

Batty about Bats:

Why Bat Health is Important for BC Agriculture

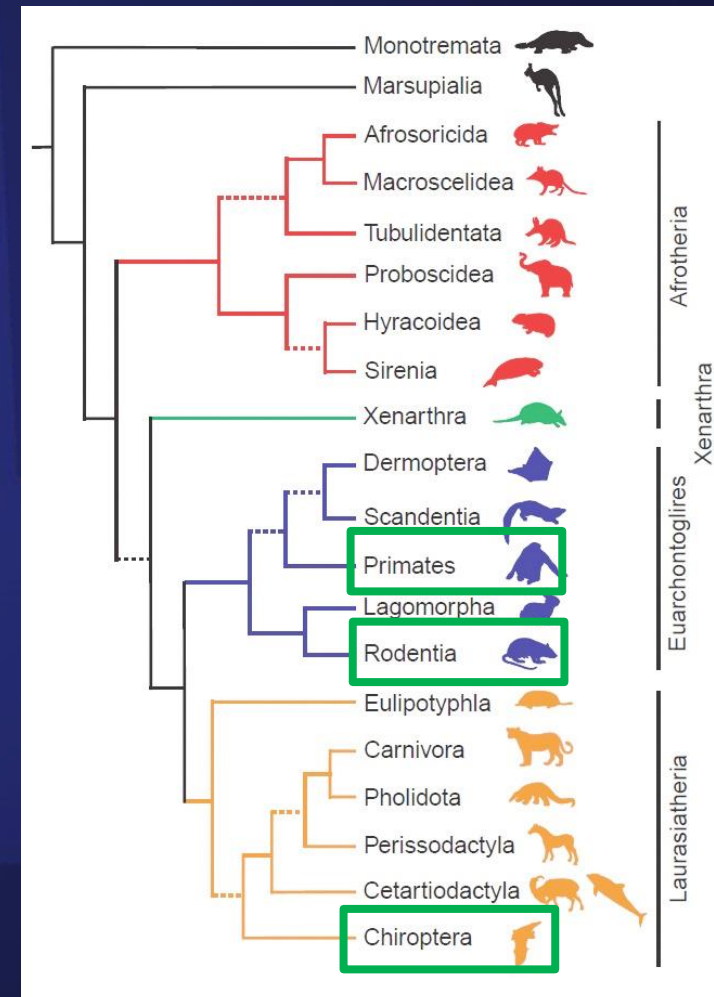


Glenna McGregor
Veterinary Pathologist
Animal Health Centre, BC Ministry of Agriculture



True or False

- Bats are related to mice and rats
 - **FALSE**. Bats are in the order Chiroptera (hand-wing), not Rodentia. In fact, mice and rats are more closely related to humans than to bats.





True or False

- All bats suck blood
 - **FALSE**. There are 1200 known species of bats, only 3 feed on blood.





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True or False

- More than half of the bat species in North America are listed as threatened or endangered
 - TRUE





True or False

- Bats are essential for rainforests
 - **TRUE** Many rainforest plants depend on seed dispersal by fruit bats. In deforested areas over 95% of rainforest regrowth comes from seeds that have been spread by fruit bats.





More Fun Facts About Bats

- Long-lived
 - If you control for body size only 19 species live longer than humans, 18 of those are bats.
 - Current a focus of longevity research
- Resistant to cancer
 - Very efficient at DNA repair, likely evolved to deal with free radical production during flight
- Can survive infections that kill all other mammals (eg. Rabies).



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Bats in BC

- Most bat-diverse province in Canada
 - 16/19 Canadian bat species
 - 7 found nowhere else in Canada
- All insectivorous
- Long lifespans and slow reproductive rates



<http://www.warrenpa.net/>



Bats and Agriculture

- Agricultural and forest pests
 - 70-100% of body weight/night
 - Value of bats to the agricultural industry in the U.S. = \$22.9 billion/year (Range \$3.7 billion/year to \$53 billion/year) (Boyles et al. 2011).

