Defenders of Wildlife

Climate Change in the Northwest

IMPACTS ON LANDS AND WILDLIFE

A Unique Region

The Northwest region features a number of distinctive areas – forests and mountains, sage steppes and great rivers, and is home to a great number of iconic wildlife species. The Cascade Mountains create a rain shadow that separates some of the nation's wettest areas from some of the driest. Old growth forests of Douglas-fir and Sitka spruce tower on the Pacific Coast, then give way to grasslands and sagebrush habitats. Farther inland are vast montane forests of lodgepole and ponderosa pine. The forests and mountains are home to imperiled but iconic species like wolves, grizzlies, lynx and wolverines. Threatened bird species—northern spotted owl and sage grouse—also make their home in this region. And of course, perhaps the most iconic of the Northwest's wildlife, its salmon and trout species rely on the rivers and coastal areas. 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 Northwest region and to the habitats upon which they depend.

Forest fire *Photo: U.S. Global Change Research Program*

Image: Global Change Research Program

***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 is also good news for 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 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.

Montane Species: In addition to the threats to their forest habitats, montane species like wolverines and lynx face additional problems under the most likely climate change scenarios. Wolverines, for instance, require deep snows for digging their dens, and lynx, which specialize in hunting snowshoe hares in deep snow, face increased competition from coyotes when snowpacks decrease.

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 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.

Salmon: Projected changes in snowpack could spell bad news for coldwater fish species like salmon and trout, which are already in steep decline due to dams, sedimentation as a result of logging and development, and declining water quality. Earlier peak streamflow could flush eggs and young smolts out to sea too early, and warmer, lower streamflows in late summer also stress the fish and make them more vulnerable to diseases.

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 Northwest region have already risen by about 1.5°F in the past 100 years, and are projected to rise between 3°F under the lowest emission scenarios and by up to 10°F under the highest emission scenarios.

Precipitation Shifts
While most of the Northwest region has gotten somewhat drier over the past 50 years, climate change projections suggest that the region will see slight increases in precipitation by the end of the century during the winter, spring and fall, but sharp decreases during the summer months. More important than amount, however, is the distribution and pattern of precipitation. A key feature of Northwest water availability is the accumulation and slow melting of snowpack, which keeps a steady supply of cool water running into streams and rivers into the summer months. As wintertime temperatures warm, less precipitation patterns are shifting from snow to rain, and snowpack is declining. The Cascade Mountains have already seen a 25% decrease in snowpack as measured on April 1, and are projected to undergo a further 40% decrease over the next 40 years. Snow is also melting faster in the spring: peak runoff periods are coming earlier and in some areas may shift 20 to 40 days earlier.

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. The most recent estimates indicate a change of about 13 inches by the end of the century along the Pacific Coast; however, when coupled with land subsidence, the effective change could be as much as 50 inches of sea level rise in parts of Puget Sound.

*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

Greater Sage Grouse *Photo: U.S.FWS*