US EPA ARCHIVE DOCUMENT

EPA United States Environmental Protection Agency

August 2016
EPA 430-F-16-014

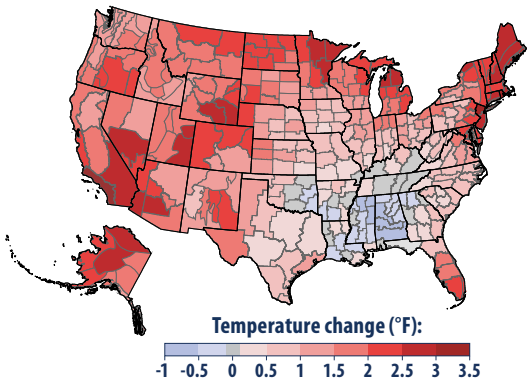
What Climate Change *Means for* Idaho

US EPA ARCHIVE DOCUMENT

Idaho's climate is changing. Over the past century, most of the state has warmed one to two degrees (F). Snowpack is melting earlier in the year, and the flow of meltwater into streams during summer is declining. In the coming decades, streams will be warmer, populations of several fish species may decline, wildfires may be more common, deserts may expand, and water may be less available for irrigation.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40 percent since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years. Warming is causing snow to melt earlier in spring.



Rising temperatures in the last century. The warming in Idaho has been similar to the average warming nationwide. Source: EPA, Climate Change Indicators in the United States.

Snowpack, Streamflows, and Water Availability

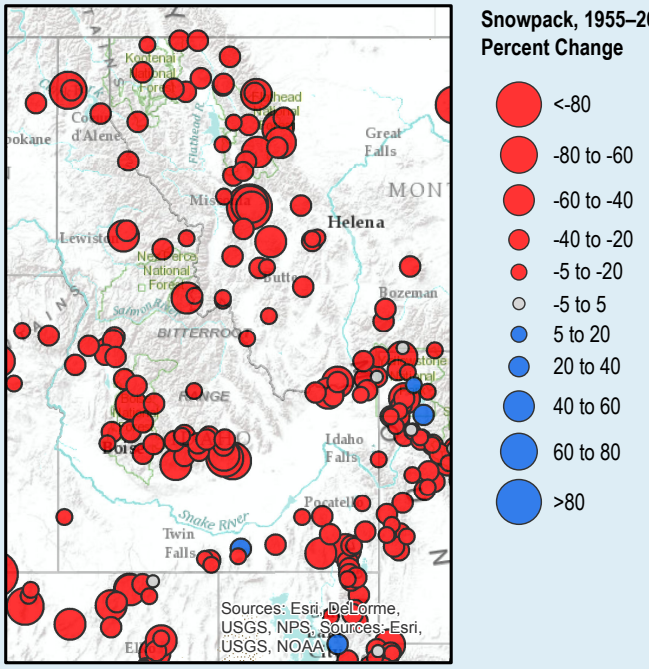
Much of the water needed for agriculture, public supplies, and other uses comes from mountain snowpack, which melts in spring and summer and runs off into rivers and fills reservoirs. As the climate warms, less precipitation falls as snow, and more snow melts during the winter, which decreases the snowpack. Since the 1950s, Idaho's snowpack has been decreasing in most locations.

Diminishing snowpack may shorten the season for skiing and other forms of winter tourism and recreation. The tree line may shift, as subalpine fir and other high-altitude trees become able to grow at higher elevations. A higher tree line would decrease the extent of alpine tundra ecosystems, which could threaten some species.

Mountain snowpack at Galena Summit, close to one of the long-term measuring sites shown in the map on the next page. April snowpack depth has decreased here and at another site in the valley below. Credit: G. Ingersoll, USGS.

A warming climate makes water less available during summer. As snowpack melts earlier, flows of fresh water in rivers and streams increase during late winter and early spring, but decrease during summer. This trend is likely to continue. Moreover, rising temperatures increase the rate at which water evaporates (or transpires) into the air from soils, plants, and surface waters, which will further reduce the amount of water draining into streams. While the impact on some streams may be negligible, in other streams, the flow of water during summer may be 50 percent less by mid-century than it is today.

Declining snowpack and streamflow are likely to harm aquatic ecosystems and water-dependent economic activities. With less melting snow to feed the streams during summer, water temperatures will rise. The combination of warmer water and lower flows would threaten salmon, steelhead, trout, and other coldwater fish. Lower flows would also mean less hydroelectric power.



Trends in April snowpack, 1955–2013. The snowpack has declined at most monitoring sites in Idaho. Source: EPA.

Drought and Wildfires

Climate change can increase the frequency and severity of fires that burn forests, grasslands, and desert vegetation. On average, nearly 1 percent of the land in Idaho has burned per year since 1984, making it the most heavily burned state in the nation. Changing the climate is likely to more than double the area in the Northwest burned by forest fires during an average year by the end of the 21st century. Although drier soils alone increase the risk of wildfire, many other factors also contribute.

Higher temperatures and a lack of water can also make trees more susceptible to pests and disease, and trees damaged or killed burn more readily than living trees. Changing the climate is likely to increase the area of pine forests in the Northwest infested with mountain pine beetles over the next few decades. Pine beetles and wildfires are each likely to decrease timber harvests. Increasing wildfires also threaten homes and pollute the air.

The combination of more fires and drier conditions may expand deserts and otherwise change the landscape in southern Idaho. Many plants and animals living in arid lands are already near the limits of what they can tolerate. Higher temperatures and a drier climate would generally extend the geographic range of the Great Basin desert. In some cases, native vegetation may persist and delay or prevent expansion of the desert. In other cases, fires or livestock grazing may accelerate the conversion of grassland to desert in response to changing climate. For similar reasons, some forests may change to desert or grassland.

A few charred tree trunks are all that remains after a section of forest was burned by the Motorway Complex Fire near Syringa and Lowell in 2015. Credit: Idaho Department of Lands.

Agriculture

Climate change may also pose challenges for livestock and crops. Hot weather causes cows to eat less, grow more slowly, and produce less milk; and in extreme cases it may threaten their health. Higher emperatures might also decrease potato yields and potato quality in the Northwest. Some farms may be harmed if more hot days reduce crop yields, or if the decline in summer streamflow reduces the water available for irrigation. Other farms may benefit from a longer growing season and the fertilizing effect of carbon dioxide.

Health and Vulnerable People

Climate change is likely to amplify some threats to health in Idaho. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor.

The sources of information about climate and the impacts of climate change in this publication are: the national climate assessments by the U.S. Global Change Research Program, synthesis and assessment products by the U.S. Climate Change Science Program, assessment reports by the Intergovernmental Panel on Climate Change, and EPA's *Climate Change Indicators in the United States*. Mention of a particular season, location, species, or any other aspect of an impact does not imply anything about the likelihood or importance of aspects that are not mentioned. For more information about climate change science, impacts, responses, and what you can do, visit EPA's Climate Change website at www.epa.gov/climatechange.

US EPA ARCHIVE DOCUMENT