

WHAT IS CLIMATE CHANGE?

- ➔ **Climate change** refers to any substantial change in measures of climate (such as temperature and precipitation) lasting for an extended period (decades or longer). Climate change may result from natural factors and processes or from human activities.
- ➔ **Global warming** is a term often used interchangeably with the term "climate change," but they are not the same thing. Global warming refers to an average increase in the temperature of the atmosphere near the Earth's surface. Global warming is just one aspect of global climate change, though a very important one.

CLIMATE CHANGE IS HAPPENING NOW.

In the United States, 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. Scientists are confident that many of the observed changes in the climate can be linked to the increase in greenhouse gases in the atmosphere, caused largely by people burning fossil fuels to generate electricity, heat and cool buildings, and power vehicles.

WHY USE INDICATORS?

One important way to track and communicate the causes and effects of climate change is through the use of indicators. An indicator represents the state or trend of certain environmental or societal conditions over a given area and a specified period of time. For example, long-term measurements of temperature in the United States and globally are used as an indicator to track and better understand the effects of changes in the Earth's climate.

What Climate Change Looks Like

As emissions of heat-trapping greenhouse gases from human activities increase, they contribute to more warming of the climate, leading in turn to many other changes around the world—in the atmosphere, on land, and in the oceans. These changes have both positive and negative effects on people, plants, and animals.

To view the full report, visit:
www.epa.gov/climatechange/indicators

Tracking Climate Change with Indicators

Highlights from *Climate Change Indicators in the United States, 2014*

EPA's *Climate Change Indicators in the United States, 2014*, presents compelling evidence that the impacts of climate change are already occurring across the United States.

GET THE REPORT

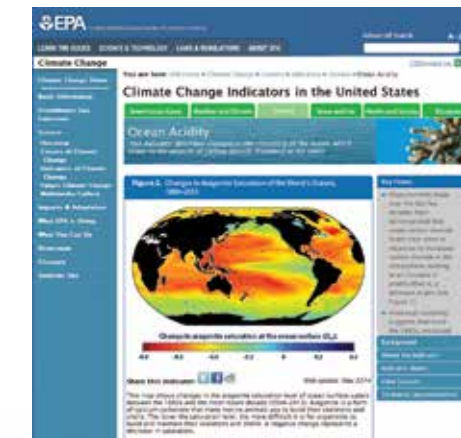
You can obtain EPA's *Climate Change Indicators in the United States, 2014*, report from the website or get printed copies upon request.



To order a printed copy, please submit a written request to:
climateindicators@epa.gov
EPA 430-F-14-015
May 2014

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WHAT'S HAPPENING

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

Health and Society: Ragweed pollen season is lengthening, as is the growing season for crops. Lyme disease is becoming more common, possibly due in part to climate change.

Ecosystems: Many areas are experiencing earlier spring events, such as peak stream runoff and flower blooms. Bird migration patterns are also changing, and wildfire size has increased.

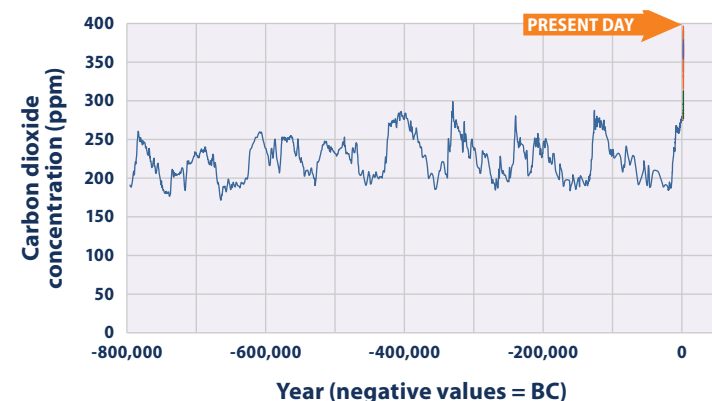


What Climate Change Looks Like

GREENHOUSE GASES

Atmospheric Concentrations of Greenhouse Gases

Concentrations of Carbon Dioxide in the Atmosphere from 800,000 Years Ago to Present Day

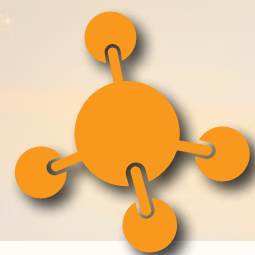


Data source: Compilation of 10 underlying datasets

- Concentrations of carbon dioxide and other greenhouse gases in the atmosphere have increased since the beginning of the industrial era. Almost all of this increase is due to human activities.
- Concentrations of carbon dioxide are currently higher than any levels recorded for hundreds of thousands of years, even after accounting for natural fluctuations.

