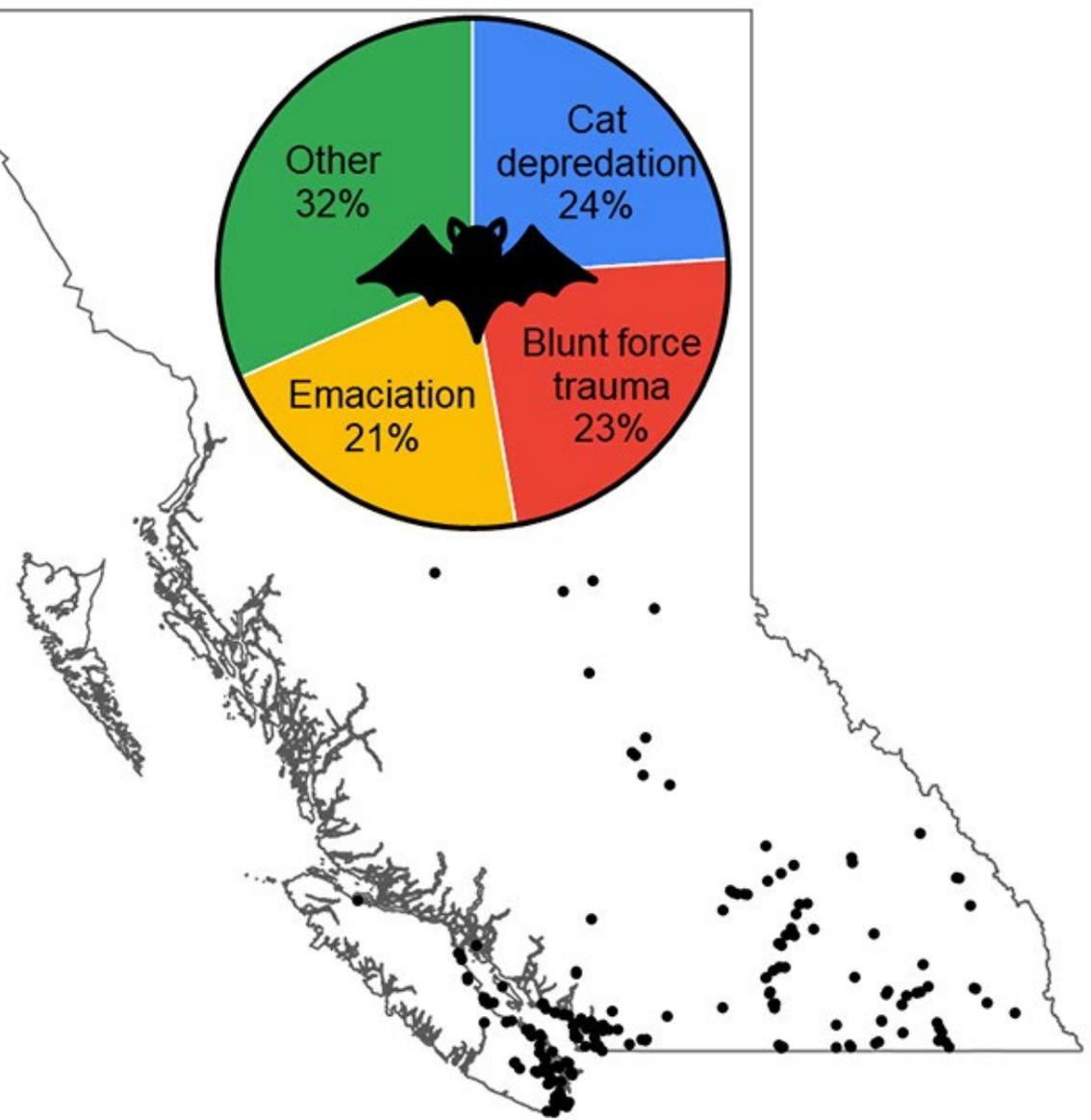
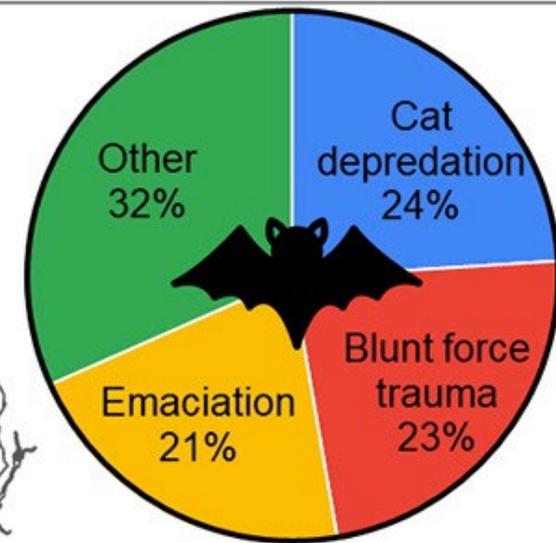
❄ Winter = 20

