

Chihuahuan Desert Network Reptile and Amphibian Inventory

Carlsbad Caverns National Park

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

PROJECT SUMMARY



MIKE WOOLMAN

Mottled rock rattlesnake (*Crotalus lepidus lepidus*) at Carlsbad Caverns 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 Carlsbad Caverns National Park, located in southeastern New Mexico. Prior to this inventory, less was known about reptiles and amphibians in the network parks, including species of special conservation concern. 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 may assist in future monitoring efforts. This summary presents information from the surveys at Carlsbad Caverns. 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.

Carlsbad Caverns is located in the Chihuahuan Desert but contains several elements of Sierra Madrean, Rocky Mountain, and Great Plains affinity, and is characterized by steep limestone canyons. The park supports a highly diverse ecosystem—including many plants and animals that are at the edges of their geographic range. Few permanent sources of water are present in the park. Rattlesnake Springs, a detached unit of Carlsbad Caverns, is a rare wooded riparian area. In 2003, the researchers, with assistance from other park partners and staff, surveyed Rattlesnake Springs, the park's sewage disposal area, and canyons and drainages throughout the park. Surveys were conducted from May to August in 2003 and from June to August in 2004. During the spring and summer 2003 survey, the park received well-below-normal levels of precipitation and it was not a good year for a reptile and amphibian surveys. The researchers did not hear any amphibians calling from within the park, and it seemed likely that some toad species remained underground all year due to the lack of monsoon rains. Snake activity is also typically correlated with rainfall. In contrast, between March and September 2004, the park received over 4.5 times as much precipitation as it did

during the same time in 2003.

Methods

Several searching approaches were used to find reptiles and amphibians: foot surveys, incidental observations, pitfall traps, and road cruising. Turtle traps were not used at Rattlesnake Springs because the researchers felt they could adequately survey the pond visually by observing basking turtles and because the steep sides of the pond were not conducive to using turtle traps. For each reptile or amphibian observed, the researchers recorded data such as location, time, weather, and species.

The majority of observations were recorded during *foot surveys*: 2,659 animals in 38 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 690 animals in 41 reptiles and amphibian species.

Pitfall traps were used to capture small reptiles and amphibians running or crawling across the ground. In 2003, three sets

of pitfall traps were checked by park staff and volunteers daily (120 times). A total of 117 reptiles and amphibians of 16 species were caught in pitfall traps.

Road cruising surveys, in which a crew drives at night to find amphibians and nocturnal snakes and lizards, were also used. In Carlsbad Caverns, 109 reptiles and amphibians were observed comprising 25 species in 73 road cruising surveys by the researchers and park partners.

Voucher specimens were collected for nearly every species found in the park. Voucher specimens provide proof that the species actually occurred in the park during the inventory and help to confirm it was correctly identified in the field. A total of 53 voucher specimens representing 43 species were collected in Carlsbad Caverns. 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 voucher specimens from Carlsbad Caverns are on permanent loan to and stored at the Museum of Southwestern Biology, University of New Mexico, Albuquerque, and are freely available to researchers and managers.

Results

In total, 3,575 reptiles and amphibians were found at Carlsbad Caverns by the researchers and park partners during this inventory, representing 46 species: eight frogs and toads, 15 lizards, 20 snakes, and three turtles.

One species found in Carlsbad Caverns is listed as state endangered, the gray-banded kingsnake (*Lampropeltis alterna*), and two state threatened species, the mottled rock rattlesnake (*Crotalus lepidus lepidus*) and Rio Grande cooter (*Pseudemys gorzugi*) were also observed.

One nonnative species was found during this inventory, the American bullfrog (*Rana catesbeiana*), which was only found at Rattlesnake Springs. This species is native to the eastern United States and was introduced to the West in the early 1900s. American bullfrogs compete with and prey on native species, particularly leopard frogs and gartersnakes.

Discussion

In order to estimate what percentage of the total herpetofaunal community known to occur within Carlsbad Caverns was documented in this inventory, the results were compared to lists of species likely to occur in the park, specifically, the park's 2002 reptile and amphibian checklist. The researchers attempted to document as many species as they could. It is



Texas banded gecko (*Coleonyx brevis*) observed in Carlsbad Caverns National Park during a road cruising survey.

estimated that there are probably four species that are likely to occur in Carlsbad Caverns that were not observed during the inventory (one lizard, two snakes, and one turtle), meaning this inventory may have documented 92% of the reptile and amphibian species in the park.

The data from this inventory can be used as baseline information, which 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

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

Project Contacts

Dave Prival, deprival@yahoo.com

Matt Goode, Research Specialist, University of Arizona, mgoode@ag.arizona.edu, <http://www.snr.arizona.edu/node/671>