

Chihuahuan Desert Network Reptile and Amphibian Inventory

Big Bend National Park

Source: D. Prival and M. Goode, University of Arizona.

PROJECT SUMMARY



DAVE PRIVAL

Trans-Pecos ratsnake (*Bogertophis subocularis subocularis*) at Big Bend National Park.

Introduction and Background

In 2003 and 2004, the University of Arizona conducted an inventory of reptiles and amphibians (herpetofauna) in six parks of the National Park Service's Chihuahuan Desert Network including Big Bend National Park, located along the U.S.-Mexico border in Texas. The primary objectives of this inventory were to document reptile and amphibian species, map the distribution of all species found, and determine a rough relative abundance for each species. The results from this may assist in future monitoring efforts. This summary presents information from the surveys at Big Bend. Summaries of the surveys conducted at the other Chihuahuan Desert Network parks are available on the Learning Center of the Southwest website, www.southwestlearning.org.

Big Bend is the largest protected area of Chihuahuan Desert in the United States, covering 1,253 square miles. The park ranges in elevation from 1,800 feet along the Rio Grande to 7,800 feet in the Chisos Mountains. This range in elevation contributes to variations in moisture and temperature, contributing to a high level diversity in the park's plant and animal communities. The reptiles and amphibians of many of the most diverse areas of the park were already well known, so this inventory focused primarily on three mountain ranges that were not previously surveyed: the Sierra Quemada south of the Chisos Mountains, the Sierra del Caballo Muerto on the eastern edge of the park, and the Mesa de Anguila in the southwestern corner of the park. The ranges are exposed and rocky with little or no water and were logistically challenging to survey. The researchers conducted backpacking trips to survey the area from May to August in 2003 and from June to September in 2004, making a total of four trips to the Sierra Quemada, two to the Sierra del Caballo Muerto (Deadhorse Mountains), and four to the Mesa de Anguila. The researchers also conducted several short surveys into each of these ranges and surveyed other areas of the park as time permitted. A total of 131 person-days were spent surveying.

Methods

Several searching approaches were used to find reptiles and amphibians: foot surveys, incidental observations, and road cruising. In 2004, the researchers used different approaches than in 2003 to maximize the likelihood of finding different species. For each reptile or amphibian observed, the researchers recorded data such as location, time, weather, and species. Because an existing multi-year study of amphibians at Big Bend was in progress at the time of this inventory (Dayton 2005), the researchers focused their efforts on finding reptiles and only recorded amphibians when they happened to see them, but also did not record every amphibian they saw, particularly if more than 10 were observed in the same place.

The majority of observations were recorded during *foot surveys*: 1,008 animals in 48 species. The searches were conducted at times when reptiles and amphibians were most likely to be active (morning around sunrise and evening around sunset). Most of the foot surveys were conducted off-trail. While on foot, the researchers looked under rocks and logs, and used mirrors and flashlights to illuminate crevices.

Incidental observations were recorded while the researchers were not conducting formalized searches (e.g., on days off or while driving to a search area). Incidental observations accounted for 817 animals in 49 reptiles and amphibian species.

Road cruising surveys, in which a crew drives at night to find amphibians and nocturnal snakes and lizards, were also used.

In Big Bend, 434 reptiles and amphibians were observed comprising 25 species in road cruising surveys. The researchers conducted 36 road cruising surveys during the inventory.

Voucher specimens were collected for nearly each species found in the park, and for each species in each of the three mountain ranges to document the distribution of species in different mountain ranges. Voucher specimens provide proof that the species actually occurred in the park during the inventory and help to confirm identification. A total of 96 voucher specimens representing 51 species were collected in Big Bend. Voucher specimens provide important data about reproduction, diet, health, and morphology. DNA collected from voucher specimens can be used to examine population questions, and genetic relationships within and between species. Voucher specimens previously collected in the parks are spread among many institutions. For this inventory, the reptile voucher specimens from Big Bend are on permanent loan to and stored at Museum of Southwestern Biology, University of New Mexico, Albuquerque, and are freely available to researchers and managers. The amphibian voucher specimens loaned to Texas A&M University to supplement the collection efforts from the multi-year amphibian study in progress at the time.

Results

In total, 2,259 reptiles and amphibians were found at Big Bend during this inventory, representing 59 species: nine frogs and toads, 21 lizards, 26 snakes, and three turtles.

Four species found in Big Bend are listed as state threatened: Texas horned lizard (*Phrynosoma cornutum*), reticulate banded gecko (*Coleonyx reticulatus*), Trans-Pecos black-headed snake (*Tantilla cucullata*), and Texas lyre snake (*Trimorphodon biscutatus wilkinsonii*).

Two nonnative species were found during this inventory: the Mediterranean house gecko (*Hemidactylus turcicus*) and American bullfrog (*Rana catesbeiana*). The Mediterranean house gecko occurs widely in urban areas in the southern United States. This gecko is typically found on buildings near lights where it is attracted by insects. In Big Bend, it was found in developed areas: on the wall of Barker House near the Rio Grande Village, the Rio Grande Village, and at Panther Junction. The native Texas banded gecko (*Coleonyx brevis*) typically feeds on the ground, not walls. However, the species may be competing in subtler ways.

American bullfrogs were heard calling from the Mexican side of Santa Elena and were also found in the park at Rio Grande Village. This species is native to the eastern United States and was introduced to the west in the early 1900s. The first reports of bullfrogs in Big Bend are from the 1980s (R. Skiles, pers.

comm.). American bullfrogs compete with and prey on native species, particularly leopard frogs and gartersnakes.

Discussion

In order to determine what percentage of the total herpetofauna community known to occur within Big Bend that was documented in this inventory, the results were compared to lists of species likely to occur in the park based on its 2002 reptile and amphibian checklist. While the emphasis of the study was on reptiles, the researchers attempted to document as many species as they could. It is estimated that there are probably 10 species that are likely to occur in Big Bend that were not observed during the inventory (one toad, one salamander, one lizard, four snakes, and three turtles), meaning this inventory may have documented 86% of the reptile and amphibian species in the park. It is unknown what percentage of species were documented in the three mountain ranges because the ranges were not previously surveyed.

The data from this inventory can be used as baseline data that may be useful to a monitoring program. Long-term monitoring and/or repeated inventories may help detect changes within reptile and amphibian communities caused by climate change, drought, invasion by nonnative species, wildland fire, or other factors. Reptile and amphibian populations can change dramatically between surveys in a given year due to the timing and amounts of precipitation. The researchers provided suggestions and evaluations of potential monitoring strategies such as monitoring species composition, monitoring species richness, monitoring species distribution, and monitoring relative abundance. Based on this study, the researchers concluded that weather has an important effect on the success of a given survey and it is important to survey each area multiple times within a season.

Literature Cited

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- Prival, D., and M. Goode. 2005. Chihuahuan Desert national parks reptile and amphibian inventory. Final report. University of Arizona.

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