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**BASELINE SURVEYS FOR MAMMALS AT
NATURAL BRIDGES NATIONAL MONUMENT
UTAH**

Annual Report

**Submitted to:
National Park Service
Rocky Mountain Regional Office
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Introduction

This was our second summer of expanded efforts of baseline surveys of mammals and our fourth season of sampling bats at NABR. In 1993, our efforts to survey rodents were suspended due to the outbreak of the zoonotic respiratory disease caused by Hantavirus. Suitably attired with HEPA-cartridges and respirators, we returned to NABR in 1994 to resume our survey work. Four biologists from the Midcontinent Ecological Science Center, National Biological Service, travelled to NABR on 27 June. We worked steadily for nine nights and completed our work on 7 July.

Objectives.--We continued to net bats at all suitable localities (wherever pools of water were present), and particularly in pools beneath each Bridge, to monitor the rich bat fauna of NABR. We surveyed new areas for rodents and revisited former collecting localities to monitor year-to-year variation of mammals. We made particular attempts to revisit sites studied by Nix (1977. Mammals of Natural Bridges National Monument, Utah. Final Report to NPS), who conducted mammal surveys at NABR in 1976, in an effort to verify some of the species reported by him but for which we had no record. For example, Nix captured three White-throated Woodrats and large numbers of the Least Chipmunk yet we had taken none to date during our survey work.

Methods

We netted bats over pools of water in the canyon bottoms and at the Sewage Disposal pond at NABR. In addition, we returned to a site in Kane Gulch on BLM land south of NABR that we netted in 1993. Nets were set up and opened by dusk and tended until about midnight. At the Sewage Disposal pond and in Kane Gulch we took the nets down before departing for the night. We remained with the nets set in the canyon bottoms and were able to check them through the night. Most bats captured were released unharmed; we saved voucher specimens of new species or localities.

Most small ground-foraging rodents were sampled with snap traps (Museum Specials and Victor-type rat traps), and Sherman live-traps. We recorded sightings of larger mammals. Voucher specimens were saved and deposited in the NBS collections in the Museum of Southwestern Biology (MSB), University of New Mexico; tissues and blood samples (for Hantavirus) from selected specimens also were saved and deposited. Specimens taken as vouchers under permits issued by the Utah Division of Wildlife are reported to the Division in January of each year. We also operated under permits provided by NABR.

Results

Precipitation at NABR was below average in 1994 and it was dry during our visit. While this potentially reduces the number of pools (and water) available to bats, it also concentrates them at the remaining pools. We netted two pools in Armstrong Canyon near Owachomo Bridge on 28 and 29 June 1994 and captured and released a total of 32 bats representing 10 species. We netted here in July of 1991, 1992, and 1993 and took fewer bats of the same species; however, this was the first time we netted Long-eared Myotis and Fringed Myotis at this locality. Also of interest is

the capture of a solitary male Silver-haired Bat, a presumed tree-roosting migratory species. We netted this bat in mid-May (1993) and late June (1994) but have not taken them in mid-July (1991 and 1992). We suspect they are thinly scattered throughout this area during the summer.

We netted several pools and a flyway in White Canyon near Kachina Bridge on 2 and 3 July. Bat activity was high; we captured 37 bats of eight species. Particularly noteworthy was the capture of a Spotted Bat which represents the first record of this bat for NABR. This species is known from several localities in southern Utah. Visits in 1992 and 1993 to Kachina Bridge yielded 7 species of bats (Long-eared Myotis, Yuma Myotis, Silver-haired Bat, Big Brown Bat, Western Pipistrelle, Pallid Bat, and Mexican Free-tailed Bat); this year we added California Myotis, Allen's Big-eared Bat, Townsend's Big-eared Bat, and Spotted Bat. The capture of Allen's Big-eared Bat represents only the second record for NABR, although they seem to be common at times and we have heard their audible echolocation cries without capturing them. We netted a solitary California Myotis from the Sewage Disposal pond on 5 July. We hypothesize that the low activity is due to the occurrence of preferred water sources elsewhere that are closer to roosting sites.

We visited Kane Gulch on 4 July and netted over several pools upstream from the Ranger Station, as we did in 1993. Bat activity was high, as were water levels. We captured 32 bats of 7 species. The Big Brown Bat was captured most frequently and it seems likely that there is a roost nearby. In 1993, in May, we captured 16 bats of 5 species. Not taken last year, but taken in 1994, were the California Myotis, Long-legged Myotis, Western Small-footed Myotis, and Western Pipistrelle. With the capture of the Western Small-footed Myotis and Spotted Bat, we have now confirmed the presence of 15 bat species at, or near, NABR. Only three species (Little Brown Bat, Hoary Bat, Red Bat), of those possible in this vicinity, remain unconfirmed. The Hoary Bat undoubtedly migrates through the park in spring and fall and males may be resident in the nearby mountains. Of the other two species, the Little Brown Bat may occur but the Western Red Bat is unlikely to be present. Our netting on the Plateau has yielded no captures of this species.