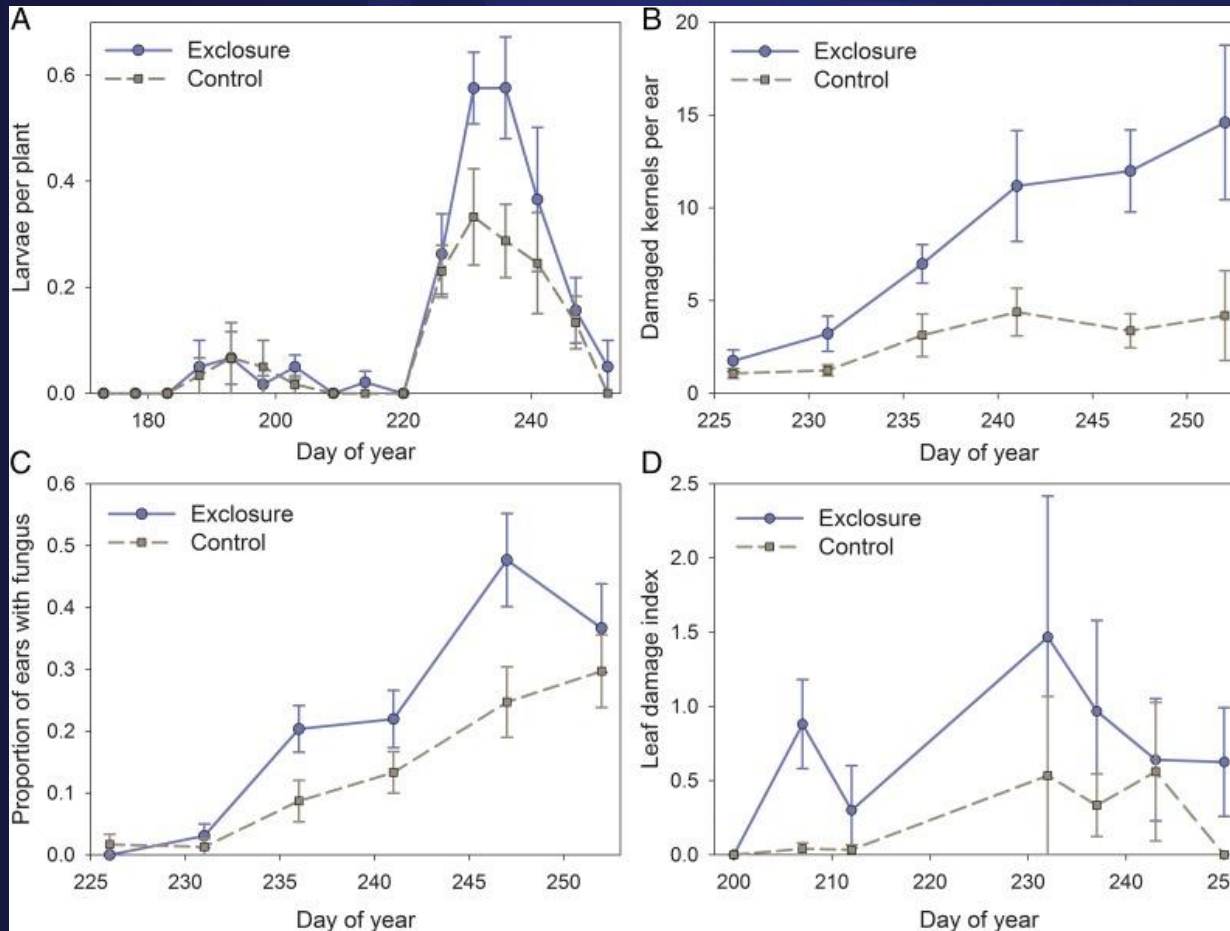


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Bats and Corn



- Globally estimate that bats are worth \$1 billion USD in corn alone



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Corn Rootworm





Chirosurveillance?



Bats detected brown marmorated stink bugs 3–4 weeks earlier than the current standard monitoring tool, blacklight traps, across all sites.





Purpose of Disease Surveillance

- Bat health
 - White Nose Syndrome
 - Other causes of death
- Human Health
 - Rabies
 - Other zoonoses?





