National Park Service
U.S. Department of the Interior

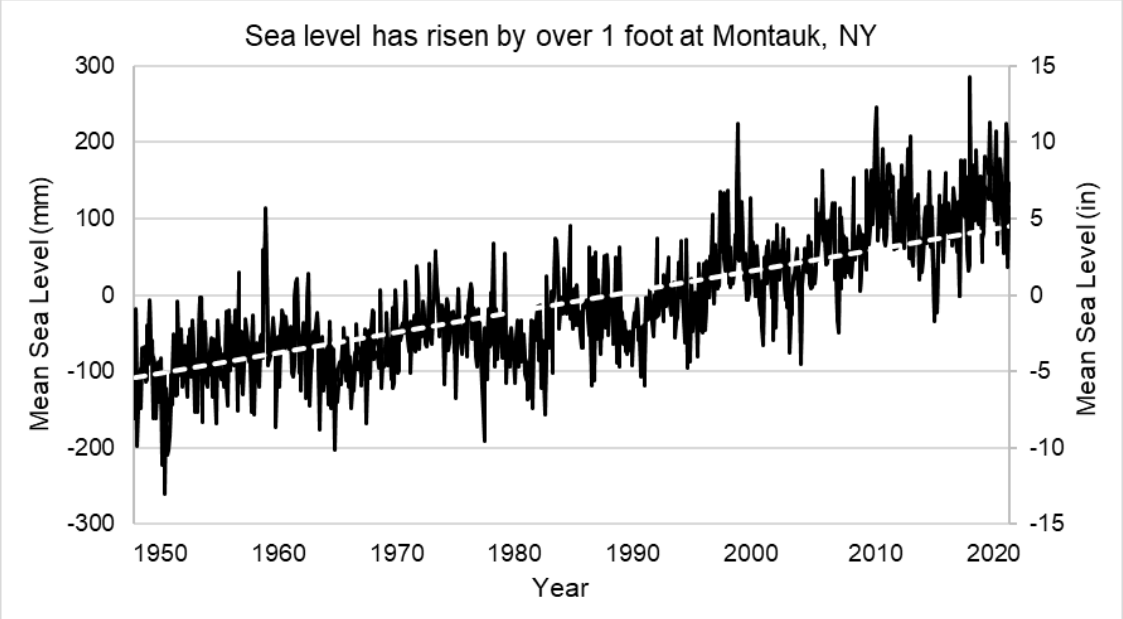
Natural Resource Stewardship & Science
Ocean and Coastal Resources Program

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; methane sources also include emissions from landfills and agriculture.



Since 1947, sea level has risen at an average rate of 0.13 in/yr at Fire Island based on data from the Montauk, NY tide gauge, which is operated by the National Oceanic and Atmospheric Administration (NOAA). Sea level could rise by as much as 6.50 feet by 2100.

What is the future of sea level rise at Fire Island?

NOAA Projections[1]	2050	2100
Intermediate Low	+1.05 ft	+2.03 ft
Intermediate	+1.67 ft	+4.30 ft
Intermediate High	+2.33 ft	+6.50 ft

This table shows projected sea level heights at the seashore 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 Fire Island Wilderness Visitor Center (red box) and Wilderness Breach area (to the left of the Visitor Center) with its current water level, with two feet of sea level rise, and with six feet of sea level rise.

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship & Science
Ocean and Coastal Resources Program

How is sea level rise impacting Fire Island?

Fire Island is a barrier island, so it is a dynamic environment by nature. Wave, tidal, and wind action continuously shape and shift the island, but rising sea levels are causing more dramatic changes that are outside the natural range of variability. The seashore is facing increases in beach erosion, saltwater intrusion, and high-tide flooding, which cause challenges for the natural and cultural resources found at the seashore. The diverse natural resources of the island, including beaches, dunes, wetlands, and the globally rare maritime holly forest, are all vulnerable to sea level rise. The park is also closely tied to the 17 communities that share the island, with year-round residents and summer vacationers. These communities, also at risk of damage from the impacts of sea level rise, work with the National Seashore in planning for a more resilient Fire Island in the face of climate change impacts.

- The maritime holly forest on Fire Island is one of only two of its kind in the world, making it a globally rare feature. Sea level rise, saltwater intrusion, and elevated groundwater tables are contributing to loss of this unique ecosystem.
- Higher average sea levels lead to more frequent high tide flooding, greater risk of flooding during storms, and increased erosion across the island. These processes can damage habitats as well as built structures, such as the Fire Island Lighthouse, which was found to have moderate vulnerability to coastal hazards in a 2018 report.
- Several shore bird species nest along the beaches of Fire Island, many of which are federally- or state-listed as threatened or endangered, such as the piping plover or the roseate tern. These breeding populations face erosion and increased flooding of their nesting habitat.

The Sunken Forest - a rare maritime holly forest [NPS]

The Fire Island Lighthouse [NPS]

A piping plover [NPS]

Strong offshore winds from storms combined with high tides often leads to flooding in the communities on Fire Island, such as in this photograph of the bay side of the Ocean Beach community. These events will become more common as sea levels continue to rise [fireislandandbeyond.com].

The Wilderness Breach was formed during Superstorm Sandy in 2012 and park managers decided to leave it open because breaches are natural features of barrier islands and serve as evidence for their dynamic nature [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 (2017).
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
4. Fire Island Coastal Hazards Assessment: A 2018 report summarizing the vulnerability levels of various FIIS assets.

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.