



[www.merseytobeatic.ca](http://www.merseytobeatic.ca)

Mersey Tobeatic Research Institute  
9 Mount Merritt Road • PO Box 215, Kempt, Nova Scotia B0T 1B0  
Ph: 902-682-2371 • Fx: 902-682-2760 • [info@merseytobeatic.com](mailto:info@merseytobeatic.com)  
[www.merseytobeatic.ca](http://www.merseytobeatic.ca)

# Bat Conservation in Nova Scotia 2020

## Brad Toms. Wildlife Biologist

- A non-profit research institute that promotes collaborative research and community involvement in sustainable resource use in the Southwest Nova Biosphere Reserve.

Based in Kempt,  
Nova Scotia

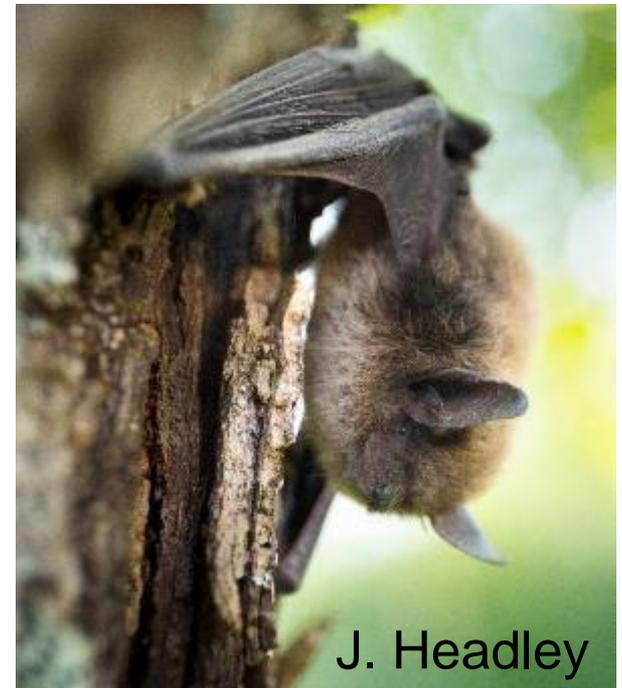


# Why We are here

- Bats populations in NS have crashed
- White Nose Syndrome (WNS) is causing massive declines in resident bat population.
- We need to learn a lot and act in a short amount of time.



N. Plant



J. Headley

# Some NS Bat Basics

- Bats are flying mammals
- Not rodents (humans are more closely related to rodents than bats are!)
- ‘Our’ bats are all “vesper bats”. That echolocate to catch their food and are mostly insect predators
- Can be both communal and solitary at different stages of their life



# Who's here?

6 Species of bats in Nova Scotia.

3 Resident  
(non-migratory)  
species\*

3 Migratory species

\*Resident species do  
migrate between areas but  
not seasonally en-masse like  
the migratory species



Bats roosting in roof peak (Hugo Mailhot)

# Little Brown Myotis (Little Brown Bat)



- *Myotis lucifugus*
- Mostly brown fur
- 5-14 grams
- Most northern species of bat in North America
- Diet is principally moths, beetles, gnats, mosquitos midges, and mayflies
- Resident species
- Feeds by hawking and gleaning
- Forages in open areas



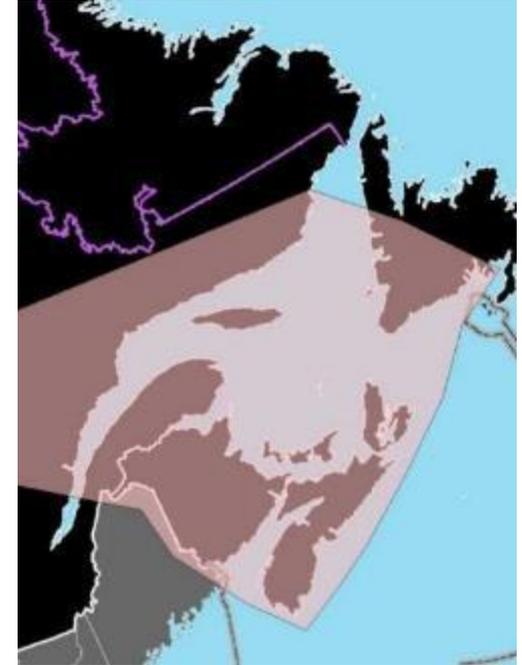
Atlantic Canada Range



# Northern Long Eared Myotis (Long Eared Bat)



- *Myotis septentrionalis*
- Mostly brown fur with some yellowish fur
- 5-10 grams
- Longer tragus in ear compared to other myotis.
- Doesn't live as far north as little brown bat.
- Feeds by hawking and gleaning
- Forages in forest cover
- Resident species



Atlantic Canada Range



# Tri-coloured Bat (Eastern Pipistrelle Bat)



- *Perimyotis subflavus*
- Reddish, Yellowish, Brownish, fur.
- Very Small (4g to 10g)
- Red/orange forearms
- At the extreme northern edge of its range (not common)
- Feeds mostly on small insects
- Resident species
- Roosts in Old Mans Beard lichen clumps
- Forages over water and along forest edges



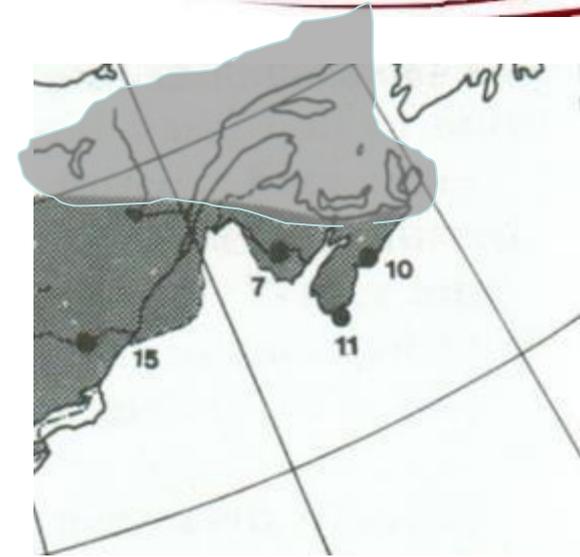
Atlantic Canada Range



# Hoary Bat (*Lasiurus cinereus*)



- Migratory Species
- Largest bat in Canada
- Averages 26g (double the size of Little brown myotis)
- Brown fur with frosted tips
- Diet is moths, beetles, flies, grasshoppers, dragonflies, wasps
- Roosts in trees (branches, hollows, bark crevices)



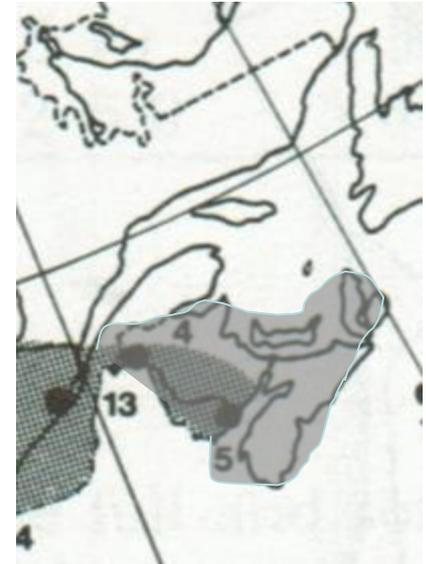
Atlantic Canada Range



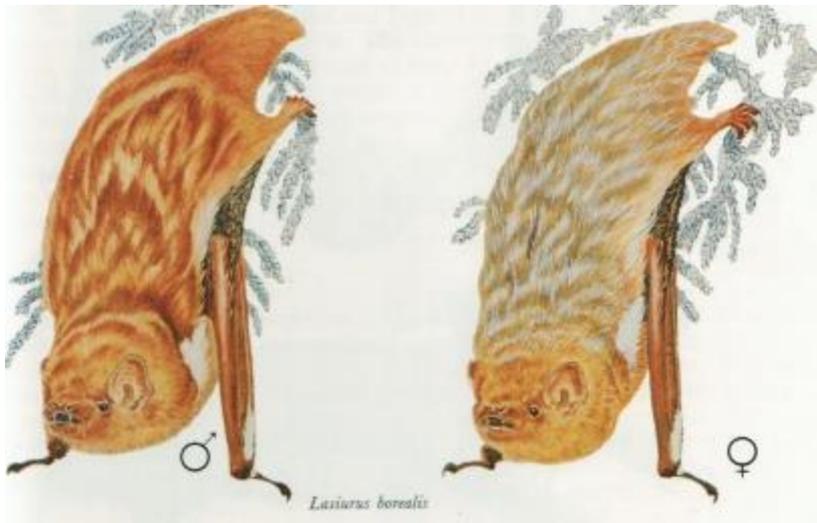
# Eastern Red Bat (*Lasiurus borealis*)



- Migratory Species
- Smaller than Hoary Bat
- Averages 15g
- Distinct Red fur, females lighter
- Diet is largely moths, beetles, flies, etc
- Roost in trees

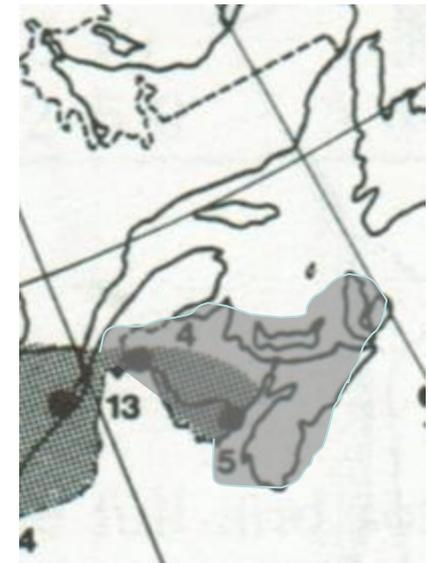


Atlantic Canada Range



# Silver-haired Bat (*Lasionycteris noctivivans*)

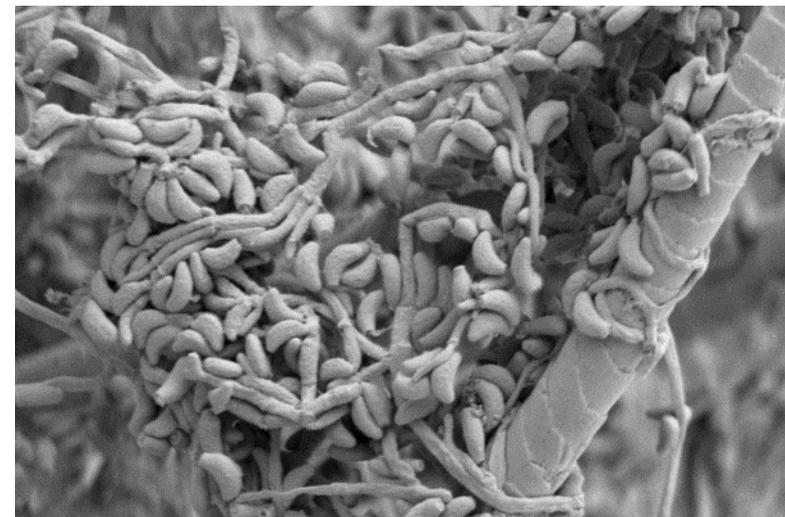
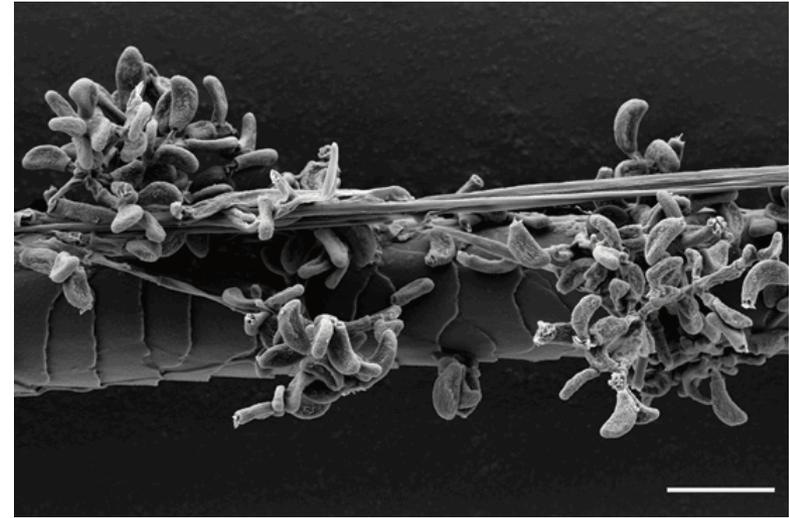
- Smaller than Hoary Bat
- Averages 15g
- Distinct silver tipped fur
- Diet is moths, beetles, flies, mosquitoes, leafhoppers, cicadas, flying ants, midges, spiders, bees.
- Roosts in cracks in rocks, wood piles, siding of houses, trees