Submissions: Public = 233

Rescue Organizations = 22

Veterinary Clinics = 13

Regional Parks = 2





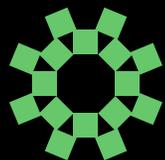
Killer Cats

24% of bats

More common among little brown myotis ($p = 0.04$)

Photo: Pixabay, Kapa65

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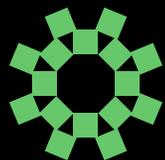
More common among female bats

Maternity roosts

Outsized impacts on reproduction

Photo: Pixabay, Kapa65

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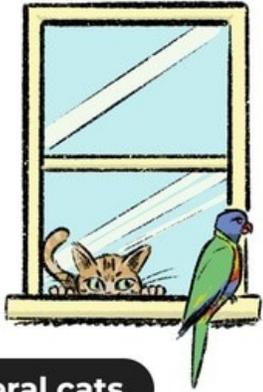
Cats and Australian wildlife by the numbers

Pet cats

There are 3.8 million pet cats in Australia, of which:

1.1 million (29%)

...are kept inside
24 hours a day.



2.7 million (71%)

...are allowed outside to roam and hunt.

- Roaming pet cats **kill 390 million animals** collectively per year in Australia
- An individual roaming pet cat **kills 186 reptiles, birds and mammals per year**, most of them (59%) native species
- A study found **39% of cats** brought in at night **snuck out** for nocturnal roaming and hunting
- Pet cats bring home only 15% of what they hunt.

Feral cats

- The average feral cat **kills 748 reptiles**, birds and mammals a year
- In the bush there is **one feral cat per 3 to 4km²**, versus **40 to 70 pet cats per km²** around towns
- **Pet cats kill 30-50 times more animals per km²** around towns than feral cats do in the bush.

