

Nebraska Bats

An overview of the bats found in Nebraska
and white nose syndrome.

Baxter Seguin

Why Bats?



Ecosystem Services

Pollination

- Cactus flowers in the Southwest
- Agave (tequila)
- Mangoes
- Bananas
- Guavas
- Over 300 species of plants



Lesser long nosed bat

Ecosystem Services

Guano

- The War of the Pacific – “Guano War” – 1879
- Bolivia and Peru vs. Chile
- Nitrogen rich fertilizer



Ecosystem Services

Insectivores

- 70% of bat species worldwide eat insects
- These bats can eat 125% of their weight each night



Ecosystem Services

Insectivores

- 70% of bat species worldwide eat insects
- These bats can eat 125% of their weight each night
 - Without bats...
 - Corn costs could increase 20-30%
 - Cotton costs could increase 10-13%

Value of Bats

Bats contribute
>\$3.7 Billion per year
to reducing crop loss and
pesticide use in the US alone

(source: Boyles, et al, 1 APRIL 2011 VOL 332 SCIENCE www.sciencemag.org)

Value of Bats

Extent	Crop	Amount	Source
Thailand	Rice	\$1.2 million	(Wanger, Darras, Bumrungsri, Tschardtke, & Klein, 2014)
Globally	Corn	\$1 billion	(Brown et al., 2015)
Texas (8 counties)	Cotton	\$741,000	(Cleveland et al., 2006)
North America	All crops	\$3.7-53 billion	(Boyles et al., 2011)

Bat Species of Nebraska



Duram photos

Bat Species of Nebraska



Hoary Bat 15.5 inches

Big Brown Bat 12.9 inches

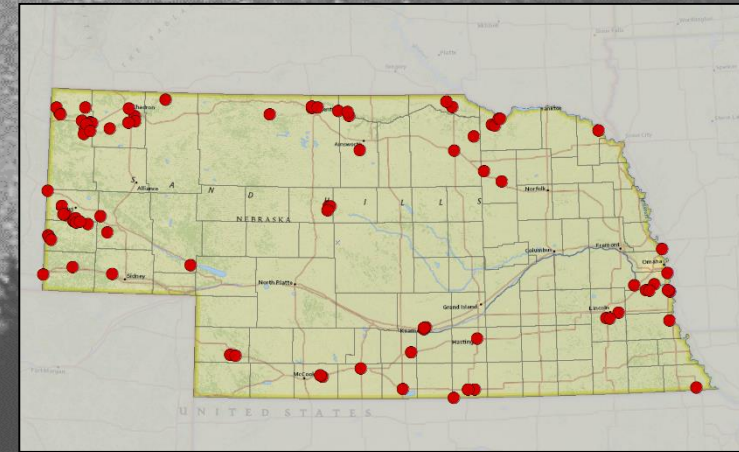
Northern Long-eared Bat 10 inches

Tri-colored Bat 9.25 inches

Big Brown Bat

Eptesicus fuscus

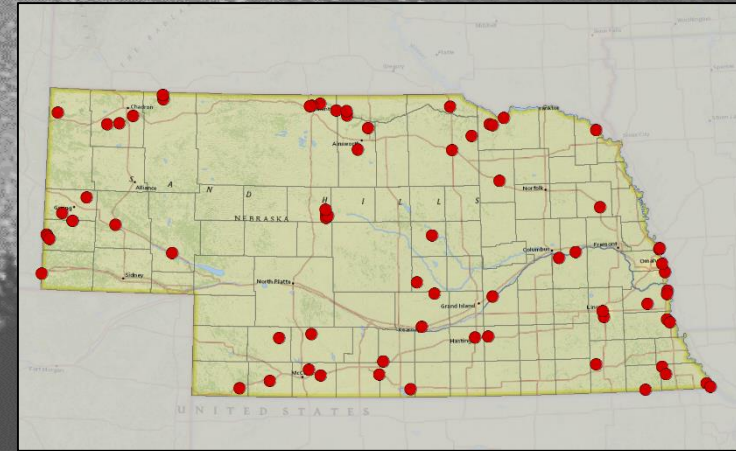
- Wingspan: 12.5 inches
- Diet: Moths and beetles
- Winter: Hibernate in caves and buildings



