Caves and Mine Adits as Wildlife Resources in the Sonoran Desert Region

Kenneth J. Kingsley
SWCA, Inc., Environmental Consultants, Tucson, Arizona
kkingsley@swca.com

Thomas R. Strong
E. Linwood Smith
Environmental Planning Group, Tucson, Arizona
tstrong@epgaz.com

Tim K. Snow
Arizona Game and Fish Department, Tucson, Arizona

Presented as a Poster

Abstract

Natural caves are rare in the Sonoran Desert region and anthropogenic mine adits are abundant and similar to caves in many respects. Both caves and mines are important resources for several wildlife species that live in the Sonoran Desert region. Wildlife uses include short-term shelter from variable ambient temperature and humidity and long-term uses such as maternity roosts, den sites, and nest substrates. Some predatory species also use mines and caves as hunting sites. Animals that use these resources include mammals (several species of bats, bighorn sheep, collared peccaries, ringtails, foxes, packrats, mice, mountain lions, and others), birds (turkey vultures, rock wrens, Say's phoebes, barn owls, and others), herpetofauna (several species of rattlesnakes, toads, lizards), and invertebrates. Many of these sites are also used by people for recreational or economic uses. The wildlife values of these sites have prompted their inclusion as protected sites in the Sonoran Desert Conservation Plan, a county government plan for the long-term protection of biodiversity in the Tucson area and 5,000,000-acre Pima County. This paper will describe wildlife uses of caves and mines in this area, list species known to us to use caves and mine adits, give examples of especially important sites, discuss management approaches, and review the process of including them in the Conservation Plan.

Introduction

Natural caves are very rare in the Sonoran Desert region. Mine adits are abundant and similar to caves in many respects. Pima County, Arizona, an area of over 5,000,000 acres has only a handful of natural caves but hundreds of mines. The State of Arizona estimates some 100,000 inactive mines statewide. More often than not, mines are found in areas devoid of natural caves, under geological conditions that do not foster cave development. Mines may be the only accessible subterranean features under these circumstances and they provide important resources for native wildlife.

Very few species of true troglobites have been described from Arizona and none are also known from mines. Many species of trogloxenes are known to use both caves and mines. In some instances, simplified ecosystems resembling those found in natural caves in other parts of the world have developed in mines in the Sonoran Desert.

Because of their rarity and locations on public lands, most Sonoran Desert caves are protected. The wildlife values of mines warrant consideration for protection also. The wildlife values of caves and mines in the Sonoran Desert sites have prompted their inclusion as

protected sites in the Sonoran Desert Conservation Plan, a Pima County government plan for the long-term protection of biodiversity in the Tucson area and the 5,000,000+-acre county.

Wildlife Uses of Caves and Mines

Both caves and mines are important resources for several wildlife species that live in the Sonoran Desert region. They provide shelter from hot, dry conditions and from predators. There are few currently known species of troglobites in the Sonoran Desert region. Most wildlife species use caves and mines as short-term shelter, occupying a site for only a few hours or days during adverse weather conditions. Several species of bats use caves and mines as maternity roosts, day roosts, night roosts, or courtship areas. Some species of birds use caves and mines as shelters in which they build nests. Several mammal species use caves and mines as den sites. Table 1 lists the wildlife taxa using caves or mines observed by one or more of the authors.

Table 1. Wildlife Species Known to Use Caves and Mines in the Sonoran Desert Region

Invertebrates
- camel crickets
- daddy longlegs
- flies
- mosquitoes
- springtails

true troglobites– *few described, not known from mines*

Amphibians
- red-spotted toad
- barking frog
- lowland leopard frog
- tiger salamander

Reptiles
- tree lizard
- side-blotched lizard
- eastern fence lizard
- Clark's spiny lizard
- desert spiny lizard
- alligator lizard
- Gila monster
- desert tortoise
- western diamondback rattlesnake
- Mojave rattlesnake
- tiger rattlesnake
- black-tailed rattlesnake
- rock rattlesnake
- speckled rattlesnake

Birds
- great horned owl
- barn owl
- white-throated swift
- cliff swallow
- violet-green swallow
- Say's phoebe
- canyon wren
- rock wren
- house wren
- turkey vulture
- black-throated sparrow

Mammals
- Townsend's big-eared bat
- Allen's big-eared bat
- spotted bat
- pallid bat
- cave myotis
- southwestern myotis
- small-footed myotis
- fringed myotis
- California myotis
- Yuma myotis
- western pipistrelle
- big brown bat
- California leaf-nosed bat
- lesser long-nosed bat
- Mexican long-tongued bat
- Mexican free-tailed bat
- western mastiff bat
- cactus mouse
- canyon mouse
- brush mouse
- white-throated woodrat
- desert woodrat
- Mexican woodrat
- porcupine
- rock squirrel
- black bear
- ringtail
- bobcat
- mountain lion
- gray fox
- kit fox
- coati
- spotted skunk
- striped skunk
- hognosed skunk
- mule deer
- bighorn sheep
- collared peccary

Biological Exploration of Caves and Mines in the Sonoran Desert

Few of the known caves have been well studied over a period of years. Unique species have been found. Other caves have had very little, if any, biological exploration. Some caves receive some level of recreational use. One known cave is strictly protected and only accessible to researchers.

Most mines have never been examined by biologists. Of those that have, about one in ten (on average) are used by bats as day roosts and about four in ten are used as night roosts. In one recent survey of 21 adits four had no evident use by wildlife, five were used by bats, eight were used by other mammals, eight were used by birds, 11 had rattlesnakes of three species, and nine had evidence of vandalism, including beer cans, shotgun and cartridge shells, and other trash.

The wildlife values of inactive mines are so important that they should be studied and protected. Most government agencies that manage land with inactive mines now require surveys before any officially sanctioned disturbance occurs. Few efforts have been made to protect mines from vandalism.

Exploring inactive mines can be much more dangerous than cave exploration. Walls and ceilings are unstable, support timbers may be rotten, hazardous materials (including explosives) may have been left behind, booby traps may have been set, and some wildlife species may react defensively to human intruders.

Caves, Mines, and The Sonoran Desert Conservation Plan

The Sonoran Desert Conservation Plan is an ongoing process being developed by Pima County to guide future development and management of land while ensuring continued high biological value and protecting the biodiversity of the County. The process includes designation of Conservation Lands within the County, including all known caves as well as mines that are known to be used by bats. Several species of cave and mine roosting bats are included as species covered by the plan process. Known roosts of these bats are included in the planning process as constraints, to be protected under all alternatives for the plan. Protective measures will be developed for each as appropriate and necessary.