

Sea Level and Storm Trends for Planning at Christiansted National Historic Site and Salt River Bay National Historic Park and Ecological Preserve

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Historical Trends

Historical sea level trends along the Atlantic coast show that sea levels are rising at a faster rate than global average sea level (IPCC 2013; NOAA tides and currents 2012; Figure 1). Both Christiansted National Historic Site and Salt River Bay National Historic Park and Ecological Preserve have been affected by storms since 1842 (Figure 2). Many of the recorded storms are relatively low intensity events (43% were either tropical storms or tropical depressions; Table 1). However, there are seven records of hurricane-strength storms that have passed within 10 miles of the parks. None of these storms have been recorded as anything greater than Saffir-Simpson category 4 hurricane.

Future Projections

Sea level projections are based on global sea level estimates (Table 1). These numbers do not include changes in storm surge. The Intergovernmental Panel on Climate Change (IPCC 2012) reports that storm intensity is likely to increase in the future. While the number of storms and their paths may not change in the future, it can be expected that storm surges will increase as storm intensity increases. Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Maximum of MEOWs (MOM) models predict that sections of both parks will be inundated by storm surges in the future (Figures 3 and 4). These SLOSH MOM projections do not include potential rises in sea level on top of storm surge.

References

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Table 1. Christiansted National Historic Site and Salt River Bay National Historic Park and Ecological Preserve sea level and storm surge trends.

	Mean	Units	Source
Historical			
Sea level, Lime Tree Bay, VI 1977–2012	0.09 (2.22)	in/yr (mm/yr)	NOAA (2013)
Number of tropical storms, depressions, and subtropical storms to directly strike CHRI/SARI, 1842–2011	0	n/a	IBTrACS (2010)
Number of tropical storms, depressions, and subtropical storms paths within 10 miles of CHRI/SARI, 1842–2011	3	n/a	IBTrACS (2010)
Number of hurricanes to directly strike CHRI/SARI, 1842–2011	0	n/a	IBTrACS (2010)
Number of hurricanes paths within 10 miles of CHRI/SARI, 1842–2011	4	n/a	IBTrACS (2010)
Global Sea Level Projections			
IPCC RCP2.6 global scenario sea level by 2100	1.31 (0.40)	ft (m)	IPCC (2013)
IPCC RCP4.5 global scenario sea level by 2100	1.54 (0.47)	ft (m)	IPCC (2013)
IPCC RCP6.0 global scenario sea level by 2100	1.57 (0.48)	ft (m)	IPCC (2013)
IPCC RCP8.5 global scenario sea level by 2100	2.07 (0.63)	ft (m)	IPCC (2013)
USACE Sea Level Projections for Beaufort, NC			
<i>Low (historical rate) scenario:</i>			
2030	0.20 (0.06)	ft (m)	USACE (2013)
2050	0.33 (0.10)	ft (m)	USACE (2013)
2100	0.59 (0.18)	ft (m)	USACE (2013)
<i>Intermediate scenario:</i>			
2030	0.33 (0.10)	ft (m)	USACE (2013)

2050	0.62 (0.19)	ft (m)	USACE (2013)
2100	1.64 (0.50)	ft (m)	USACE (2013)
<i>High scenario:</i>			
2030	0.75 (0.23)	ft (m)	USACE (2013)
2050	1.57 (0.48)	ft (m)	USACE (2013)
2100	5.21 (4.92)	ft (m)	USACE (2013)