Eastern Red Bat

Lasiurus borealis

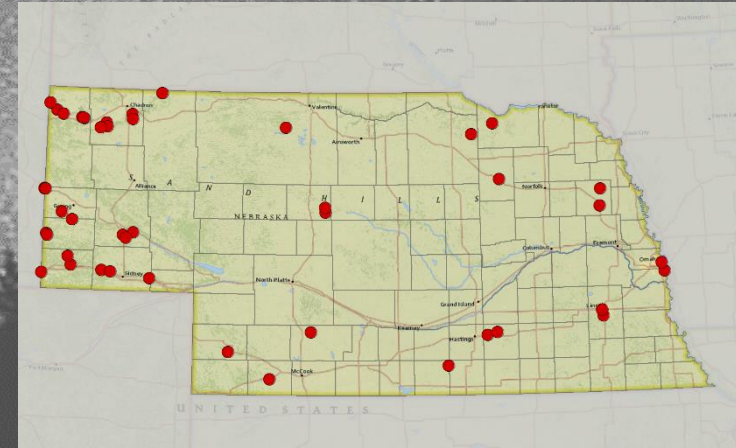
- Wingspan: 12.2 inches
- Diet: Moths, beetles, and flies
- Winter: Migrate and tree roost



Silver Haired Bat

Lasionycteris noctivagans

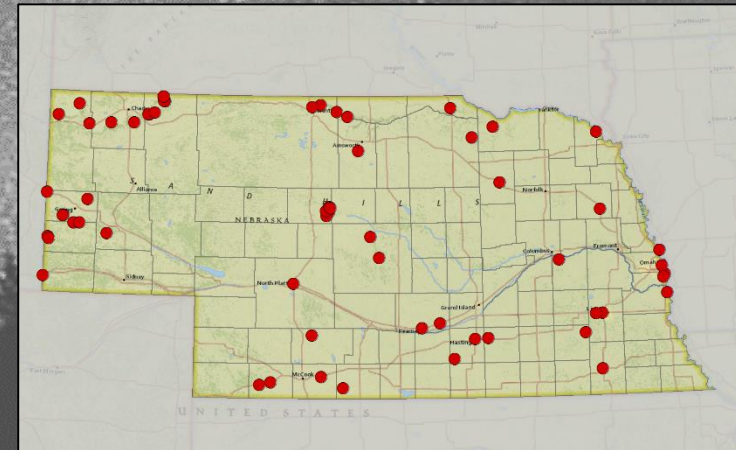
- Wingspan: 11.5 inches
- Diet: Moths, flies, leafhoppers, and beetles
- Winter: Short distance migrants



Hoary Bat

Lasiurus cinereus

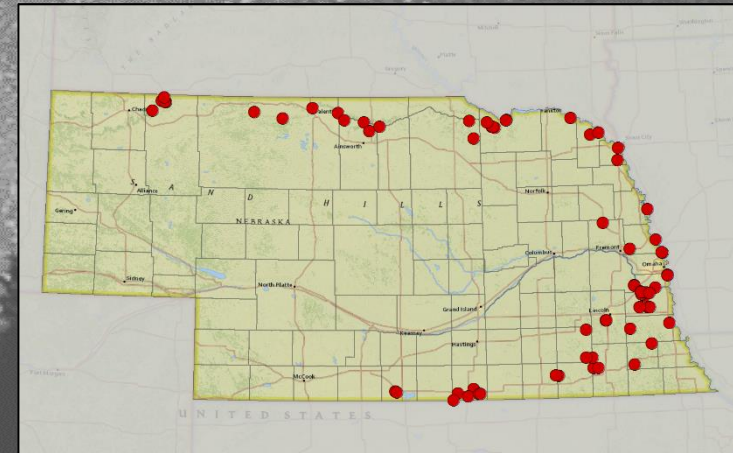
- Wingspan: 15.5 inches
- Diet: Moths
- Winter: Migrate and tree roost