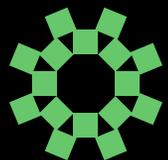


Photo: Wes Mountain, The Conversation



Photo: Pixabay, rihajj

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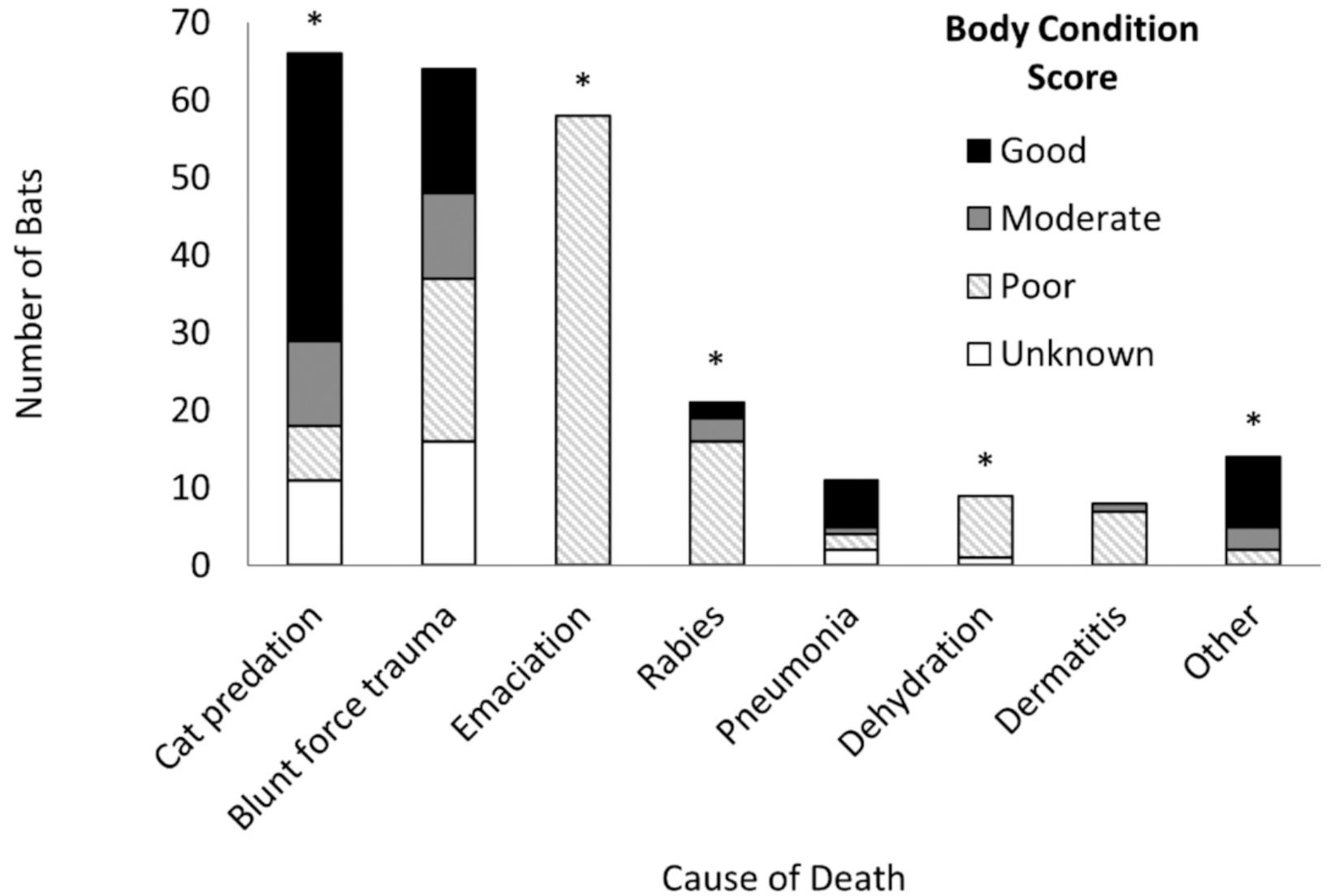
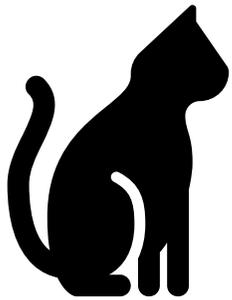
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Cat depredation associated with good body condition ($p < 0.01$)



Worlds Collide

23% died by blunt force trauma

Disproportionately males

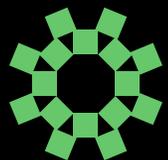
Sex differences in behaviours

Opportunities for ecologically-informed conservation efforts



Photo: Pixabay, 12138562

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Photo: Pixabay, 2023852/75

Emaciation

58 (21%) of bats



Photo: Pixabay, 2023852/75

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Emaciation not commonly reported in bats, except in context of Pd