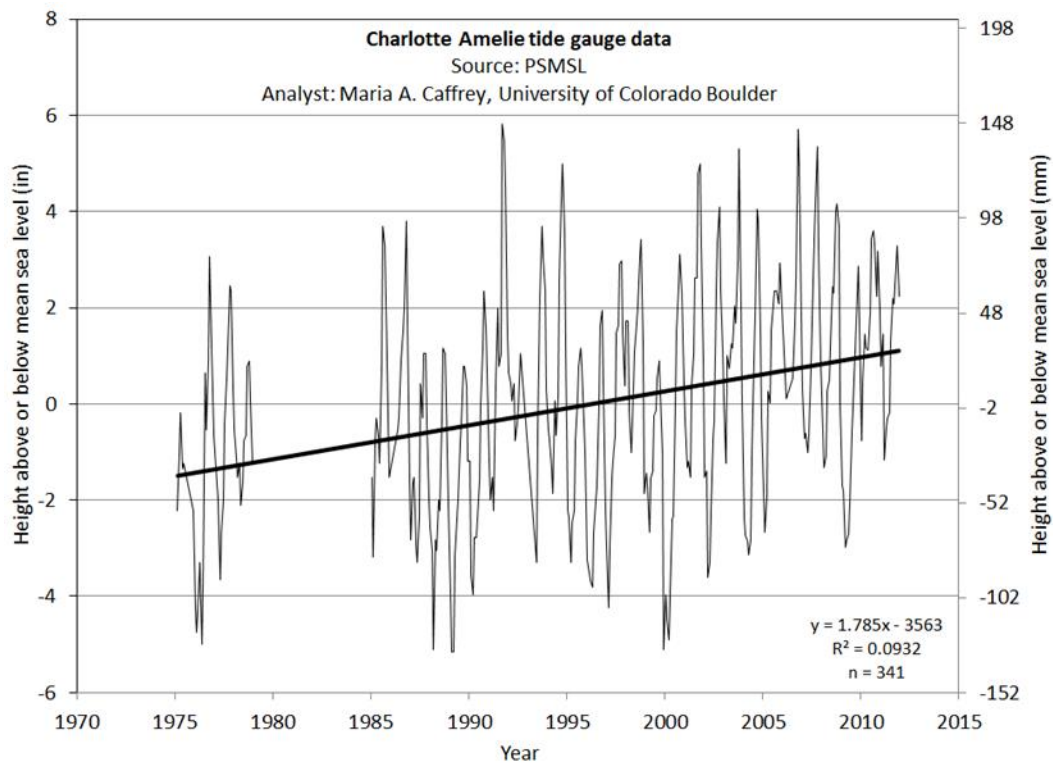


Figure 1.

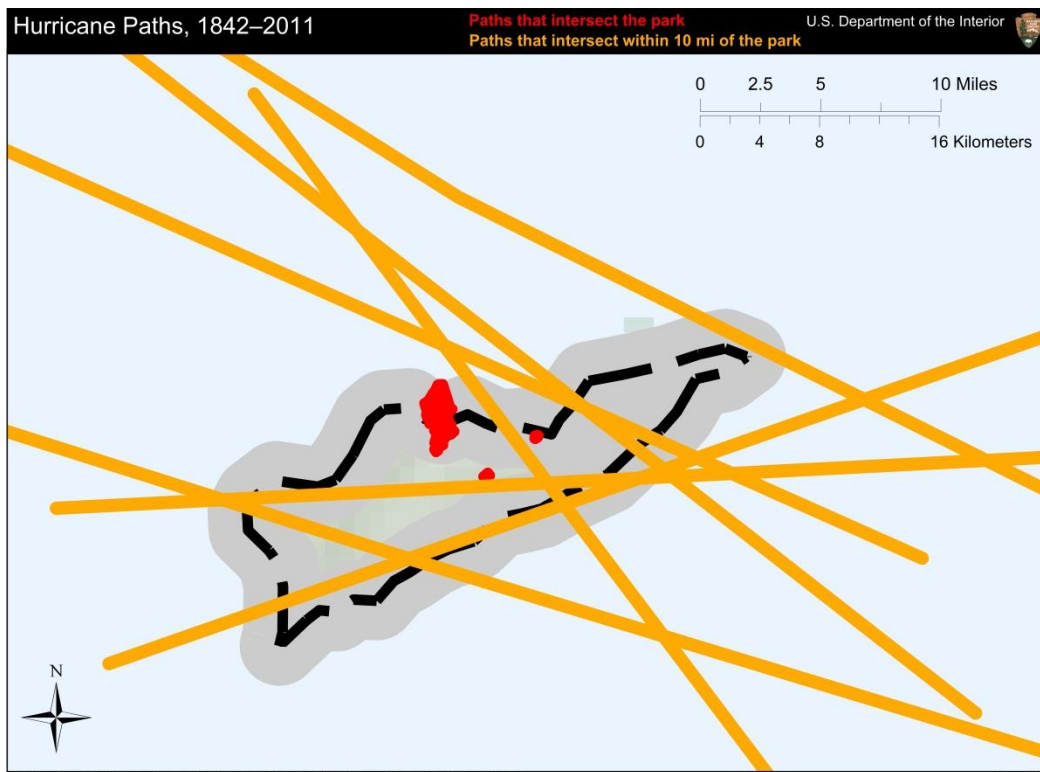


Figure 2.

