Final report for faculty research grant

Jorista van der Merwe

Project title: Bat foraging ecology before and after prescribed burns

Principle Investigator: Dr. Jorista van der Merwe

College: CNHS

Department: Biological Sciences

Amount Requested: $1,891.00

Amount used: $1,891.00

Project duration: August 2016 – August 2018

B.

Multiple bat species throughout North America are threatened or endangered as a result of diseases, habitat fragmentation and climate change. Both wild fire and prescribed burns alter habitat structure and the effects could spill over to both tree-roosting and cave-dwelling bats. Fire not only changes the physical structures of forests, which affects foraging efficiency of bats, but also impacts food sources. Our objectives are 1) to determine if burns affect bat foraging ecology, and 2) to investigate changes in bat occupancy before and after burns. We started fieldwork in April 2016 (it is still ongoing) and used acoustic bat detectors (that were purchased using the grant money) to record bat-echoes, enabling us to identify bat species in burned and control units over a 9-month period. Acoustic data, together with invertebrate abundance, will be used to model spatial and temporal changes in bat foraging activity and occupancy as a result of prescribed burning.

C.

The project is being done on National Park Service land, located in the Buffalo National River area, in NW Arkansas. Thus far we have sampled 20 burned and 20 unburned sites. At each site we had acoustic detectors deployed for 3 nights at a time, and we trapped insects for a 12 hours period (at night). In July we started resampling all 40 of the previously sampled sites. By resampling these sites we should be able to determine if there are temporal changes to bat occupancy, and if that is driven by changes in insect abundance.

D.

Up to date we have recorded 105,600 bat calls, from 220 nights of trapping. We are still sorting through data, but we have positively identified 14 bat species at burned sites and 13 species at unburned sites. Based on naïve occupancy numbers it seems like occupancy is lower at unburned

sites (0.22) than at burned sites (0.41). In addition, we have identified all of the trapped Lepidoptera (moths and butterflies) species. Our results indicate ~54 Lepidoptera species, with much higher biomass at burned sites (205g) than at unburned sites (188g).

E.

The project will only conclude in summer of 2018, by which time we should have clear results and recommendations to make to National Park Service. The first set of results from this project will be presented as a poster at the North American Society for Bat research, by my graduate student, in October. A portion of the insect data is looked at and analyzed by and undergraduate student, who will be presenting her portion at the undergraduate research symposium in March 2018.