19 (33%) had fungal growth, 11 with associated inflammation



Photo: Pixabay, 2023852/75

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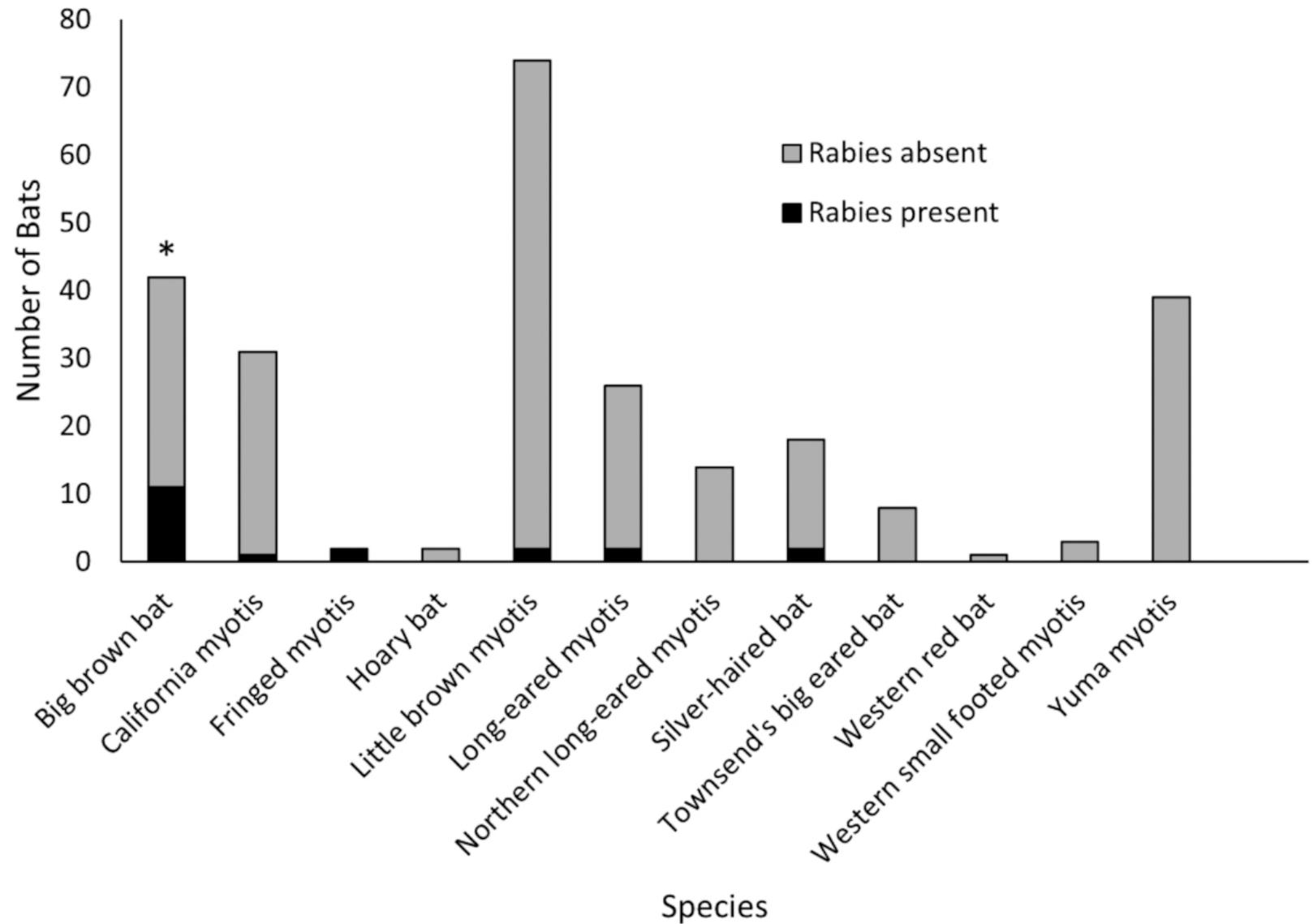
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Pesticide consumption?

