

Using stable isotopes to identify population dynamics of bats at Acadia National Park, Maine

2009



UNIVERSITY OF
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USING STABLE ISOTOPES TO IDENTIFY POPULATION DYNAMICS OF BATS AT
ACADIA NATIONAL PARK, MAINE

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WILDLIFE SCIENCE CHANGING OUR WORLD

SUBMITTED BY:

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FRONT PHOTO CAPTION: *Eastern small-footed bat with numbered band on wing; Passive bat detector at marsh edge, recording calls nightly. Photo provided by T.Divoll.*

PUBLIC INTEREST HIGHLIGHTS

In order to help managers, agencies, developers, and policy makers in planning future wind farms and tracking the spread of white-nose syndrome (WNS), I began a pilot study to better understand the species composition and size of the bat population in Acadia National Park, Maine. Both wind development and WNS are current environmental factors that have great potential to impact bat populations. I conducted the following field work:

- I used mist nets to capture live bats at 13 different sites at Acadia National Park on Mount Desert Island during June, August, and September. All captured bats were banded and standard measurements taken. Additionally, I collected tissue samples for stable isotope analysis. Each bat was then released on site. These samples will be useful in determining which bats are breeding residents and which ones are migrants. It may also be possible to determine the origin of migrant bats with stable isotopes.
- Passive bat detectors were used to autonomously record bat calls to verify that species' calls are consistent with bat species being captured in nets. The timing of calls recorded will help determine when resident bats may leave the park and migrants may enter the park.
- To better understand movements of temperate bats, I will submit data containing band numbers, date, and capture location to the joint Southeastern Bat Diversity Network and Northeast Bat Working Group database. This will allow other researchers to recapture the same bats elsewhere and determine where the bats were originally banded.
- Researchers in other states conducting fall swarming or winter hibernacula WNS surveys may also obtain band returns. This will help determine if the bats in Maine intersperse with bats in WNS affected states (WNS has not been documented in Maine yet, though it is expected to spread this winter).

2009 ACCOMPLISHMENTS

- I banded 396 individual bats of six different species at Acadia National Park. Although the majority of those were little brown bats, 21% were northern long-eared bats and 11% were eastern small-footed bats. All of the bats caught are likely local migrants.
- I captured two hoary bats and one red bat, which likely were migrating from Maine, Canada, or Greenland and to at least the Carolinas and Florida, or possibly beyond (both species are found on Bermuda in the winter).
- I recaptured two bats in the park: one little brown banded in early June and recaptured at the same site in late August and one eastern small-footed banded in early June and recaptured at a different site within the park in late August.
- I recorded thousands of bat calls and am currently analyzing the electronic files.

PROPOSED 2010 FIELD EFFORTS

- Continue capturing, banding, and sampling bats, starting in early May and going through the month of September.
- To assess seasonal use of the park by different species, place passive bat detectors at the two sites with the most individual bats and highest species diversity.
- Send out tissue samples for stable isotope analysis to determine the percentage of the bat population at Acadia that are residents or migrants and track how this ratio may change depending on the season.
- I will present these data at the University of Southern Maine and either Acadia National Park headquarters or the Schoodic Education and Research Center.
- I will use these data to produce a Master's thesis and submit a paper to a peer-reviewed scientific journal.