

# CLIMATE CHANGE AND THE CHESAPEAKE BAY

Located on the East Coast of the United States, the *Chesapeake Bay* is the largest estuary in North America. Its watershed is 64,000 square miles and covers part of six states: Virginia, Maryland, West Virginia, Delaware, Pennsylvania, and New York, as well as Washington, D.C. It is one of the most productive estuaries in the world. An *estuary* is a partly enclosed body of water where freshwater rivers and streams mix with seawater. The Chesapeake Bay and its tributaries are a national treasure as well as an important economic asset.



NOAA “smart buoys” in the Bay deliver real-time data that help scientists measure the effects of climate change.

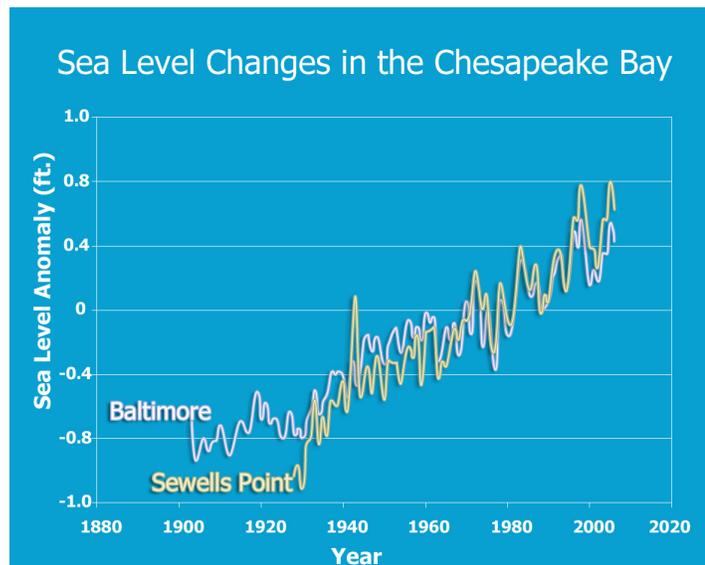
Global climate change is a measurable difference in Earth’s average global temperature and weather patterns over extended periods of time, ranging from decades to millions of years. These changes occur as a result of natural processes such as slight changes in the Earth’s orbit and volcanic activity, and due to manmade factors. Since the industrial revolution in the early 1800s, humans have increased the abundance of heat-trapping gases in the atmosphere, which is the main reason Earth’s average temperature has risen by about 1.5°F since 1990. Evidence of climate change in the Chesapeake Bay is clear:

- Sea level in the Chesapeake Bay is rising at an average rate of 0.14 in/yr (this rate is almost 0.08 inches faster than the global average because the land around the Chesapeake Bay is subsiding).
- Water has become more acidic due to increased carbon dioxide levels in the atmosphere and decomposing phytoplankton blooms (driven by nutrient runoff).
- Water temperatures have increased almost 2° F since 1960.

## What to Expect in the Next Century

The Chesapeake Bay is especially vulnerable to the effects of climate change because the environment is already stressed from pollution, development, and other pressures, and many species are already at the edge of their habitable range. The following changes are projected to occur in the Chesapeake Bay by 2100:

- Sea level rise of 2-5 feet;
- Increase in storm intensity and more destructive storm surges;
- Decreased shellfish growth due to increased water acidification;
- More variable precipitation and water salinities (+/- 10%);
- Increased plant and algae growth as a result of increased carbon dioxide;
- Change in plant and animal ranges due to changes in temperature, salinity, and food distribution (e.g. rockfish, eelgrass); and
- Another 3-10° F increase in water temperature.



## Climate Change and the Executive Order

Executive Order 13508, issued by President Obama in 2009, calls for the protection and restoration of the Chesapeake Bay. The goal is to create a Chesapeake Bay watershed with a resilient network of habitats, clean water, abundant fish, shellfish, and wildlife populations, and increased public access and stewardship. The Executive Order directs NOAA and other federal agencies to minimize the vulnerability of the Chesapeake Bay watershed, including its habitats, public infrastructure and human communities, to adverse impacts from climate change. This objective will be accomplished by:

- Improving information on communities; habitats, and resources at risk
- Conducting monitoring activities;
- Controlling greenhouse gas emissions; and
- Implementing effective restoration strategies that increase ecosystem resilience and protect vulnerable areas.

## NOAA Science and Services

The National Oceanic and Atmospheric Administration (NOAA) informs citizens by providing weather forecasts, storm warnings, climate monitoring, fisheries management, coastal restoration, and support for marine commerce. NOAA is the official U.S. climate change agency and maintains the world's largest and oldest archive of satellite- and Earth-based observations.

NOAA works to help society understand, plan for, and respond to climate change. It aims to provide decision makers and the public with an understanding of the global climate through its observation systems, research on key climate processes, and the development and delivery of climate information and services. Its modeling capabilities allow it to predict future climate as well as assess impacts of climate change. NOAA is helping reduce the threat of climate change.

*"Climate change is real. It is here, and it is happening now, in our backyards and around the globe."*

-Dr. Jane Lubchenco,  
NOAA Administrator



**For more information, please visit:**

NOAA Climate Portal: [www.climate.gov](http://www.climate.gov)

NOAA Chesapeake Bay Office: <http://chesapeakebay.noaa.gov>

Chesapeake Bay Executive Order: [executiveorder.chesapeakebay.net](http://executiveorder.chesapeakebay.net)