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What is BC doing to protect bats?

- Prevent introduction of WNS
- Detect WNS as soon as possible
- Improve resiliency of bat populations

BC Bat Action Team

2016 - 2020 Action Plan

In Response to the Threat of White-nose Syndrome



<http://www.bcbat.ca>



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Prevent introduction of WNS



Bats Astray



Please don't take
any bats with you!

PLEASE CHECK YOUR CAMPER,
TENTS, AWNINGS AND UMBRELLAS
BEFORE YOU LEAVE

Bats Live Here!

Help prevent the spread of
White Nose Syndrome BC's bats



October 1 to May 31
Do not enter caves.



June 1 to September 30
Clean shoes, clothing and gear before
entering caves. To clean gear, immerse
in 55° water for 20 minutes.



Cluster of hibernating bats

White Nose Syndrome is a fungal disease that has killed millions of bats.



BCParks

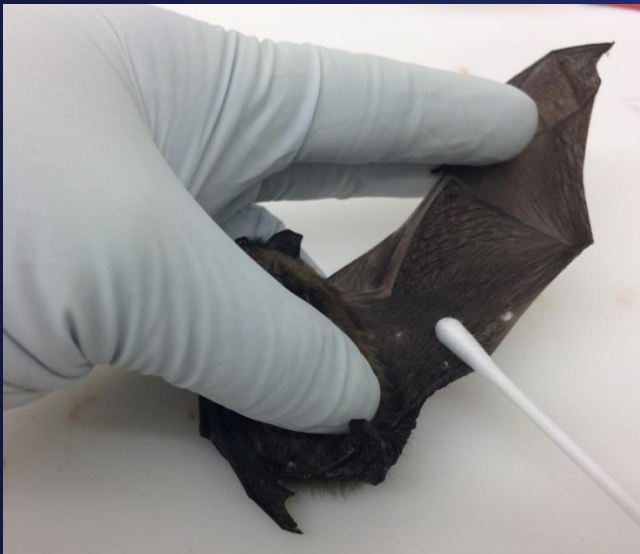
Caves are unique ecosystems-
Please help us protect them!





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Detect WNS as soon as possible





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Improve resiliency of bat populations



The Happy Cat

Tips for Responsible Pet Ownership



STEWARDSHIP CENTRE
FOR BRITISH COLUMBIA

The Stewardship Centre for BC urges you to keep your feline family members indoors and adopt these tips. It's better for cats and better for birds, bats and, other wildlife.