Atlantic Canada Range

# What is White-nose Syndrome?

- A fungus, *Pseudogymnoascus destructans*
- Latin translates to “destroying false bare sack”
- Infects bats that hibernate communally
- Think of it like a fungal skin infection



○The fungus is spread by **bat to bat transfer** through physical contact so winter hibernacula are a perfect place for an outbreak to occur and spread



A Tri-colored bat barely hangs on to the roof of a Nova Scotia cave during the winter. Threatened by white-nose syndrome, this bat species, the rarest of three occurring in the province may be affected more than the other species. ©Dr. Hugh Broders

# What the fungus does

○Bats infected with the fungus wake up in from torpor in an attempt to fight off the infection or to get more food so that they can rebuild their fat stores or rehydrate.

○This usually results in them starving or freezing

○Some bats can live with the fungus

- Dead little brown bats lie on the snow at the entrance to an abandoned mine on the mainland of Nova Scotia in the late winter of 2013. ©NS DNR



○Initially known roost sites in Nova Scotia were visited during winter and spring of 2011 to look for dead or dying bats.

○Losses of 95% have been observed at several of these major overwintering sites



Doctors Hugh Broders and Andrew Hebda with researchers Amanda Lowe and Krista Arsenault investigating the impacts of White-Nose Syndrome in a Nova Scotia cave. The white uniforms they wear are disposable to avoid inadvertent transmission of the fungus to other hibernacula. ©Dr. Hugh Broders

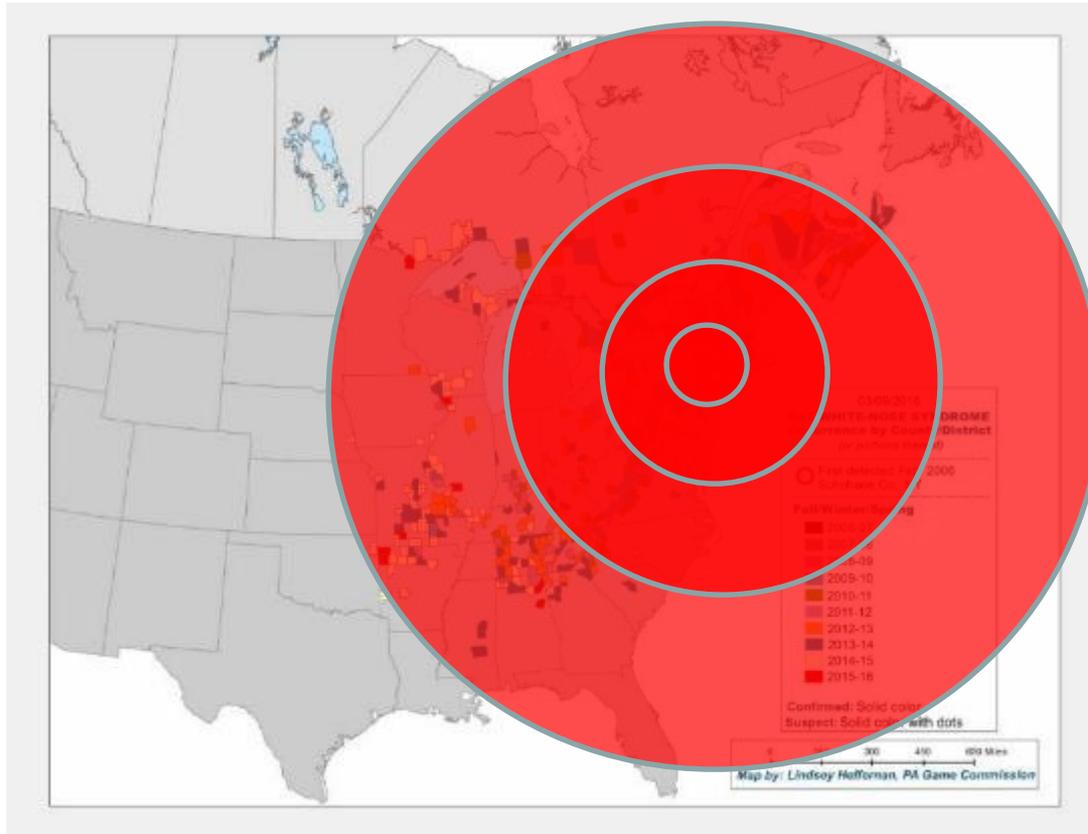
○ Nova Scotia took action and requested a federal emergency assessment and provincial listing of “endangered” for bats vulnerable to WNS

(Little Brown Myotis, Northern Myotis and Tri-coloured Bat)



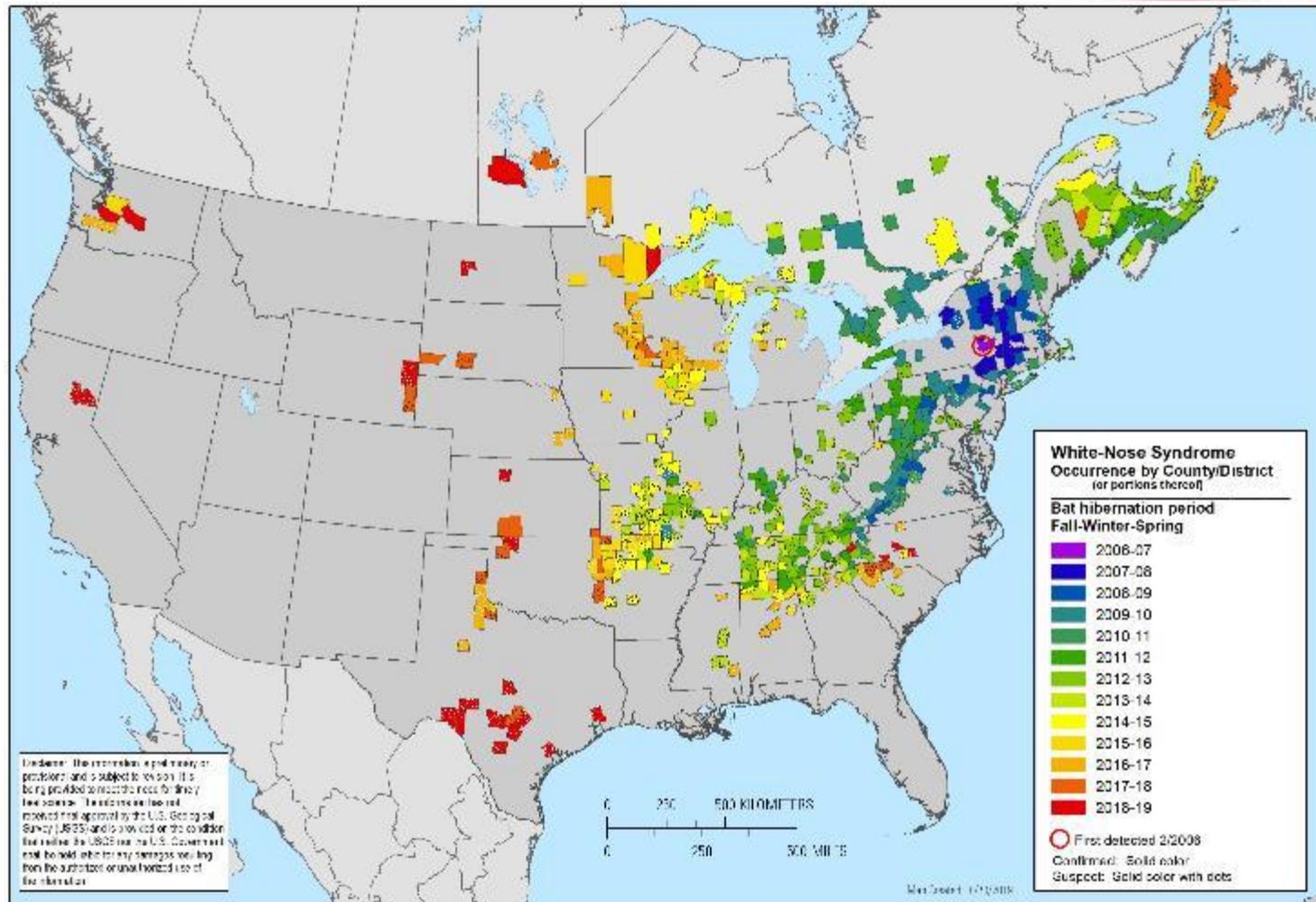
Dr. Don McAlpine was the first to record the arrival of white-nose syndrome in Atlantic Canada, shown in a cave wearing disposable clothing coveralls and boots to reduce transmission between winter sites. ©Karen Vanderwolf