Northern long-eared Bat

Myotis septentrionalis

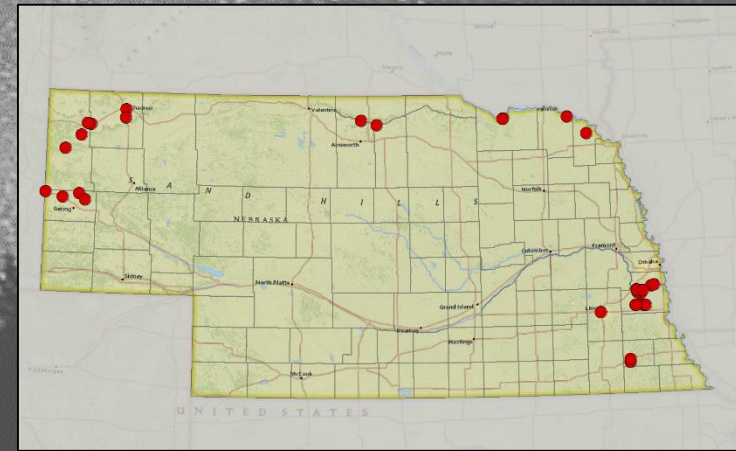
- Wingspan: 10 inches
- Diet: Moths, crickets, spiders, stone flies
- Winter: Hibernate in caves



Little Brown Bat

Myotis lucifugus

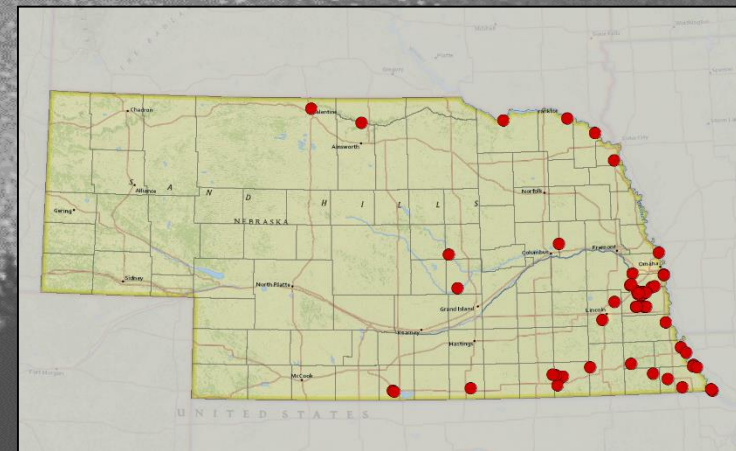
- Wingspan: 8-11 inches
- Diet: Moths, mosquitoes, midges, mayflies...
- Winter: Hibernate in buildings, caves, mines



Tri-colored Bat

Perimyotis subflavus

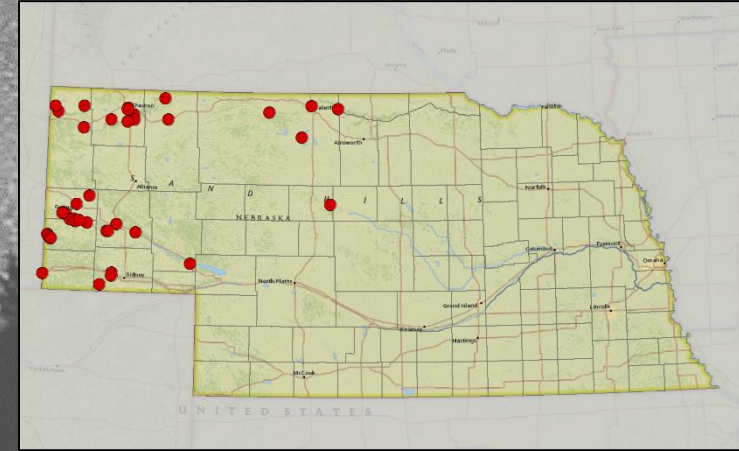
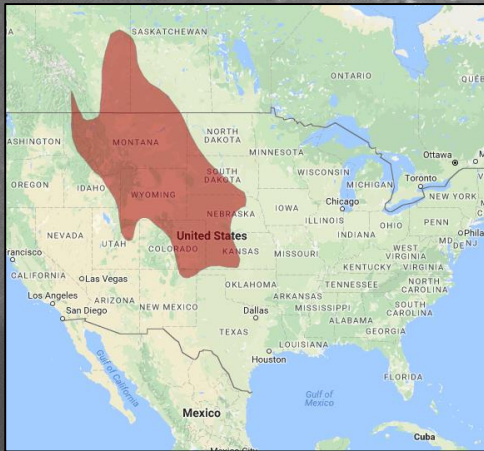
- Wingspan: 9 inches
- Diet: Opportunistic
- Winter: Hibernate in caves and mines



