



IMPACTS ON LANDS AND WILDLIFE

A Unique Region

Stretching through the heart of the country from Montana and North Dakota to the Rio Grande Valley of Texas, the Great Plains encompasses vast grasslands and sage steppes, prairie pothole lakes and forested mountains. The rugged, forested mountains of Wyoming and Montana include the Greater Yellowstone Ecosystem, known as “America’s Serengeti” for its assemblages of large grazing mammals like elk, moose and bison, and its imperiled carnivores like wolves, grizzlies, lynx and wolverines. Cutting a broad swath through center of the region are the shortgrass and tallgrass prairies. One hundred years of agriculture and ranching have reduced these landscapes to fragments of their former extent and grassland-dependent species like the greater and lesser prairie chicken are now in steep decline. The retreat of the glaciers during the last ice age left the northern reaches of the region with thousands of shallow ponds and lakes. These prairie potholes are now the most important waterfowl breeding areas in the country. Virtually all these places and species are under stress from past land use, over-exploitation, pollution and other threats, and all are increasingly vulnerable to climate change



Greater Prairie Chicken

Photo NRCS



Image: Global Change Research Program

Natural Resources at Risk

Climate changes are projected to cause considerable stress to the wildlife of the Great Plains 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 the forested parts of the region, raising the risk of forest fires. Climate change will also benefit forest pests as warmer temperatures hasten the growth and reduce wintertime die-off of pine beetles and other pests. Drought conditions additionally weaken trees’ resistance to attacks by insects and pathogens like the fungus white pine blister rust. Grizzly bears, which depend on whitebark pine nuts as an important food source, may be particularly vulnerable to climate change impacts on their forest habitats.

Sagebrush Species: Sage grouse have already declined sharply over the past 100 years due to habitat conversion, livestock grazing and other disturbances. Climate change poses additional threats

Climate Change in the Great Plains

to their sage brush habitat because invasive weeds like cheat grass are expected to benefit from increased temperatures and decreased summer precipitation. An additional threat to the species, West Nile Virus, is also linked to climate change.

Grassland Birds: Due to extensive loss and fragmentation of prairie habitats, grassland birds have experienced dramatic declines. Droughts associated with climate change are likely to further damage populations through reduced nest success and greater fire frequency. Meanwhile, declining forage values and crop yields could expand the agricultural footprint, putting pressure on what little native prairie habitat is left.

Waterfowl and Aquatic Species: Drought and heat increase evaporation rates from the many prairie potholes and playa lakes in the Great Plains region. As these small shallow water bodies shrink, so goes breeding and migration stopover habitat for dozens of species of ducks and geese, as well as cranes, frogs and invertebrates. Playa lakes also play an important role in aquifer recharge, so their loss creates an additional stress on regional water resources.

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 Great Plains region have already risen by about 1.5°F, and are projected to rise between 2.5 to 13°F depending on the emissions scenario. Changes are projected to be more pronounced in the summer months, with more frequent and intense heat waves expected, especially in the central and southern parts of the region.

Precipitation Shifts

The Great Plains region is characterized by a strong precipitation gradient from northwest which mainly gets 10 to 15 inches of rain per year to the southeast, which can see up to 50 inches per year. By the end of the century, the southern part of the region is projected to get drier and the northern part of the

region wetter, though the entire region is forecast to receive less precipitation in the summer. Agriculture in this region has been heavily dependent on withdrawals of water from the High Plains aquifer, which is being tapped at rates that have already been shown to be unsustainable. Climate change will likely exacerbate the need for irrigation water, while simultaneously reducing the natural rate of recharge. Thus, climate change will likely necessitate changes in how water is allocated and substantial investments in conservation.

*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



Prairie Potholes. Climate change is likely to reduce the number of pothole lakes through evaporation and decreased precipitation.