Annual Report: Natural Resource Program Center Funded Projects

Fiscal Year Project First Funded: 2014

Project Name: Current Status and habitat associations of the endangered Indiana bat and three other bat species of special concern on the Cache River NWR.

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Project Location: Cache River National Wildlife Refuge

Project Goal: Assess population status and distributions of bats in the Cache River National Wildlife Refuge especially the southeastern myotis (*Myotis austroriparius*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), Indiana bat (*M.* sodalis) and northern long-eared bat (*M. septentrionalis*). Additionally we are looking at the roosting ecology, habitat use and preference.

Objectives are to:

(1) Survey Cache River NWR using acoustic sampling and mist nets to establish baseline population status and distributions for the previously mentioned bat species.

(2) Locate maternity colonies and/or roost sites and determine micro- forest habitat characteristics of selected maternity colonies and/or roost and foraging habitats for the different bat species using radio telemetry, habitat sampling and analysis techniques.

(3) Determine maternity colonies and/or bat roost sites and foraging habitat preferences through sampling, comparison, and analysis of used vs. unused habitats with habitat sampling assistance from USFWS personnel and other partners as needed.

(4) Share data/knowledge acquired from this research project and work with bat experts and experienced habitat management foresters and wildlife biologists (partners) to create "Habitat Management Guidelines" that could possibly be used across the landscape..

Project Measureable Objectives (Year 1): Identify a minimum of ten roost trees and assess microhabitat of identified roosts as well as assess presence/absence via mist-net efforts.

Project Measureable Objectives (Long-term): Identify a minimum of twenty roost trees and assess microhabitat. Identify patterns of selection of roost trees.

Assessment of Short-term Performance (Year 1):

- More than 90% of conservation objective achieved.

Assessment of Long-term Performance this year:

- Less than 70% of conservation objective achieved

Project Status:
Mist-netting of forest canopies for the presence/absence of bats was conducted in the Cache River National Wildlife Refuge. Three acoustic detection devices were deployed in proximity to nets. A southeastern myotis with a mass of 6.5g or higher was eligible to be transmitted. Females were given priority over males in order to locate maternity roosts. Bats were radio-tagged with 21-day or 14-day transmitters. Radio-tagged bats were then tracked for the life of the transmitter. Upon finding roost trees, microhabitat data (tree species and diameter at breast height (DBH)) within 5m and 11.3m were collected. For each roost tree, a random tree was chosen and the same microhabitat data were collected.

Several modifications will be implemented to the 2015 field season to help reach the set goals. A 14-day transmitter will replace the 21-day transmitter. The sacrifice of battery life will increase the range of the transmitter by ca. 250 m. Night vision will be used to identify if chimney openings are in use. Access to a boat to track the bats down lotic flyways will also be implemented to ensure the success of this study.

A total of 279 individuals representing five species of bats (*Myotis austroriparius*, *Corynorhinus rafinesquii*, *Lasiurus borealis*, *Nycticeius humeralis*, *Perimyotis subflavus*) were captured over 117 net nights between May 25, 2014 and August 10, 2014. Acoustic data were analyzed using Echoclass v2 Britzke and suggest the presence of several bat species that were not physically captured nor visually identified at any time during the summer, such as *M. grisescens*, *M. leibii*, and *M. septentrionalis*. This may be due to similarity of call characteristics in the Myotis genus. Southeastern myotis calls were recorded this summer to help build on the current Midwest Call library. Acoustic data will be re-analyzed using Bat Call Identification East using Midwest Call library and compared to Echoclass.

Thirteen *M. austroriparius* were radio-tagged. One radio-tagged bat was believed to be a *M. septentrionalis*, after reviewing photographs, it was changed to a *M. austroriparius*. Seven bats were successfully tracked to their roosts. Three bats were tracked to more than one tree and two bats used the same roost but at different times. Four bats used only a single tree. In total twelve roost trees were recorded: nine trees were identified as water tupelo (*Nyssa aquatica*), one red maple (*Acer rubrum*), one black gum (*Nyssa sylvatica*), and one sweet gum (*Liquidambar styraciflua*). Exit counts were conducted at roosts.

One *N. aquatica*, identified as roost tree number 3 for bat 150.868, was harp-trapped on 6, August 2014 with 98 *M. austroriparius* caught. The same tree was harp-trapped on September 4, 2014 with 82 caught. Ninety-four individuals were banded on 6, August 2014. An additional eighty-one individuals were banded on 4, September 2014 with no recaptures from 6, August 2014.

Several variables were measured on the roost trees such as diameter at breast height or DBH (cm), canopy coverage (%), tree height (m), and basal area. A random number generator was used to determine direction and distance from the roost tree to a random tree. Program R was used to analyze the data. A Rank-signed Wilcoxon test was run to discern if there were any significant differences between the median of variables between roost trees and random trees. Results show significance in all the variables except tree height.