Western Small-footed Myotis

Myotis ciliolabrum

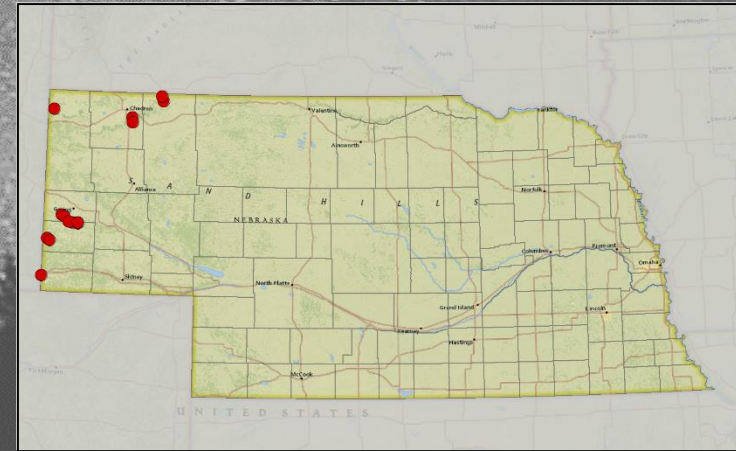
- Wingspan: 9.4 inches
- Diet: Moths, beetles, and flies
- Winter: Hibernate in caves and cliffs



Fringed Myotis

Myotis thysanodes

- Wingspan: 11 inches
- Diet: Beetles and moths
- Winter: Hibernate in buildings and mines



