

American Memorial Park

Sea Level Rise

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship & Science
Ocean and Coastal Resources Program

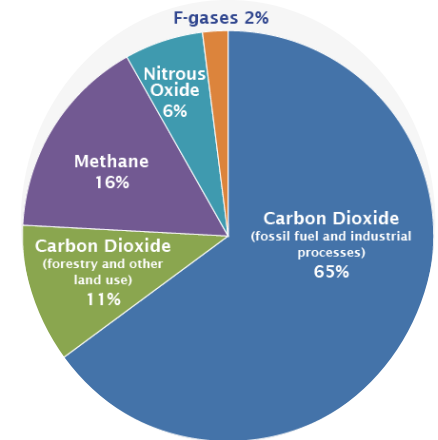


Sea levels are rising.

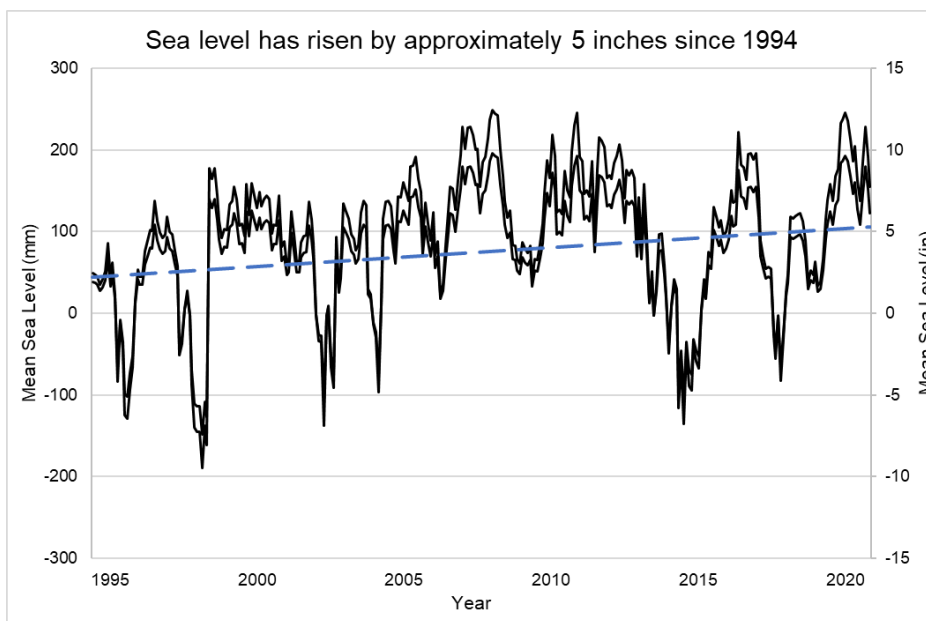
Two phenomena related to climate change contribute to accelerated global sea level rise:

- 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 1994, sea level has risen by about 5 inches at the tide gauge located closest to American Memorial Park, the Apra Harbor tide gauge in Guam.* The tide gauge is operated by the National Oceanic and Atmospheric Administration (NOAA). Sea level could rise by as much as 5.41 feet by 2100.

**The Apra Harbor record is short due to a major earthquake in 1993 that caused vertical land motion and an abrupt change in sea level elevations. Only post-earthquake measurements are included here.*

What is the future of sea level rise at American Memorial Park?

NOAA Projections ¹	2050	2100
Intermediate Low	+0.69 ft	+1.77 ft
Intermediate	+0.85 ft	+3.44 ft
Intermediate High	+1.08 ft	+5.41 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 American Memorial Park with its current sea level, with three feet of sea level rise, and with five feet of sea level rise. Most of the park would be inundated with five feet of sea level rise.



How is sea level rise impacting American Memorial Park?

American Memorial Park occupies 133 acres along the shoreline of Saipan and includes memorials that were put in place to commemorate lives lost during the Marianas Campaign of World War II. It also features unique natural resources such as a fringing barrier reef, a mangrove forest, seagrass beds, beaches, and marshes. The park's shoreline location and its low elevation make it susceptible to impacts of sea level rise such as flooding, erosion, storm damage, and saltwater intrusion.

- Some of the park's infrastructure has already been impacted by sea level rise. For example, a walkway along the shore collapsed due to erosion of the surrounding soil.
- Part of the park's shoreline consists of a salt marsh. Even a slight rise in sea level may cause the marsh to "drown," converting much of the vegetated habitat into open water.
- The mangrove forest is also at risk of drowning if it is unable to migrate landward as sea levels rise. Mangroves provide critical nursery habitat for many fish species and help protect the shoreline from strong waves. If the forest were lost, erosion rates would accelerate at the park.
- The park's coral reef also protects the shoreline from erosion by reducing wave energy during storms. However, sea level rise may reduce the level of protection the reef offers because storm surges and waves will more easily wash over the reef.



Shoreline erosion resulted in a collapsed walkway at the park [NPS]

The mangrove forest at the park [NPS]



How is American Memorial Park responding to sea level rise?

- The park is monitoring infrastructure to ensure continued visitor support and safety and is moving structures away from the shore where necessary. For example, the public bathrooms near the beach were moved inland after their foundations were damaged by flooding and erosion.
- To address the concern of mangrove forest loss, the park is working with local agencies to plant mangroves and restore habitat.



The damaged public bathrooms at their original location [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.