NORTHEAST REGIONAL CONSERVATION NEED GRANT QUARTERLY REPORT

Grant Number: 2007-09
Grant Title: Exploring the Connection Between Arousal Patterns in Hibernating Bats and White Nose Syndrome: Immediate Funding Needs for the Northeast Region
Grant Receipt: Bucknell University
Grant Contact Name: DeeAnn M. Reeder, Department of Biology

PROJECT ABSTRACT (final report)

The objective of this project was to determine if the hibernation patterns of bats affected by the emerging infectious disease "White Nose Syndrome" (WNS) are disrupted. This study addressed the hypothesis that WNS bats are either arousing too frequently from torpor or exhibiting prolonged periods of euthermy ('normal' body temperatures) during the winter, either of which would cause them to starve to death by prematurely depleting stored body fat. A total of 14 field sites in six states were studied during either the 2008-2009 winter or the 2009-2010 winter. Morphological data were collected from several hundred bats prior to the hibernation season, just prior to attaching a temperature sensitive datalogger (iBBat, WeeTag Lite, or Bucknell University Temperature tracker – made in the PI's lab) or a radiofrequency (RF) transmitter (the pulse rate of which varied by body temperature). RF data were collected remotely; data from the dataloggers were collected after recapture in the spring of each year. For recaptured bats, morphological data were again collected, allowing for determination of body mass index. To control for the effects of hibernacula microclimate on torpor patterns, temperature sensitive dataloggers (ibuttons) were deployed at each field site. Data analysis for this large study is ongoing, as some dataloggers were retrieved from the field at the end of March, 2010. The first of at least three papers that will stem from this study is in preparation for submission to the journal *Nature.* Using the funds from this grant, we have been able to very clearly demonstrate that WNS affected bats arouse from hibernation significantly more often than healthy bats, which leads to their starvation. This highly significant effect is independent of initial body condition and hibernacula microclimate, which are both known to influence hibernation patterns. As such, this is a VERY important finding.

While this project is now officially completed (grant period ended 03/31/2010). However, because of the importance of these findings, and the continued rapid spread of WNS, we will continue to monitor hibernation patterns in WNS affected bats using the supplies purchased with this grant supplemented by those purchased with other funds. Approximately 150 dataloggers are available for studies next winter, during which bats in several sites will be surveyed for their third. This will provide for longitudinal analysis of the influence of WNS on a given hibernaculum over time (e.g., in an unaffected year, during the first year of infection, when mortality is high but some survivorship occurs, and in the second year of infection, in which nearly all remaining bats will perish).