We were unable to capture Western Harvest Mouse and Long-tailed Vole at additional localities. Previously we took one Western Harvest Mouse from the bottom of Owachomo Canyon and despite returning to the same locality in 1994, we took none. Similarly, we revisited our 1992 capture site of Long-tailed Vole, along a sandy bank in White Canyon, north of Kachina Bridge, and captured none this year. Both these species are grassland inhabitants and might be expected to be uncommon in marginal habitats during dry years. At NABR they occur only in the more mesic canyon bottoms and then perhaps only in good years. The below average precipitation at NABR in 1994 also may have had a direct impact on food resources of these animals as well (harvest mice, insects and seeds; voles, grasses).

We revisited 3 localities of Nix (1977) where he captured White-throated Woodrats and large numbers of Least Chipmunks. While we were unable to confirm their presence at these specific localities, we did take 4 White-throated Woodrats at 4 other localities (including another site of Nix where he obtained no woodrats). At one site where Nix captured large numbers of Least Chipmunks, one of us observed a small, dark chipmunk in the vicinity but we were unable to capture any for identification. The only chipmunk we have recorded from NABR is the Hopi Chipmunk which is abundant and widespread. The Least chipmunk may be present at NABR but

because of its predilection for more mesic, less rocky habitats than those favored by the Hopi Chipmunk, it must be less common, at least at present. It seems unlikely that Nix would have confused the two species as they are quite distinct in this area. We were also able to verify the presence of White-tailed Antelope Squirrel near the park; we observed one in the piñon-juniper mesa top just off the Monument's East boundary. Nix observed one in 1976 but the specific locality is unknown.

One of the more exciting localities we worked, also examined by Nix, was along a mesa top across (SW) from Owachomo Bridge, near an old Ranger Station. Of the four species taken by Nix in 1976 (Ord's Kangaroo Rat, Least Chipmunk, the Deer Mouse and Piñon Mouse), we took all but the Least Chipmunk. In addition, we added seven species: the Desert Cottontail; Bushy-tailed, Desert, and Mexican Woodrats, Brush Mouse, Canyon Mouse, and Plains Pocket Mouse. The pocket mouse is especially noteworthy because it is the first specimen for NABR. The closest locality record is John's Canyon, along the San Juan River.

We returned to sites in the canyon bottom near the three bridges and broadened our survey area further from the bridges. In one site, approximately 0.4 mi from Owachomo Bridge in Armstrong Canyon, we captured the Brush Mouse, Canyon Mouse, and Deer Mouse. Mule deer were observed in the canyon bottom near Kachina and Owachomo bridges. We sampled additional mesa top sites in 1994, including the Sipapu Bridge trailhead, the nearby mesa top trail, and our campsite, just east of the Monument's eastern boundary. We took the Hopi Chipmunk, Mexican and White-throated Woodrat, Brush Mouse, Canyon Mouse, Deer Mouse, and Piñon Mouse.

We ventured to the far western edge of NABR, along the North side of US Hwy 95, to survey an area we had not previously sampled. This locality was typical mesa top habitat: we took the Hopi Chipmunk, White-throated and Mexican Woodrats, Canyon Mouse, and large numbers of the Piñon Mouse.

Comments and Summary

During our visit we saved tissues of 103 animals for testing for Hantavirus. Testing was performed by Centers for Disease Control (CDC) in Atlanta. The animals tested included 1 Townsend's Big-eared Bat, 2 Desert Cottontails, 11 Hopi Chipmunks, 1 Ord's Kangaroo Rat, 1 Plains Pocket Mouse, 31 Brush Mice, 13 Canyon Mice, 13 Deer Mice, 14 Piñon Mice, 3 White-throated Woodrats, 2 Bushy-tailed Woodrats, and 11 Mexican Woodrats. Of this total, only one Deer Mouse gave a positive response to the test for Hantavirus. Although considerably more is known about western Hantaviruses now than in 1993, we encourage park staff to continue to follow guidelines published by CDC and NPS to reduce exposure to Hantavirus. (Note: These results are preliminary at this time and should not be released without first contacting Mike Bogan at 505/766-3903).