For further information go to:
www.stewardshipcentrebc.ca
1-866-456-7222

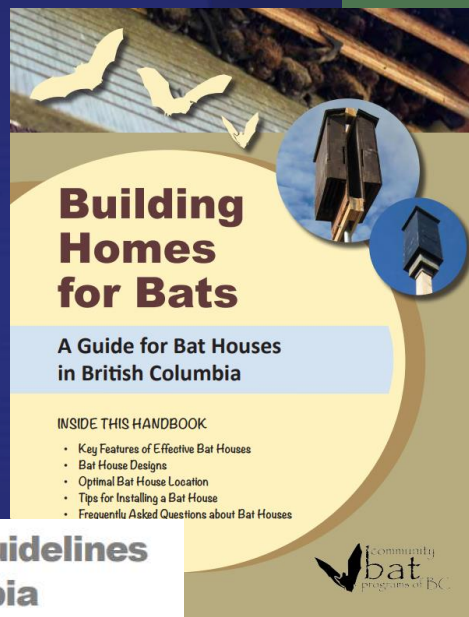
Canada

Best Management Practices Guidelines for Bats in British Columbia

CHAPTER 1: INTRODUCTION TO BATS OF BRITISH COLUMBIA



February 2016

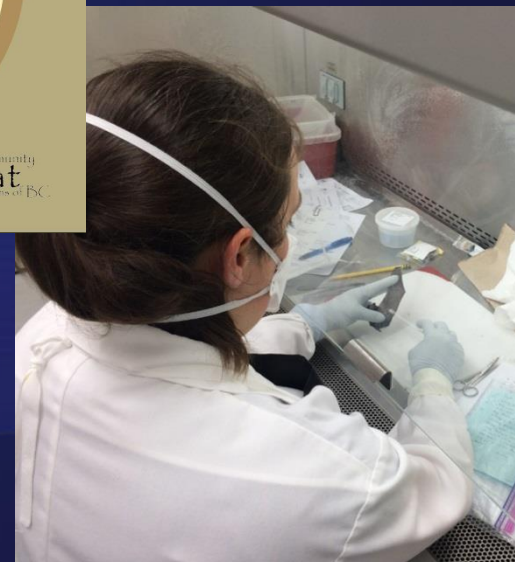


Building Homes for Bats

A Guide for Bat Houses
in British Columbia

INSIDE THIS HANDBOOK

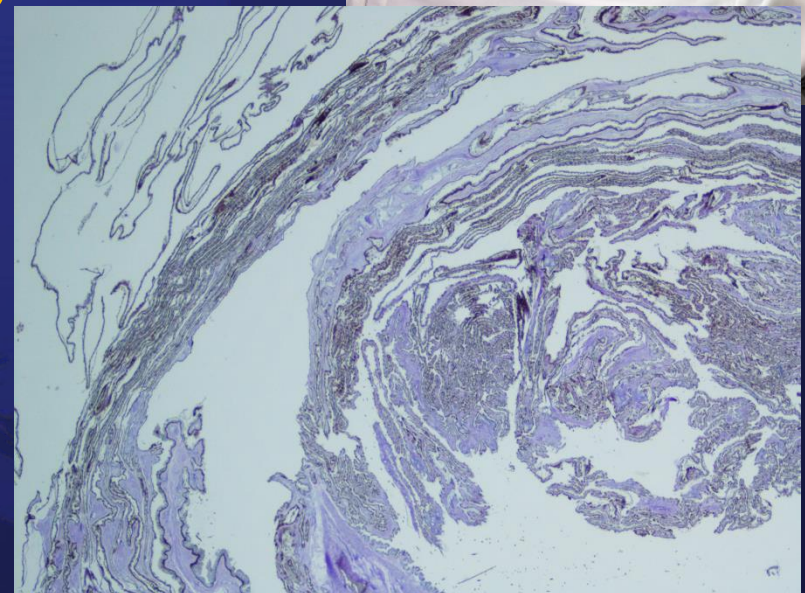
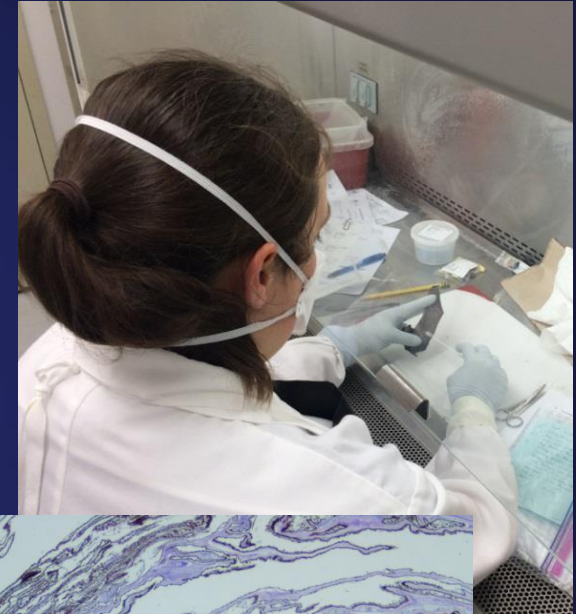
- Key Features of Effective Bat Houses
- Bat House Designs
- Optimal Bat House Location
- Tips for Installing a Bat House
- Frequently Asked Questions about Bat Houses





Disease Surveillance

- Full necropsy
 - Histology of lung, liver, spleen, kidney, stomach, intestine, plagiopatagium, ears, uropatagium, brain
 - Rabies testing
 - *Pseudogymnoascus destructans* PCR on wing swabs Nov. 1 to May 31.





