

George Washington Birthplace National Monument

Sea Level Rise

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship & Science
Ocean and Coastal Resources Program

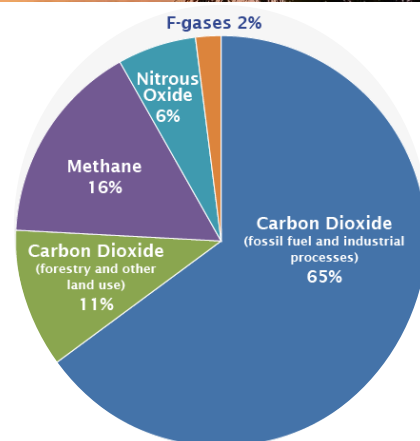


Sea levels are rising.

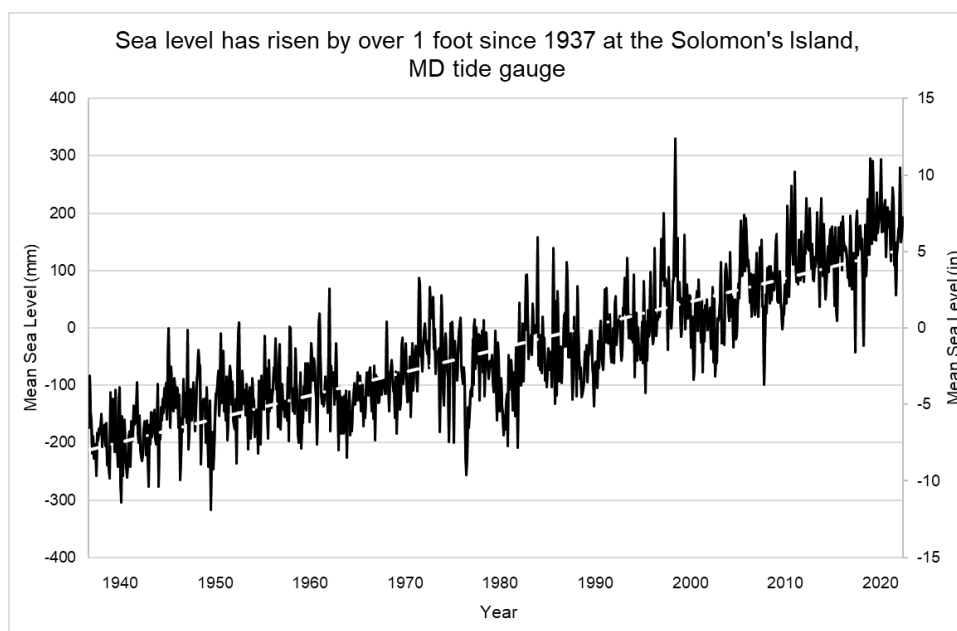
Two phenomena related to climate change contribute to accelerated global sea level rise:

- Thermal expansion: global atmospheric and ocean temperatures are rising, and water expands as it absorbs heat.
- Ice melt: melting glaciers and ice sheets increase freshwater runoff into oceans.

Greenhouse gases trap heat in our atmosphere resulting in rising ocean temperatures. Sources of greenhouse gases include the use of fossil fuels such as coal, oil, and natural gas to power our societies, which releases carbon dioxide and methane into the atmosphere. Other methane sources include emissions from landfills and agriculture.



Greenhouse Gas Emissions by Gas

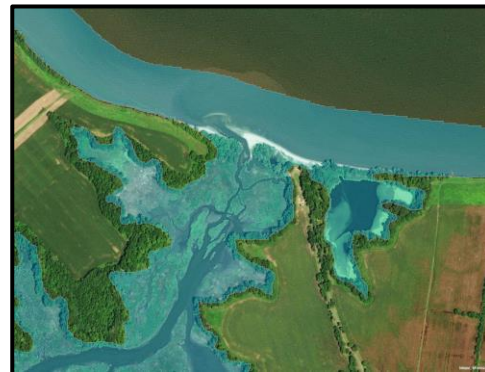


Since 1937, sea level has risen by over one foot at the Solomon's Island tide gauge in Maryland, which is operated by the National Oceanic and Atmospheric Administration (NOAA). Sea level could rise by as much as 5.35 feet by 2100.