# North American outbreak



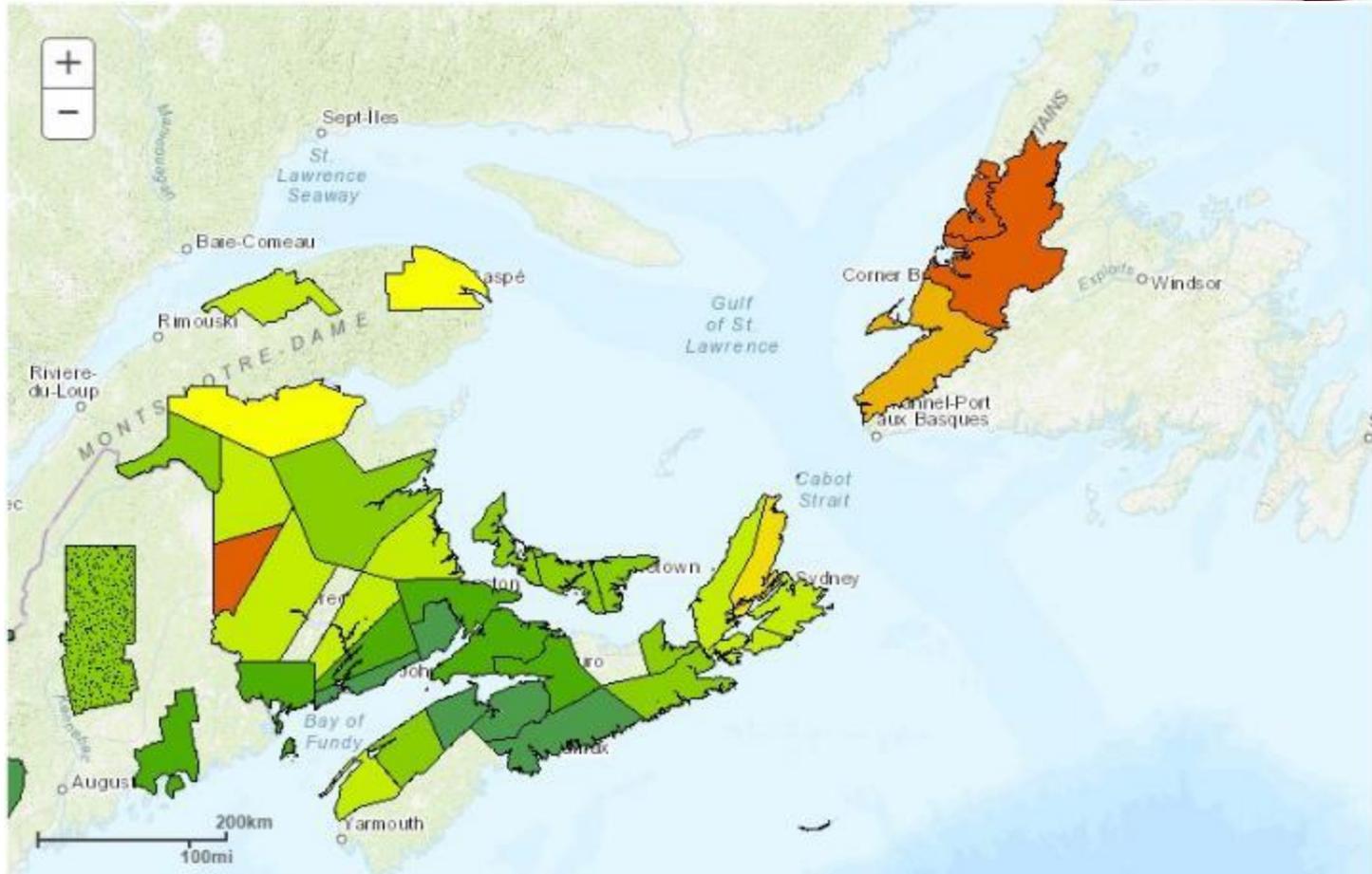
Map of the United States and Canada showing counties where white-nosed syndrome is suspected or confirmed. The actual magnitude of impact however, where bats are now absent may extend for 100s of kilometers beyond the county borders indicated. ©Whitenose-syndrome.org

# Current Continental Context



Citation: White-nose syndrome occurrence map - by year (2019). Data Last Updated: 8/30/2019. Available at: <https://www.whitenosesyndrome.org/static-pages/spruce-maps>.

Map of the North America showing counties where White Nose Syndrome is confirmed as of August, 2019. ©[www.whitenosesyndrome.org](http://www.whitenosesyndrome.org)



Map of the Atlantic Canada showing counties where White Nose Syndrome is confirmed as of August, 2019. ©[www.whitenosesyndrome.org](http://www.whitenosesyndrome.org)

WNS is likely present but undetected in counties with no records due to sparse bat populations

# Why is this a big deal?



○Bats generally produce only 1 to 2 pups a year(‘k strategists’). Natural recovery will take a long time.

○Bats provide a incalculable service to the ecosystem, to agriculture and to forestry in pest control.

○Bats fulfill a unique niche as nocturnal insect predators that can’t be fulfilled by other wildlife

# Further Actions

- Nova Scotia DNR and experts began education efforts
- However the full extent of the population was unknown because baseline work on the populations was not geographically complete.
- We don't closely monitor many abundant species.



Bats infected with White-nose syndrome leave hibernating sites through winter in broad daylight when they should be dormant and have been reported over most of the central mainland of the province by the public. ©Mark F. Elderkin

# Bat recovery work



Step 1. Bring in the help of everybody in Nova Scotia.

[www.batconservation.ca](http://www.batconservation.ca)



## Welcome to the Nova Scotia Bat Conservation Site

Bats are increasingly at risk in Nova Scotia and Canada due to white-nose syndrome caused by an invasive fungus (*Geomyces destructans*). During the winter of 2012–2013, white-nose syndrome was responsible for a decline of 95% of bats in five of Nova Scotia's largest overwintering sites. In the wake of this unprecedented natural disaster, we need to know where bats are located across the province.

Our goal is to amass the collective knowledge of past and current bat sightings in Nova Scotia to guide conservation and recovery efforts. Your participation is valuable and will be held confidential. If you wish, you do not need to give exact locations of your observations, although this information would increase the value of your report.

You can also help spread the word by downloading and distributing our bat

[www.batconservation.ca/?q=node/add/batreport](http://www.batconservation.ca/?q=node/add/batreport)

## Have you seen any bats?

You can help by reporting your bat sightings. Click on the button below to access our online reporting form or call the toll free number below.

Report a Sighting 

Toll free: 1-866-727-3447

# Easy to use website



Easy to use interface (only 1 complaint so far)

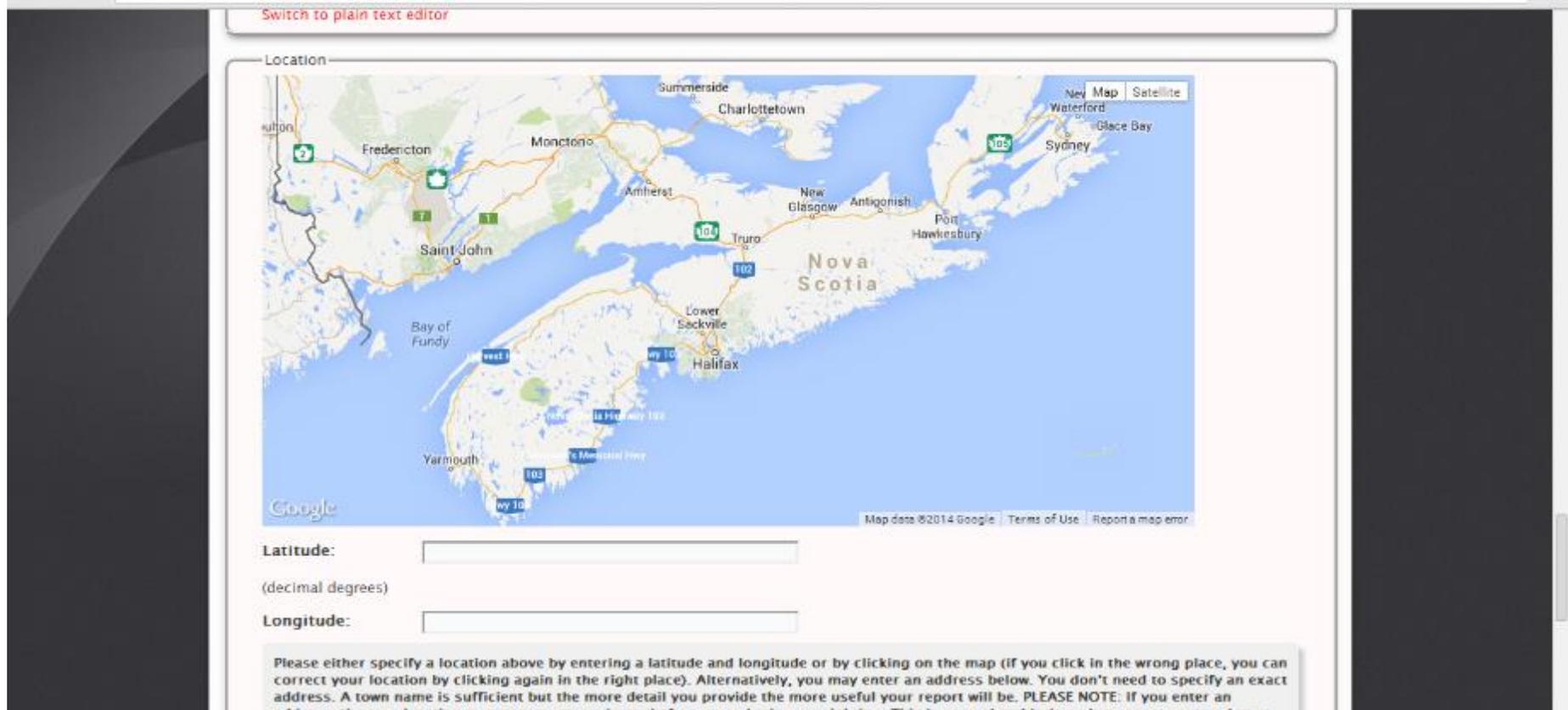
Users can provide as much or as little information as the feel comfortable with.

A screenshot of a web form titled "Submit Your Bat Sighting". The form is set against a dark red header with navigation links: Home, Photo Gallery, Report a Sighting (highlighted), Administrative Map, View Map, View Reports, Site Editing, and Log Out. The form is divided into two main sections: "Your Contact Information" and "Sighting Details".  
**Your Contact Information:** This section contains three text input fields labeled "Your Name:", "Your Email Address:", and "Phone Number:". Below these fields is a light gray box with the text: "Your contact information is not required but it will allow us to contact you if we have further questions about your sighting. This information will not be made public and it will only be used if a followup contact is necessary."  
**Sighting Details:** This section includes date selection fields for "Year: \*", "Month: - None - ▾", and "Day: - None - ▾". Below these is a checkbox labeled "Exact Date Unknown". A light gray box contains the instruction: "Please specify the date as accurately as you can. If you are unsure of the date, check the above checkbox and specify only the portion of the date that you know." At the bottom, there is a "Species: \*" section with radio button options: "Species Unknown" (selected), "Little Brown Bat (Little Myotis)", and "White Noctule (Myotis macrotis)".

