Bats of the Devils River State Natural Area- Big Satan Unit, Val Verde County, Texas

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ABSTRACT

...ermine the species diversity and community composition at Devils River State Natural Area (DRSNA) . Big Satan Unit, as part of ongoing research with ...t. The DRSNA is a 38,000-acre preserve situated along a 10.8-mile stretch of the Devils River in Val Verde County, 40 miles north of Del Rio, Texas. A ...cho Meter EM3+ Ultrasonic Recorder, was used to detect species based on echolocation calls. Calls were recorded along an 8-mile long transect route ...DRSNA, and at three stationary netting sites around the survey area. Echolocation calls vary among bats allowing species to be identified in flight. An ...cope, was used to analyze the sound files recorded. Kaleidoscope is an integrated suite of bat data tools designed to help quickly convert files, and sort ...a total of 3,845 sound files recorded so far, 699 have been recognized as good bat echolocation calls that can be used to identify species, while 3,146 ...results found seven species (*Lasiurus borealis, Lasiurus cinereus, Lasionycteris noctivagans, Nycticeius humeralis, Parastrellus hesperus, Perimyotis subflavus, Tadarida brasiliensis*) present at DRSNA. We will continue to collect data for the next year and hope to predict bat species distributions, map centers of high diversity, and identify key conservation areas at Devils River.

INTRODUCTION

The Devils River State Natural Area (DRSNA) is a 38,000-acre preserve situated along a 10.8-mile stretch of the Devils River in Val Verde County, 40 miles north of Del Rio, Texas. Because this area is at the juncture of the Chihuahuan, Balconian (Edwards plateau), and Tamaulipan Biotic Provinces, it is an important location for understanding the biogeographic and faunistic relationships among southern Texas vertebrates. A biological survey of mammals, birds, reptiles and amphibians for DRSNA was conducted from 1998-2001 (Brant and Dowler, 2001). That study addressed the vertebrate fauna of the 17,639 acres now termed DRSNA- North Unit. In 2011, 19,988 acres were added and termed DRSNA- South Unit, or Big Satan Unit (BSU). Because DRSNA-BSU is a larger area with much greater frontage along the Devils River, a similar baseline assessment of this site was warranted. Currently a survey of bats is being conducted to determine the species diversity and community composition at DRSNA-BSU, as part of that baseline assessment of the south unit and ongoing research being conducted in conjunction with the Texas Parks and Wildlife Department (TPWD). Bat echolocation calls have been collected and are being used to detect species. Calls have been recorded for a total of 8 months from July 2013 through March 2014.

MATERIALS AND METHODS

˝Recording calls: A handheld acoustic monitoring device, the Echo Meter EM3+ Ultrasonic Recorder, was used to detect and record echolocation calls. The EM3+ records to16-bit full spectrum WAV files allowing for analysis in compatible software. The files were recorded at an audio sample rate of 256khz.

˝Transects: Sound files were recorded along an 8-mile long driven transect route that runs generally west to east across DRSNA-BSU (Fig. 1). The transect route transitions from a lower elevation to a higher elevation, starting at the river and ending by the main entrance gate to the park. Transect data were collected by driving the route at 15mph approximately 30 minutes after sunset. The EM3+ was held in the back of the truck with the microphone facing upwards.

˝Stationary Netting Sites: Sound files were also recorded at three stationary netting sites around the survey area. As part of the overall research project being conducted, relative density estimates also are being obtained through the use of mist nets (Ammerman et al., 2012) . The EM3+ was placed in a stationary position alongside the nets at these four netting locations (Fig. 1).