Rabies

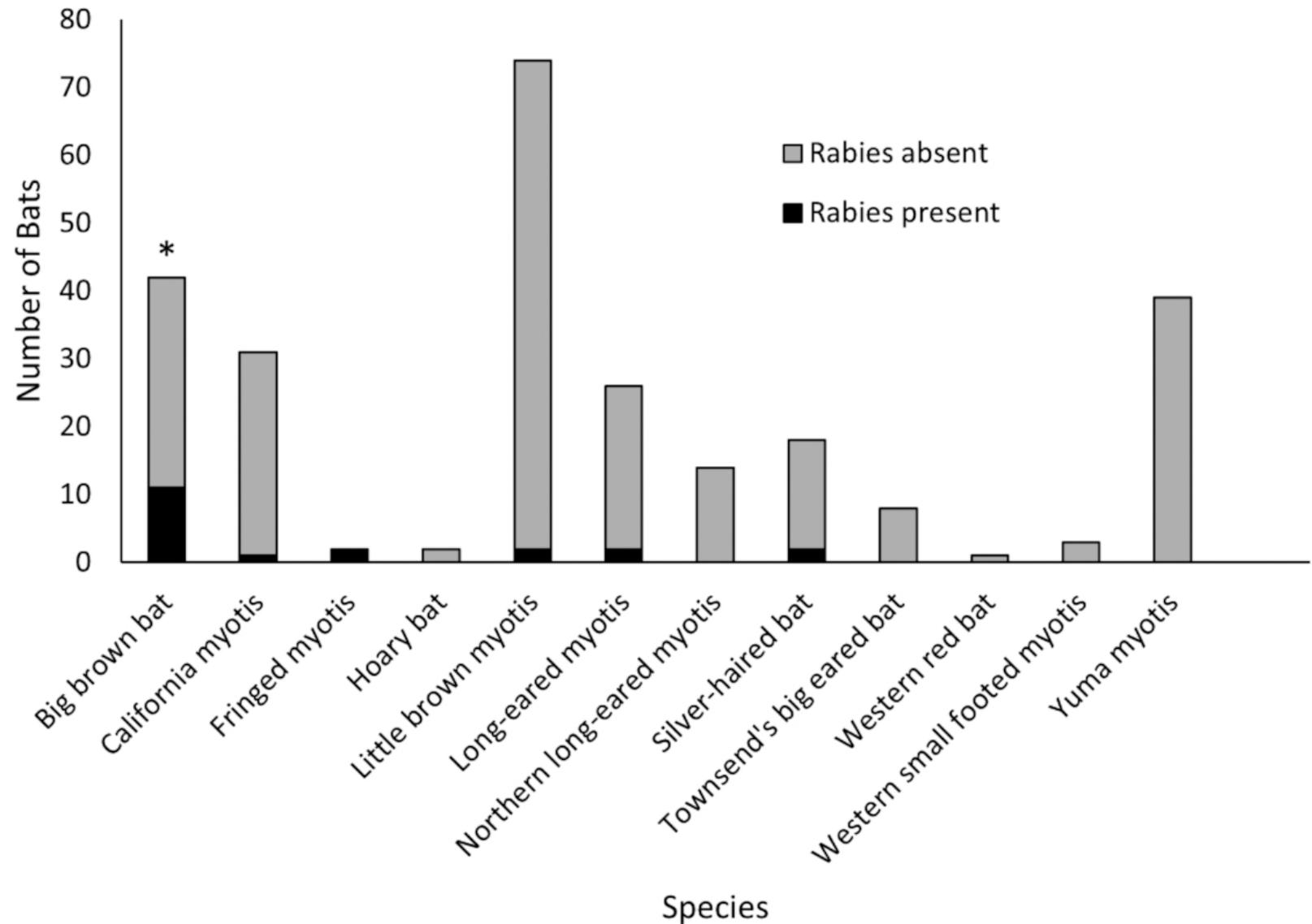
More common in big brown bats ($p = 0.01$)