White Nose Syndrome testing

- 2016 – 36/36 negative
- 2017 – 30/30 negative
- 2018 – 38/38 negative
- Problem:
 - Sample sizes are small, and areas of the province not sampled at all



Courtesy: Patrick Burke



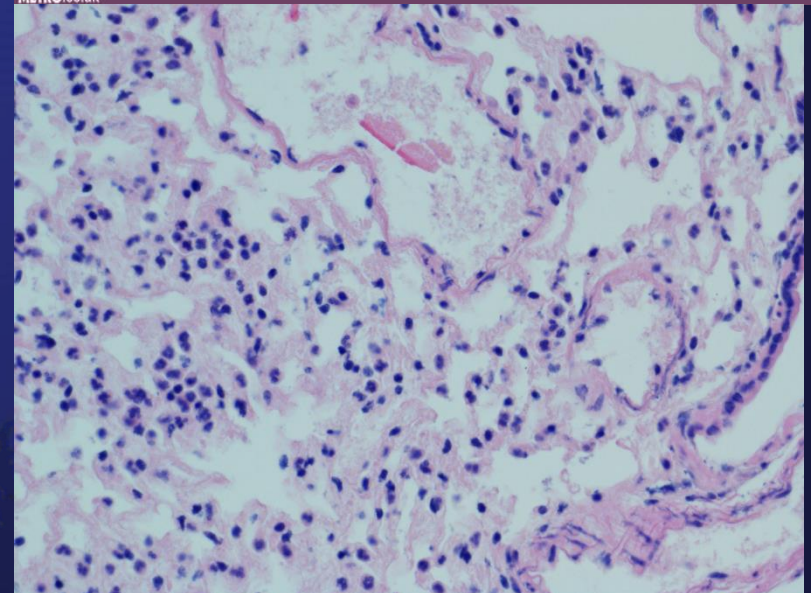
Causes of death

173 bat cases in 2016 and 2017

- Emaciation – 25% cases
- Trauma – 32%
 - 12% bats domestic cat predation
- Infectious disease – 17%
 - 9% rabies
 - 5% pneumonia
 - 2% dermatitis
- Unknown – 20%



METRO.co.uk





Bats and Human Health

- More than 200 viruses of 28 families have been isolated or detected in bats
 - Rabies, Ebola, Nipah, Hendra, SARS-CoV, MERS-CoV
- Bats infected with more zoonotic viruses per host species than rodents
- Pest control



What is it about bats?

- Second largest order of mammals:
~1200 recognized bat species (= 21 % of mammals)
- Long lifespan
 - 10-20 years (41 years = longest recorded)
- Evolutionarily ancient mammals
 - Originated 80 million years ago
- High intra- and interspecific contact rates and large population sizes
- Frequent contact with people
- Immune differences





Rabies in Bats in BC

- 43 bats tested in 2015
 - 4 positive
 - 9% prevalence
- 81 bats tested in 2016
 - 14 positive
 - 17% prevalence
- 44 bats tested in 2017
 - 2 positive
 - 5% prevalence
- 29 bats tested in 2018 (up to end of September)
 - 3 positive
 - 10% prevalence



