



# The Canadian Wildlife Health Cooperative Annual National Bat Health Report – 2022

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## Preamble

This report summarizes Bat Health information collected through post mortem necropsy by the Canadian Wildlife Health Cooperative across Canada, from samples collected and provided by provincial, territorial, federal, and other partners. Approximately 17 bat species have been identified in Canada (Adams 2003; Lausen et al. 2019; Naughton 2012). Three of these species, little brown myotis (*Myotis lucifugus*), northern myotis (*M. septentrionalis*), and tri-colored bat (*Perimyotis subflavus*), are federally listed as endangered under the [Species At Risk Act](#) (SARA) due to impact of the disease white-nose syndrome caused by the fungus *Pseudogymnoascus destructans* (*Pd*) (Environment and Climate Change Canada 2018). Pallid bat (*Antrozous pallidus*) and spotted bat (*Euderma maculatum*) are federally listed as threatened and special concern, respectively (Environment and Climate Change Canada 2017). The three migratory species, hoary bat (*Lasiurus cinereus*), eastern red bat (*L. borealis*), and silver-haired bat (*Lasionycteris noctivagans*), are currently under review for status assessment (COSEWIC 2021). Additional species are [listed under various provincial and territorial](#) endangered species acts.

Targeted surveillance for WNS is conducted in a harmonized manner at all CWHC centres following the [Canadian bat WNS necropsy protocol](#), including an internationally agreed upon [case definition for reporting incidents of bat white-nose syndrome \(WNS\) at the individual specimen level](#).

The CWHC WHIP database was searched for any chiroptera (the taxonomical order of the bats) with earliest date (*i.e.*, date found, date received, date of death, or necropsy date) from April 1 2021 to March 31 2022. British Columbia and Yukon data were provided by the BC Conservation Science Section and Yukon Fish and Wildlife Branch respectively.

Incidents were reviewed and categorized by cause of death. Fields reviewed included: etiology, history, interpretation, diagnosis text, rabies test status, and bat white nose syndrome test status. Data came from across Canada with the exception of Nunavut (figure 1 and table 1). Regardless of etiology recorded in the database, all specimens in an incident that tested positive for rabies or WNS were designated as such for the cause of death (for example: a bat killed by a cat or human, testing positive for rabies, was reclassified with a final diagnosis of rabies as the cause of death even if the incident previously had trauma as the etiology of the incident).



Figure 1: Map of Canada illustrating known locations of bat mortality incidents with specimen submissions to CWHC centres.

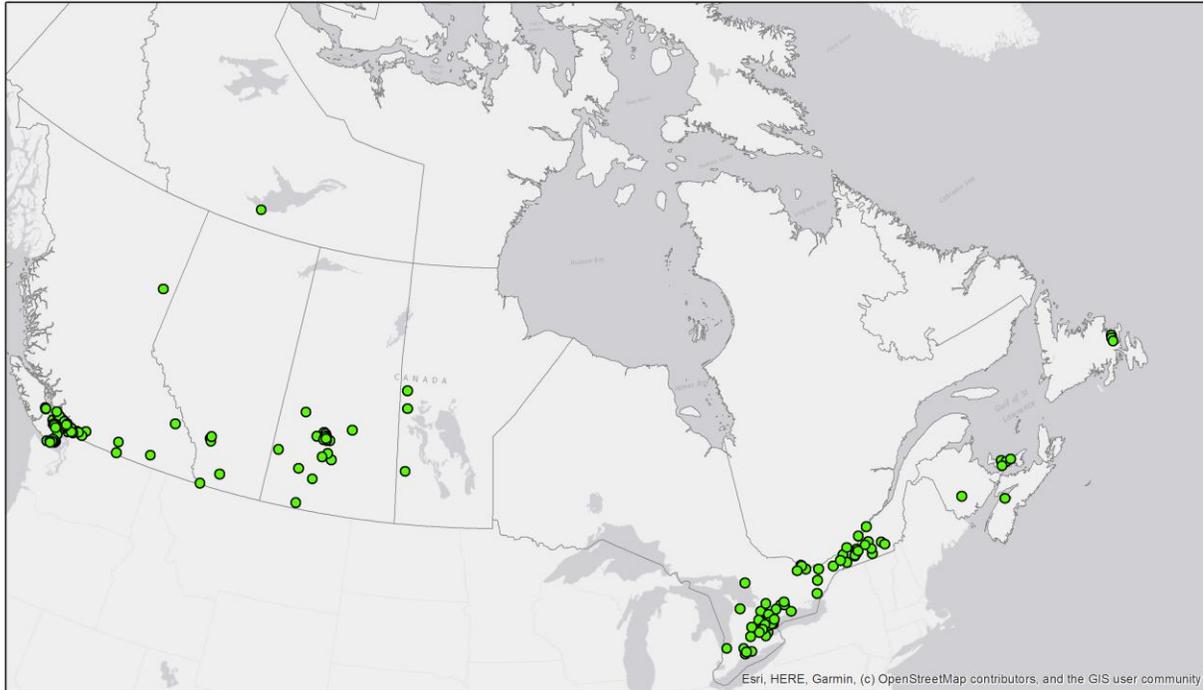


Table 1: Number of incidents across Canada

Province or Territory	Number of incidents
Alberta	5
British Columbia	154
Manitoba	7
New Brunswick	1
Newfoundland and Labrador	8
Northwest Territories	1
Nova Scotia	1
Nunavut	0
Ontario	64
Prince Edward Island	5
Québec	25
Saskatchewan	73
Yukon	5
Total	349



## Results

Included in this report are 349 incidents involving Chiroptera of which 194 incidents had a final diagnosis which also included a category of “no diagnosis” where the cause of death could not be determined. The species were grouped as presented in Table 2. Specimens identified as ‘Chiroptera’ can be any bat species, and this designation might have been used for specimens with significant post mortem decomposition that precluded accurate species identification.

