

Sea Level and Storm Trends, Golden Gate National Recreation Area and Fort Point National Historic Site

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Sea Level Summary

Historical tide gauge data from the San Francisco, CA tide gauge show that sea level around Golden Gate National Recreation Area (GOGA) and Fort Point National Historic Site (FOPO) is rising (IPCC 2013; NOAA tides and currents 2012; Figure 1). GOGA and FOPO have not been directly in the path of any hurricane-strength storms over the last century; however, it has been close to a number of hurricane-strength storm paths. Storms are expected to intensify over the next century. At least one Saffir-Simpson category 1 hurricane should be expected to travel up to GOGA or FOPO by 2100.

Table 1. Historical and projected sea level and storm trends for Golden Gate National Recreation Area and Fort Point National Historic Site.

Sea Level and Storm Surge Trends, GOGA and FOPO		2050 ²	2100 ³
Historical sea level trend, 1897–2014	+0.08 in/yr		
Number of tropical storms, depressions and subtropical storm paths within 10 miles of GOGA or FOPO, 1842–2014	0		
Estimated storm surge height ¹ (50 yr return level)	3.7 ft		
Estimated storm surge height ¹ (100 yr return level)	4.0 ft		
Low Emissions Scenario (RCP 4.5) Projected sea level		+0.57 ft	+1.35 ft
Intermediate Emissions Scenario (RCP 6.0) Projected sea level		+0.59 ft	+1.41 ft
High Emissions Scenario (RCP 8.5) Projected sea level		+0.60 ft	+1.75 ft

¹ Storm surge heights are taken from C. Tebaldi, B.H. Strauss, and C.E. Zervas (2012) Modelling sea level rise impacts on storm surges along US coasts. Environmental Research Letters 7: 014032.

² Calculated by Caffrey and colleagues using IPCC data.

³ Ensemble mean based on data used for figure 13.20 by the IPCC (2013).

Sea Level Change and Storm Surge Vulnerability at Golden Gate National Recreation Area and Fort Point National Historic Site

- Increasing sea levels may lead to loss of land and critical habitat.
- Increased erosion and/or accretion across the coastline by storms coupled with shorelines adjusting to new mean sea levels.
- Rising groundwater tables and possible salt water intrusion due to rising sea levels.
- Increased risk of high intensity storm events.
- Potential loss of nearby freshwater ecosystems as sea levels rise.

References for Additional Sea Level and Storm Surge Information

- Intergovernmental Panel on Climate Change: <http://www.climatechange2013.org/report/>
- USACE Sea Level Calculator: <http://www.corpsclimate.us/ccaceslcurves.cfm>
- NOAA Tides and Currents: <http://tidesandcurrents.noaa.gov>
- NPS Storm Surge Mapping: <http://mariacaffrey.com/storms>
- NOAA Historical Storm Data: <http://www.ncdc.noaa.gov/ibtracs/>

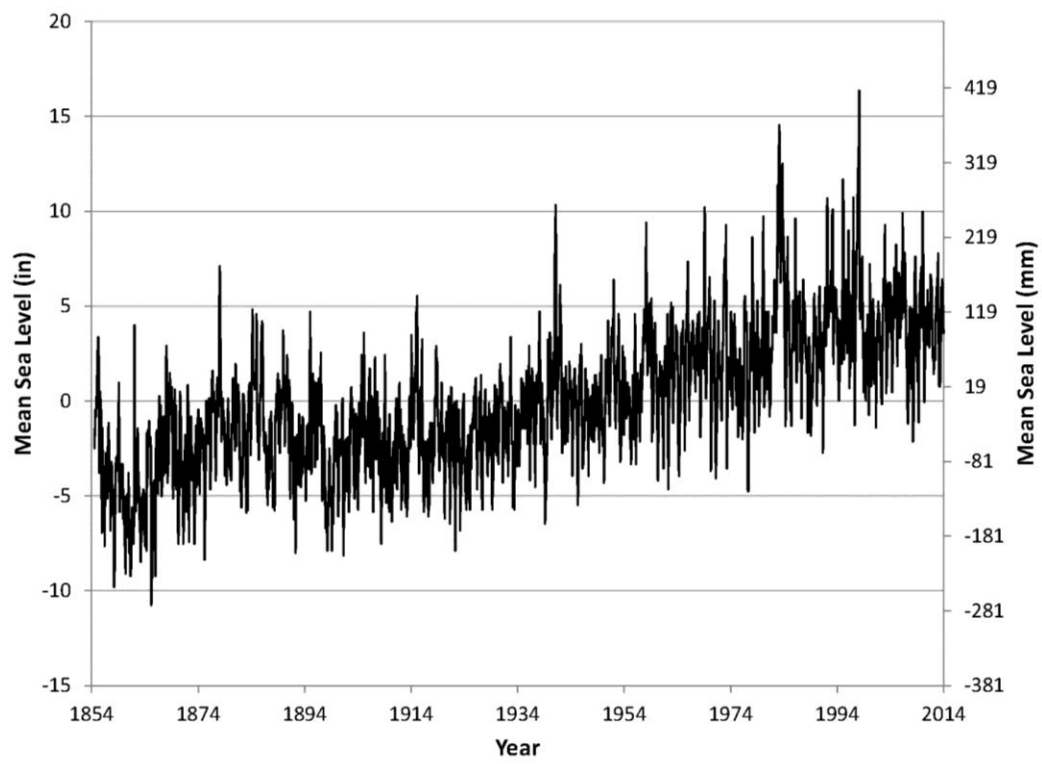


Figure 1. Sea level trends, San Francisco tide gauge, 1854–2014.