



# Southwest Biological Science Center

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The Southwest is the most ecologically rich and diverse area of the United States. Its habitats vary from Sonoran desert to alpine tundra atop the San Francisco Peaks in northern Arizona. Along with its ecological value, the Southwest is also home to explosive population growth. This growth leads to increased competition for natural resources, especially water.

The Southwest Biological Science Center (SBSC) was created to address critical research needs in the Southwestern US. SBSC research includes water use and the effects of livestock grazing, wildland fires, invasive species, environmental contaminants, declining populations of native species and urban development on the Southwest region.

Four field stations are at the core of the SBSC. These stations include: the Grand Canyon Monitoring and Research Center, Sonoran Desert Field Station, Colorado Plateau Field Station and Canyonlands Field Station.

## Grand Canyon Monitoring and Research Center

The Grand Canyon Monitoring and Research Center (GCMRC) is the cornerstone of the Glen Canyon Dam Adaptive Management Program. The GCMRC was formally established in October of 1996, and became part of the Southwest Biological Science Center in October 2002. Located in Flagstaff, Arizona, the GCMRC studies effects of Glen Canyon Dam operations on the resources along the Colorado River from Glen Canyon Dam to Lake Mead. The GCMRC's scientific activities contribute to meeting the statutory requirements placed on the Secretary of the Interior by Congress with the 1992 Grand Canyon Protection Act, the 1995 Glen Canyon Dam Environmental Impact Statement, and the 1996 Record of Decision.

The goals of the GCMRC are to develop monitoring and research programs as well as related scientific activities that evaluate short-and long-term impacts of the Glen Canyon Dam operations on the biological, cultural, recreational and physical resources of

the Colorado River Ecosystem.

Long-term monitoring of all vital resources facilitates detecting and quantifying changes relating to operation of the dam. Research efforts focus on:

- Interpreting and explaining trends
- Determining causal relationships
- Defining inter-relationships among physical, biological, recreational and cultural processes.



*Chiricahua Leopard Frog*

## Sonoran Desert Field Station

The Sonoran Desert Field Station (SDFS), located at the University of Arizona in Tucson, Arizona, collaborates with the Advanced Resources Technology Laboratory in the School of Renewable Natural Resources (SRNR) to gather, manage, and provide natural resource data to land managers throughout the desert region. The station also maintains a node on the Federal Geographic Data Committee's Geographic Data Clearinghouse.

Lead scientists and staff at the SDFS conduct research on issues related to the ecology and management of desert



resources. In doing so, the station provides technical assistance to the National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and Department of Defense on issues related to the development and implementation of plans to manage desert lands and their resources.

Some examples of ongoing research include:

- Plants and animals effects in land management units of the Sonoran and Chihuahuan Deserts
- Assistance to land managers on natural resource monitoring programs
- Effects of and development of techniques for the removal of alien species such as buffalgrass and bullfrogs
- Effects of fire in the Sonoran and Chihuahuan deserts



*Sonoran Desert at Dusk*

in Flagstaff, Arizona. CPFS was then merged into the United States Geological Survey (USGS) in 1996 when the National Biological Service was incorporated into the USGS as the Biological Resources Division.

One area of CPFS research focuses on historical vegetation of the Colorado Plateau. Plant fossils such as leaves, wood, cones, pollen and seeds provide the CPFS with important evidence of how vegetation has responded to climate change. Other research areas include:

- A neotropical migrant bird monitoring program
- Yellow-billed cuckoo research (in cooperation with the Arizona Game and Fish Department)
- Small vertebrate studies
- Vegetation studies such as classification, description and mapping of vegetation alliances
- Global change studies
- Southwestern Willow Flycatcher studies
- Pronghorn antelope studies (in cooperation with the Arizona Game and Fish Department)
- Maintaining a Geographic Information System

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## Canyonlands Field Station

Canyonlands Field Station (CLFS) consists of staff and programs formerly associated with three units of the National Park System —Arches, Canyonlands and Natural Bridges national parks. The station, located in Moab, Utah, merged with the USGS Forest and Rangeland Ecosystem Science Center (FRESO)

in 1997 and became a part of the SBSC in October 2002. The station has close ties with Brigham Young University, Denver University, Colorado State University, University of Colorado (Boulder) and Oregon State University. CLFS is also closely associated with the National Park Service and the Bureau of Land Management offices in Moab.



*Locating Pack Rat Middens*

## Colorado Plateau Field Station

The Colorado Plateau Field Station (CPFS) consists of state and federal employees focused on the ecology of the Colorado Plateau. The CPFS works in cooperation with federal, state, tribes and local agencies such as Northern Arizona University and the Grand Canyon National Park.

The field station was originally established in 1989 as a National Park Service Cooperative Park Studies Unit at Northern Arizona University, located



*Evaluating soil crust*

CLFS scientists study:

- Exotic plant invasion in western rangelands
- Soil susceptibility to land erosion
- Cryptobiotic soil crusts
- Impact of fires on invasive annual grasses
- Amphibian decline
- Biological cycles of vernal and ephemeral pools

**For more information:**

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