Sonoran Desert Network
Park Monitoring Brief

National Park Service
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Intermountain Region
Inventory & Monitoring Program

2009

Natural Resource Monitoring at Tuzigoot National Monument

The Sonoran Desert Network

The Sonoran Desert Network (SODN) covers the geologically and biologically diverse Sonoran Desert and Apache Highlands ecoregions of southern Arizona and southwestern New Mexico. The network comprises 11 national parks containing biomes ranging from low-elevation desert scrub to mixed conifer forests, as well as critical riparian systems associated with perennial rivers, ephemeral and intermittent washes, seeps, springs, and tinajas. The SODN is designing and implementing a long-term monitoring program to measure key indicators of ecological integrity, or "vital signs." This coordinated, multi-perspective ecosystem monitoring effort will help inform managers and the public as to the condition of key park resources and provide an early warning system for potential problems. This brief describes SODN activities at Tuzigoot National Monument (NM).

Tuzigoot National Monument/NPS

Resource Inventories

USFWS/GARY STOLZ

Woodhouse's toad.

Managers need reliable data to maintain resources "unimpaired for future generations," especially as conditions outside parks rapidly change. Natural resource inventories are extensive, point-in-time surveys of plants, animals, and the physical environment. From 2001 to 2004, biologists from the University of Arizona and SODN conducted comprehensive field investigations of mammals, birds, amphibians, reptiles, and vascular plants at Tuzigoot NM. Access to adjacent Tavasci Marsh greatly influenced the taxa documented at this productive site. These surveys documented 264 plant species (86 new to park species lists). Species richness of other taxa was equally impressive; biologists documented 15 fish species (11 non-native), 28 amphibians and reptiles (all new to park species lists), 248 birds (3 new species), and 42 mammals (25 new species). This inventory documented the highest bird species richness of any SODN park, reflecting the importance of Tavasci Marsh and the Verde River, two critical sources of perennial water in this semi-arid landscape. The park's location of the near the interface of the Sonoran Desert and Colorado Plateau is also an important determinant of high species richness.

Since 2001, SODN staff and cooperators have completed resource inventories on vertebrates, vascular plants, air quality and air quality-related values (updated in 2009), water quality, climate, hydrography, and a natural resource bibliography. Projects underway include geologic-resource evaluation and mapping (expected completion in 2011), soil resources (2012), andrevision of existing and outdated vegetation classification and mapping products. These inventories provide an important baseline for management and monitoring efforts to support effective park resource protection.

Landbirds

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Ladder-backed woodpecker.

Birds are a conspicuous component of many ecosystems. They have high body temperatures, rapid metabolisms, and occupy high trophic levels. Because they can respond quickly to changes in resource conditions, birds are considered effective indicators of ecosystem condition. Therefore, changes in bird populations and community structure may indicate key changes in the biotic and abiotic components of the environments upon which they depend. The SODN initiated annual bird monitoring at Tuzigoot NM in 2007, to provide insights into human perturbations and natural events. Status reports and resource briefs are produced annually and a detailed synthesis and trend report will be produced in 2012, based on five years of monitoring information.

Exotic Plants

SMITHSONIAN INSTITUTION/ R.A. HOWARD

Russian thistle.

Invasive exotic plants are a critical threat to native species and, in many cases, ecosystem functional attributes. Tuzigoot NM was the focus of a prototype exotic plant inventory and mapping effort for SODN units. From 2003 to 2004, botanists with the University of Arizona, Sonoran Institute, and SODN conducted roaming exotic plant surveys: comprehensive surveys that amounted to a census of this small unit and adjacent Tavasci Marsh. The occurrence and distributions of exotic plants were mapped in the field using handheld GIS/GPS mapping units, backed by quantitative field plots. The maps and reports produced through this effort have been used to guide restoration and exotic-plant control efforts at Tuzigoot NM, and will support the development of a management strategy for Tavasci Marsh.

Climate

NPS

Climate monitoring station.

Climate is a primary driver of ecosystem structure and function in the Sonoran Desert ecoregion. Spatial and temporal variability in precipitation and temperature extremes have critical consequences for flora and fauna, and set the limits for community composition and productivity in these semi-arid environments. Additional parameters, including wind velocity, relative humidity, photosynthetically active radiation, and total radiation, provide insights into environmental conditions. The SODN compiles and analyzes climate information from existing long-term stations. Data are interpreted in annual climate monitoring reports and resource briefs, and are referenced in most reports for other vital signs.

Tavasci Marsh

NPS

Tavasci Marsh.

Tavasci Marsh is a unique wetland adjacent to the pueblo complex at Tuzigoot NM. Recently acquired by the monument, Tavasci is rich in aquatic and riparian biota, supported by a complicated hydrology that is linked to perennial springs, the Verde River, and an artificial lake. Park managers are initiating the development of a management strategy for this key resource, which comprises or influences most of the significant natural resources of this small unit. Pending the completion of this management strategy, SODN and park staff will develop an ecological monitoring protocol to assess the condition of this important site. We anticipate an approach similar to that which has been applied to streams, in which ecological and hydrologic parameters are monitored in an integrated fashion.

Seeps, Springs, and Tinajas

NPS

Shea Spring.

Seeps and springs are important components of the complex hydrology of Tuzigoot NM. Working with park staff, the SODN completed a baseline inventory of Shea Spring and the associated, unnamed springs that feed Tavasci Marsh in 2009, with focus on water quantity, basic water quality, sedimentation, and qualitative monitoring of aquatic biota. Results from this effort will be used to develop a monitoring protocol in 2010–2011.

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For more information

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