Table 2: Number of bat species and groupings

Species grouping (N = 349)	Species (N = 349)
Chiroptera (24)	Unidentified bat species (24)
Big brown bat (154)	Big brown bat (154)
Endangered <i>Myotis</i> (48)	Little brown myotis (48)
Migratory bats (47)	Eastern red bat (1) Hoary bat (6) Silver-haired bat (40)
Other hibernators (76)	California myotis (11) Eastern small-footed myotis (1) Spotted bat (1) Western long-eared myotis (2) Yuma myotis (61)

Big brown bat (*Eptesicus fuscus*) was the most commonly identified species, with 154 specimens. Notably absent are the endangered northern myotis and tri-colored bat.

Causes of death per species group are presented in Table 3. Further data summaries regarding causes of death consider only the 194 incidents with a final diagnosis.

Trauma was by far the most commonly diagnosed cause of death, with all trauma categories combined representing 33.5% of all incidents of mortality (65/194) (Table 3). The majority of traumatic incidents, when the specific cause could be identified, were categorized as predation by cats (23/194). These were all represented by little brown myotis and big brown bats, with little brown myotis proportionately most commonly affected (13/34 or 38.2%), compared to big brown bats (10/130 or 7.7%). These bat species are most commonly found in human residences across Canada, which likely contributed to them being the most common species submitted for post mortem examination (big brown bats 130/194 or 67.0%; little brown myotis 34/194 or 17.5%) (Tables 3 and 4).

Significant infectious diseases of bats are bat rabies and white-nose syndrome. Rabies was diagnosed in 10/194 bats (5.5%). Rabies was detected in big brown bats (9/130 or 6.9%) and a silver-haired bat (1/16 or 6.3%). White-nose syndrome was diagnosed in 4/194 bats (2.1%), all little brown myotis (4/34 or 8.8%).



Other notable results include: 26 big brown bats and 1 silver-haired bat were diagnosed with various infections and inflammations other than WNS and rabies; 2 big brown bats, 1 endangered little brown myotis, and 1 unidentified Chiroptera were killed in homes by people deliberately crushing or causing blunt force trauma unto them; the cause of 2 silver-haired bat's death was wind farm trauma; 6 silver-haired bats' cause of death was suspected overheating after an extreme heat wave event; and the cause of death was undetermined in 34.0% of incidents (66/194), including species from all species groupings. No bats were diagnosed to have died from bycatch in glue traps, a relatively common cause of death in the five years prior to this report.



Table 3: Identified causes of death per species grouping

Cause of death	Big Brown Bat	Migratory bats	Other hibernators	Endangered myotis	Chiroptera	Grand Total
Emaciation	9		1	3		13
Euthanized rabies testing	1					1
Inflammation	26	1				27
No diagnosis	46	7	4	7	2	66
Other	2					2
Rabies	9	1				10
Trauma*	37	7		20	1	65
WNS				4		4
Overheating		6				6
Grand Total	130	22	5	34	3	194

\*See breakdown of Trauma types in table 4

Table 4: Identified causes of trauma per species grouping

Trauma	Big Brown Bat	Migratory bats	Other hibernators	Endangered myotis	Chiroptera	Grand Total
Trauma undetermined	17	5		6		28
Intentional trapping	2			1	1	4
Predation undetermined	8					8
Predation cat	10			13		23
Wind farm		2				2
Grand Total	37	7		20	1	65



## Conclusion

The primary health threats to bats identified through this examination of data were: trauma (primarily predation by cats) and inflammation / infectious causes. White-nose syndrome and rabies were relatively uncommon but remain important to be vigilant for. The continuation of the CWHC's WNS targeted surveillance program is important as this disease continues to move west and north in Canada. Opportunistic and targeted surveillance for rabies in bats will always be important to protect the health of humans and domestic animals as well as to better understand the epidemiology of this disease as it relates to the health of Canadian bat populations.

The CWHC has coordinated Canada's national WNS response program since 2012, focusing heavily on this threat to bats. While the regions where WNS is endemic are concentrated on response efforts and recovery of affected bat species, regions on the leading edge of WNS continue monitoring for the emergence of *Pd* and WNS and assessing bat populations pre-emergence of WNS. Although the impact of WNS can be mitigated to a certain extent, once it emerges, its negative impact on bat health cannot currently be avoided. Therefore, understanding other pressures on bat populations is more important now than ever so these threats do not compound the effects of WNS, and so appropriate strategies can be developed to mitigate and prevent them for the overall protection of bat health in Canada. The CWHC will continue to work towards this goal with our federal, provincial, and territorial partners as well as other interested partners to ensure our bat health program provides evidence-based knowledge on which to base timely response and management initiatives to protect and recover bat populations across our country.

## Acknowledgements

We wish to thank our colleagues at all CWHC centres for contributing bat health data to the CWHC WHIP database and the BC Conservation Science Section and Yukon Fish and Wildlife Branch for providing region specific data. We also wish to thank all our partners in the federal, provincial, and territorial government and non-governmental partners who continue to report and submit bat carcasses to our centres for bat health surveillance.

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