EPA United States Environmental Protection Agency

Climate Change Indicators in the United States, 2012

EPA's *Climate Change Indicators in the United States, 2012*, presents compelling evidence that many fundamental measures of climate in the United States are changing. Temperatures are rising, snow and rainfall patterns are shifting, and more extreme climate events—like heavy rainstorms and record-high temperatures—are already affecting society and ecosystems. Similar changes are occurring around the world. EPA's report presents 26 indicators, which are organized into the five categories listed at right.

Observed Changes

Greenhouse Gases: Greenhouse gas emissions are increasing as a result of people's activities. Consequently, average concentrations of these heat-trapping gases in the atmosphere are also increasing.

Weather and Climate: Average U.S. and global temperatures are increasing. Other attributes of weather and climate, such as precipitation, drought, and tropical cyclone activity, are changing.

Oceans: The oceans are getting warmer. Sea levels are rising around the world, and the oceans are becoming more acidic.

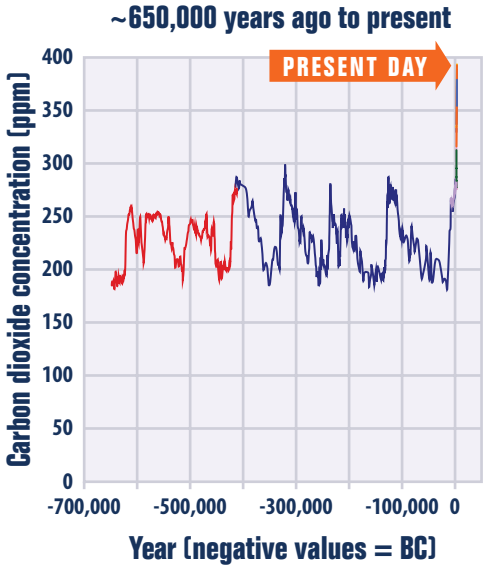
Snow and Ice: The extent of Arctic sea ice is declining. Glaciers in the United States and around the world are generally shrinking, while snowfall and snow cover in the United States have decreased overall.

Society and Ecosystems: Ragweed pollen season is lengthening, as is the growing season for crops. Winter habitats of bird species have shifted northward as temperatures have risen.

Atmospheric Concentrations of Greenhouse Gases

Before the industrial era began in the late 1700s, global carbon dioxide concentrations in the atmosphere measured approximately 280 parts per million (ppm). Concentrations have risen steadily since then, reaching 391 ppm in 2011—a 40 percent increase. Current global atmospheric concentrations of carbon dioxide are unprecedented compared with the past 650,000 years.

Global Atmospheric Concentrations of Carbon Dioxide Over Time

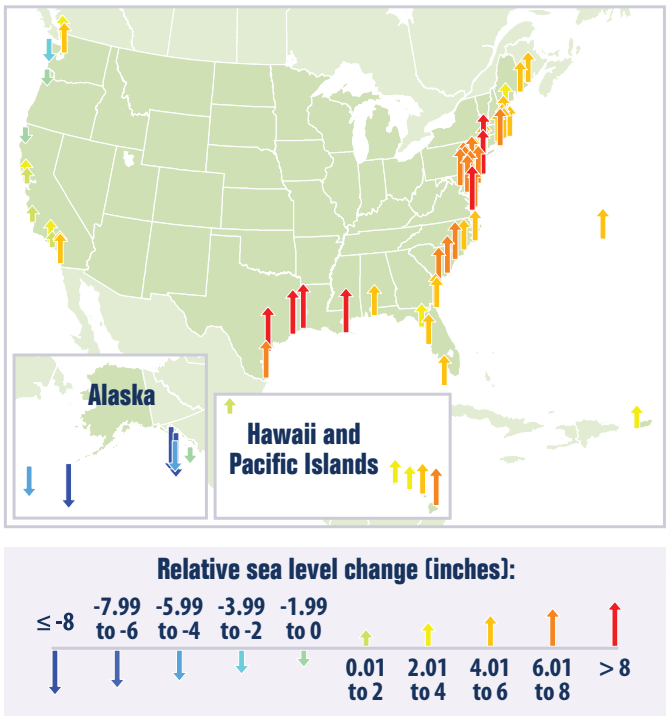


Data source: Compilation of 12 underlying datasets

Sea Level

As temperatures rise, seawater warms up and expands, and ice melts. This raises sea level worldwide. Sea level rose relative to the land along much of the U.S. coastline between 1960 and 2011, particularly along the Mid-Atlantic and Gulf Coasts. Some parts of the Gulf Coast have registered a relative sea level rise of more than 8 inches since 1960.

