Sea Level and Storm Trends, Colonial National Historical Park

University of Colorado, Department of Geological Sciences, Boulder, Colorado
Contacts: Maria Caffrey, maria.caffrey@colorado.edu; Rebecca Beavers, rebecca_beavers@nps.gov
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Sea Level Summary

Historical tide gauge data from the Sewells Point, VA tide gauge show that sea level around Colonial National Historical Park (COLO) is rising (IPCC 2013; NOAA tides and currents 2012; Figure 1). COLO has not been directly in the path of any hurricane-strength storms over the last century; however, it has been with 10 miles of at least six storm paths that had been downgraded from a hurricane. Storms are expected to intensify over the next century. At least one Saffir-Simpson category 1 hurricane should be expected to travel up to COLO by 2100.

Table 1. Historical and projected sea level and storm trends for Colonial National Historical Park.

Sea Level and Storm Surge Trends, Colonial National Historic al Park		**2050**[2]	**2100**[3]
Historical sea level trend, 1927–2013	+0.18 in/yr		
Number of tropical storms, depressions and subtropical storm paths within 10 miles of Colonial, 1842–2011	18		
Estimated storm surge height[1] (Category 1, mean tide), 2014	Dry		
Estimated storm surge height[1] (Category 4, mean tide), 2014	17.3 ft		
Low Emissions Scenario (RCP 4.5) Projected sea level		+0.89 ft	+2.10 ft
Intermediate Emissions Scenario (RCP 6.0) Projected sea level		+0.91 ft	+2.20 ft
High Emissions Scenario (RCP 8.5) Projected sea level		+0.90 ft	+2.67 ft

[1]Storm surge heights are projected on top of current mean sea level for Historic Jamestowne Visitor Center. It should be expected that potential storm surge heights will change over time based on changes in mean sea level.
[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 Colonial National Historical Park

- 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/

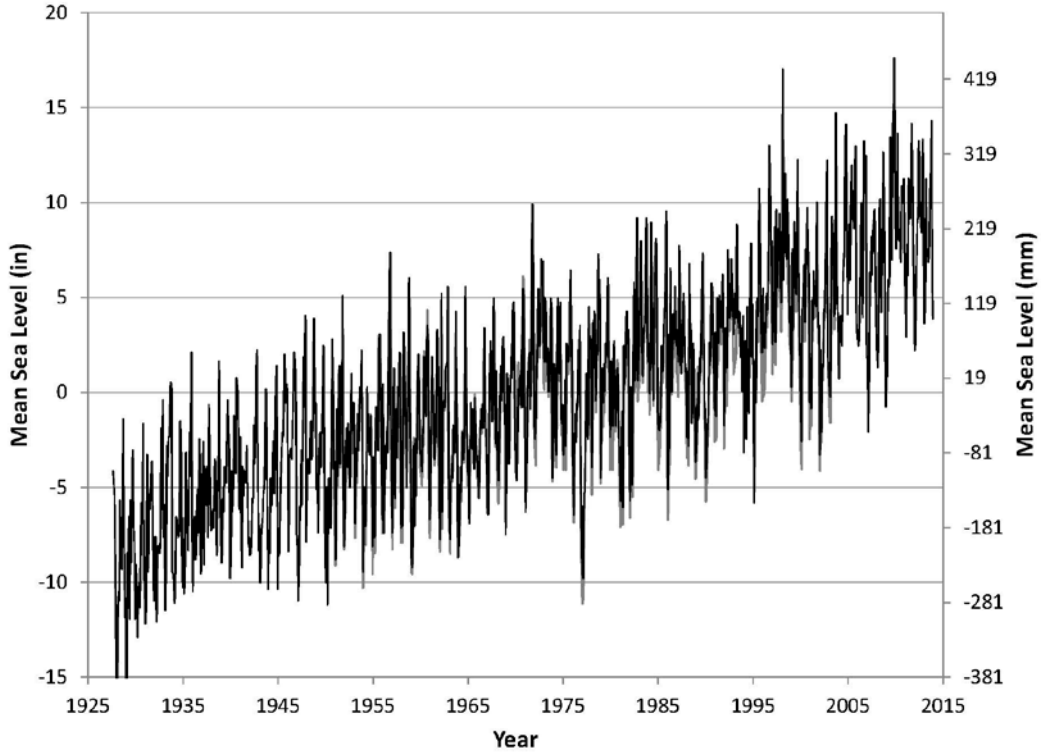

Figure 1. Sea level trends, Sewells Point tide gauge, 1927–2013.