What is the future of sea level rise at George Washington Birthplace NM?

NOAA Projections ¹	2050	2100
Intermediate Low	+1.31 ft	+2.62 ft
Intermediate	+1.41 ft	+4.07 ft
Intermediate High	+1.57 ft	+5.35 ft

This table shows projected sea level heights at the park compared to today's mean sea level. These projections were developed by NOAA in 2022 based on different climate change scenarios. Projections are a way of visualizing a range of possible futures. They can aid in park planning by helping managers determine which resources are most threatened by sea level rise.



From left to right, these images show the beach area and the nearby Bridges Creek with its current sea level, with two feet of sea level rise, and with five feet of sea level rise. Sea level rise is projected to flood the beach area and inundate much of the marsh and pond area surrounding Bridges Creek.



How is sea level rise impacting George Washington Birthplace National Monument?

George Washington Birthplace National Monument is located along Popes Creek, Bridges Creek, and the Potomac River in Virginia. It occupies 550 acres of the former Popes Creek Plantation, the American ancestral home of the Washington Family where George Washington was born. In addition to the Washington Family Burial Ground, a farm, and Colonial Revival-era buildings constructed in honor of Washington's 200th birthday in 1932, the park also includes natural resources such as a beach area, tidal marshes, two globally-rare forest types, and meadows. The park's location along a tidal river and two tidal creeks means its resources are susceptible to impacts of sea level rise like flooding, erosion, higher storm surges, and saltwater intrusion. Park infrastructure and visitor recreation areas are also being impacted by these sea level rise threats.

- The most popular visitor recreation area of the park is the beach along the Potomac River. High tides and high waves during storms have made the beach narrower, washed away vegetation, and caused sand overwash into a nearby marsh.
- The park contains many important archeological and historic sites, which are vulnerable to impacts such as high rates of erosion or damage from flooding and storm surges.
- The marsh in the Popes Creek area of the park used to be mostly contiguous, but it has since turned into marsh islands as much of the space has been converted to open water. Marshes have low elevation profiles, so even a minor change in sea level can cause dramatic changes to the habitat and cause the marsh to drown.
- The cliffs along the park's shoreline are made of silty sand deposits that constitute a geologic formation called the Calvert Formation, which dates between 22 and 14 million years old. These cliffs are being eroded at an extremely high rate of up to 2 meters per year because strong waves during high tides and storm events easily wash away their soft, unconsolidated sediments. A variety of resources are threatened as the cliffs continue to erode.



Trees along the beach area fell during storm events [NPS]



Part of the eroding cliffs along the shore [NPS]

How is George Washington Birthplace National Monument responding to sea level rise?

- The park recently began developing a vulnerability assessment, which will provide park managers with information on which resources are most vulnerable to sea level rise impacts. This information will assist in park planning efforts.
- Shoreline erosion and impacts to resources are expected to accelerate with sea level rise. In response to this threat, the park has implemented a regular shoreline monitoring process to more accurately assess rates of erosion, as well as record impacts to resources. This information also helps the park better plan for the future.



One resource that is vulnerable to sea level rise is the park's marsh. It is at risk of drowning as water levels rise [NPS].

What can you do to help?

- Reduce your carbon footprint: power down electronics or reduce your thermostat. Go to carbonfootprint.com to calculate your carbon footprint and find ways to make changes.
- Volunteer with organizations working to protect coastal habitats that provide natural defenses against sea level rise.
- Support climate mitigation and adaptation policies. Contact your representatives in Congress to let them know you care.
- Visit coastal areas and support the parks and communities that are taking actions to prepare for sea level rise.

Additional Resources

1. <https://coast.noaa.gov/slr/>: A NOAA SLR viewer tool to access local sea level rise projections at tide gauges and visualize sea level rise scenarios.
2. <https://tidesandcurrents.noaa.gov/>: Access water levels, tide predictions, and other conditions along coasts.
3. [NOAA Coastal Flood Exposure Mapper](#): A tool to visualize coastal hazards as well as societal, infrastructure, and ecosystems exposure to those hazards

Note: The sea level rise projections, storm surge projections, and other information presented here are for general educational and awareness purposes only. They should not be used for site-specific analysis, navigation, permitting, or legally binding activities.