

DOCUMENTATION OF THE NORTHERN LONG-EARED MYOTIS, *MYOTIS SEPTENTRIONALIS* ON THE STANDING ROCK INDIAN RESERVATION

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ABSTRACT

Since 2006, the northern long-eared myotis (*Myotis septentrionalis*) has declined by 98 percent in the U.S. Northeast, where white-nose syndrome first appeared. Because of the species' strong association with large blocks of older forests, forest fragmentation, logging and forest conversion (such as clearing trees for agriculture and development) are major threats to its survival. In 2013, the US Fish and Wildlife Service designated the northern long-eared bat as threatened under the Endangered Species Act. The Standing Rock Sioux Tribe (SRST) was awarded a US Fish and Wildlife Tribal Grant to assess all small mammals on the reservation, including bats. Surveying for bat species on the SRST reservation included the use of Pettersson D500x passive terrestrial ultrasonic recorders, one of which was installed at a Moreau Prairie location in Sioux County, North Dakota. On 37 trap nights 143 bats from 10 species were recorded, among them the federally threatened northern long-eared bat. More sampling will be conducted to further investigate the diversity and abundance of bat species on Standing Rock Indian Reservation, and will contribute to the development of crucial conservation management programs on the reservation.

KEYWORDS

Northern long-eared myotis, Standing Rock Indian Reservation, Pettersson D500x, *Myotis septentrionalis*

INTRODUCTION

The northern long-eared myotis, *Myotis septentrionalis*, is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches (US Fish and Wildlife Service 2015). Fur color ranges from medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly in comparison to other bats in the

genus *Myotis*. The northern long-eared myotis spends winter hibernating in caves and mines, called hibernacula. High value hibernacula include draftless areas of high humidity and relatively high and stable temperature. Within hibernacula, northern long-eared bats most often hibernate in small crevices or cracks, often with only the nose and ears visible. During summer, the northern long-eared myotis roosts singly or in colonies underneath bark, in cavities, or in crevices of both live trees and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines, and less frequently in structures, like barns and sheds (Henderson and Broders 2008). The northern long-eared bat's range (Figure 1) includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia (US Fish and Wildlife Service 2015).

Of the six bat species known to be affected by white-nose syndrome, the northern long-eared is among the hardest hit. Since 2006, the northern long-eared has declined by up to 99 percent in the US Northeast, where white-nose syndrome first appeared (US Fish and Wildlife Service 2016). Because of the species' strong association with large blocks of older forests, forest fragmentation, logging and forest clearing are also major threats. Various human activities disturb hibernacula, including the effects of roost disturbance, control of economically important insect pests, exposure to pesticides, long-term monitoring of populations, and the potential consequences of expanding populations (Agosta 2002). In 2013, the US Fish and Wildlife Service determined that the northern long-eared myotis should be designated as threatened under the Endangered Species Act. Under the Endangered Species Act, a threatened species is likely to become endangered in the foreseeable future, while an endangered species is currently in danger of becoming extinct (US Fish and Wildlife Service 2016).

In 2012, the Standing Rock Sioux Tribe (SRST) was awarded a US Fish and Wildlife Tribal Wildlife Grant to assess the diversity and abundance of small

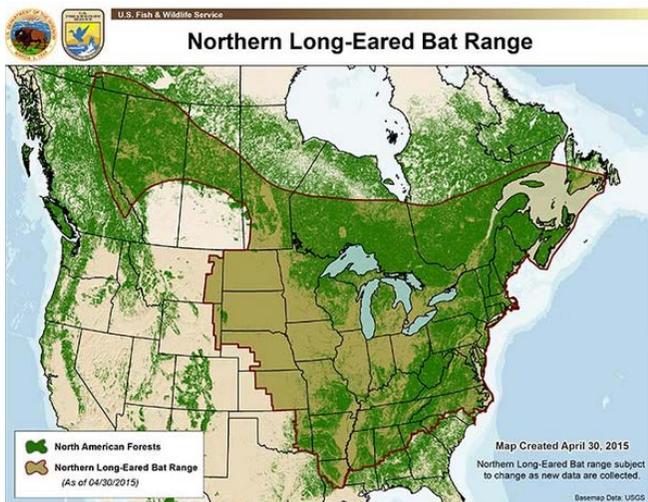


Figure 1. Northern long-eared bat range. Map courtesy of US Fish and Wildlife Service, 2015.