INDICATORS IN THIS CATEGORY:

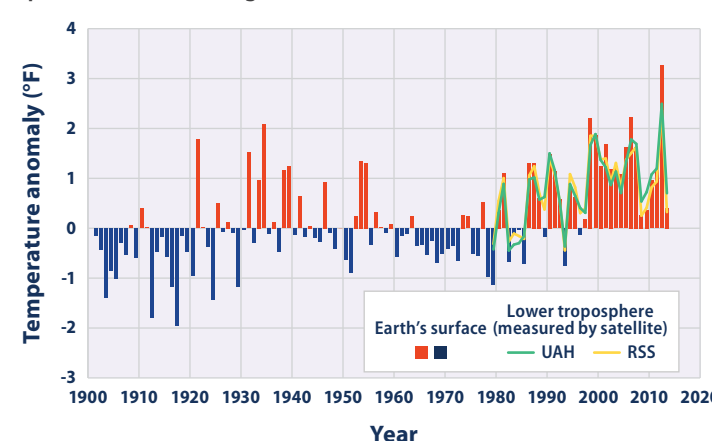
- U.S. Greenhouse Gas Emissions
- Global Greenhouse Gas Emissions
- Atmospheric Concentrations of Greenhouse Gases**
- Climate Forcing



WEATHER AND CLIMATE

U.S. and Global Temperature

Temperatures in the Contiguous 48 States, 1901–2013



Data source: NOAA, 2014

- Average temperatures have risen across the contiguous 48 states since 1901, with an increased rate of warming over the past 30 years.
- Seven of the top 10 warmest years on record in the contiguous 48 states have occurred since 1998. Globally, the top 10 warmest years on record have all occurred since 1998.

INDICATORS IN THIS CATEGORY:

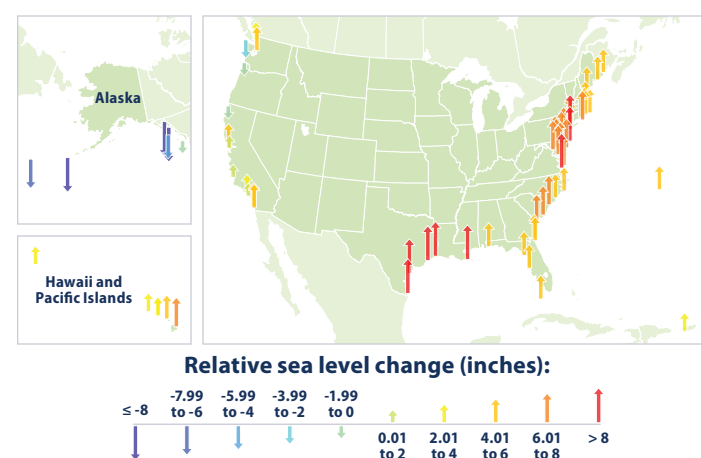
- U.S. and Global Temperature**
- High and Low Temperatures
- U.S. and Global Precipitation
- Heavy Precipitation
- Drought
- Temperature and Drought in the Southwest (A Closer Look)
- Tropical Cyclone Activity



OCEANS

Sea Level

Relative Sea Level Change Along U.S. Coasts, 1960–2013

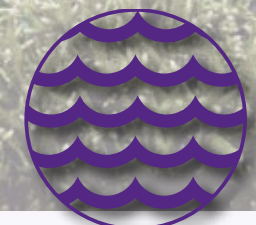


Data source: NOAA, 2014

- When averaged over all the world's oceans, sea level has increased at a rate of roughly six-tenths of an inch per decade since 1880.
- Along the U.S. coastline, sea level has risen the most relative to the land along the Mid-Atlantic and Gulf coasts, in some places by more than 8 inches.

