

Climate Change

Possible Impacts on Fish and Wildlife in the United States

A Summary of the Intergovernmental Panel on Climate Change Fourth Assessment Report

With the weight of scientific data pointing to the changes in the environment due to increasing concentrations of greenhouse gases—called climate change—the U.S. Fish and Wildlife Service (Service) has begun monitoring and analyzing impacts of climate change on fish and wildlife and working toward solutions to help species adapt to their changing habitats. Representing a compilation of the work of hundreds of the world's top scientists, the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports are important to the Service's understanding about how it can meet this challenge.

The IPCC is a scientific organization set up by the World Meteorological Organization and the United Nations Environmental Program. It assesses, analyzes, and reports on the latest science on climate change and its human and environmental impacts. Hundreds of the world's most respected scientists have contributed to the IPCC's Assessment Reports of the state of knowledge on climate change. Many U.S. scientists have contributed to the findings in IPCC Assessment Reports, and these reports are a highly credible source of information on climate change science.

What does the IPCC say about the impact of climate change on natural systems and what does it mean for the future of our fish and wildlife?

In its most recent Assessment Report* the IPCC recounts the best and most current evidence of the effects of warming on natural systems on all continents and most oceans. Of more than 29,000 observational data series around the world, examined by the IPCC, more than 89 percent are consistent with the direction of change expected in response to global warming.

- Reduced sea ice in the Arctic is linked to reduced body condition and reproductive success of polar bears because they cannot remain on the ice long enough to obtain an adequate quantity of their favored prey – ringed

seals. Because of this threat to its habitat, the polar bear has been listed as threatened under the Endangered Species Act.

- Reduced snowpack in the mountains, combined with earlier seasonal melting caused by rising temperatures, is projected to increase winter flooding, increase the intensity and length of late summer droughts, and reduce the availability of water, especially in the western United States. Having enough water is becoming an increasingly difficult challenge for western fish and wildlife species.
- Spring is arriving earlier, and plants and animals are being found farther and farther north of their historic ranges in the U.S. Wildlife biologists are concerned that this will mean some migratory bird species may not arrive in their breeding habitats when — or where — their particular food species is available.
- Oceans, lakes and streams are changing — warming is evident and is linked to changes in distribution of algae, plankton, and fish, as well as changes in salinity, oxygen levels, and circulation. These changes are happening much faster than species can adapt, and some changes will have profound consequences for the future of aquatic life.
- Because of changes in the contributions of Greenland and Antarctic ice flow and feedback mechanisms that cause warming of the atmosphere to be influenced by warming of the oceans, the future rate of sea level rise remains uncertain. But it is a real phenomenon linked to climate change. Sea level rise is causing increased loss of coastal lands to erosion, washing away wetlands and other habitat for coastal fish and wildlife species.
- Increasing uptake of carbon from the atmosphere by the ocean is changing ocean chemistry, causing surface waters to become more acidic. This threatens sea creatures with external, carbon-based shells, including corals

and many plankton species that support the ocean's entire food chain.

- Warming of waters in rivers and streams may make these habitats less able to support the spawning of salmon, trout, and other anadromous fish species that have significant economic value to recreational and commercial fisheries.

In addition, the IPCC identifies other ecosystems likely to be affected by climate change, including tundra and boreal forest and mountain regions (because of sensitivity to warming); Mediterranean-type ecosystems because of reduction in rainfall; and tropical rainforests where precipitation declines.

The IPCC concludes that warming and sea level rise would continue for centuries even if greenhouse gas emissions are stabilized now, making climate change the greatest single conservation challenge we face in the new millennium. The U.S. Fish and Wildlife Service is working to anticipate and address this challenge to fulfill its unique role in protecting fish and wildlife habitats and maintaining biodiversity in our world—today and into the future.

* IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability.*

Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate

Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22.

For more information on how the U.S. Fish and Wildlife Service is working with others to conserve the nature of America in a changing climate, visit <http://www.fws.gov/home/climatechange>

