

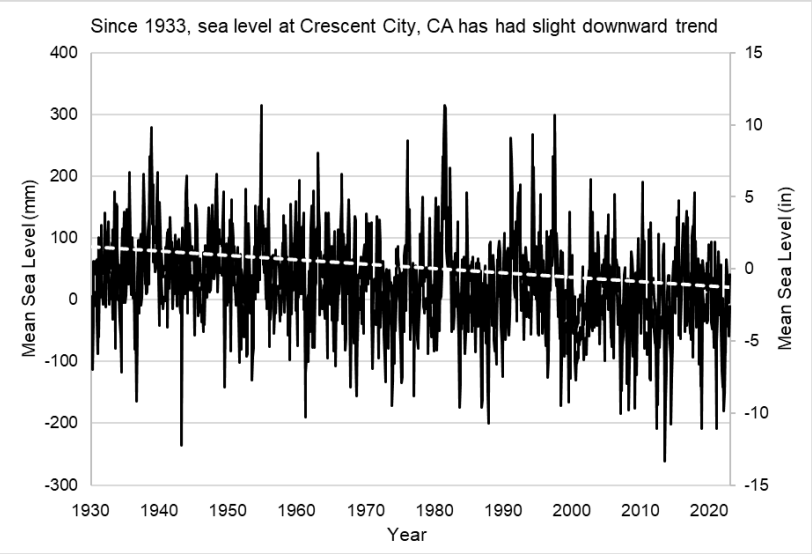


Sea level Rise

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 1933, relative sea level has had a slight downward trend at Redwood National Park based on data from the Crescent City, CA tide gauge (operated by the National Oceanic and Atmospheric Administration; NOAA). This sea level decrease is caused by continued vertical land motion, or “uplift”, of the northern California crust that Redwood National Park is located on. The land is rising in elevation due to long-term geologic processes, such as the shifting of tectonic plates. In northern California, a small tectonic plate named the Gorda plate is moving under the North American plate, pushing the North American plate upward at a rate of a few millimeters per year. While this does not impact sea levels directly, it causes the land to rise so that water levels decrease by comparison. This is referred to as relative sea level change.

Although relative sea level is decreasing at Redwood, global sea levels are still rising, and the rate of global sea level rise is expected to accelerate in the coming decades. Sea level rise will soon outpace the land level changes occurring at Redwood, and it could rise by as much as 4.72 feet by 2100.

What is the future of sea level rise at Redwood National Park?

NOAA Projections ¹	2050	2100
Intermediate Low	+0.26 ft	+0.66 ft
Intermediate	+0.69 ft	+2.46 ft
Intermediate High	+1.21 ft	+4.72 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.



These images show the Thomas H. Kuchel Visitor Center (yellow box) with its current water level (left) and with 5 feet of sea level rise (right), which is the maximum amount of sea level rise predicted by 2100. The visitor center and parking lot would be impacted by flooding.



How is sea level rise impacting Redwood National Park?

Redwood National Park features coastal redwood forests, numerous grasslands and meadows, oak woodlands, and 40 miles of rugged coastline. In addition to the iconic redwoods, the park hosts a diverse community of plant and animal species as well as important cultural resources, such as precontact and historic archeological sites, historic districts, and sites of importance to contemporary Yurok, Tolowa, and Chilula people, such as ceremonial and sacred sites. However, the park's coastal location also means that rising sea levels can have substantial impacts on the resources within the park. Erosion, flooding, and the threat of high storm waves already impact some park resources. These impacts will intensify as sea level rise accelerates over the next century.

- The park's coastal bluffs are one of the most at-risk resources as strong waves during winter storm events have increased erosion. As the cliffs disappear, the ancestral coastal village of *Shin-yvslh-sri~*, which has importance to contemporary Tolowa people, is at increased risk of eroding into the ocean. Since 2007, the cliffs have eroded three feet.
- The Thomas H. Kuchel Visitor Center, located directly on a beach, could also be impacted by sea level rise. This very busy center provides visitors with orientation, trip planning, and other learning opportunities. Because it currently sits within the high-tide zone associated with projected rises in sea level, efforts to protect this structure from flooding or damage from storm waves will be important as the park continues to support and engage visitors into the future.
- One of the most delicate habitats at the park is the rocky intertidal zone, which exists in a balance between high and low tides. Animals living in this zone are only adapted to a certain amount of inundation and exposure, and rising sea levels may cause longer periods of inundation that individual organisms cannot tolerate. These species will have to respond to the stress of changing conditions and keep up with the rate of sea level rise as water begins to flood their habitat more frequently.



Coastal bluffs at Redwood National Park [NPS]



The Thomas H. Kuchel Visitor Center is the park's busiest visitor center and is threatened by future sea level rise [NPS].



Visitors peer into a tidepool in the intertidal zone at Redwood National Park. Tidepools support diverse communities, which could be threatened as sea 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 (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

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.