

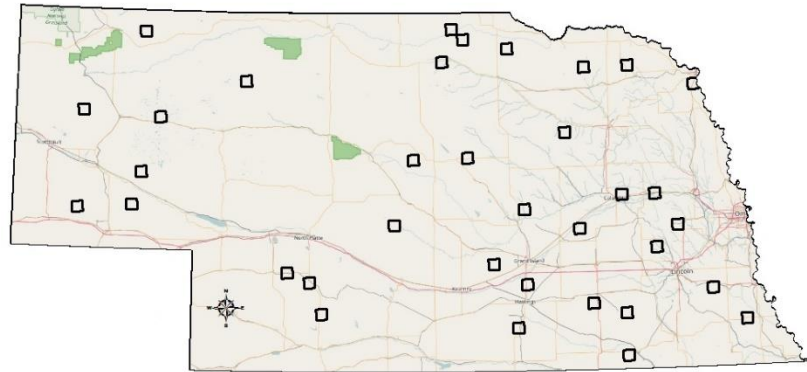


PROJECT OVERVIEW

The North American Bat (NABat) Monitoring Program is a research protocol that monitors bats across large landscapes. We plan to use this protocol to increase our understanding of bat populations and habitat use, which will promote long-term viability of bat populations across Nebraska and North America.

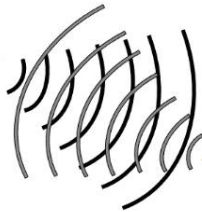
Starting in the summer of 2016, our team implemented this protocol to answer questions specific to bats in Nebraska. We established 127 sites and over 840 miles of road transects throughout the state. These locations will provide vital information about bats for years to come.

Nebraska Study Areas



□ - NABat Grid cell (2-4 Stationary detectors)

HOW DO WE STUDY BATS IN NEBRASKA?



- - Bat Echolocation
- - Returning Sound Waves

Using Sound for Research

All Nebraska bats use echolocation to find prey and avoid obstacles in the dark. Bats bounce high frequency ultrasound off their surroundings and listen to the response to navigate and eat insects in total darkness.

We use sensitive Ultrasound Acoustic Detectors to record the ultrasound that bats emit. Since each species of bat emits a unique pattern and call shape, we can use computer analysis to identify which bats are in the area.

THE TWO STUDY METHODS OF NEBRASKA NABat

I. Stationary Sound Detectors

- We place Ultrasound Acoustic Detectors at stationary points on public and private land. These detectors passively record bat echolocation from dusk till dawn for 4 to 6 days.
- We take detailed site measurements around each detector to record the habitat characteristics that may influence bat presence.



II. Car-based Driving Transects

- An Ultrasound Acoustic Detector is attached to the roof of a vehicle.
- After sunset, we drive a 15- to 30-mile transect at 20 mph on the roads near stationary detectors.
- Since we drive faster than bats can fly, we assume that each bat detected is a unique individual. This gives us a view into the bat population of Nebraska.

GENERAL INFORMATION ABOUT NE BATS

Bats are Everywhere in Nebraska

There are 13 bat species found in the state. Nebraska is particularly interesting since it is situated where Eastern and Western bat species overlap in the United States.

Bats are considered important species to ecosystems since they are influential in controlling insect populations. However, because bats have long lifespans (30+ years) and usually a breeding pair only has one young per year, bat populations are especially vulnerable to decline due to threats such as habitat destruction or catastrophic decline from invaders and large mortality events.



Corn Earworm;
an agricultural pest

Bats provide an estimated over \$3.7 billion per year in pest control for US agriculture

All of the bats of Nebraska eat insects and contribute to controlling their populations. Many bats eat equal to or greater than their body weight in insects each night. This results in huge reductions to agricultural pests like the corn earworm, which has been estimated to increase corn yields by 1.4% annually.

MAJOR THREATS FACING BATS TODAY

White Nose Syndrome

White Nose Syndrome (WNS) is a non-native fungus that has decimated North American bat populations in recent years. First documented in New York in 2006, WNS has since spread throughout much of the United States, including Nebraska. WNS specifically attacks bats while they hibernate and causes greater than 90% mortality in many species.

Although scientists are working very hard to combat this epidemic, there is no reliable solution at this time.



Collisions with Wind Turbines

Because many bat species migrate, collisions with wind turbines have become an increasing concern. Wind turbines kill over 1 million bats each year in North America.

Given the recent expansion of wind energy throughout the United States, scientists and energy experts have been working diligently to reduce the rate and risk of bat mortality at wind turbine facilities.