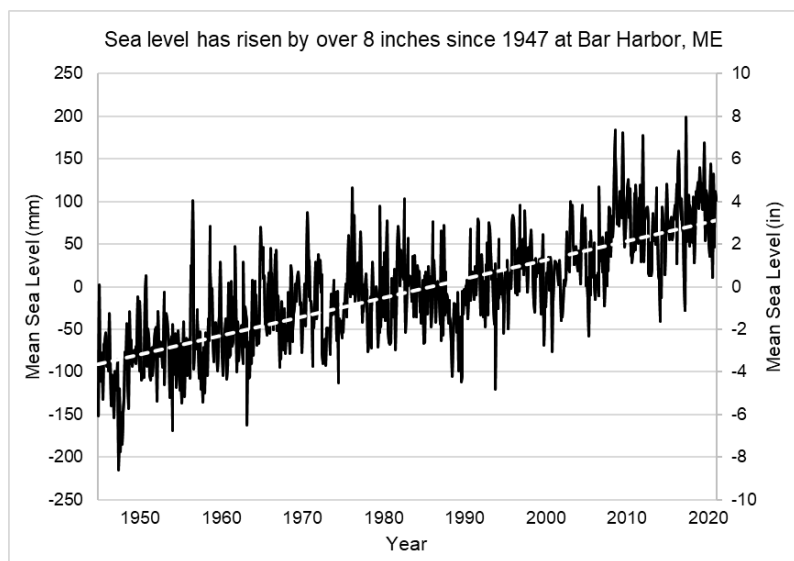


Sea levels are rising.

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, Acadia has observed over 8 inches of sea level rise at the nearby Bar Harbor, ME tide gauge, which is operated by the National Oceanic and Atmospheric Administration (NOAA). Sea level could rise by as much as 6.2 feet by 2100.

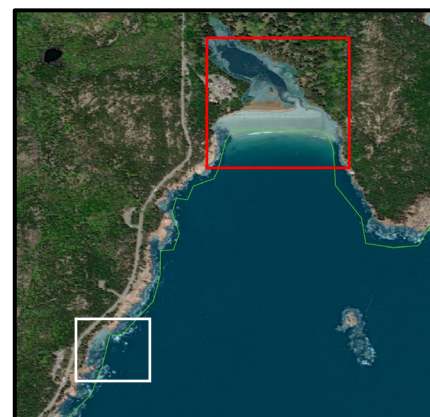
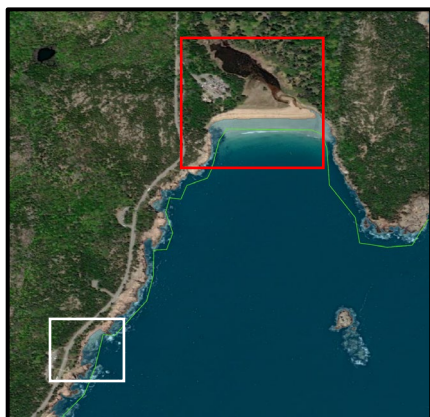


Higher sea levels mean higher storm surges, which can lead to more dangerous conditions during storm events. Access will often be restricted during storms to ensure visitor safety [NPS].

What is the future of sea level rise at Acadia?

NOAA Projections ¹	2050	2100
Intermediate Low	+0.9 ft	+1.7 ft
Intermediate	+1.6 ft	+4.0 ft
Intermediate High	+2.3 ft	+6.2 ft

This table shows projected sea level heights at Acadia 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 Sand Beach (red box) and Thunder Hole (white box) area of Acadia with its current water level, with 2 feet of sea level rise, and with 6 feet of sea level rise. Sand Beach and Thunder Hole are two of the most popular visitor locations in Acadia.



How is sea level rise impacting Acadia?

Acadia protects nearly 64 miles of coastline on Mount Desert Island, Schoodic Peninsula, Isle au Haut, and other islands. With miles of rocky coast and sand beaches, mudflats, seagrasses and estuarine wetlands, the ocean is highly integrated to the park's natural features. Acadia is facing increases in beach erosion, saltwater intrusion into freshwater habitats, and high-tide flooding, which cause challenges for the resources found at the park. Sea level rise can also cause issues in accommodating visitors.

- Storms - Acadia is frequently hit by storms, which cause flooding from storm surge. Higher sea levels will increase the impact of storms by increasing flooding extent. Climate change is also causing storms to grow stronger, which will further increase a storm's impact.
- Destinations - because most of Acadia is situated at relatively high elevations, only 10% of the park's structures and roads are vulnerable to sea level rise. However, the 10% includes many of the park's most popular visitor destinations, such as Sand Beach, Thunder Hole, Thompson Island, and parts of the Schoodic Peninsula.
- Habitat Loss – Acadia's shoreline habitats, such as remote offshore islands, sand beaches, and rocky intertidal zones, are important foraging and breeding habitats for shorebirds, such as common eiders. Damage to these habitats could impact these breeding populations.



Waves strike Thunder Hole on a stormy day [NPS].



The coastal Wonderland Trail has been damaged by storms and flooding in the past [NPS].



A common eider [National Audubon Society]

How is the NPS responding to sea level rise?

To respond to the challenge of rising waters, the National Park Service employs the Resist, Accept, Direct (RAD) framework, which serves as a guide to climate response strategies for parks. Acadia National Park uses this strategy in their management of the park. For example:

- In some areas, it may be possible to *resist* change, such as by continuing to rebuild stairs, railings, and walkways at Thunder Hole after storm events cause damage.
- In other areas of the park, *accepting* conversion of one habitat type to another is the best response strategy, such where Acadia's spruce-fir forest is being converted to salt marsh habitat.

Salt marshes in Acadia are migrating landward as sea levels rise and may encroach upon other vulnerable habitats, such as the coastal spruce-fir forests seen in this image [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 (20 17).
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. [Acadia Coastal Hazards Assessment](#): A 2018 report summarizing the vulnerability levels of various Acadia 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.