mammals, including bats, on its reservation. The reservation lies within the level III Northwestern Great Plains eco-region, while the specific site where the northern long-eared bat was detected is in the level IV Moreau Prairie eco-region, within a mile or two of the adjacent level IV Missouri Plateau eco-region (US Environmental Protection Agency 2015). The Moreau Prairie is characterized by buttes, badlands, salt pans and grasslands that typically have alkaline soils less suitable for agriculture than the soils of the adjacent Missouri Plateau (Omernik and Griffith 2008). Representative flora within the site of monitoring includes the following: tree stratum: green ash (*Fraxinus pennsylvanica*), bur oak (*Quercus macrocarpa*) and eastern cottonwood, (*Populus deltoides*); scrub-shrub stratum: chokecherry, (*Prunus virginiana*), coralberry (*Symphoricarpos orbiculatus*) and Missouri gooseberry (*Ribes missouriense*); forbs and grass stratum: blue grama (*Bouteloua gracilis*), white sagebrush (*Artemisia ludoviciana*), curlycup gumweed (*Grindelia squarrosa*) and prairie dropseed (*Sporobolus heterolepis*).

METHODS

We surveyed for bat species on the SRST reservation at a Moreau Prairie location (Figure 2) in Sioux County, North Dakota, known as Unit 41 (N 46° 10.18' W 100° 54.51'). Unit 41 is an area of mixed grass prairie that also includes bluffs, woody draws, scrub and short grass steppe. The land is extremely rugged, and has no regular human presence. There are no residences on Unit 41, and no hunting or other human incursion unassociated with managing Unit 41's bison and wildlife assets is allowed.

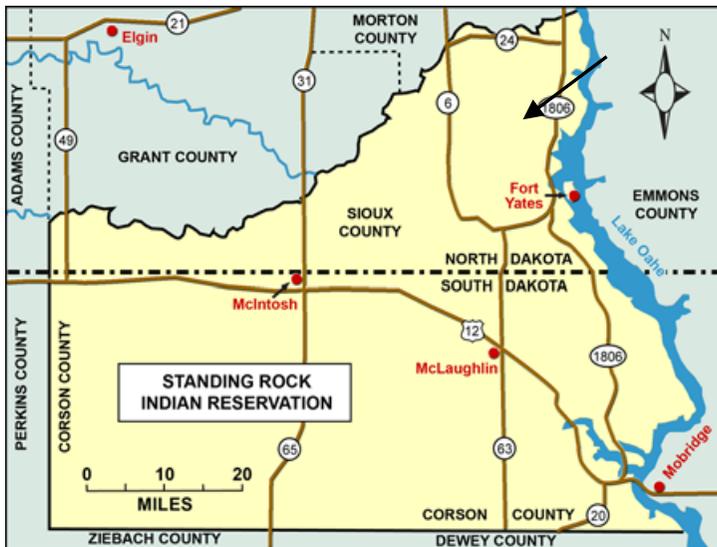


Figure 2. Map by county of Standing Rock Indian Reservation with an arrow indicating Unit 41 location.

An ultrasonic microphone was installed on a telescoping microphone mast, approximately 6 m high to minimize noise from vegetation and other interference. The data recording device, a Petterson D500x passive ultrasonic recorder (Bat Conservation Management, Carlisle, PA), was placed on the ground at the base of the microphone mast and protected from bison. Data were stored on compact flash cards, and were then processed and analyzed using the bat species identification software, SonoBat 3.2.1 (SonoBat, Deer Fern Ct, Arcanta, CA). Bat presence, in the form of vocalizations, was determined by frequency of occurrence of identified bat calls, thereby allowing us to estimate species presence.