White Nose Syndrome



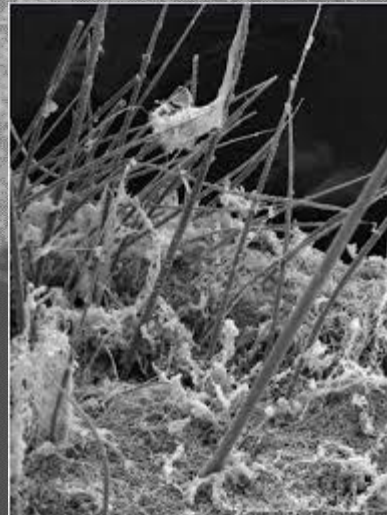
White Nose Syndrome



*Pseudogymnoascus
destructans*

Or

Pd



White Nose Syndrome



White Nose Syndrome



White Nose Syndrome

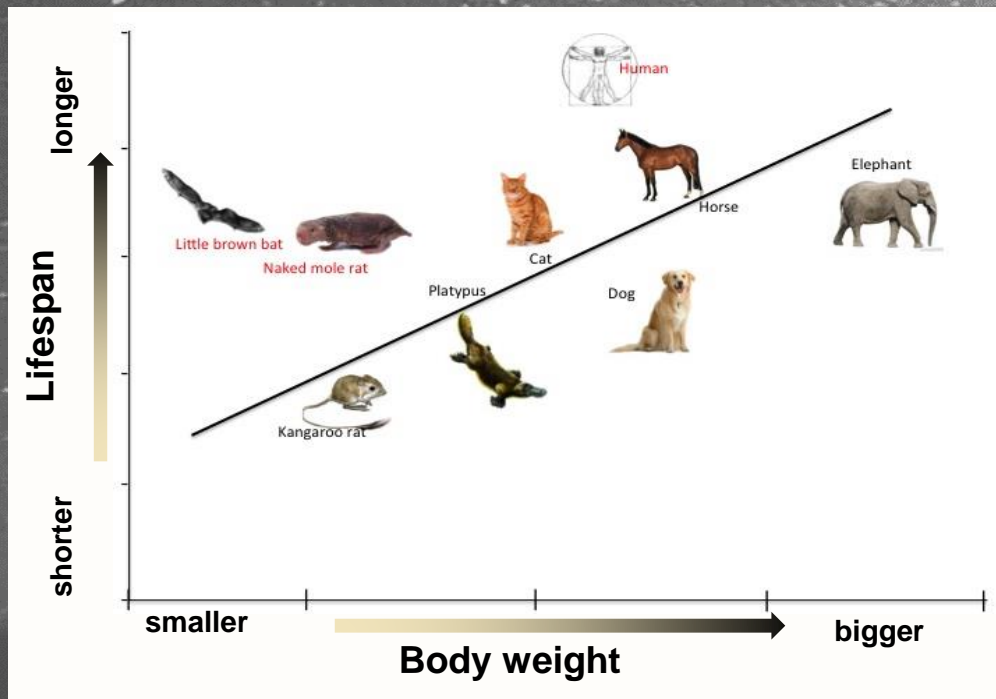


>90% mortality in cave dwelling species

White Nose Syndrome

Long lived

Low reproduction rates



White Nose Syndrome

Quick animation showing the spread
since 2006

Species Affected in NE



Tri-colored bat
(*Peryimyotis subflavus*)



Little brown bat
(*Myotis lucifugus*)



Northern long-eared bat
(*Myotis septentrionalis*)

White Nose Syndrome



So that is the bad news...
What can we do about it?

White Nose Syndrome

www.nature.com/scientificreports

SCIENTIFIC REPORTS

OPEN Virally-vectored vaccine candidates against white-nose syndrome induce anti-fungal immune response in little brown bats (*Myotis lucifugus*)

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White-nose syndrome (WNS) caused by the fungus, *Pseudogymnoascus destructans* (*Pd*) has killed millions of North American hibernating bats. Currently, methods to prevent the disease are limited. We conducted two trials to assess potential WNS vaccine candidates in wild-caught *Myotis lucifugus*. In a pilot study, we immunized bats with one of four vaccine treatments or phosphate-buffered saline (PBS) as a control and challenged them with *Pd* upon transfer into hibernation chambers. Bats in one vaccine-treated group, that received recombinant *Pd* calnexin (CAL) and serine

Anti fungal bacterium
Originally studied to
combat fruit spoiling

White Nose Syndrome



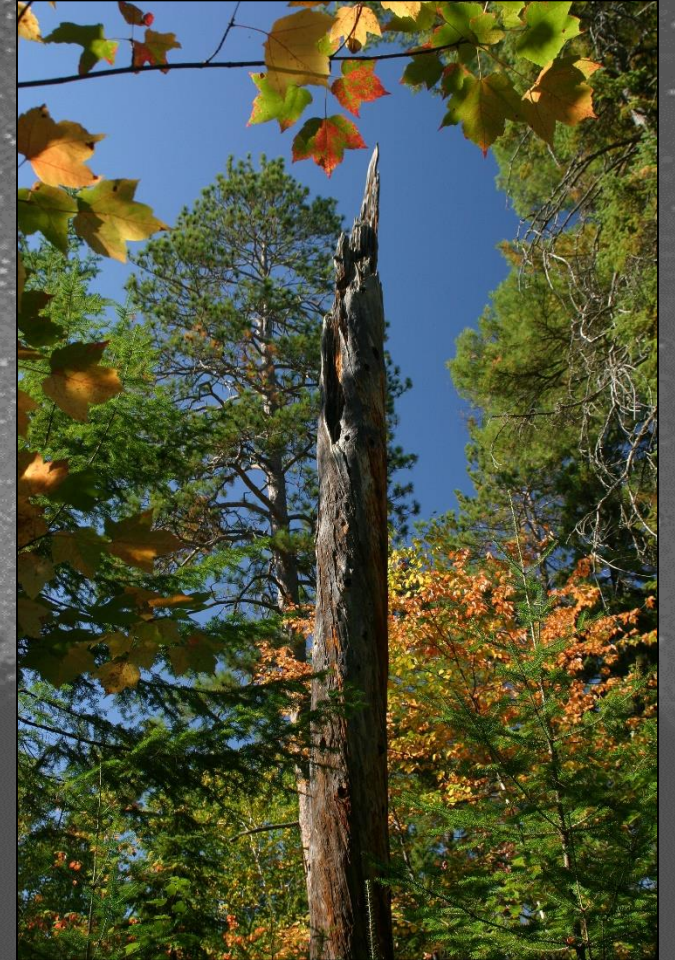
Avoid further spread
Decontamination



WNS in Nebraska



Habitat
Habitat
Habitat!



