RESULTS OF THE ACOUSTIC SURVEY OF BAT POPULATIONS WITHIN THE WICHITA MOUNTAINS WILDLIFE REFUGE

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Introduction

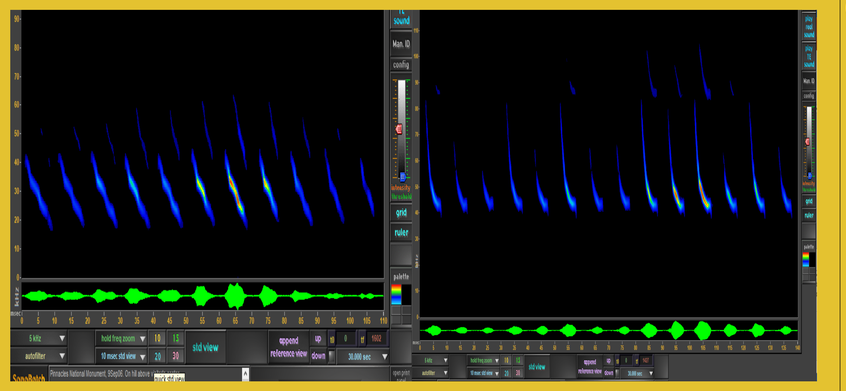
- Wichita Mountains Wildlife Refuge (WMWR) comprises 59,020 acres of federally protected land
- Home to approximately 50 species of mammals but exactly which species of bats present is not well known.
- Published records of bats sampled on the refuge predate 1963 (Glass and Halloran 1961) and the WMWR's own record is also outdated and incomplete (WMWR, n.d.).
- Objective was to establish a more complete record of the diversity of bats present within the refuge.
- Original plans included the use of mist nets to catch and physically identify bats.
- Permission to handle bats was denied due to covid-19 transmission risk therefore we utilized ultrasonic recording devices to non-invasively survey six locations within WMWR from April – November 2021 (Fig 1).
- All six locations are a mixture of mixed-grass prairie and forests with vegetation primarily dominated by *Schizachyrium scoparium* (Little Bluestem), *Quercus stellata* (Post Oak), and *Juniperus virginiana* (Eastern Red Cedar).
- All locations, except for French Lake location, have large granite outcroppings (Fig 2).

Figure 1: Map of WMWR sampling area. Stars mark sampling sites.

Methods

- Utilized five Wildlife Acoustics Song Meter Mini Bat Ultrasonic Recorders and one Wildlife Acoustics SM4 Acoustic Recorder.
- Recorders were left at sampling sites for entire sampling period.
- Recorders were checked every two weeks for recordings.
- Noise files were removed and the remaining recordings were batch processed in Sonobat 4.
- Batch processes were run against North Texas and Eastern Arizona reference databases (Fig 3 and 4).
- If the overall likelihood of presence was >0.9 we accepted the identified species as present within the site.
- We performed manual verification of individual files if the species had an overall likelihood of presence < 0.9 but single recordings with values >0.9.

Figure 2: Image taken at Post Oak Lake sampling site.



Figures 3 and 4: Example of *Corynorhinus townsendii* (left) and *Myotis velifer* (right) recordings.

Results

- We report the detection of *Myotis velifer, Nycticeius humeralis, Lasiurus borealis, Lasiurus cinereus, Eptesicus fuscus, Lasionycteris noctivagans, Tadarida brasiliensis, Antrozous pallidus, Corynorhinus townsendii,* and *Nyctinomops macrotis*.
- Each species was detected at least once during the sampling period at each site and each species was detected every month somewhere in WMWR.
- We detected either *Parastrellus hesperus* and *Perimyotis subflavus* at every site as well, however we were unable to differentiate between the two.
- We also recorded *Eumops perotis*, but as this species was only recorded once we didn't feel confident in confirming it's presence.

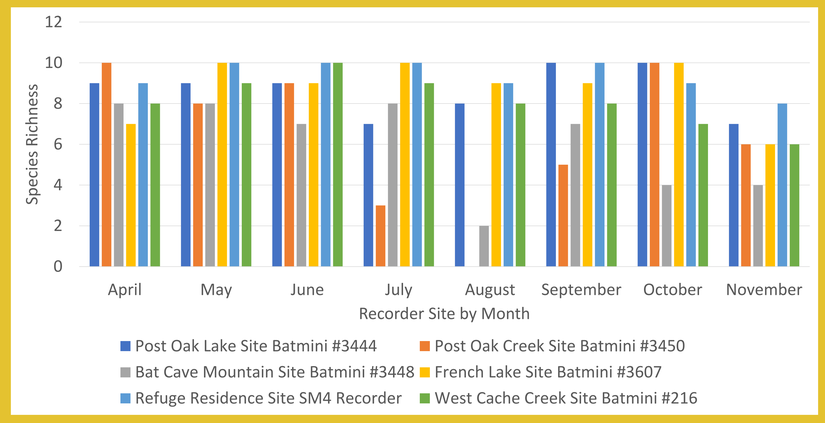


Figure 5: Bar graph representing species richness at each location for each month during the sampling period.

Conclusion

- Species richness decreased at Post Oak Creek and Bat Cave Mountain during late summer do appear to be impacted by intense heat and droughts.
- There are no published records of *E. fuscus, E. perotis* and *N. macrotis* in Comanche County (Caire 1989 and Braun 2020), but *E. fuscus* was acoustically recorded in Comanche County in another study (Brandi Coyner pers comm).
- *Myotis ciliolabrum* has been caught in Comanche County before, but we were unable to confirm it's presence in the WMWR.
- Acoustic survey methods used to derive reliable estimates of species occurrence are well established (Blumstein 2011). However, it is not a perfect substitution for mist net sampling.
- Moving forward we need to use mist nets to sample the bat populations in the WMWR to confirm the presence of *E. perotis, E. fuscus, N. macrotis, M. ciliolabrum, P. hesperus,* and *P. subflavus*.

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