

Inventory of Big Bend National Park and Rio Grande Wild & Scenic River

National Park Service managers are confronted with increasingly complex and challenging issues that require a broad-based understanding of the status and trends of each park's natural resources as a basis for making decisions, working with other agencies, and communicating with the public to protect park natural systems and native species. The Inventory and Monitoring (I&M) Program is part of the National Park Service's effort to emphasize reliance on science to improve management decisions and safeguard our natural heritage. An essential component of this strategy is a comprehensive inventory of the natural resources found in national parks. Inventories are extensive point-in-time surveys designed to contribute to our knowledge of the condition of park resources and establish baseline information for subsequent monitoring activities. The I&M Program provides guidance, funding, and technical assistance to complete a set of 12 baseline natural resource inventories for parks, including the presence of plants, animals, and other resources such as water, air quality, and climate.

The Chihuahuan Desert I&M Network (CHDN) comprises seven national parks in New Mexico and Texas. Six of the seven CHDN

PARK BRIEF



NPS

Mule Ears, Big Bend National Park.

parks are located in the Northern Chihuahuan Subregion of the Chihuahuan Desert Ecoregion. Big Bend National Park and Rio Grande Wild and Scenic River are near and on the U.S.-Mexico border. This brief summarizes inventories at Big Bend and Rio Grande, coordinated by the network. Reports from inventories supported by the CHDN are available on the CHDN website, <http://science.nature.nps.gov/im/units/chdn/index.cfm> and on the Learning Center of the American Southwest website, www.southwestlearning.org. A database of inventories coordinated at the national level in cooperation with CHDN—climate, geology, air quality, and soil—are available on the I&M Program's Inventory home page: <http://science.nature.nps.gov/im/tracking/InventorySearch.aspx>.

Birds



Black capped vireo/NPS

Bird populations in the Chihuahuan Desert fluctuate year-to-year, particularly in the winter. The CHDN supported a survey of resident grassland birds in Big Bend during the winters of 2002–03 and 2003–04. A total of 2,831 birds were detected from 73 species in four grassland habitat types: tobosa, riparian, lower desert, and Chisos foothills. The habitat and location with the highest number of species recorded was riparian grassland at Rio Grande Village. The habitat and location with the lowest number of species recorded was lower desert grasslands in the Tornillo Flats area. Only

13 species were common to all four habitat types surveyed: greater roadrunner (*Geococcyx californianus*), Say's phoebe (*Sayornis saya*), loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), green-tailed towhee (*Pipilo chlorurus*), Cassin's sparrow (*Aimophila cassinii*), Brewer's sparrow (*Spizella breweri*), black-throated sparrow (*Amphispiza bilineata*), white-crowned sparrow (*Zonotrichia leucophrys*), Pyrrhuloxia (*Cardinalis sinuatus*), and house finch (*Carpodacus mexicanus*).

Fish



Big Bend National Park/NPS

In 2003–04, the CHDN supported a reevaluation of the fish communities on the Rio Grande in and near Big Bend National Park initially studied in 1999 by the U.S. Geological Survey. The objective of the comparisons between years was to identify any measurable differences that would be attributable to a period of low spring flow at Johnson Ranch in 2003, a phenomenon not seen since the 1950s. The total number of fish species collected

at the sampling sites (Boquillas, Johnson Ranch, and Santa Elena) in 2004 was less than in 1999. The fish community at the Santa Elena site was more similar to the fish community documented in 1999 than the Boquillas and Johnson Ranch downstream sites. Changes in the streamflow at the two downstream sites may account for some of changes in the fish communities.

Mammals



Mule deer/NPS

In 2004 and 2005, the CHDN supported a survey of mammals in riparian habitats along the Lower Canyons of the Rio Grande downstream of Big Bend. A total of 43 species were documented through sight and sign observations, including tracks, cuttings by beavers, gopher mounds, and acoustic recordings of bat calls. Mammals were also captured and identified using traps and mist nets. The greatest diversity of species was of rodents and bats and only one nonnative species, nutria (*Myocastor coypus*), was documented. Car-

nivores were infrequently observed and there were no signs of bobcats (*Lynx rufus*). Nonnative feral hogs (*Sus scrofa*) and aoudad or Barbary sheep (*Ammotragus lervia*) were not observed, but may enter the area. Researchers concluded that the ruggedness of the canyons of the Rio Grande may be responsible for the minimal effects human activities and nonnative mammals have had on changes to the species assemblage of mammals occurring in the Lower Canyons of the Rio Grande.

Reptiles and Amphibians



Trans-Pecos ratsnake/Dave Prival

In 2003 and 2004, the CHDN supported an inventory of reptiles and amphibians in Big Bend. Researchers documented 59 species: nine frogs and toad, 21 lizard, 26 snake, and three turtle species, including four state-listed threatened species. The data from this inventory could be used to detect changes within the reptile and amphibian communities that may occur as a result of climate change, urbanization near the park boundary, drought,

invasion by nonnative species, wildland fire, or other factors. Reptile and amphibian populations exhibit natural fluctuations in range extensions and contractions. The researchers provided suggestions and evaluations of potential monitoring strategies, such as monitoring species composition, species richness, species distribution, and relative abundance, for determining unexpected population changes.

Vegetation



Big Bend National Park/NPS

Big Bend is the largest protected area of Chihuahuan Desert in the United States, and 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 communities. The CHDN supported preparation of a herbarium and literature review of plants for Big Bend in 2002 and is also supporting a vegetation mapping project of the park.

Water



Big Bend National Park/NPS

The CHDN supported a 2009 study of surface water and surface and groundwater hydrology, water quality conditions and trends, and the condition of macroinvertebrate communities in Big Bend and the Rio Grande Wild and Scenic River. Scenic and environmental values along the Rio Grande section are threatened as a result of water-quality contamination and two major impoundments (Elephant Butte and La Boquilla reservoirs) that have controlled streamflow in the Rio Grande since the early part of the 20th century. These impoundments contribute to decreased annual mean flows, gradual decreases of peak flows, decreases in sediment transport, and changes in the composition and abundance of riparian vegetation. Large amounts of water diversion and extraction for agricultural

and domestic uses in New Mexico and El Paso, Texas and Ciudad Juarez, Mexico have significantly reduced streamflow of the river. Invasive, nonnative plants, such as river cane and tamarisk, have replaced native populations of cottonwood and willow trees, and diminish the flow of natural springs, changing the composition and ecological value of riparian habitats. Groundwater discharge from seeps and springs along the Rio Grande is dependant on the long-term stability of aquifers that are hydraulically connected to surface water in the region. Comparative studies indicate that the condition of macroinvertebrate communities in the Rio Grande appear to have changed little from the late 1970s to the late 1990s.

For more information

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