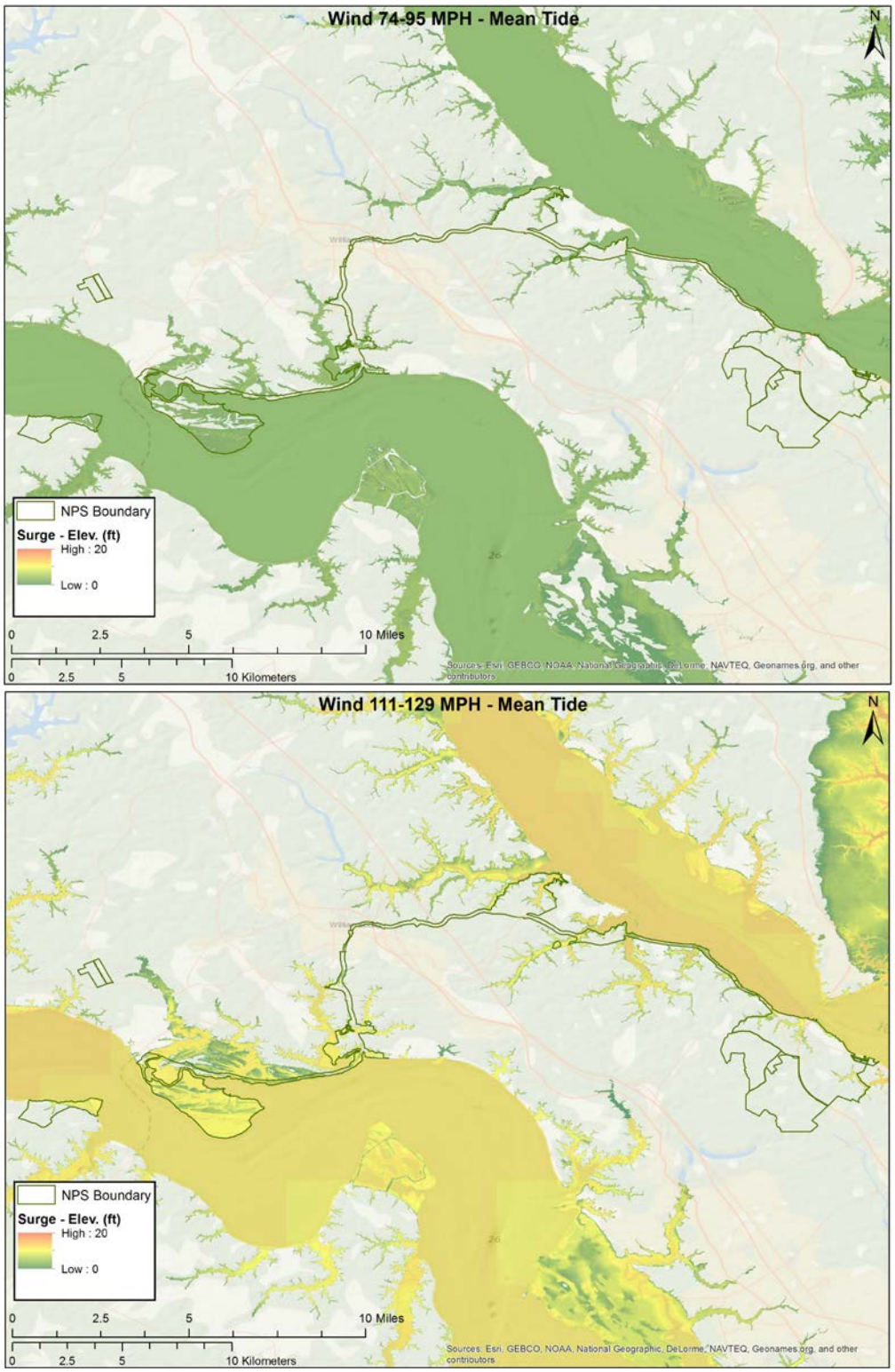

Figure 2. Potential storm surge height and extent of a Saffir-Simpson category 1 hurricane (top) versus a Saffir-Simpson category 3 hurricane (bottom) striking during mean tide.