Defenders of Wildlife

Climate Change in the Southwest

IMPACTS ON LANDS AND WILDLIFE

A Unique Region

Ranging from the California coast to west Texas, the Southwest region features a stunning array of forests, mountains and deserts, and is home to an impressive number of iconic wildlife species. California, with its huge expanse and varied topography encompassing estuaries, forested mountains, oak woodlands, vernal pools and the Mojave Desert boasts more species than any other state in the nation, as well as more species found nowhere else on Earth. Arizona, New Mexico and Texas are also among our most species-rich states. The Sonoran and Chihuahuan Deserts are home to pronghorn, cactus ferruginous pygmy-owl, and some of our rarest cat species – the jaguar, ocelot and jaguarundi. The Southwest region is also the location of two ambitious programs to restore populations of predator species: lynx in Colorado and Mexican wolves in the Arizona-New Mexico region. Virtually all these places and species are under stress from past land use and management practices, over-exploitation, pollution and other threats and all are increasingly vulnerable to climate change.

Natural Resources at Risk

Climate changes are projected to cause considerable stress to the wildlife of the Southwest region and to the habitats upon which they depend.

***Forests*:** Increasing temperatures, coupled with shifts in precipitation and earlier loss of snowpack, are forecast to increase summertime drought conditions in forests. This will raise the risk of forest fires in the region. Climate change also benefits forest pests: warmer temperatures hasten the growth and reduce wintertime die-off of pine beetles and other pests. Drought stress also makes trees more vulnerable to attack by insects and pathogens. Drought has already led to a die-off of piñon pines over 4,600 square miles of the Southwest. The loss

Image: Global Change Research Program

of piñons removes an important food source for bears, birds and many small mammals.

***Deserts*:** Climate change is expected to benefit invasive species that have been introduced from Africa and the Mediterranean – in particular red brome and buffel grasses. These grasses form continuous cover between the patchy native vegetation of the desert, creating fuel loads for fires that kill off the iconic native vegetation of the Southwest deserts – the saguaro cactus and Joshua

Invasive red brome grass. Photo BLM

trees. Extended drought is also bad news for the endangered Sonoran pronghorn, which has dramatically lower fawn survival in times of drought.

Montane Species: Mountain ecosystems are important biodiversity hotspots in the Southwest. Aptly named the Sky Islands, these isolated high-elevation refuges are home to dozens of species of oaks and pines, birds, mammals and reptiles. Rising temperatures could literally push these unique communities off the top of the earth.

Aquatic Species: Water – in the form of ephemeral ponds, vernal pools, estuaries, desert streams, and springs, is the lifeblood of the Southwest region and the heart of much of its biodiversity. Many of California's vernal pools, for instance, support species of plants and invertebrates found nowhere else. Mojave Desert oases near Death Valley have among the highest numbers of unique species anywhere. As this region enters a period of extended, intense drought, the future of many of these small water bodies and their animals is uncertain. Sea level rise threatens the San Joaquin river delta, an area of once-vast salt marshes that contains over 135 imperiled species.

Expected Climate Changes

Rising temperatures
According to the U.S. Global Change Research Program's 2009 *report "Global Climate Change Impacts in the United States," temperatures in the Southwest region have already risen by about 1.5°F and are projected to rise by 4-6°F under the lowest emission scenarios and by up to 10°F under the highest emission scenarios.

Precipitation Shifts
The most important feature of observed and projected climate changes in the Southwest is the impact on precipitation and water availability. Much of the area is already experiencing a severe drought. The Lake Mead and Lake Powell reservoirs on the Colorado River, were nearly full in 1999, but lost nearly half their volume by 2007 due to one of the worst droughts on record. Most climate change projections indicate that the region will be substantially drier in the future. In a region that is already experiencing water conflicts between agriculture, urban water use and ecosystem health needs, climate change will likely necessitate changes in how water is allocated and substantial investments in conservation.

Sea Level Rise
Sea level rise is difficult to forecast given uncertainties about the rate of melting from the ice sheets on Greenland and Antarctica. However, the San Joaquin River Delta in northern California is already below sea level due to land subsidence, so even a small amount of sea level rise will threaten this important estuary.

*Global Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo and Thomas C. Peterson (eds.) Cambridge University Press, 2009. Available at www.globalchange.gov/usimpacts

Photos by John Dohrenwend

Image Credit: U.S. Global Change Research Program