Relative Sea Level Change Along U.S. Coasts, 1960–2011



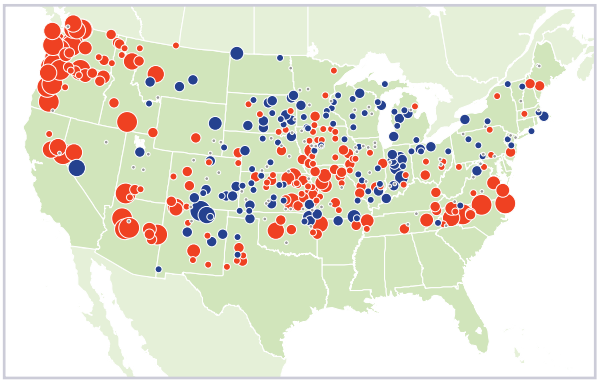
Data source: NOAA, 2012

dicator Highlights

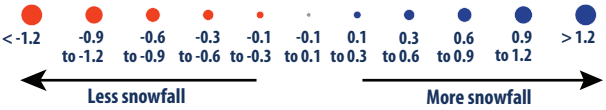
Snowfall

With warming temperatures and changing weather patterns, snowfall amounts have decreased in many parts of the country (as indicated by the red circles on the map), with 57 percent of weather stations showing a decline. The Pacific Northwest has seen the largest consistent decline in snowfall, but some regions have experienced modest increases, including areas near the Great Lakes.

Change in Total Snowfall in the Contiguous 48 States, 1930–2007



Rate of change (percent per year):

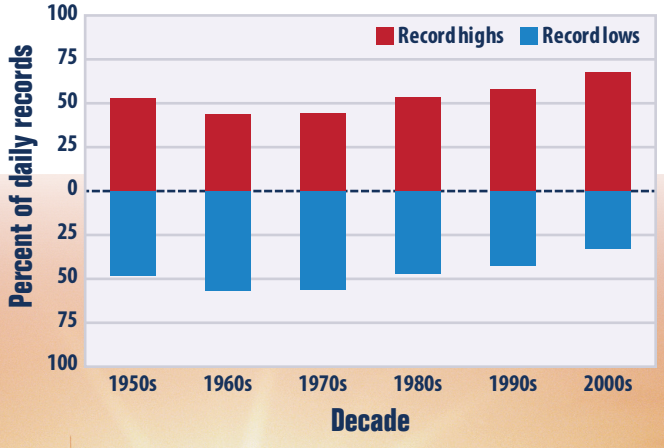


Data source: Kunkel et al., 2009

High and Low Temperatures

Since the 1970s, record-setting daily high temperatures have become more common than record lows across the United States. The most recent decade had twice as many record highs as record lows.

Record Daily High and Low Temperatures in the Contiguous 48 States, 1950–2009

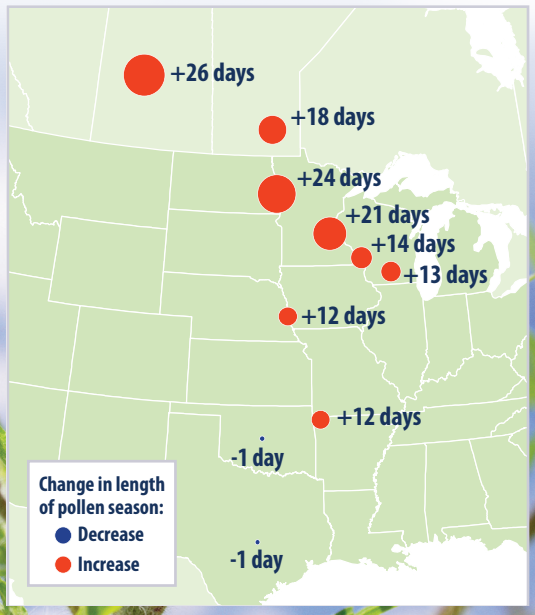


Data source: Meehl et al., 2009

Ragweed Pollen Season

The length of the ragweed pollen season is closely related to the timing of the first fall frost, which is occurring later than it used to in northern areas. Since 1995, the ragweed pollen season has grown longer at eight of the 10 locations studied. The red circles represent a longer pollen season, with larger circles indicating larger changes.