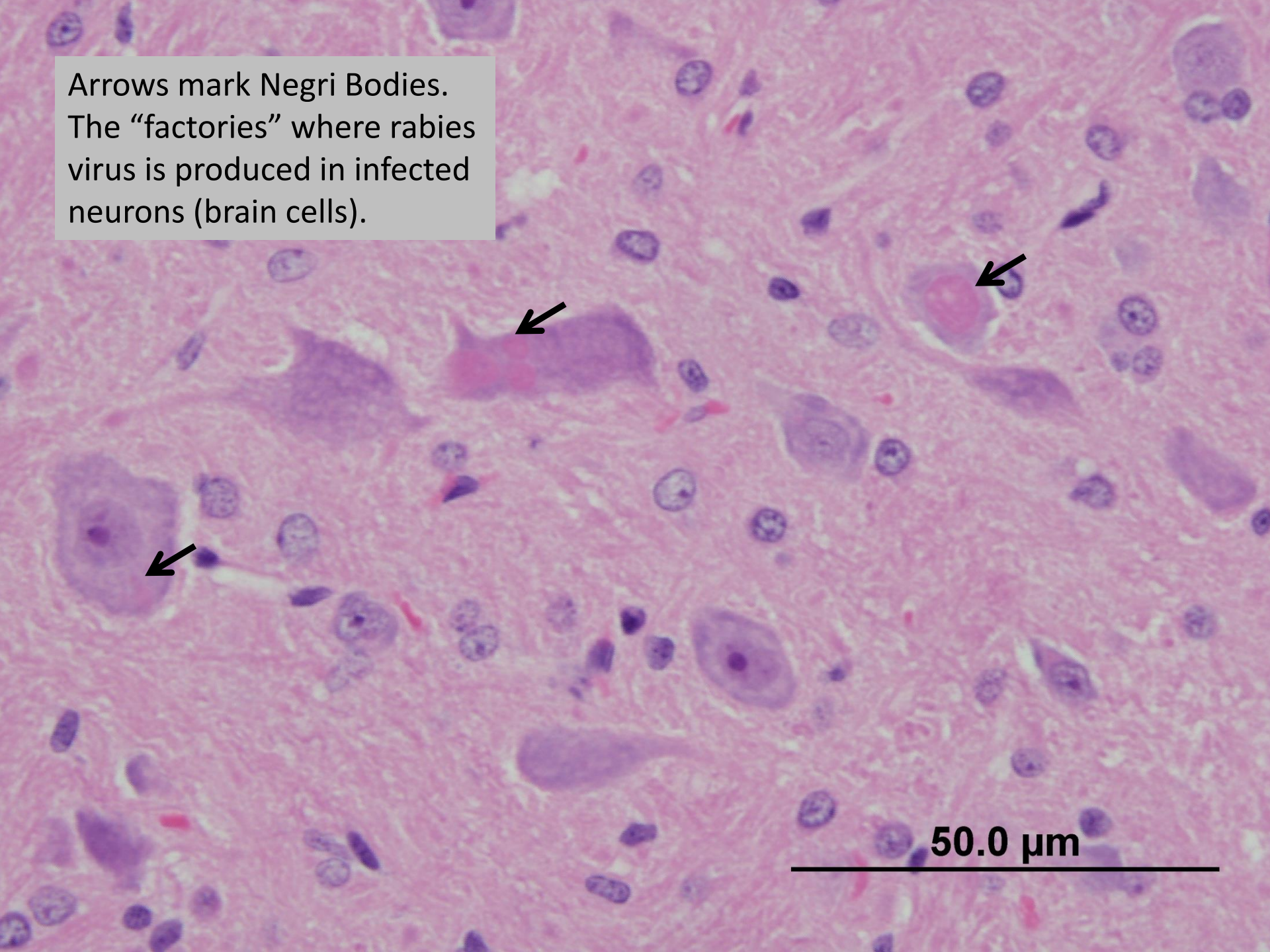


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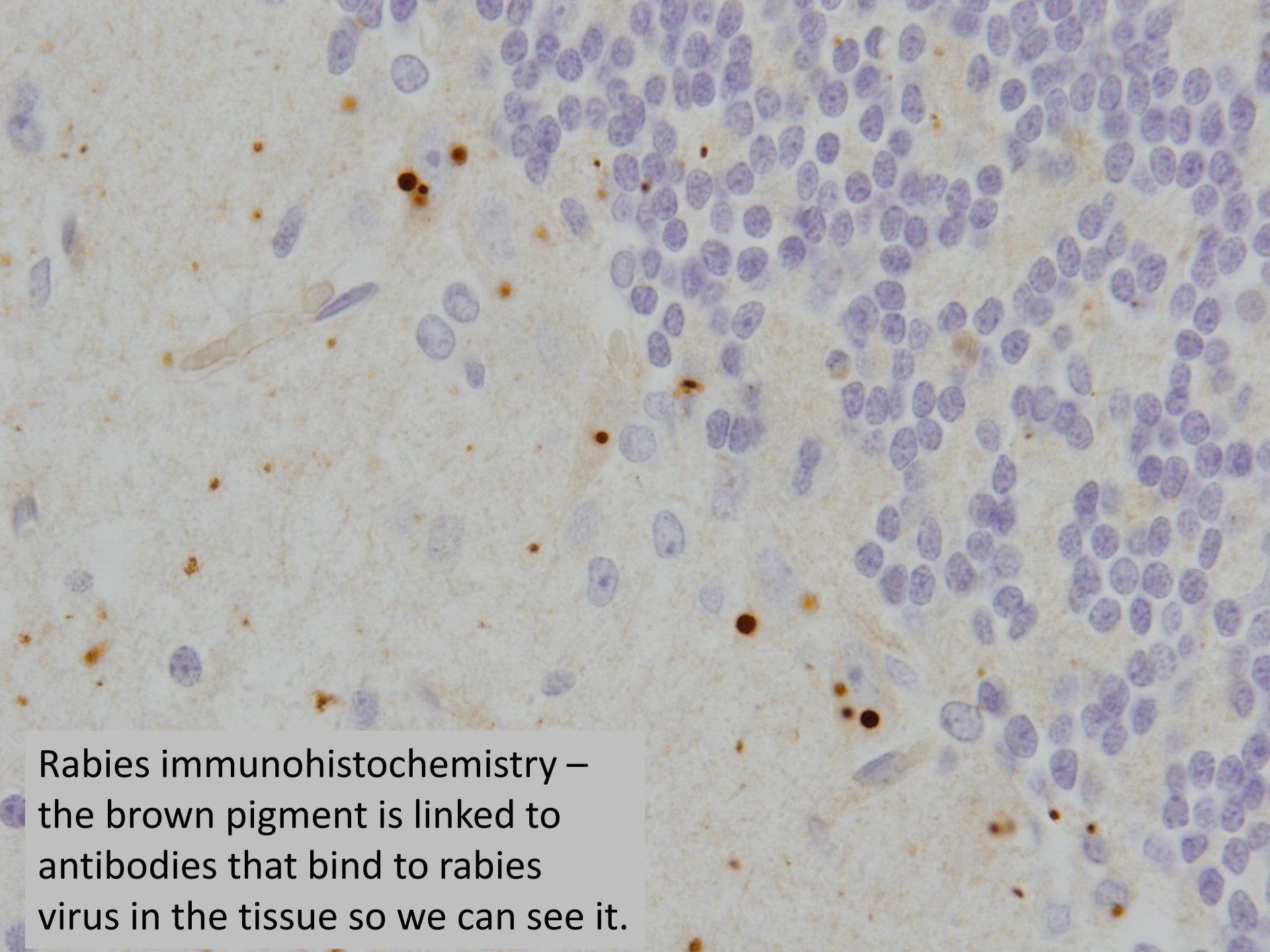


Species affected with rabies	Percentage positive	Number tested
Big Brown Bat	38%	13
Yuma Myotis	17%	12
Little Brown Bat	9%	11
California Myotis	0%	8
Silver-Haired Bat	33%	3
Western Long-eared/Keen's myotis	33%	3
Fringed Myotis*	100%	2
Northern Long-eared Bat	0%	2
Western Small-Footed	0%	1

Arrows mark Negri Bodies.
The “factories” where rabies
virus is produced in infected
neurons (brain cells).