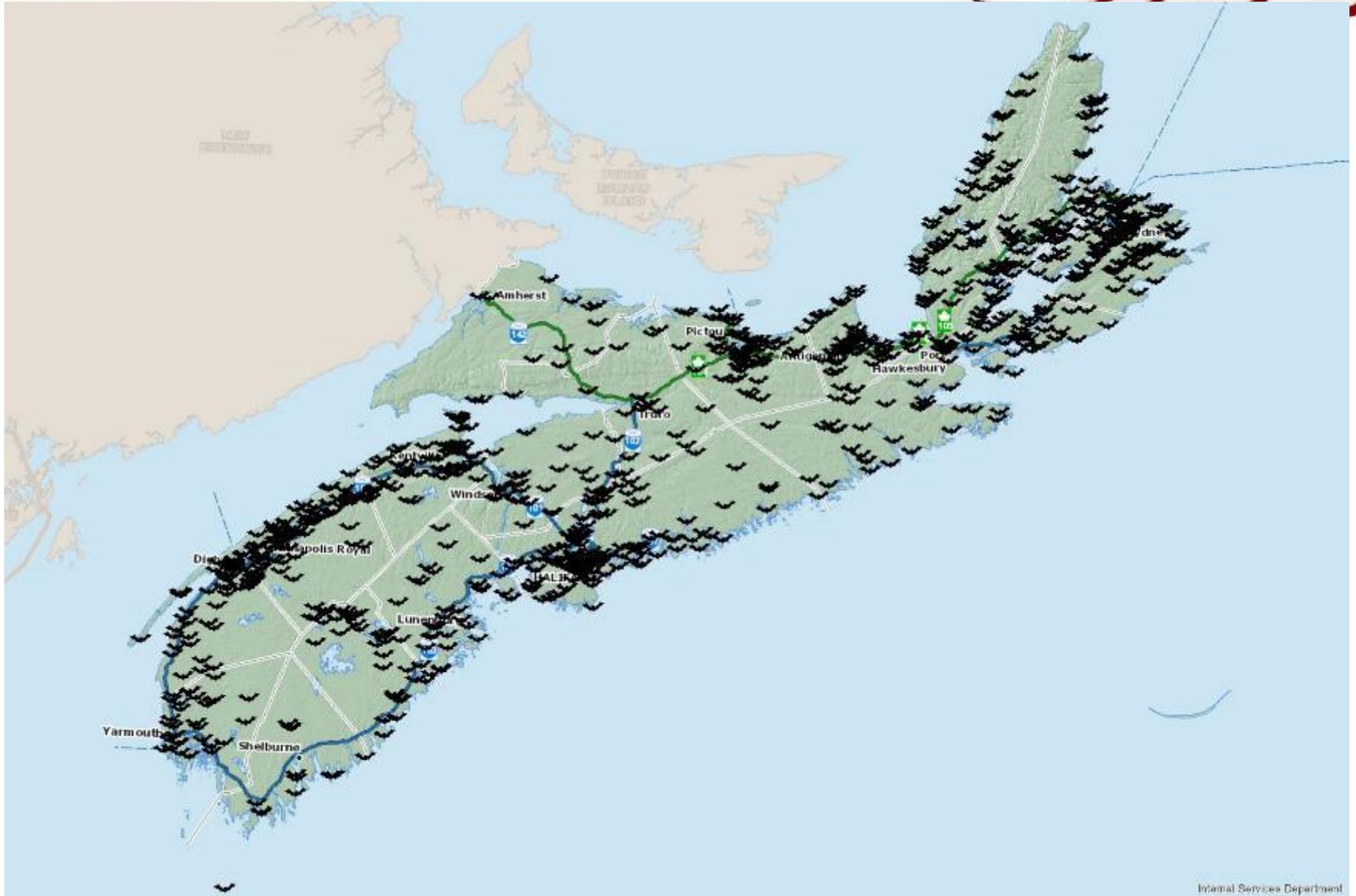
# Easy location mapping



- Google Maps interface allows people the option of selecting their location in Nova Scotia taking the guesswork out of reporting location.