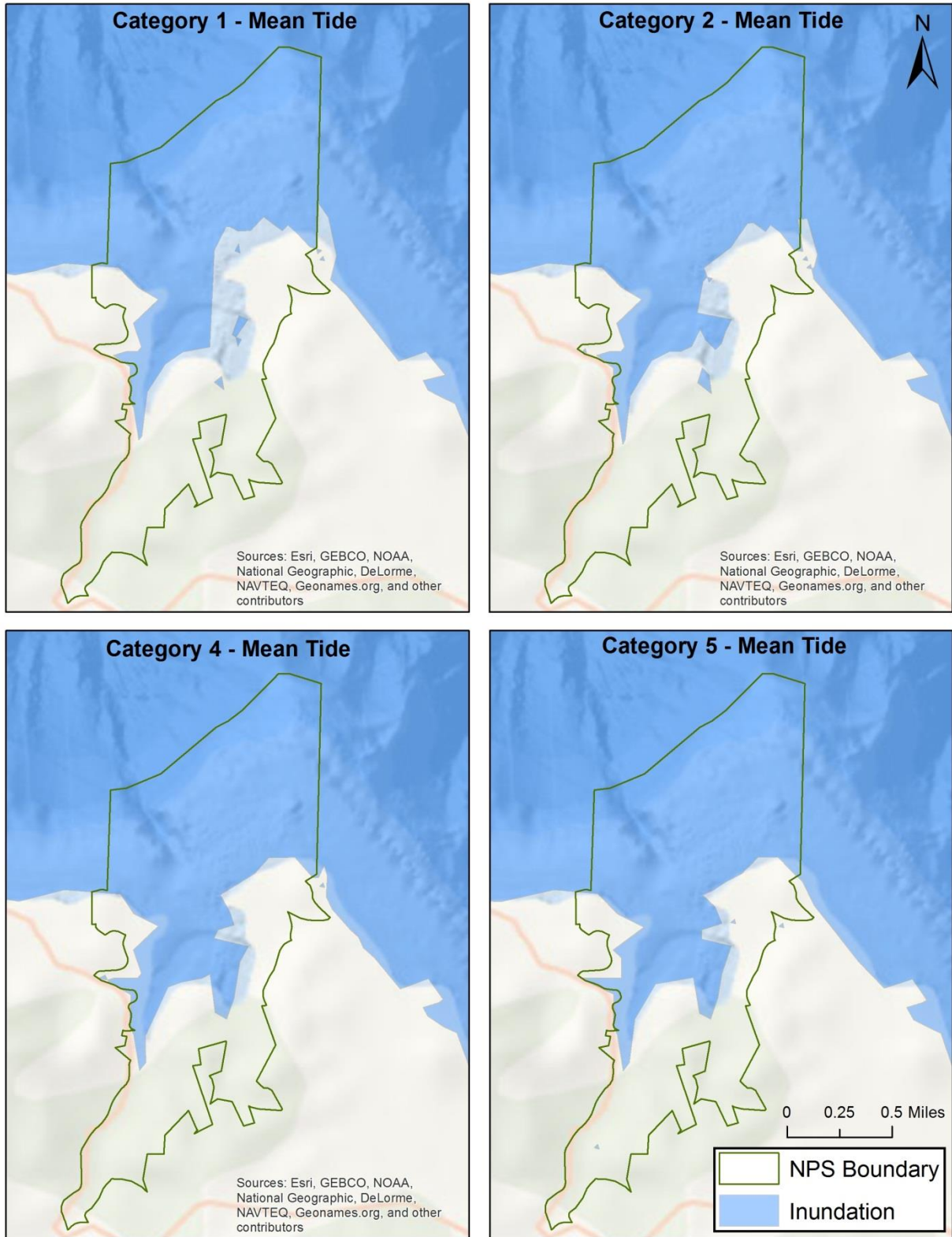


Figure 3.