Several species of bats were given Category 2 Candidate Species Status ("Taxa for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which persuasive data on biological vulnerability and threat are not currently available to support proposed rules") by the Fish and Wildlife Service late

in 1994 (Federal Register, Vol.59: 58982-59028). This listing includes the following species at NABR: Western Small-footed Myotis, Fringed Myotis, Long-eared Myotis, Long-legged Myotis, Yuma Myotis, Allen's Big-eared Bat, Townsend's Big-eared Bat, and Big Free-tailed Bat. My understanding is that these bats were listed on request of individuals who were concerned about bats threatened by abandoned mine closures. In general, there are no known data supporting population declines in these species with the exception of Townsend's Big-eared Bat. The status of this species is of increasing concern in the West and an effort is underway to collate information on this species. We continue to net good numbers of most of these species at NABR but will maintain our policy of capture and release for these species except for new records. Closure of abandoned mines should not be done until mines have been checked for significant concentrations of roosting bats.

Work on mammals from NABR now will focus on final specimen identification and data analysis preliminary to report writing. Among groups of mammals at NABR, we have been unsuccessful in obtaining shrews, extremely successful in sampling the bat fauna, and moderately successful with rodents. Many rodents on our Preliminary List of Mammals probably do not occur at NABR, especially several species in the squirrel family. Tree squirrels are probably restricted to higher elevations in this area and prairie dogs and some ground squirrels may never have occurred in the rocky areas of NABR. Our continuing inability to see or capture Least Chipmunks is puzzling. Perhaps Nix's visit was made at a time of wet years when this species was more common. We have confirmed the presence of most other species of small rodents. Nix (1977) provides some information on carnivores unseen by us. Staff at the park should be encouraged to record observations of mammals, especially carnivores and ungulates.

Preliminary List of the Mammals of Natural Bridges National Monument

This listing of species is based on the proximity of known ranges to NABR, historical accounts, and museum and literature records. Species captured by NBS are noted by the year of capture. Species believed to be extirpated are indicated by a (+), those of questionable occurrence by a (?). Category 2 Candidate Species (FWS) are noted as (C2).

INSECTIVORA

Sorex merriami (Known from Elk Ridge)
S. monticolus (Known from Abajo Mts.)
S. nanus (Known from Elk Ridge)
S. palustris (Known from Abajo Mts.)
Notiosorex crawfordi ?

CHIROPTERA

Myotis californicus 91, 92, 93, 94
M. ciliolabrum Kane Gulch, 94 (C2)
M. evotis 91, 92, 93, 94 (C2)
M. lucifugus
M. volans 91, 92, 94 (C2)
M. thysanodes 92, 94 (C2)
M. yumanensis 91, 92, 93, 94 (C2)
Lasionycteris noctivagans 93, 94
Lasiurus blossevillei ?
L. cinereus
Pipistrellus hesperus 91, 92, 93, 94
Eptesicus fuscus 91, 92, 93, 94
Euderma maculatum 94 (C2)
Plecotus townsendii 91, 92, 94 (C2)
Idionycteris phyllotis 91, 92, 94 (C2)
Antrozous pallidus 91, 92, 94
Tadarida brasiliensis 91, 92, 93, 94
Nyctinomops macrotis 92, 94 (C2)

LAGOMORPHA

Sylvilagus audubonii 92, 94
S. nuttallii ?
L. californicus observed, 92; 94

RODENTIA

Eutamias minimus (Nix, 1977)
E. quadrivittatus [= *hopiensis*] 92, 94
Marmota flaviventris (Known from LaSal Mts.)
Ammospermophilus leucurus observed off-park, 94
Spermophilus spilosoma (Known from Navajo Mt., Monticello)
S. variegatus observed, 92, 94
Cynomys gunnisoni (Known from near Blanding)
Sciurus aberti (Known from Kigala Ranger Station, Elk Ridge)
Tamiasciurus hudsonicus (Known from Abajo Mts.)

Thomomys bottae
T. talpoides (Known from Abajo Mts.)
Perognathus flavescens 94
P. flavus ?
Dipodomys ordii 92, 94
Castor canadensis
Reithrodontomys megalotis 92
Peromyscus boylii 92, 94
P. crinitus 92, 94
P. maniculatus 92, 94
P. truei 92, 94
Onychomys leucogaster
Neotoma albigula 94
N. cinerea 92, 94
N. mexicana 92, 94
Microtus longicaudus 92
M. montanus (known from Abajo Mts.)
Ondatra zibethicus ?
Erithizon dorsatum (Nix, 1977)

CARNIVORA

Canis latrans observed, 92
C. lupus +
Vulpes vulpes (Nix, 1977)
Urocyon cinereoargenteus (Known from near Monticello)
Ursus americanus (Known from Abajo Mts.)
U. arctos +
Bassariscus astutus
Procyon lotor
Mustela erminea (Known from Abajo Mts.)
M. frenata
M. nigripes + (Known from near Blanding)
Taxidea taxus (Nix, 1977)
Spilogale gracilis (Nix, 1977)
Mephitis mephitis (Nix, 1977)
Felis concolor (Nix, 1977)
Lynx rufus (Nix, 1977)