# 2013 Results

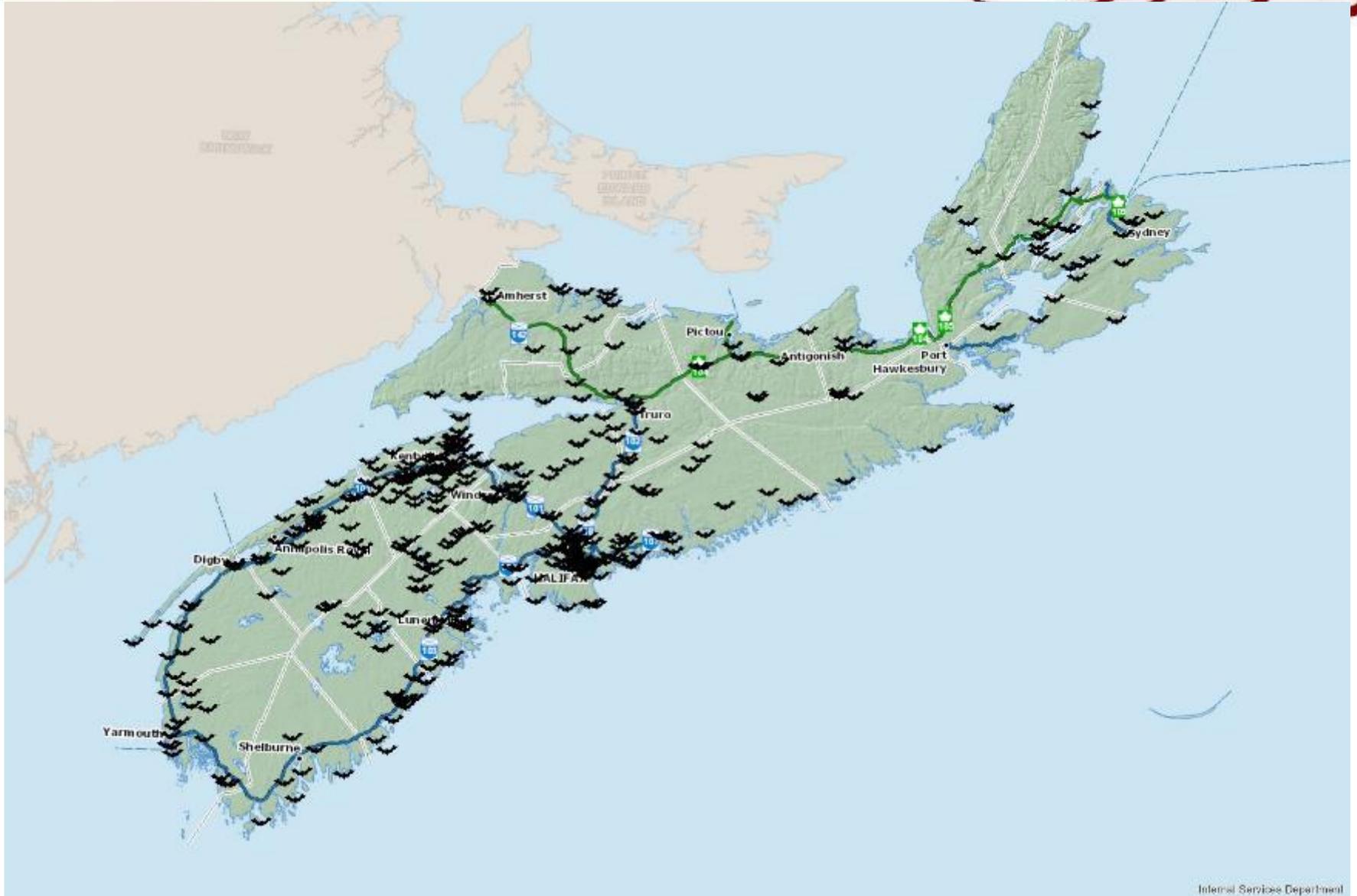




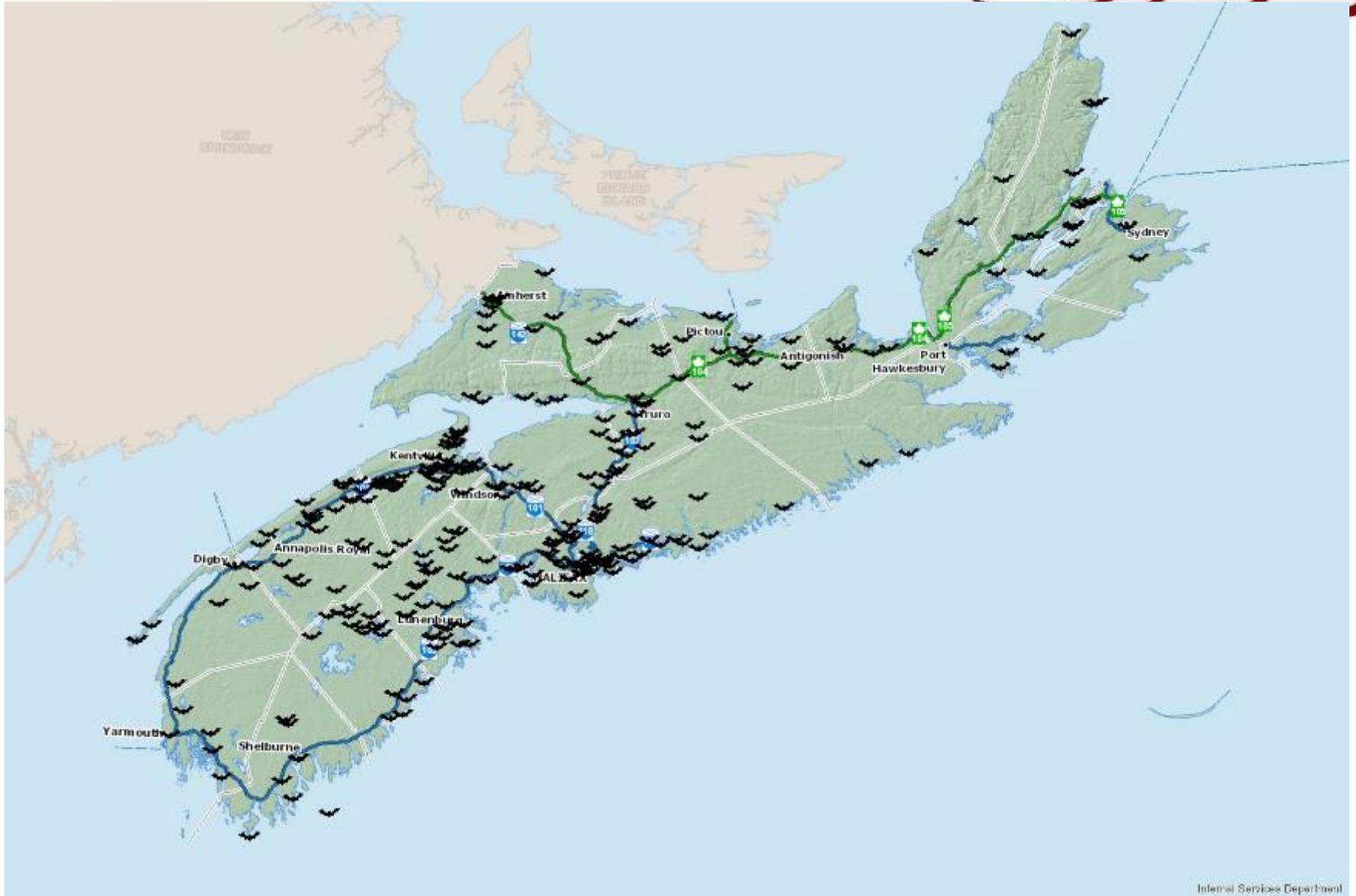
# 2015 Results



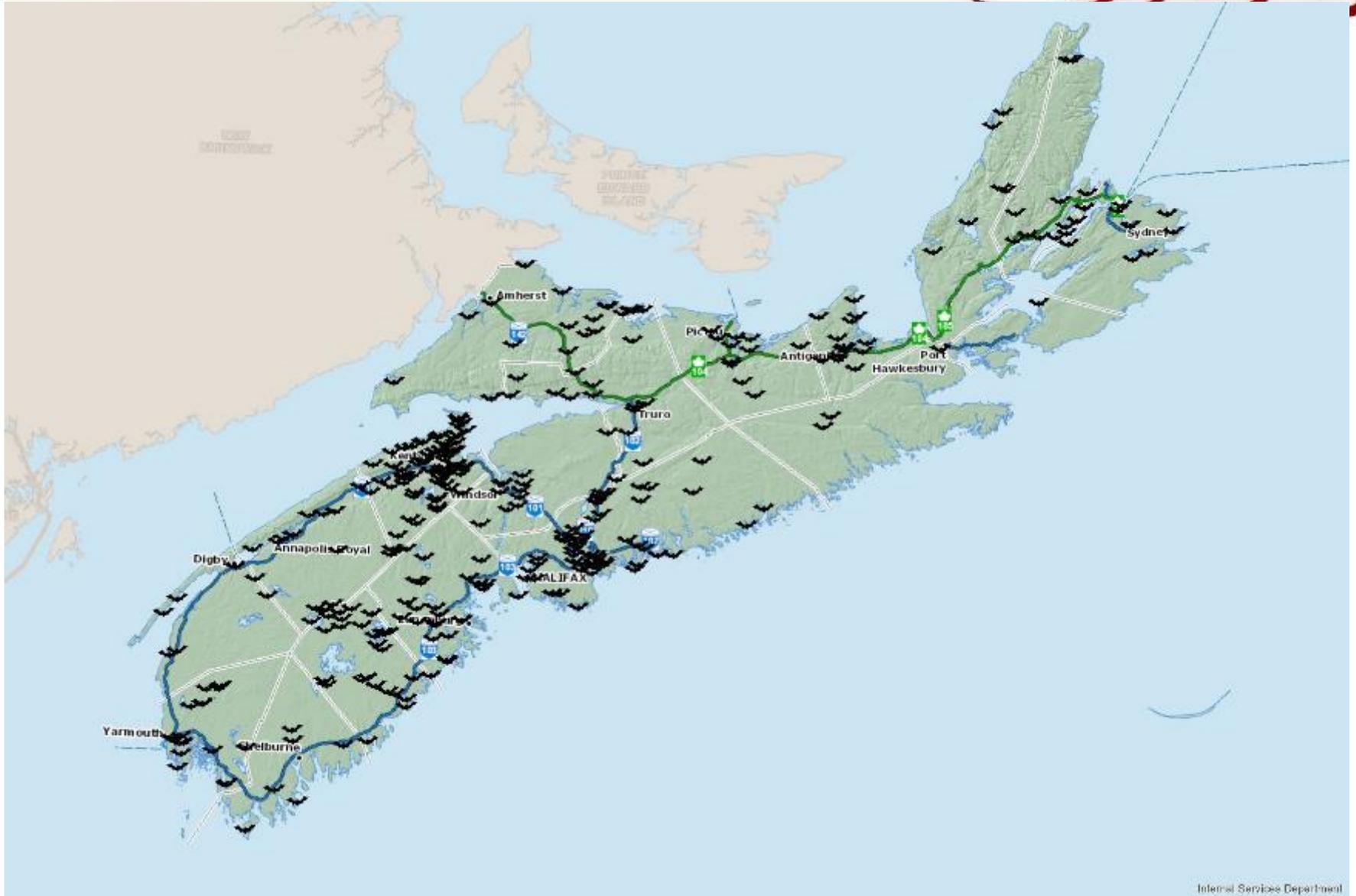
# 2016 Results



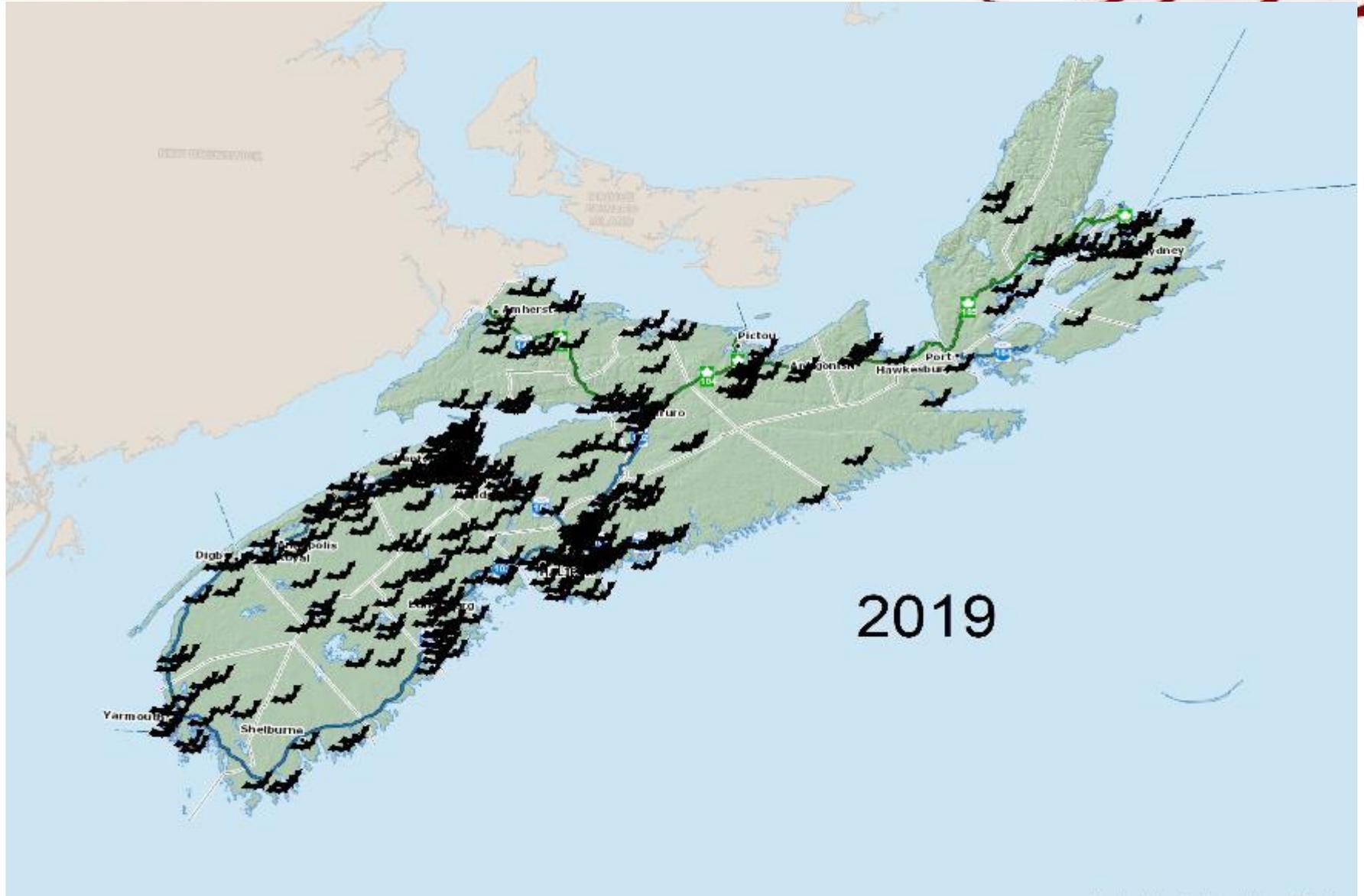
# 2017 Results



# 2018 Results

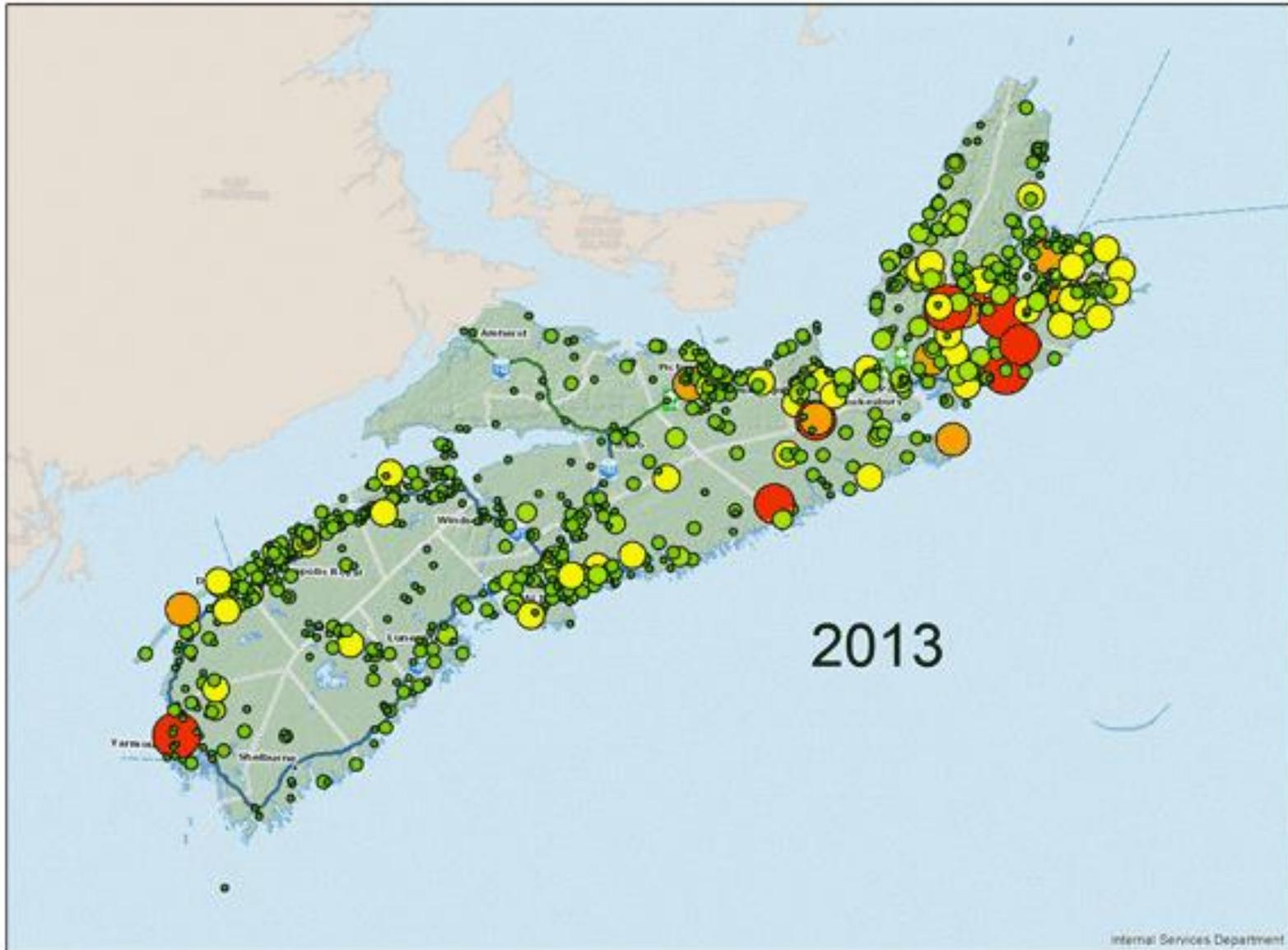


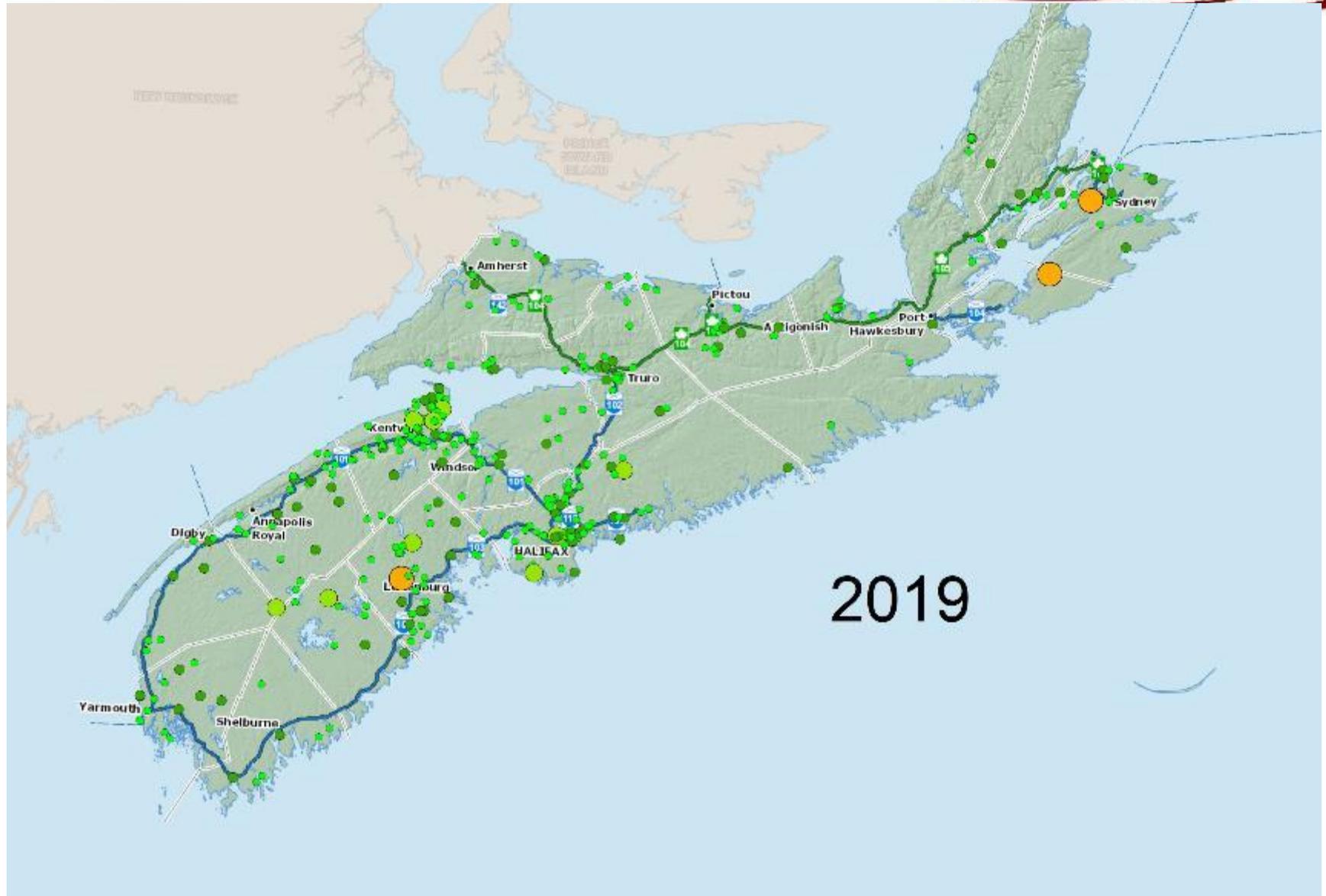
# 2019 Results



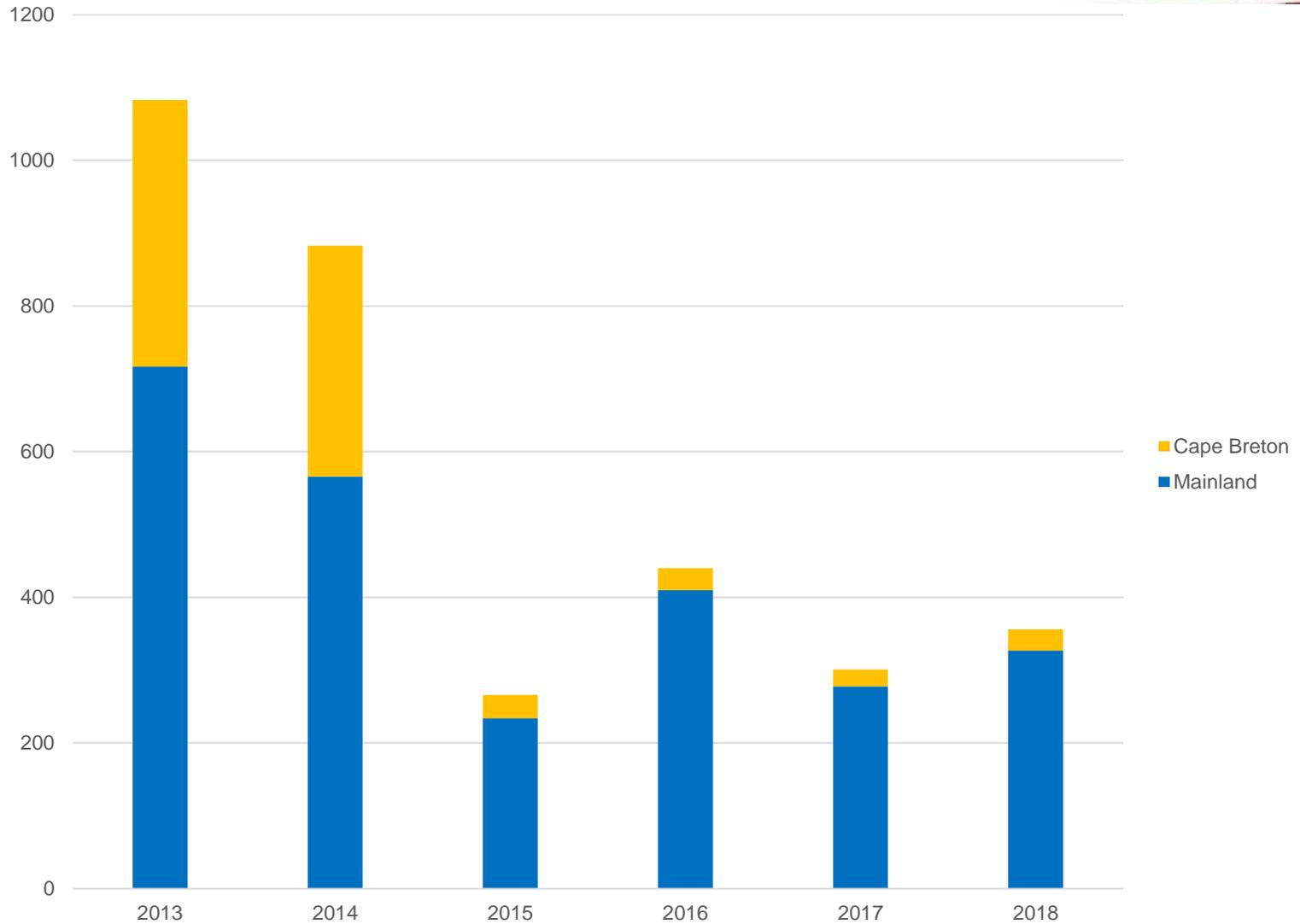


# Animation (bigger circles=larger groups)

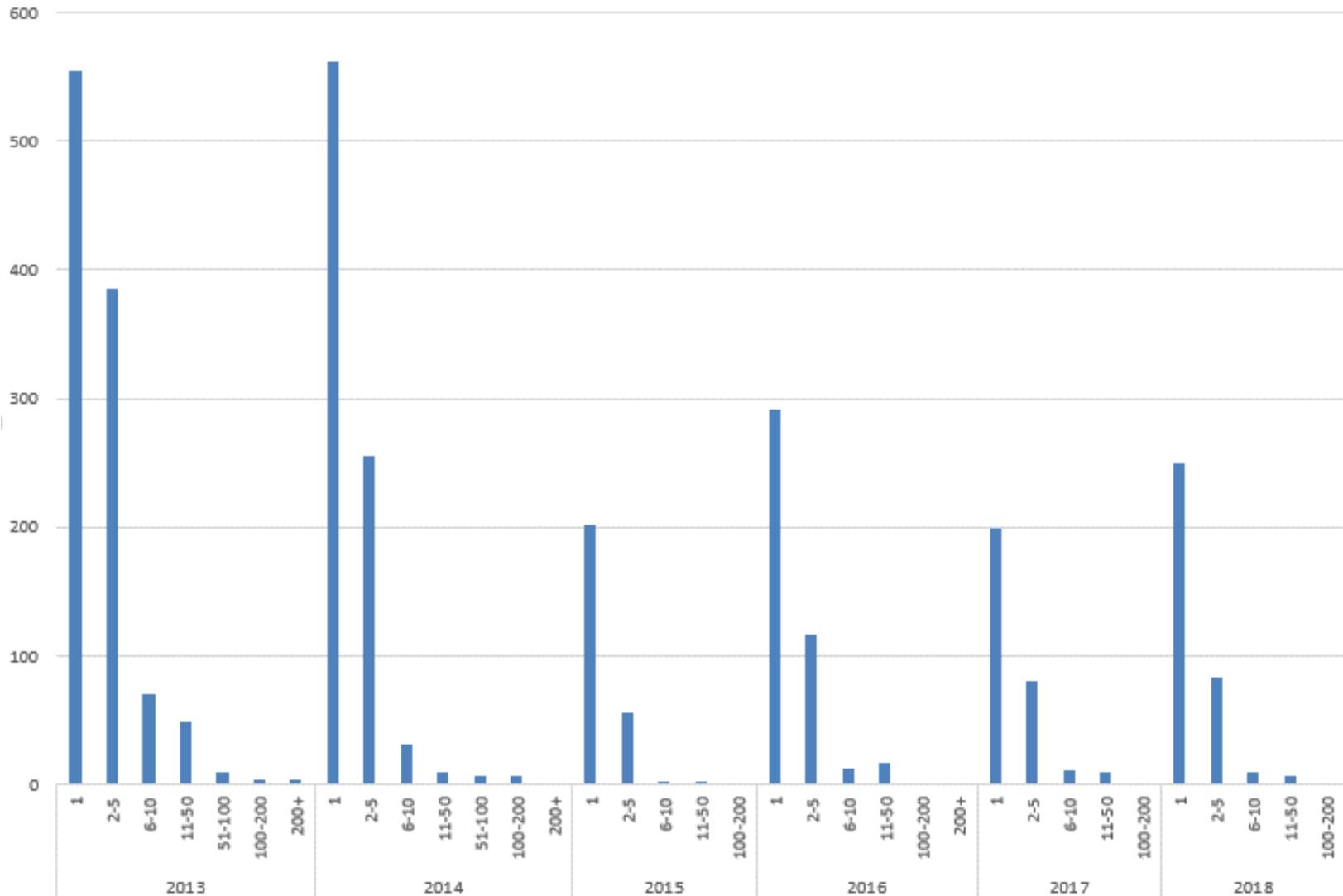




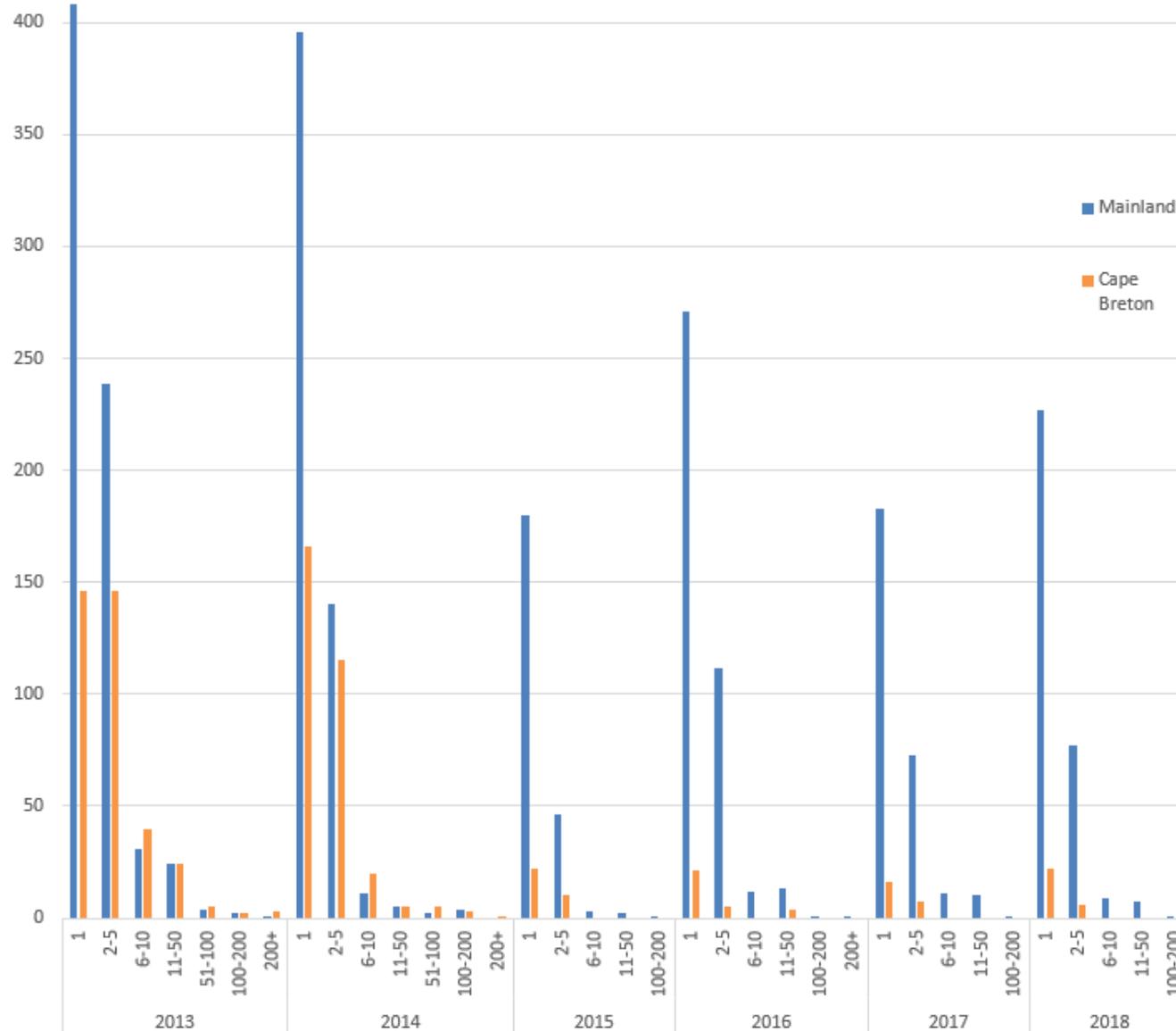
# Number of reports to batconservation.ca



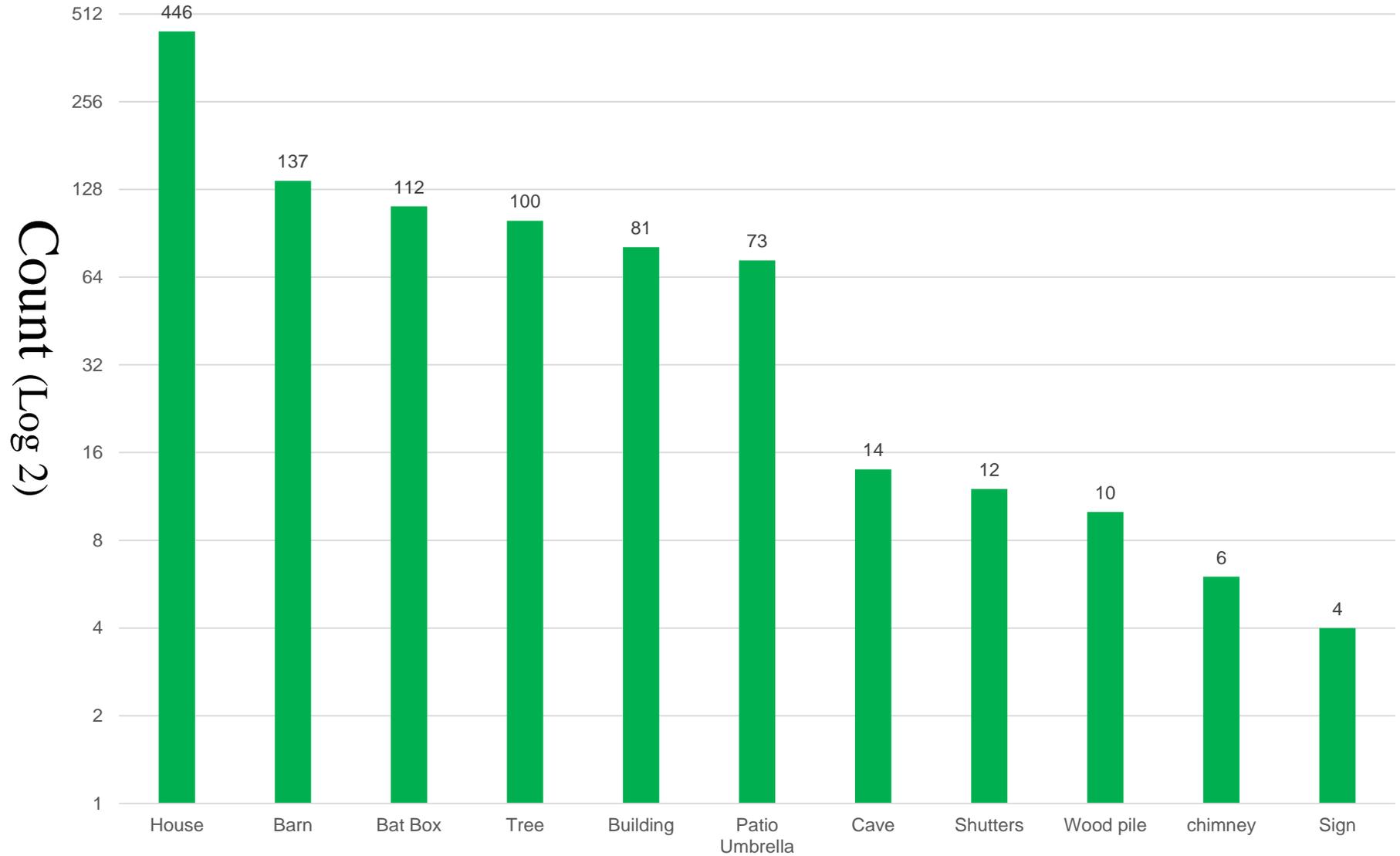
# Numbers of Bat by year



# Same thing, CB and mainland NS



# Bat habitats reported 2013-2019 (n=995/3916)



# So...what can we do?

- Encourage people to create small roost sites to increase habitat? Is lack of habitat a problem? (probably not)
- Some box types have been shown to be detrimental
- BUT...Makes us feel like we're helping. 😊
- Most useful long term to get them out of a human structure to reduce interactions



“Rocket Box”

- New US research into the relatives of the fungus might reveal a way to fight against it at a specific genetic level.
