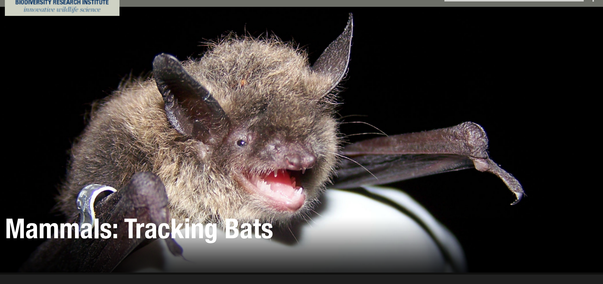

Mammals: Tracking Bats

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Identifying Late Summer Activities and Habitat Preferences of Remnant Populations of Myotis Bats in Acadia National Park, Maine

Acadia National Park was known to have vibrant populations of at least three *Myotis* species, including northern long-eared bats, prior to the discovery of White Nose Syndrome in little brown bats in the winter of 2011-2012. Since then all *Myotis* populations have suffered from the spread of the fungus. Low captures of northern long-eared bats and little brown bats confirm the numerous reports of dead and dying bats the park received in the winter of 2011-2012. Determining late summer and early fall locations and activities of remnant individuals or populations of northern long-eared and little brown bats will inform conservation efforts integral in their survival.

The purpose of this project was to find remnant populations of northern long-eared bats (*Myotis septentrionalis*) and other *Myotis* species, and to identify the key activities and important habitats supporting these bats in Acadia National Park, abutting lands on Mount Desert Island, and in mid-coast Maine. Northern long-eared bats, once the second most common bat species, are now found only in extremely low numbers and scattered across much of the southern areas of Mount Desert Island. Other species such as little brown bats (*Myotis lucifugus*) and eastern small footed bats (*Myotis leibii*) have been found scattered in low numbers across the park and island area.

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Contributing Investigators: Mandy Bailey, Caroline Byrne, and Morgan Ingalls

Background

In April 2015, northern long-eared bats were listed as Threatened, 4(d), under the Federal Endangered Species Act. Similarly, in the State of Maine, little brown bats and northern long-eared bats are now listed as endangered, and eastern small-footed bats are listed as threatened. These bat species were once common to Maine and New England; however, recent surveys have shown that populations of at least two *Myotis* species (northern long-eared and little brown) have suffered severe declines in recent years.

Our work in Acadia National Park in 2014 provided the first look at how this remnant, post white-nose syndrome population is distributed across the park and the island's rugged landscape, and how the individuals are using the many habitats found there. Following up, we concentrated on identifying the activities of, and habitats used by, *Myotis* bats.

Objectives

Our objectives were to learn the life history activities of remnant individuals of *Myotis* bats in the greater Acadia National Park area for the period beginning in the late summer and through the early fall. Specifically, we sought to identify activities (e.g., roost selection, foraging, movement patterns, swarming activities, and direction of migration to hibernacula, etc.) during this late season and critically important activity (e.g., breeding) period as it relates to the run-up to and beginning of the migration to hibernacula.

The overarching objective was to learn about remnant populations of Maine's mid-coast *Myotis* bats, specifically those originating from the park. Learning the activities of post-*Pd* surviving bats for the late summer in the mid-coast area of Maine may give the park and other managers an idea of the remaining population and where these resilient, or perhaps resistant, individuals are hibernating.

Methods

- Mist Net Capture: We established 12 trapping locations on park lands in mixed forests
- Roost Homing: Bats were tracked to day roosts and followed by plane (weather permitting) for the first one to two hours after emergence
- Foraging: Bats were followed by plane during the first one to two hours of foraging (weather permitting)

What We Found

Eighty-seven bats were captured at 12 different sites across Mount Desert Island between August and October 2015. The proportion of little brown bats and northern long-eared bats captured in 2014 and 2015 remained lower than in previous years, except 2013, although more sampling occurred in 2014 and 2015 than in 2013. While eastern small-footed bats dominated the latter portion of the capture period, little brown bats were captured until September 29 2015, 24 days later than the last captpure of a little brown bat in 2014. Similarly, the only northern long-eared bat captured in 2015 was captured September 14, 2015, nine days later than the last capture of a northern long-eared bat in 2015.

In 2015, we calculated units of effort expended in mist netting by multiplying the number of hours mist nets were open by the area of the nets deployed. In 2015, we expended 33,361 units of effort, which, divided by the total number of Myotis species captured, resulted in 0.00234 bats per unit of effort. The 428 units of effort required to catch a single bat in 2015, compared to 120 units in 2012 and 28 units in 2009, demonstrates a decline in these species.

Significance

Our findings provide insight into direct and indirect actions that managers, conservation groups, and landowners can implement in the conservation of these species. They also shed light on how remnant individuals or populations are surviving given their continued exposure to *Pseudogymnoascus destructans* (*Pd*) from other populations, infected hibernacula, or other commonly used roost sites.

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