

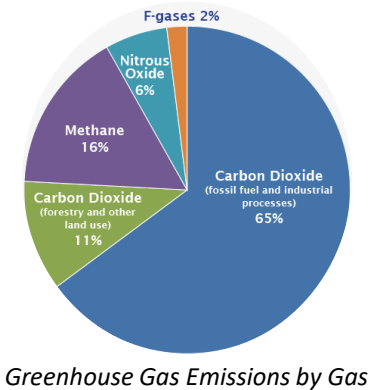
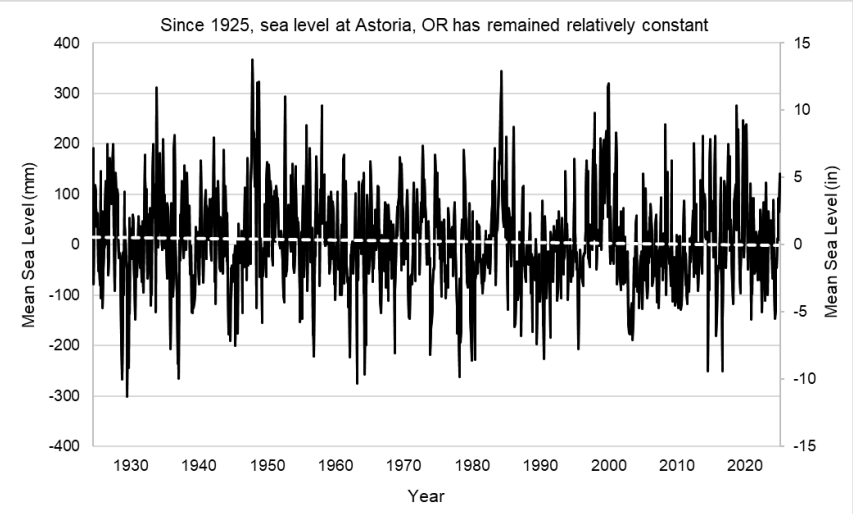


Sea Level Rise

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, which release carbon dioxide and methane into the atmosphere; methane sources also include emissions from landfills and agriculture.

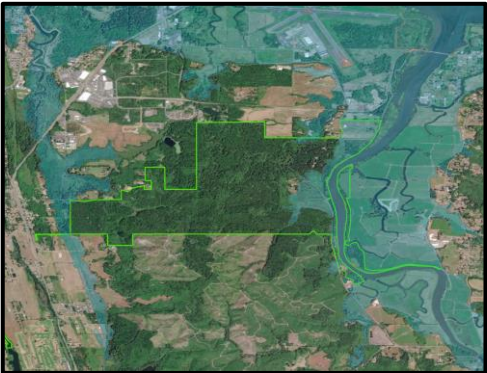
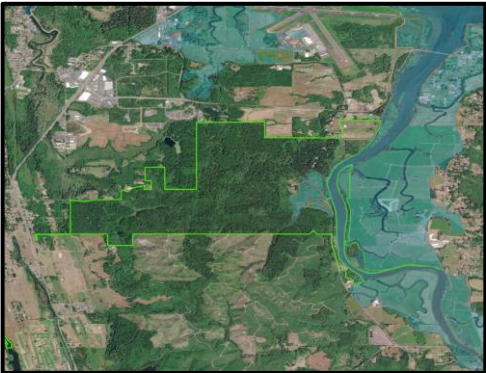
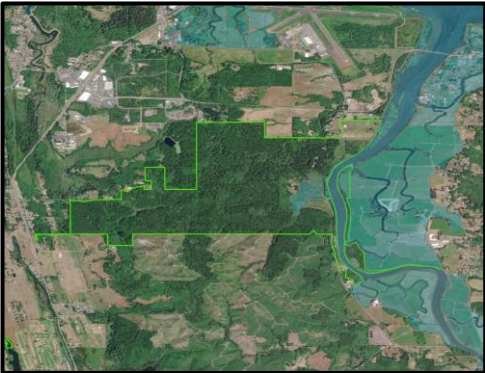


Since 1925, sea level has not changed dramatically at Lewis and Clark National Historical Park based on data from the Astoria, OR tide gauge, which is operated by the National Oceanic and Atmospheric Administration (NOAA). This is generally attributed to the continued vertical land motion, or “uplift”, of the continental plate in western Oregon. In this area, a small tectonic plate named the Juan de Fuca plate is moving under the North American plate, pushing the continental crust that Lewis and Clark National Historical Park is located on upward at a rate of a few millimeters per year. However, sea level rise is expected to speed up in the coming decades, eventually outpacing this rate of uplift. It is expected that sea levels could rise by as much as 4.66 feet by 2100.

What is the future of sea level rise at Lewis and Clark?

NOAA Projections ¹	2050	2100
Intermediate Low	+0.30 ft	+0.79 ft
Intermediate	+0.69 ft	+2.49 ft
Intermediate High	+1.18 ft	+4.66 ft

This table shows projected sea level elevations 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 Fort Clatsop unit of the park (outlined in green) and its surroundings with its current water level, with 1 foot of sea level rise, and with 5 feet of sea level rise.



How is sea level rise impacting Lewis and Clark National Historical Park?

Lewis and Clark National Historical Park features globally rare intertidal communities, important salmon spawning habitat, and sacred Native American archaeological sites. It also features scenic beaches and dunes, providing many places of recreation for visitors. Lewis and Clark encompasses seven separate park units at the mouth of the Columbia River near the Oregon and Washington coasts. Its proximity to water means that rising sea levels and increased storm wave heights can have substantial impacts on the natural and cultural resources within the park. Frequent flooding and other challenges related to sea level rise can damage these resources and lead to fewer opportunities for recreation and visitor access. The park already experiences impacts from flooding during king tide events. While these annual extremely high tides are not caused by sea level rise, their impacts give a sense of what future flooding could look like, and the extent of flooding currently caused by annual king tides will increase as sea levels increase.

- Yeon and Sunset Beach, two of the park units that feature beaches and dunes, are popular visitor recreation areas. Sea level rise and increased storm surge could inundate these areas and erode the dunes.
- Cape Disappointment is also one of the most visited areas of the park and features globally rare intertidal plant communities that would be lost as sea levels rise. This park unit's campground is the most used in the Washington state park's campground system and could also be damaged or inundated by sea level rise.
- The Fort Clatsop unit includes hiking trails, a replica of a fort built by Lewis and Clark and the Corps of Discovery during the winter of 1805-1806, and a visitor center. Although the fort replica and visitor center are unlikely to be impacted by sea level rise because they sit at higher elevations, the Netul River Trail, three restored tidal wetlands, and Fort Clatsop Road would all be impacted by sea level rise.
- The archeological site of a Chinookan seasonal plankhouse village is located at the Middle Village & Station Camp unit. This cultural resource is one of the most important archeological sites on the lower Columbia River and is considered a sacred site by contemporary Chinook descendants. It is protected by a riprap seawall along the river, but higher sea levels combined with high tide flooding or high waves during storms could damage this site.



Sunset Beach could be damaged by sea level rise [Oregon Coast Visitors Association]



The Netul River Trail at the Fort Clatsop unit could be damaged by sea level rise [NPS]



Archeological excavation of a Chinookan village at the Middle Village & Station Camp unit. This important archeological site and cultural resource could be damaged by rising sea levels [chinookstory.org].

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

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.