- Some bats have been rehabilitated and released using experimental treatments
- Avoid disturbing bats
- Be observant, report bats...you never know which sightings will be important.
- Protect maternal colonies and overwintering sites.

# Some Hope?

- New Research, key messages  
“Hibernating bats mount a partial immune response against white-nose syndrome”
- “Big, dry bats more likely to survive fatal fungus”
- Anecdotally in NS more people are reporting “first bat I have seen in years” 2018-2019

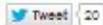


# Some Hope from the US?

## Bat populations rebound after deadly white-nose syndrome

By Michael Hill  
The Associated Press

Share this Article



VOORHEESVILLE, N.Y. – Researchers found substantially more bats in several New York caves that were the first ones struck by [white-nose syndrome](#), giving them a glimmer of hope amid a scourge that has killed millions of bats in North America.

Figures released Thursday by the state [Department of Environmental Conservation](#) showed notable increases in the number of little brown bats in three out of five upstate New York hibernation caves where scientists first noticed white nose decimating winter bat populations six years ago. The largest cave saw an increase from 1,496 little browns last year to 2,402 this winter.

There are hopes this is an early sign that bats can adapt to a disease that has spread to 19 states and Canada. But scientists caution it's far too early to tell if it is the start of a trend or a statistical blip.

# What if we do nothing?

What are the consequences?  
Pest outbreaks? (Moths etc.)

Large scale effects and ecosystem  
changes are difficult to measure



Pale Winged Grey Moth defoliation in Keji (pre-WNS)

- MTRI, CWS, NS Department of Natural Resources and Parks Canada collaborating on an acoustic monitoring study starting 2017 and continuing to 2019/2020
- Monitor and protect remaining large maternal colonies
- Work with landowners that have important habitat



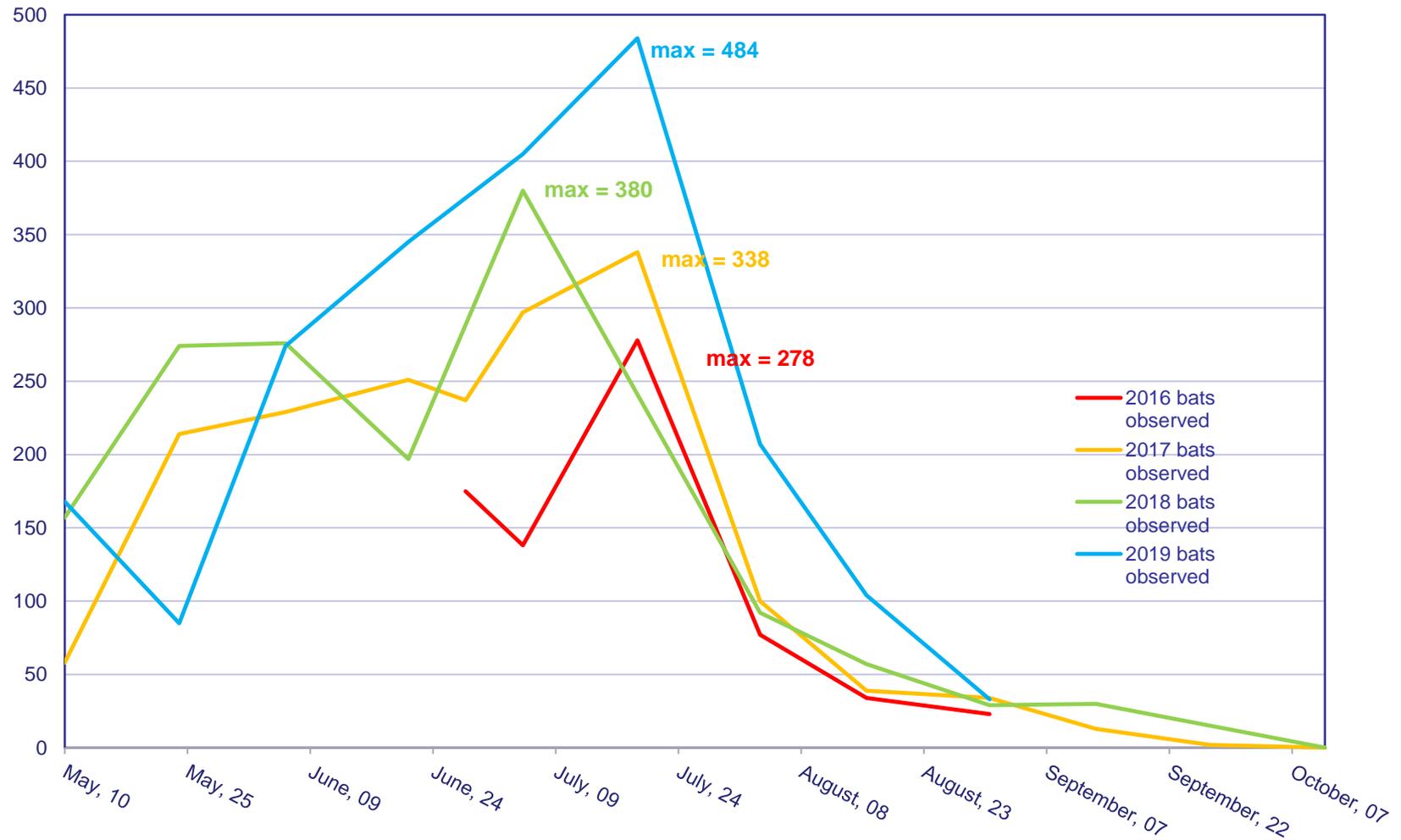
# Maternal Colonies



- Spring 2016 two maternal colonies found in SWNS
- One had >200 breeding females and the other ~40 breeding females
- Many other small colonies reported around the province
- Generated media attention in 2016 and 2018
- Protecting maternal colonies is one of the few concrete actions we can take to help the population recover.