How can the public help?



Primum non nocere



You don't have to actively try to help bats to do good...



...just avoid doing additional harm

Timing tree clearing

- Cut between Oct. and March 15
- Avoid removing snags if possible



Exclusion efforts

- Avoid excluding during summer months
- Use reputable exclusion experts
- Install bat houses well in advance



Avoid Entering Caves

- White-nose syndrome is easily spread cave-to-cave
- Avoid recreational caving
- If you have been in an eastern cave, avoid western caves!



Help out the bats

You can also do things to help out bats!



Bat Houses

- 60 % occupied within 2 years
- Tall designs (>25") are best
- Bats like it hot!
- Avoid trees
- Keep out wasps
 - No spraying!
- Use BCI's plans



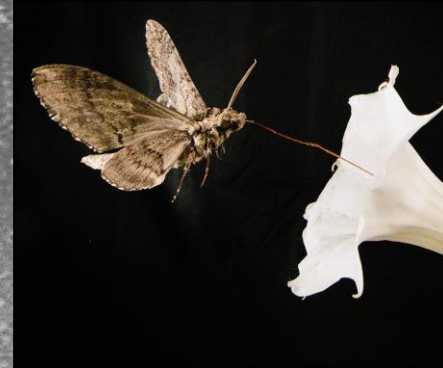
Stock Tank Ladders

- Many animals drown in stock tanks including bats.
- Ladders help provide an exit.
- Costs: \$45-60/8 ladders
- Required at NRCS watering facilities



Bat Friendly Gardens

- Bats need food, water, and shelter.
- Plants to attract moths
- Water features
- Maintain roost structures or bat houses.



Spread the word!

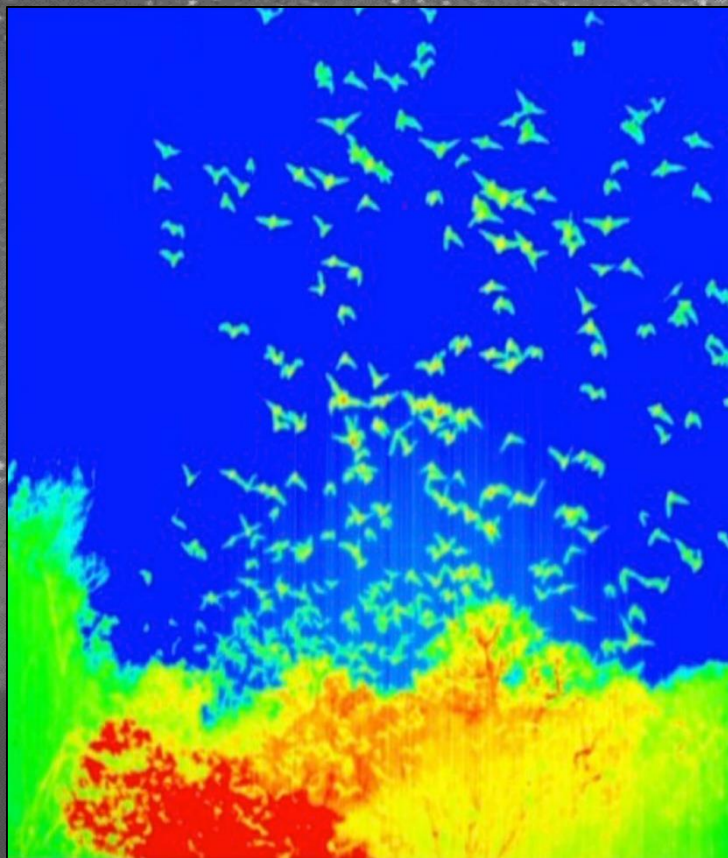
- Get the word out about bats!
- Citizen Science
- Join or donate to bat conservation groups
- Attend bat viewings
- BioBlitz
- Batcon.org
- Batconservation.org



How do we Study Bats?