˝Analyzing calls: Echolocation calls among bat species vary, allowing different species to be identified by analyzing their echolocation calls (Parsons et al., 2009). An analysis software system, called Kaleidoscope, was used to analyze the sound files recorded. Kaleidoscope is the compatible analysis software for the EM3+ recorder and is an integrated suite of bat data tools designed to help quickly convert files, and sort and categorize bat data by species. During file processing, Kaleidoscope applies classifiers to attempt automatic species identification. For this project the North American Bat classifier was used, and only those species likely to occur at DRSNA-BSU were selected.
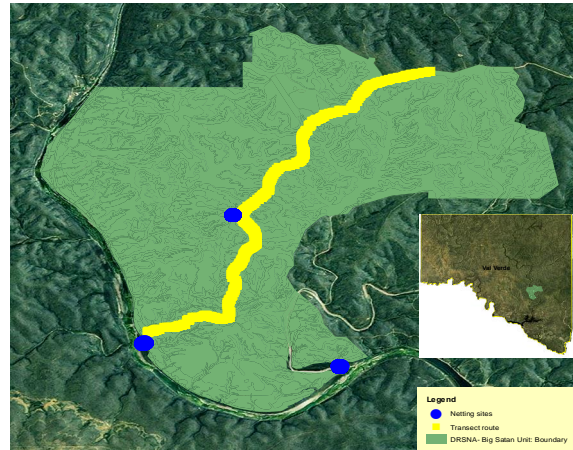

Figure1. Devils River State Natural Area- Big Satan Unit with transect route and netting sites.

Legend
- Netting sites
- Transect route
- DRSNA- Big Satan Unit: Boundary

Results

A total of 3,845 sound files have been recorded so far. 699 have been recognized as good bat echolocation calls that can be used to identify species. Eliminated from analysis were 3,146 labeled as noise files. Noise files include sounds such as insect noise, background noise, and potentially bat echolocation that has insufficient data to analyze. Because the Kaleidoscope software is limited to the 20 species available in its North American classifier, 472 of the good calls were not identified to species (NOIDs). These calls will be manually analyzed to determine species as part of the bigger research project. The remaining 227 calls that were identified to species were used for this project. Preliminary results found seven species (*Lasiurus borealis*- Eastern red bat, *Lasiurus cinereus*- Hoary bat, *Lasionycteris noctivagans*- Silver-haired bat, *Nycticeius humeralis*- Evening bat, *Parastrellus hesperus*- Western parastrelle, *Perimyotis subflavus*- Eastern perimyotis, *Tadarida brasiliensis*- Mexican free-tailed bat) present at DRSNA-BSU. Species diversity varied month-to-month with the lowest number of species detected in October at 0 species, and the highest number of species detected in February at 6 species (Fig. 2). Although there were no species identified from the data collected in October, there were good bat calls recorded and labeled as NOID. Further manual analysis of these calls will allow for species identification. Species diversity also varied between recordings collected via the transect route and those collected at stationary netting sites. Only four different species were detected along the transect route while seven species were detected at the netting sites. This too will be analyzed in the future.
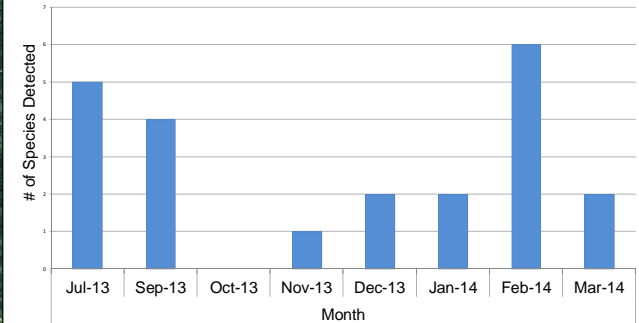

Figure 2. Variation in species diversity on a month-to-month basis. Numbers shown represent data collected both via transect route (Sep-Mar) and at stationary netting sites (Jul, Sep, Jan, Feb).

Figure 3. *Tadarida brasiliensis* (Mexican free-tailed bat) in flight.

DISCUSSION

Devils River State Natural Area is a diverse location and is an important conservation zone. There are a total of 16 different species of bats that may occur at DRSNA-BSU (Ammerman et al., 2012). Through continued research effort we hope to identify additional species in the survey area. We will continue to collect data for the next year and hope to predict bat species distributions, map centers of high diversity, and identify key conservation areas at Devils River using geospatial technology.

LITERATURE CITED

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ACKNOWLEDGMENTS