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Prevalence varied widely



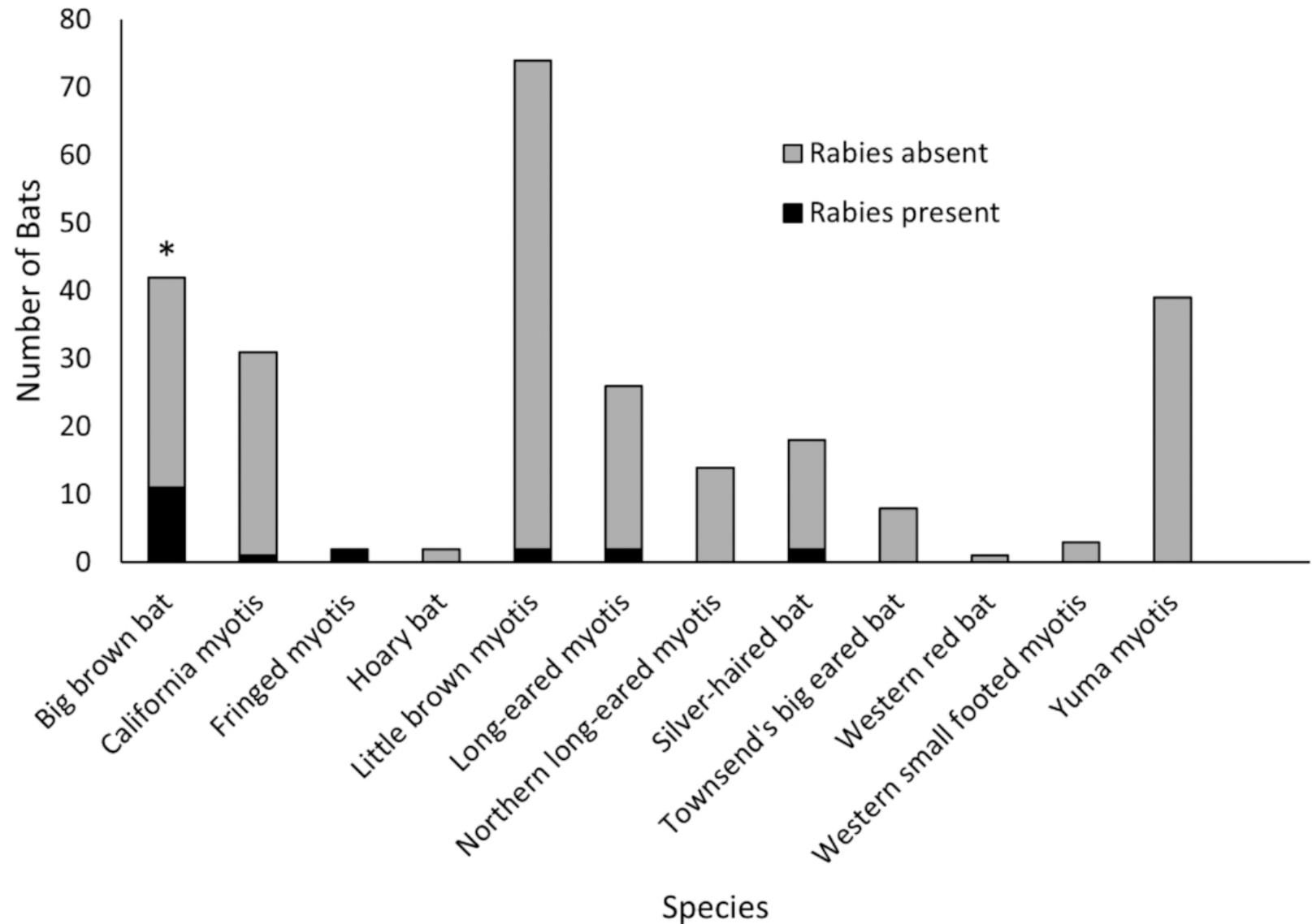
Rabies

More common in big brown bats ($p = 0.01$)

Prevalence varied widely

Unlikely to represent actual prevalence

- Passive
- Bat behaviours



Conservation, Community Science



Photo: Amy Mitchell



Importance of human behaviour change



Cat management



Actions to reduce collisions

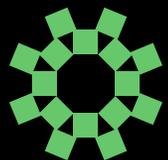


Precautionary measures for White-Nose Syndrome



Support for community engagement in reporting

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Thank
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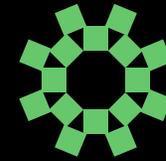
Canadian Wildlife Health Cooperative

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Dr. Glenna McGregor
Dr. Scott McBurney
Dr. Chelsea Himsworth

Community Collaborators

Mandy Kellner
Orville Dyer
BC Community Bat Program

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