Studying Bats: Caves



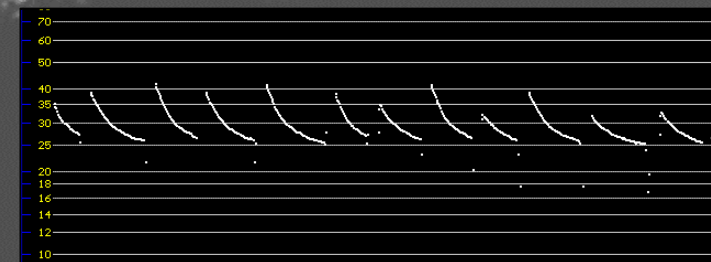
Studying Bats: Mist Netting



Studying Bats: Telemetry



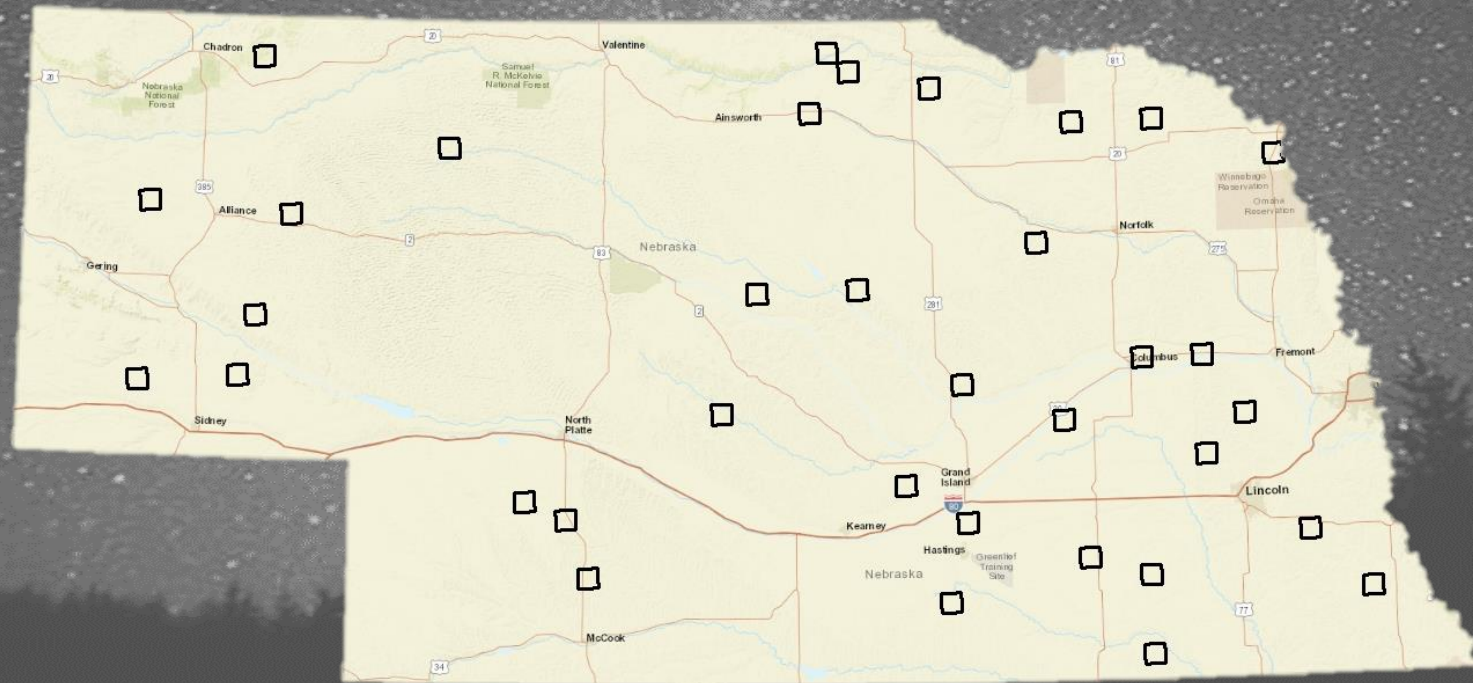
Studying Bats: Acoustics



North American Bat Monitoring Program (NABat)