INDICATORS IN THIS CATEGORY:

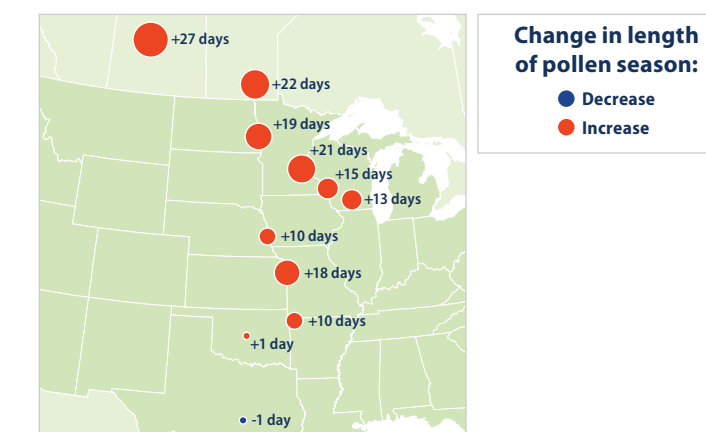
- Ocean Heat
- Sea Surface Temperature
- Sea Level**
- Land Loss Along the Atlantic Coast (A Closer Look)
- Ocean Acidity



HEALTH AND SOCIETY

Ragweed Pollen Season

Change in Ragweed Pollen Season, 1995–2013



Data source: Ziska et al., 2014

- Warmer temperatures and later fall frosts allow ragweed plants to produce pollen later into the year, potentially prolonging allergy season.
- The length of ragweed pollen season has increased at 10 out of 11 locations studied in the central United States and Canada since 1995. The change becomes more pronounced from south to north.

INDICATORS IN THIS CATEGORY:

- Heating and Cooling Degree Days
- Heat-Related Deaths
- Lyme Disease
- Length of Growing Season
- Ragweed Pollen Season**



SNOW AND ICE

Lake Ice

Change in Ice Thaw Dates for Selected U.S. Lakes, 1905–2012



Data source: Various federal, state, and local agencies

- Most lakes in the northern United States are freezing later and thawing earlier compared with the 1800s and early 1900s.
- Thaw dates for most of the lakes studied show a general trend towards earlier ice breakup in the spring, with some growing earlier by up to 23 days in the past 107 years.

INDICATORS IN THIS CATEGORY:

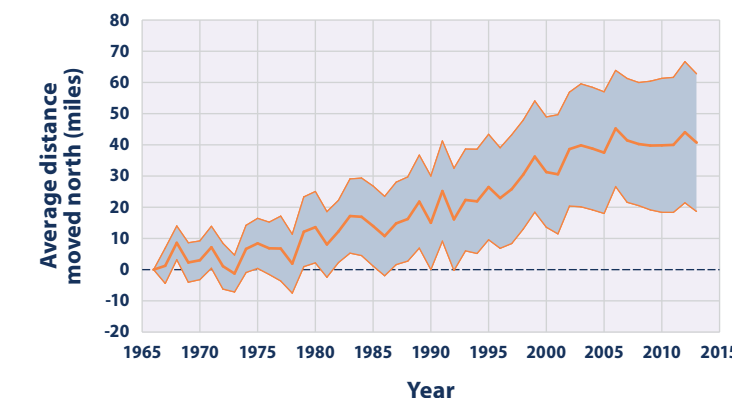
- Arctic Sea Ice
- Glaciers
- Lake Ice**
- Ice Breakup in Two Alaskan Rivers (Community Connection)
- Snowfall
- Snow Cover
- Snowpack



ECOSYSTEMS

Bird Wintering Ranges

Northward Shift of Bird Populations, 1966–2013



Data source: National Audubon Society, 2014

- Some birds shift their range or alter their migration habits to adapt to changes in temperature or other environmental conditions.
- Widespread North American bird species have shifted their wintering grounds northward by an average of more than 40 miles since 1966, with several species shifting by hundreds of miles.

INDICATORS IN THIS CATEGORY:

- Wildfires
- Streamflow
- Great Lakes Water Levels and Temperatures
- Bird Wintering Ranges**
- Leaf and Bloom Dates
- Cherry Blossom Bloom Dates in Washington, D.C. (Community Connection)