ARTIODACTYLA

Cervus elaphus
Odocoileus hemionus observed, 92, 94
Antilocapra americana +?
Bison bison +
Ovis canadensis

1994 Capture Summary for
Natural Bridges National Monument (NABR)

MAMMALS

Utah: San Juan Co., NABR, Armstrong Canyon, 28 June 1994
0.25 mi SSE Owachomo Bridge

8 Peromyscus boylii rowleyi
1 Neotoma albigula laplatensis
9

Utah: San Juan Co., NABR, Armstrong Canyon, 29 June 1994
0.25 mi ESE Owachomo Bridge

1 Neotoma mexicana inopinata
1 Peromyscus boylii rowleyi
1 P. crinitus auripectus
2 P. maniculatus rufinus
5

Utah: San Juan Co., NABR, Tuwa Canyon, 29 June 1994
0.2 mi ESE Owachomo Bridge

1 Myotis thysanodes thysanodes
4 Peromyscus boylii rowleyi
5

Utah: San Juan Co., NABR, 0.2 mi SW Owachomo Bridge 30 June 1994
6 July 1994

1 Sylvilagus audubonii cedrophilus
7 Eutamias quadrivittatus hopiensis
1 Perognathus flavescens caryi
1 Dipodomys ordii nexilis
1 Neotoma albigula laplatensis
2 Neotoma cinerea arizonae
1 N. mexicana inopinata
1 Peromyscus boylii rowleyi
2 P. crinitus auripectus
2 P. maniculatus rufinus
10 P. truei truei
29

Utah: San Juan Co., NABR, Armstrong Canyon, 30 June 1994
0.35 mi NW Owachomo Bridge

3 Peromyscus boylii rowleyi
3 P. crinitus auripectus
2 P. maniculatus rufinus
8

Utah: San Juan Co., NABR, Tuwa Canyon, 30 June 1994
0.3 mi ENE Owachomo Bridge

4 Neotoma mexicana inopinata
4 Peromyscus boylii rowleyi
2 P. crinitus auripectus
1 P. truei truei
11

Utah: San Juan Co., NABR, 0.75 mi SW Kachina Bridge,
N of Hwy 95

1-2 July 1994

4 Eutamias quadrivittatus hopiensis
1 Neotoma albigula laplatensis
2 N. mexicana inopinata
1 Peromyscus crinitus auripectus
12 P. truei truei
20

Utah: San Juan Co., NABR, 1.7 mi SE Visitor Center

1, 5 July 1994

1 Eutamias quadrivittatus hopiensis
1 Neotoma mexicana inopinata
3 Peromyscus maniculatus rufinus
15 P. truei truei
20

Utah: San Juan Co., NABR, Kachina Bridge

2-4 July 1994

1 Euderma maculatum
10 Peromyscus boylii rowleyi
11

Utah: San Juan Co., NABR, White Canyon, 0.25 mi N Kachina Bridge

2 July 1994

1 Neotoma mexicana inopinata
10 Peromyscus boylii rowleyi
11

Utah: San Juan Co., NABR, Armstrong Canyon,
0.25 mi S Kachina Bridge

2 July 1994

1 Plecotus townsendii pallescens

Utah: San Juan Co., NABR, Kachina Bridge trailhead

3 July 1994

5 Eutamias quadrivittatus hopiensis
3 Peromyscus crinitus auripectus
3 P. maniculatus rufinus
6 P. truei truei
17

Utah: San Juan Co., Kane Gulch
6 mi S, 6.1 mi E NABR Visitor Center

4 July 1994

1 Myotis cf. ciliolabrum
1 M. cf. evotis
2

Utah: San Juan Co., NABR, Sipapu Bridge trailhead
mesa top trail

5 July 1994

2 Eutamias quadrivittatus hopiensis
1 Neotoma albigula laplatensis
3 Peromyscus truei truei
6

Utah: San Juan Co., NABR, Sipapu Bridge trailhead

5 July 1994

5 Eutamias quadrivittatus hopiensis
2 Peromyscus boylii rowleyi
1 P. crinitus auripectus
4 P. maniculatus rufinus
1 P. truei truei
13

Utah: San Juan Co., NABR, 0.3 mi SW Owachomo Bridge

6 July 1994

1 Sylvilagus audubonii cedrophilus
9 Peromyscus truei truei
10

Utah: San Juan Co., NABR, 0.75 mi S Owachomo Bridge

6 July 1994

3 Eutamias quadrivittatus hopiensis
13 Peromyscus truei truei
16

Utah: San Juan Co., 4.1 mi SE NABR Visitor Center
6 mi (by rd) E jct Hwy 95 & 276 along Hwy 95

7 July 1994

1 Lepus californicus texianus