Nebraska NABat



Nebraska NABat

Stationary Detector
Deployments



Car Driving
Transects



Nebraska NABat

Work with over 100 private landowners

Help from dozens of volunteers

Nebraska NABat

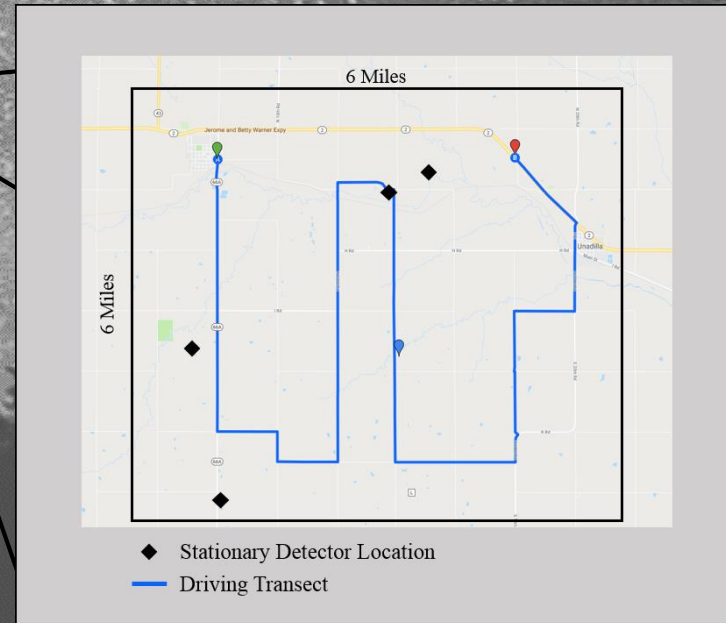
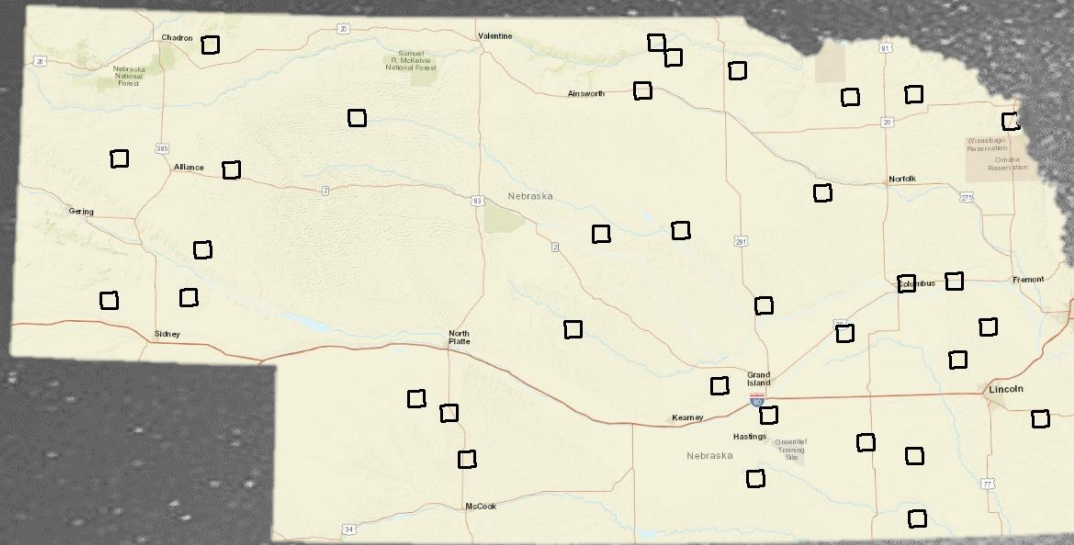
Work with over 100 private landowners

Help from dozens of volunteers

4 Years of successful data collection

2 More years of funding

Nebraska NABat



Nebraska NABat

Establish an early warning system for
common species decline

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common species decline

Determine what landscape characteristics
influence higher levels of bat activity for each
species

Nebraska NABat

Establish an early warning system for common species decline

Determine what landscape characteristics influence higher levels of bat activity for each species

Increase public awareness and involvement in bat research

Questions

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