Climate Change Indicators in the United States, 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 also 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: 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 wildlife populations are increasing.

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.

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.

What Climate Change Looks Like
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**GREENHOUSE GASES**
- 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.
- Atmospheric concentrations of greenhouse gases are currently higher than any levels recorded for hundreds of thousands of years, even after accounting for natural fluctuations.

**WEATHER AND CLIMATE**
- 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.

**SNOW AND ICE**
- 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 thawing.

**OCEANS**
- When averaged over the world’s oceans, sea level has increased at a rate of roughly a sixth 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 6 inches.

**ECOSYSTEMS**
- Some birds shift their range or alter where they migrate based on changes in temperature or other environmental conditions.