RESULTS AND DISCUSSION

The monitor recorded from August 18, 2015 through September 23, 2015 for a total of 37 trap nights and yielded recordings from 143 bats from 10 different species. Most significantly, the federally threatened northern long-eared myotis was unequivocally documented. This is the first bat survey conducted within the 3,571.9 square mile Reservation, therefore the data gathered are crucial for benchmarking species diversity and abundance. Table 1 shows data from SonoBat 3.2.1 which reveal a total of 19 northern long-eared bat recordings on the device with an estimated likelihood of presence of 0.997494. Results demonstrated a relatively high diversity of bat species. Figure 3 shows the sonogram results from data analysis through the SonoBat program. Given that the northern long-eared myotis had an estimated likelihood of presence of 0.997494 suggests a very high chance of presence (Table 1). More sampling will be conducted to further investigate the diversity and abundance of bat species on the SRST reservation, and will contribute to the development of crucial conservation management programs on the reservation.

Table 1. The number of individual bats recorded from August 18, 2015 through September 23, 2015 at Unit 41 on the Standing Rock Reservation in North Dakota and the estimated likelihood of their presence.

Species	Number	Est. likelihood of presence
<i>Myotis leibii</i>	35	0.999919
<i>Myotis septentrionalis</i>	19	0.997494
<i>Myotis sodalis</i>	4	0.523413
<i>Myotis lucifugus</i>	1	0.192
<i>Perimyotis subflavus</i>	3	0.805231
<i>Nycticeius humeralis</i>	4	0.615933
<i>Lasiurus borealis</i>	11	0.999837
<i>Eptesicus fuscus</i>	20	0.981117
<i>Lasionycteris noctivagans</i>	38	0.999921
<i>Lasiurus cinereus</i>	8	0.998095

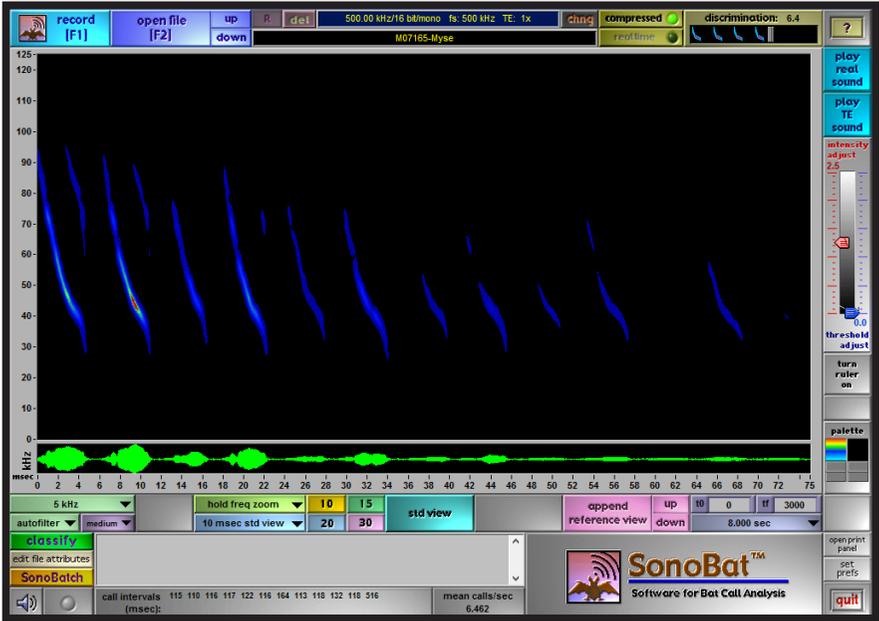


Figure 3. Northern long-eared bat Sonogram from recordings at Unit 41 study site on the Standing Rock Reservation, North Dakota.

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