# Maternal Colonies



# New Project in Nova Scotia

- 2018/2019 We are repeat acoustic monitoring from 2006/2007 pre WNS. First study of it's scale and kind in North America

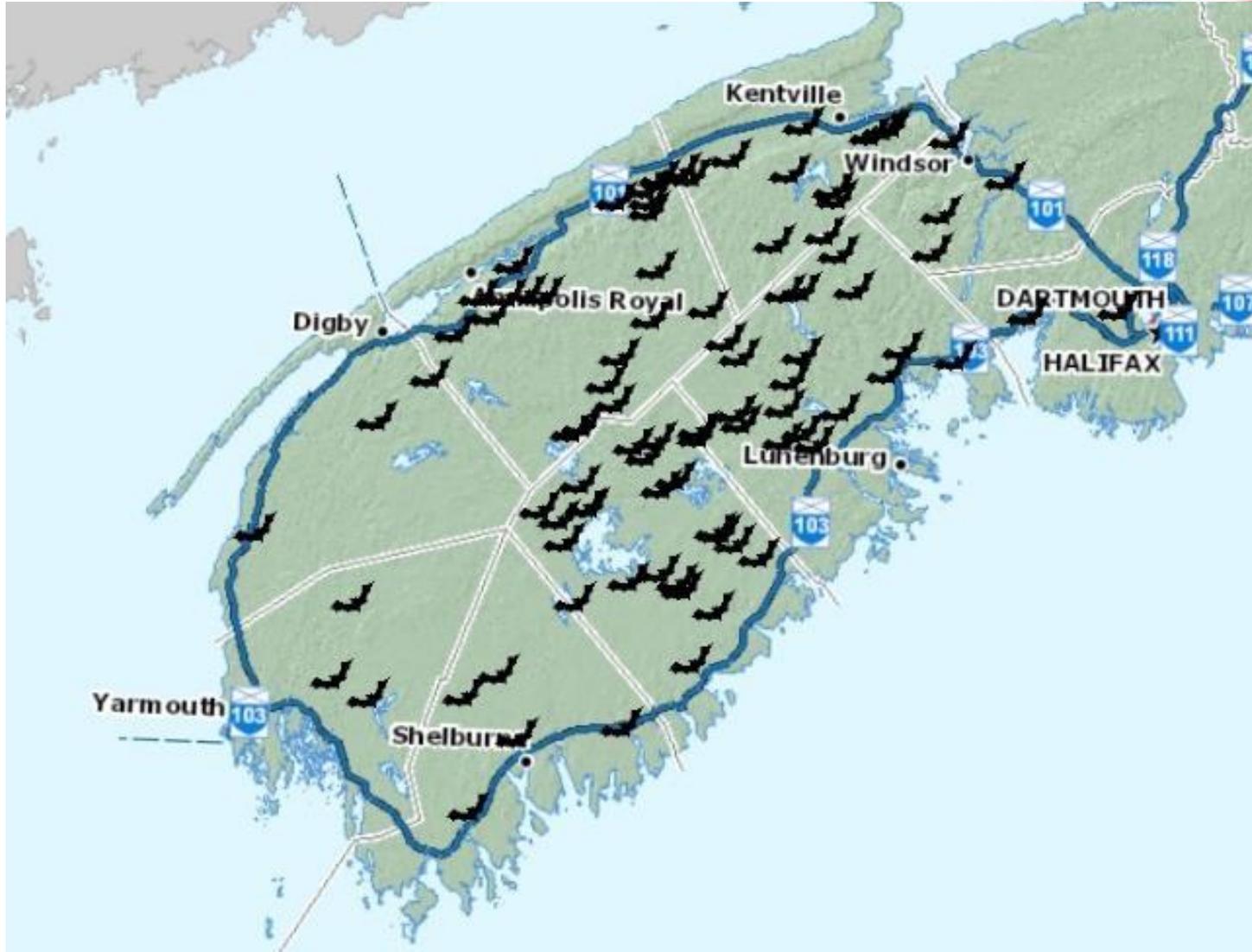


2006



2018

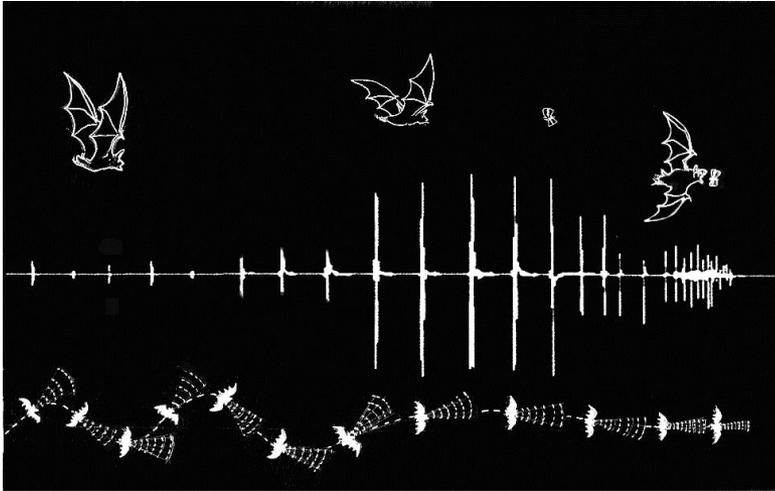
# Acoustic Sampling Sites



- Re-visited all sites from 2005-2006 on exactly the same schedule
- Each site was monitored twice in the season.
- MSc. started Jan 2019.



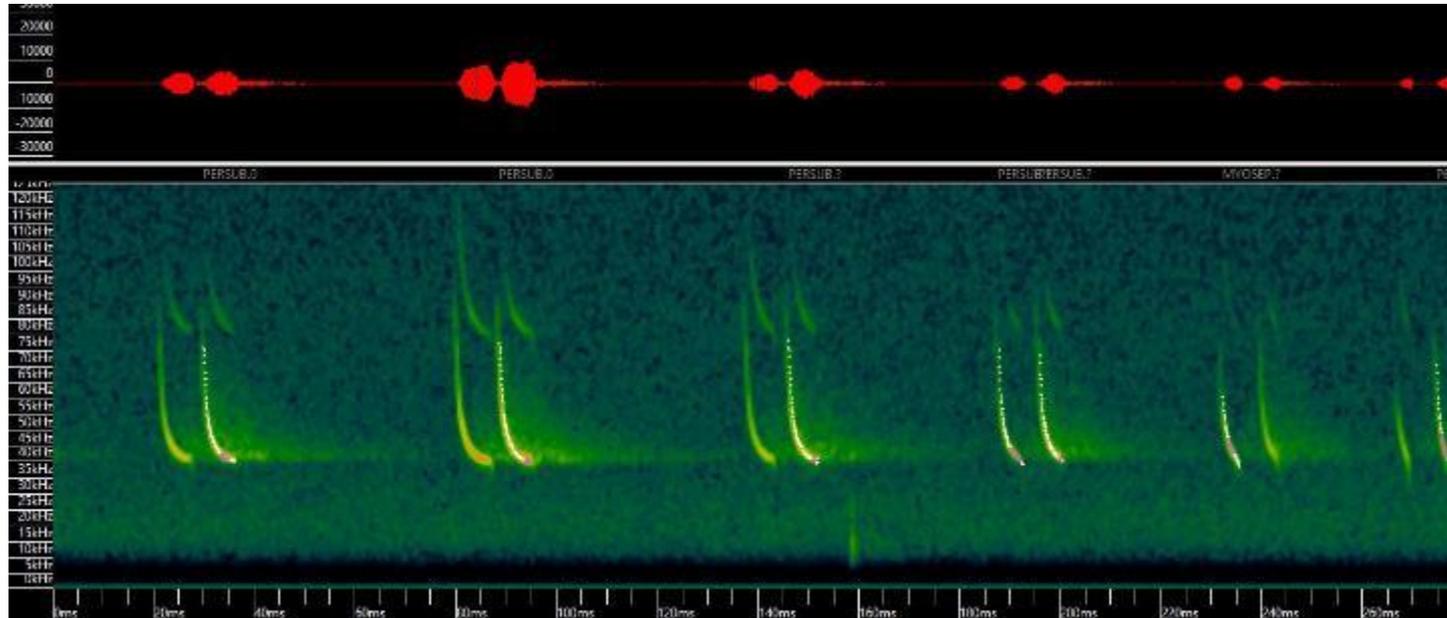
Project in collaboration with University of Waterloo and  
Kejimikujik NPNHS



- Unique bat voices for each species occurs in the “search phase” of echolocation.
- However “bats are not birds” (Barclay 1999)
- Software sorts the data and filters out noise but identification is done manually

# Acoustic data

Tri-coloured  
bat “Hockey  
Stick” call



Acoustic data will be analyzed for amount of activity recorded (Mbytes)

Data can be identified to species based on frequency profile and pitch (small bats=high voice, big bats = low voice)

# So what do I do if I see a bat?



- If it is a **general sighting** of a bat  
[www.batconservation.ca](http://www.batconservation.ca) OR 1 866 727 3447
- If it is a **nuisance bat** or a **dead bat** call Nova Scotia Department of Lands and Forestry  
1 800 565 2224
- If you have had any **bare skin contact** with a bat contact the Canadian Wildlife Health Cooperative at UPEI Veterinary College.  
1 902 628 4314

# Thanks



## Funders



## Partners



CANADIAN  
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COOPERATIVE





# Mersey Tobeatic Research Institute

MTRI is a charitable organization that operates a field station for research and education within the Southwest Nova Biosphere Reserve.

MTRI's mission is to promote sustainable use of natural resources in southwestern Nova Scotia through research and education.

Over the last few years, the organization has been developing capacity through its staff, volunteers, members, and directors.

MTRI is currently undertaking projects that focus on species at risk; aquatic health of streams, lakes, rivers, and wetlands; landscape connectivity and forest health; climate change; and invasive alien species.

Learn more on our website at [www.merseytobeatic.ca](http://www.merseytobeatic.ca).



Mersey Tobeatic Research Institute, Kempi, Nova Scotia



Southwest Nova Biosphere Reserve



## Questions?