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United States Environmental Protection Agency

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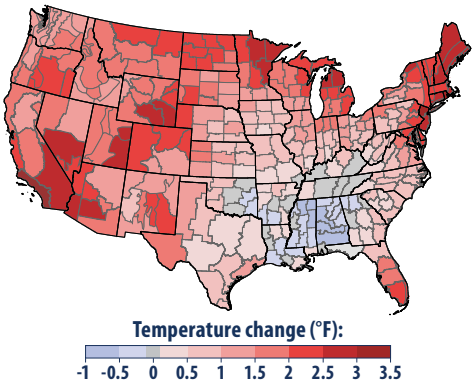
What Climate Change Means for Iowa

Iowa's climate is changing. Most of the state has warmed one-half to one degree (F) in the last century, and floods are becoming more frequent. In the coming decades, the state will have more extremely hot days, which may harm public health in urban areas and corn harvests in rural areas.

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.



Rising temperatures in the last century. All regions of Iowa have warmed. Source: EPA, Climate Change Indicators in the United States.

Heavy Precipitation and Flooding

Changing the climate is likely to increase the frequency of floods in Iowa. Over the last half century, average annual precipitation in most of the Midwest has increased by 5 to 10 percent. But rainfall during the four wettest days of the year has increased about 35 percent, and the amount of water flowing in most streams during the worst flood of the year has increased by more than 20 percent. During the next century, spring rainfall and average precipitation are likely to increase, and severe rainstorms are likely to intensify. Each of these factors will tend to further increase the risk of flooding.

Flooding of the Cedar River in 2008 damaged this section of U.S. Highway 6 east of Atalissa. Credit: Iowa Department of Transportation.

Mississippi and Missouri Rivers

Flooding occasionally threatens both navigation and riverfront communities, and greater river flows could increase these threats. In April and May 2011, a combination of heavy rainfall and melting snow caused a flood that closed the Mississippi River to navigation and caused billions of dollars in damage downstream. Later that spring, heavy rains and rapid snowmelt upstream led to flooding along the Missouri River, which damaged property and closed the river to navigation. These floods caused $85 million in direct damages along the Missouri, with the most extensive property damage and crop loss occurring between Sioux City and Council Bluffs.

Although springtime in Iowa is likely to be wetter, summer droughts are likely to be more severe. Higher evaporation and lower summer rainfall are likely to reduce river flows. The drought of 2012 narrowed navigation channels, forced lock closures, and caused dozens of barges to run aground on the Mississippi River, which cost the region more than $275 million.

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Tornadoes

Scientists do not know how the frequency and severity of tornadoes will change. Rising concentrations of greenhouse gases tend to increase humidity, and thus, atmospheric instability, which would encourage tornadoes. But wind shear is likely to decrease, which would discourage tornadoes. Research is ongoing to learn whether tornadoes will be more or less frequent in the future. Because Iowa experiences about 50 tornadoes a year, such research is closely followed by meteorologists in the state.

Agriculture

Changing the climate will have favorable and harmful effects on farming, although the net effect is unknown. Longer frost-free growing seasons and higher concentrations of atmospheric carbon dioxide would increase yields for many crops during an average year. But increasingly hot summers are likely to reduce yields of corn and possibly soybeans. Higher temperatures are also likely to reduce livestock productivity, because heat stress disrupts the animals' metabolism. Seventy years from now, Iowa is likely to have 10 to 20 more days per year with temperatures above 95°F than it has today. More severe droughts or floods would also hurt crop yields.

Drought-stricken corn in Missouri Valley in August 2012. Credit: Dave Kosling, USDA.

Air Pollution and Human Health

Changing the climate can harm air quality and amplify existing threats to human health. Higher temperatures can increase the production of ground-level ozone, a pollutant that can cause lung and heart problems. Ozone also harms plants. In rural Iowa, ozone levels are high enough to reduce yields of soybeans. EPA and the Iowa Department of Natural Resources have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will become more difficult.

Climate change may also increase the length and severity of the pollen season for allergy sufferers. For example, the ragweed season in the northern Great Plains and Upper Midwest is now 10 to 21 days longer than it was in 1995, because the first frost in fall is later.

Hot days can be unhealthy—even dangerous. High air temperatures can cause heat stroke and dehydration, and affect people's cardiovascular and nervous systems. Midwestern cities are vulnerable to heat waves, because many houses and apartments lack air conditioning, and urban areas are typically warmer than their rural surroundings. In recent decades, severe heat waves have killed hundreds of people across the Midwest. Heat stress is expected to increase as climate change brings hotter summer temperatures and more humidity. 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.

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