Change in Ragweed Pollen Season, 1995–2011



Data source: Ziska et al., 2012

2012 Climate Indicators

Greenhouse Gases

U.S. Greenhouse Gas Emissions
Global Greenhouse Gas Emissions
Atmospheric Concentrations of Greenhouse Gases
Climate Forcing

Weather and Climate

U.S. and Global Temperature
High and Low Temperatures
U.S. and Global Precipitation
Heavy Precipitation
Drought
Tropical Cyclone Activity

Oceans

Ocean Heat
Sea Surface Temperature
Sea Level
Ocean Acidity

Snow and Ice

Arctic Sea Ice
Glaciers
Lake Ice
Snowfall
Snow Cover
Snowpack

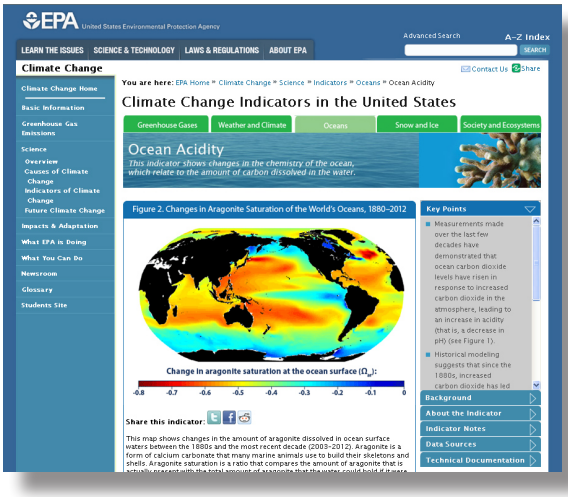
Society and Ecosystems

Streamflow
Ragweed Pollen Season
Length of Growing Season
Leaf and Bloom Dates
Bird Wintering Ranges
Heat-Related Deaths

Access the 2012 Report Online

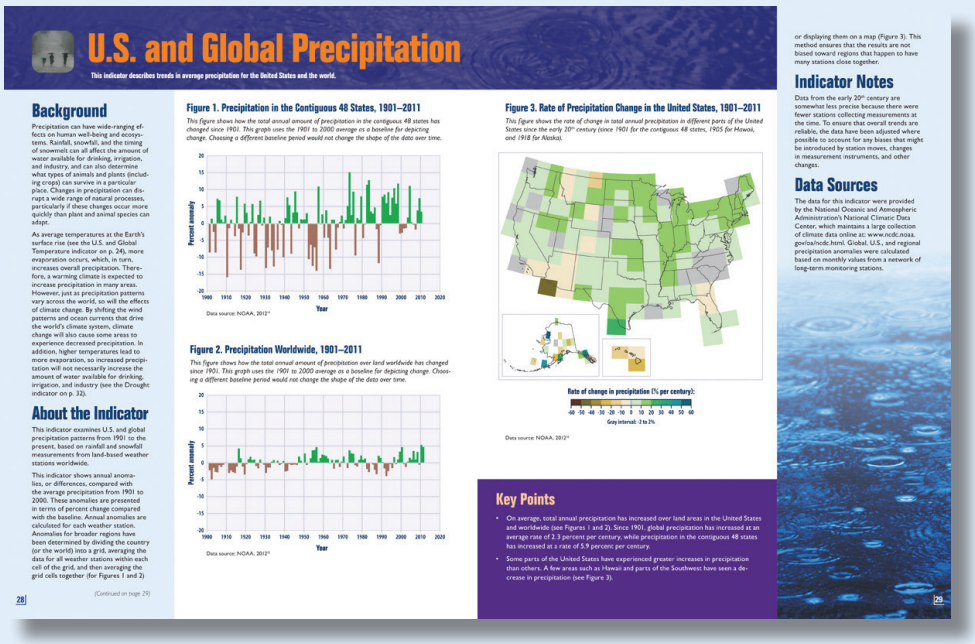
www.epa.gov/climatechange/indicators

For each of the 26 indicators, the report presents graphics depicting changes over time, key points about what the graphics show, background on how the indicator relates to climate change, and information about how the indicator was developed.



The website also features technical documentation that provides additional details about each indicator. Visitors to the website can share report content through social media outlets like Facebook and Twitter.

A print version of the report is available by request or for download from the website.



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Print copies of *Climate Change Indicators in the United States, 2012*, are available upon request. To order a copy, please submit a written request to:

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United States Environmental Protection Agency

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