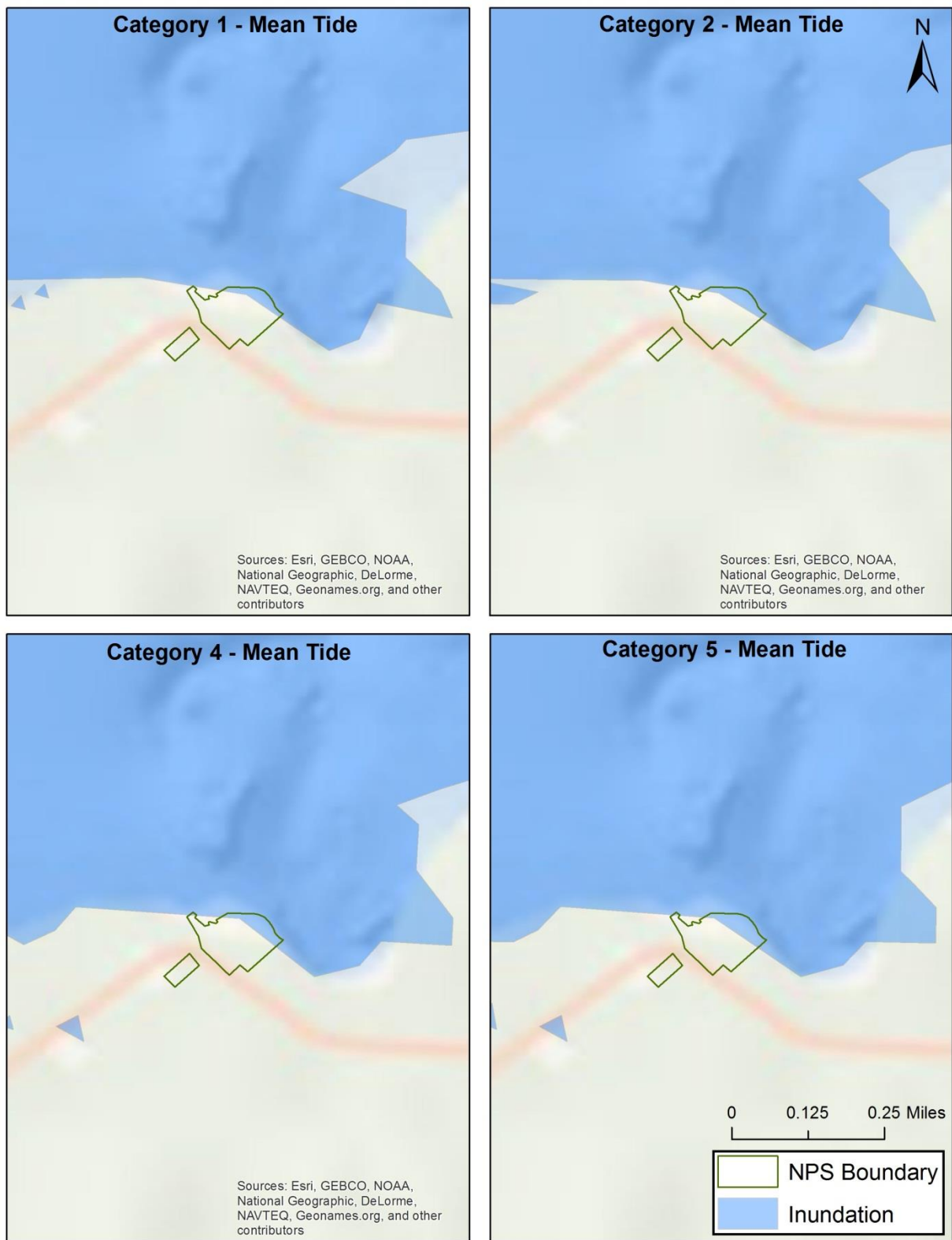


Figure 4.