

Colorado Plateau Research Station

Global Change Studies



Nankoweap Basin, Grand Canyon National Park

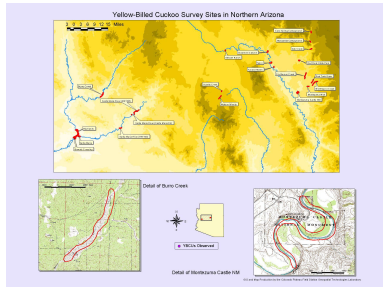
Studies of past vegetation change on the Colorado Plateau are part of the global change research program. Vegetation response to past changes in climate provide information on possible future changes. These images of a mesa within the Grand Canyon compare the modern vegetation with ice age vegetation as reconstructed from fossil packrat middens. The top picture shows caves containing fossil packrat middens as they look today. A desert scrub of mormon tea, blackbrush and cactus grow at this 5000' elevation site today with a few juniper trees along the top of the cliff. The bottom picture shows caves as they may have appeared 20,000 years ago. The bottom slopes support juniper, sagebrush and shadscale, while Douglas fir grows in the shady alcoves. A few limber pine grow along the top of the cliff.



Nankoweap Basin as it may have appeared 20,000 years ago

Geographic Information Systems

Geographic Information System (GIS) is a component system of computer technology that is capable of assembling, storing, manipulating, and displaying spatially-referenced information. The spatial information in a GIS can be displayed as cartographic maps. The CPRS utilizes GIS technologies in complex analysis,



Maps generated using spatial data in a GIS

spatial modeling, management of long-term monitoring databases, map production, and in the dissemination of spatial data on the Internet. The CPRS integrates GIS into various research projects on the Colorado Plateau, including vegetation studies, Mexican Spotted Owl studies, and Yellow-Billed Cuckoo studies. The CPRS also incorporates Global Positioning Systems (GPS) technology to assist in mapping efforts.



GPS unit

Mexican Spotted Owl Monitoring Program

The spotted owl has been the focus of agency and public concern in the Pacific Northwest for more than a decade. Little information is available concerning habitat use of the



Rocky canyon habitat used by Mexican spotted owls, southern Utah

Mexican spotted owl. The CPRS is conducting a long-term, interagency study to provide information on the ecology of spotted owls and potential impacts by human activities to support the conservation of the species.



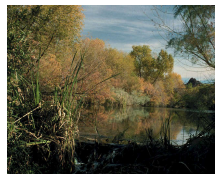
Mexican spotted owl fledglings (above) and pair (below)

Yellow-Billed Cuckoo Research

This research is being conducted in collaboration with the Arizona Game & Fish Department and the USGS-BRD Cooperative Park Studies Unit at the University of Arizona, Tucson. The project seeks to generate a population estimate of the cuckoos breeding in Arizona and to describe breeding habitat use. A primary objective of this project is to make tabular and geospatial census data on the YBCU easily accessible via the World Wide Web (www). The web site is designed to provide an interactive and user-friendly environment for other scientists, land managers and the public to access general information about the YBCU, census methodology, data resources and links to associated sites.



Yellow-billed cuckoo



Typical habitat, Bill Williams River National Wildlife Refuge

Small Vertebrate Studies



Milksnake

Inventory and population studies of plants and animals provide baseline information for land management planning and decision-making. Research Station personnel have ongoing and completed studies of birds, mammals, reptiles and amphibians at Montezuma Castle National Monument, Petrified Forest National Park, Grand Canyon National Park, and the Verde Valley of central Arizona. Studies at Petrified Forest, Wupatki National Monument, and Glen Canyon National Recreation Area are evaluating species diversity, population distributions, and effects of grazing in native arid grasslands on the Colorado Plateau.



Bobcat

Threatened, endangered, and regionally rare species are a particular focus in these studies. Additional studies at Montezuma Castle and Tuzigoot National Monument focus on the ecology and management of nuisance rattlesnakes.



Western diamondback rattlesnake



Little striped whiptail

Vegetation Studies

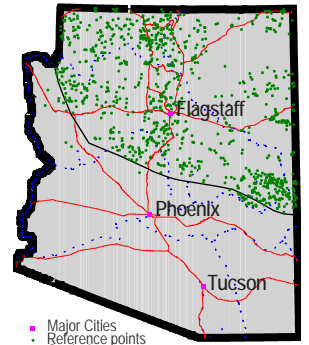


Dalmatian toadflax



Diffuse knapweed

Vegetation studies at CPRS include classification, description and mapping of vegetation alliances in Petrified Forest National Park, the three Flagstaff National Monuments and the east Mojave. The invasive exotic plant species in the four corners region are being documented, and maps of their distribution are served on the internet. The ongoing Southwest Gap Analysis Program Update will provide a conservation assessment of biota throughout Arizona. Plant dynamics are also being studied in the Mojave Desert in an interdivisional USGS program and in the Mojave/Colorado Plateau ecotone in a Global Change Project.



Reference points for GAP, northern AZ

Southwestern Willow Flycatcher Studies

The endangered Southwestern Willow Flycatcher has been severely impacted by widespread loss and modification of riparian habitats. Since 1992, the Colorado Plateau Research Station has pioneered and conducted extensive research on the flycatcher with the goal of providing data critical to the bird's management and recovery.



Southwestern Willow Flycatcher

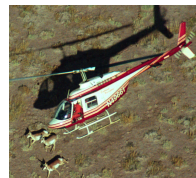


Banded willow flycatcher

Research includes surveys for breeding sites, banding and demography studies, population genetics analyses, information management and range-wide data integration, and analysis of human impacts. Recently, the program has expanded to include studies of distribution, status, and ecology on the flycatcher's wintering grounds in Central America.

Pronghorn Studies

In cooperation with the Arizona Game & Fish Department and the National Park Service, the CPRS is studying pronghorn home ranges and habitat patterns, and analyzing fawn bed sites in and around Wupatki National Monument and Petrified Forest National Park. Park Managers are interested in learning more about pronghorn life history and movements to better manage these populations.



Tracking pronghorn in helicopter



Pronghorn, tagged and collared