50.0 μm



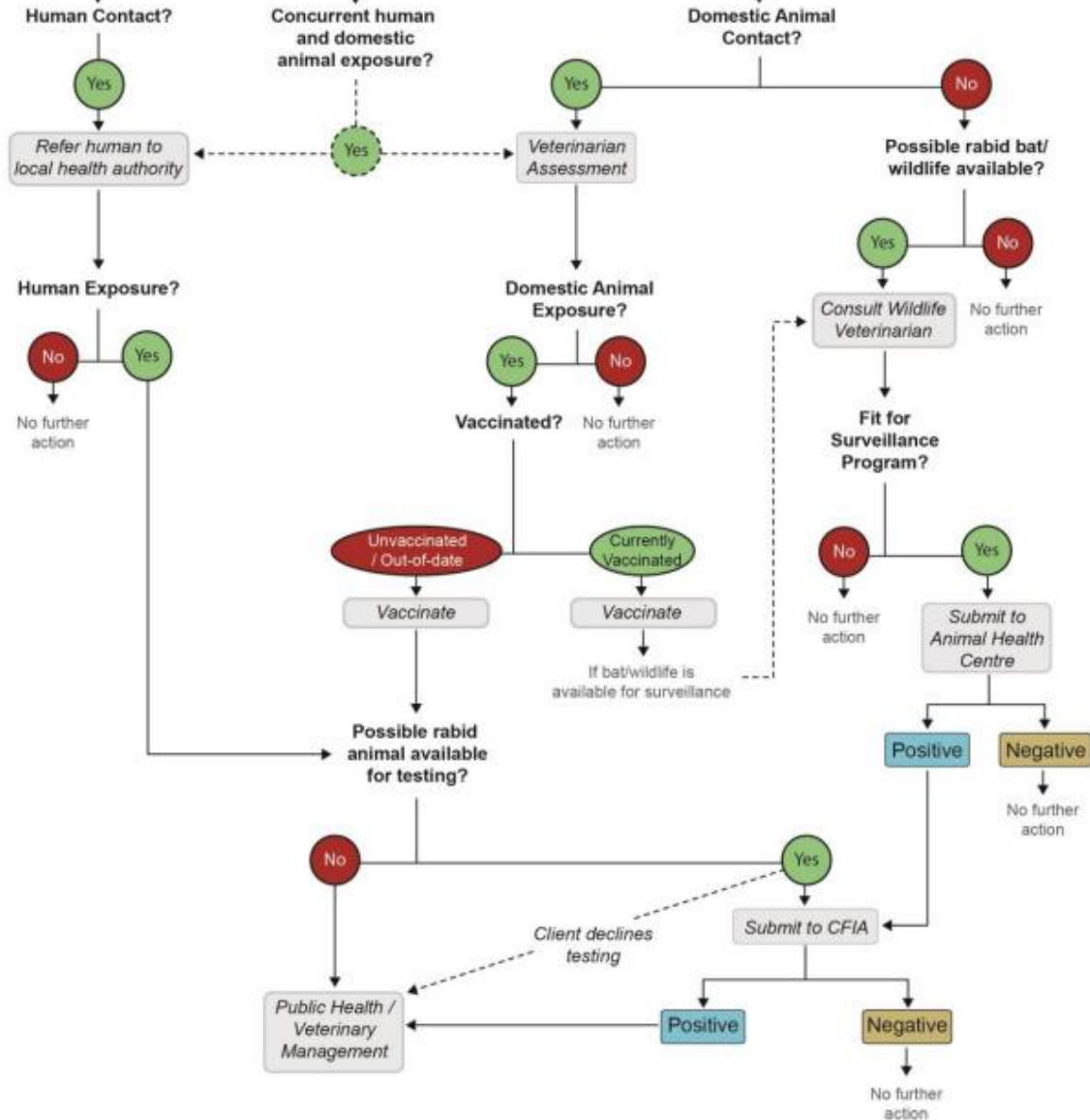
Rabies immunohistochemistry – the brown pigment is linked to antibodies that bind to rabies virus in the tissue so we can see it.



Possible rabid animal
(e.g. bat, other wildlife,
domestic animal)

Consult BCCDC Public
Health Veterinarian
for coordination

Phone: 778-677-7790





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Human rabies risk?



10-13 deaths per
year in the US



1-3 deaths per
year in the US

The last rabies case in BC was in 2003 (bat origin), that was the only case since the early 1980s.



How can you help bats?

- BC Community Bat Program
 - www.bcbats.ca
- Avoid the use of pesticides, particularly near wetlands and riparian areas.
- Protect known roosting sites from disturbance.
- Discourage free-roaming domestic cats, especially near potential bat habitat.
- Report dead bats between Nov. 1 and May 31 for White Nose Syndrome testing



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Questions?