

Sea Level and Storm Trends for Planning at Jean Lafitte National Historical Park and Ecological Preserve and New Orleans Jazz National Historical Park

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Historical Trends

Historical sea level trends along the Gulf 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 Jean Lafitte National Historical Park and Ecological Preserve (JELA) and New Orleans Jazz National Historical Park (JAZZ) have been affected by storms since 1842. Many of the recorded storms are relatively low intensity events (77.5% were either tropical storms or tropical depressions; Table 1). However, there are nine 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 2 hurricane; however, Hurricane Katrina created significant damaged throughout the region in 2005. Hurricane Katrina was a category 2 hurricane when it passed within 27 miles of JELA.

Future Projections

Sea level projections are based on global sea level estimates and regional tide gauge data (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 2 and 3). These SLOSH MOM projections do not include potential rises in sea level on top of storm surge.

References

- Intergovernmental Panel on Climate Change (IPCC). 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Eds. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley. Cambridge University Press, Cambridge, UK, and New York, NY, USA.
- Intergovernmental Panel on Climate Change (IPCC). 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- International Best Track Archive for Climate Stewardship (IBTrACS). 2013. Data center: <http://www.ncdc.noaa.gov/ibtracs/index.php?name=ibtracs-data> [accessed 01/21/14].
- National Oceanic and Atmospheric Administration (NOAA) Tides and Currents. 2012. Sea level trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html> [accessed 01/21/14].
- U.S. Army Corps of Engineers (USACE). 2013. Sea-level change calculator: <http://www.corpsclimate.us/ccaceslcurves.cfm> [accessed 01/21/14].

Table 1. Jean Lafitte National Historical Park and Ecological Preserve and New Orleans Jazz National Historical Park sea level and storm surge trends.

	Mean	Units	Source
Historical			
Sea level, Grand Isle, LA 1947–2012	0.36 (9.07)	in/yr (mm/yr)	NOAA (2013)
Number of tropical storms, depressions, and subtropical storms to directly strike JELA/JAZZ, 1842–2013	0	n/a	IBTrACS (2013)
Number of tropical storms, depressions, and subtropical storms paths within 10 miles of JELA/JAZZ, 1842–2013	31	n/a	IBTrACS (2013)
Number of hurricanes to directly strike JELA/JAZZ, 1842–2013	1	n/a	IBTrACS (2013)
Number of hurricanes paths within 10 miles of JELA/JAZZ, 1842–2013	9	n/a	IBTrACS (2013)
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 Grand Isle, LA			
<i>Low (historical rate) scenario:</i>			
2030	1.16 (0.26)	ft (m)	USACE (2013)
2050	1.77 (0.54)	ft (m)	USACE (2013)
2100	3.30 (1.00)	ft (m)	USACE (2013)
<i>Intermediate scenario:</i>			
2030	0.92 (0.39)	ft (m)	USACE (2013)

2050	2.07 (0.63)	ft (m)	USACE (2013)
2100	4.33 (1.32)	ft (m)	USACE (2013)
<i>High scenario:</i>			
2030	1.69 (0.52)	ft (m)	USACE (2013)
2050	3.02 (0.92)	ft (m)	USACE (2013)
2100	7.62 (2.32)	ft (m)	USACE (2013)

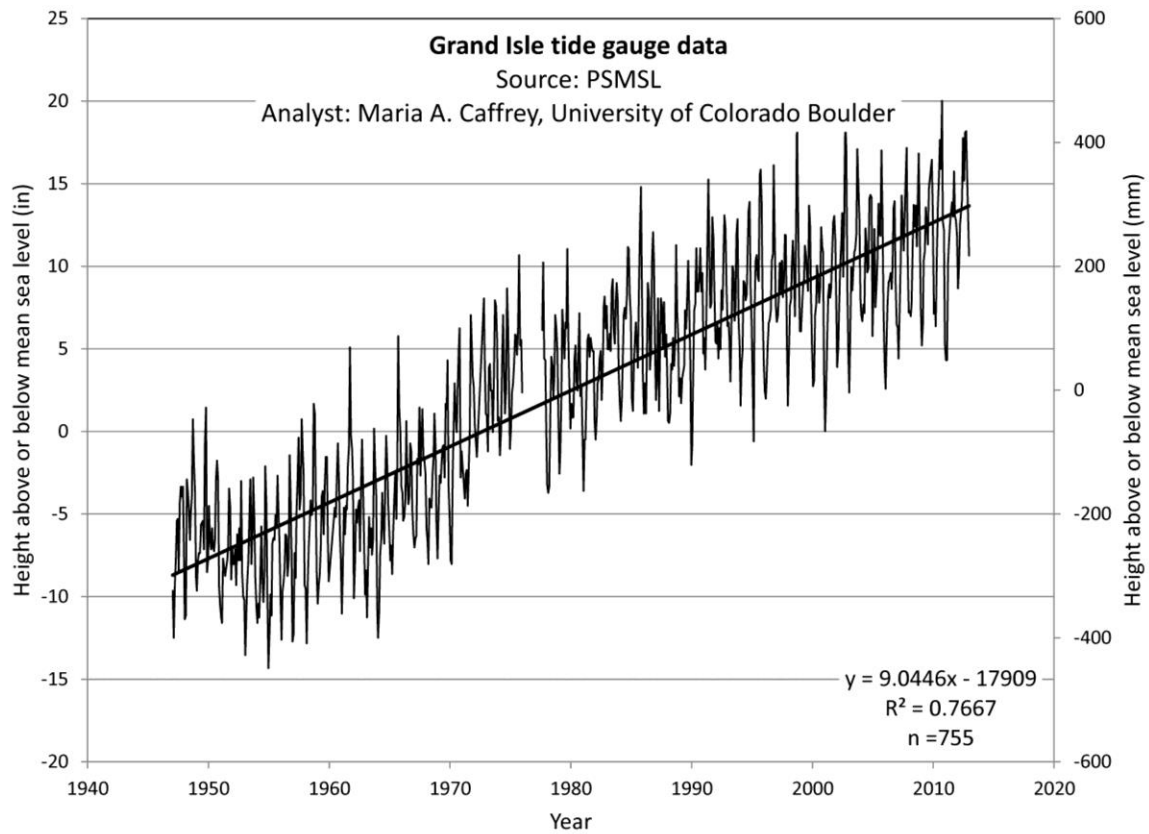


Figure 1.

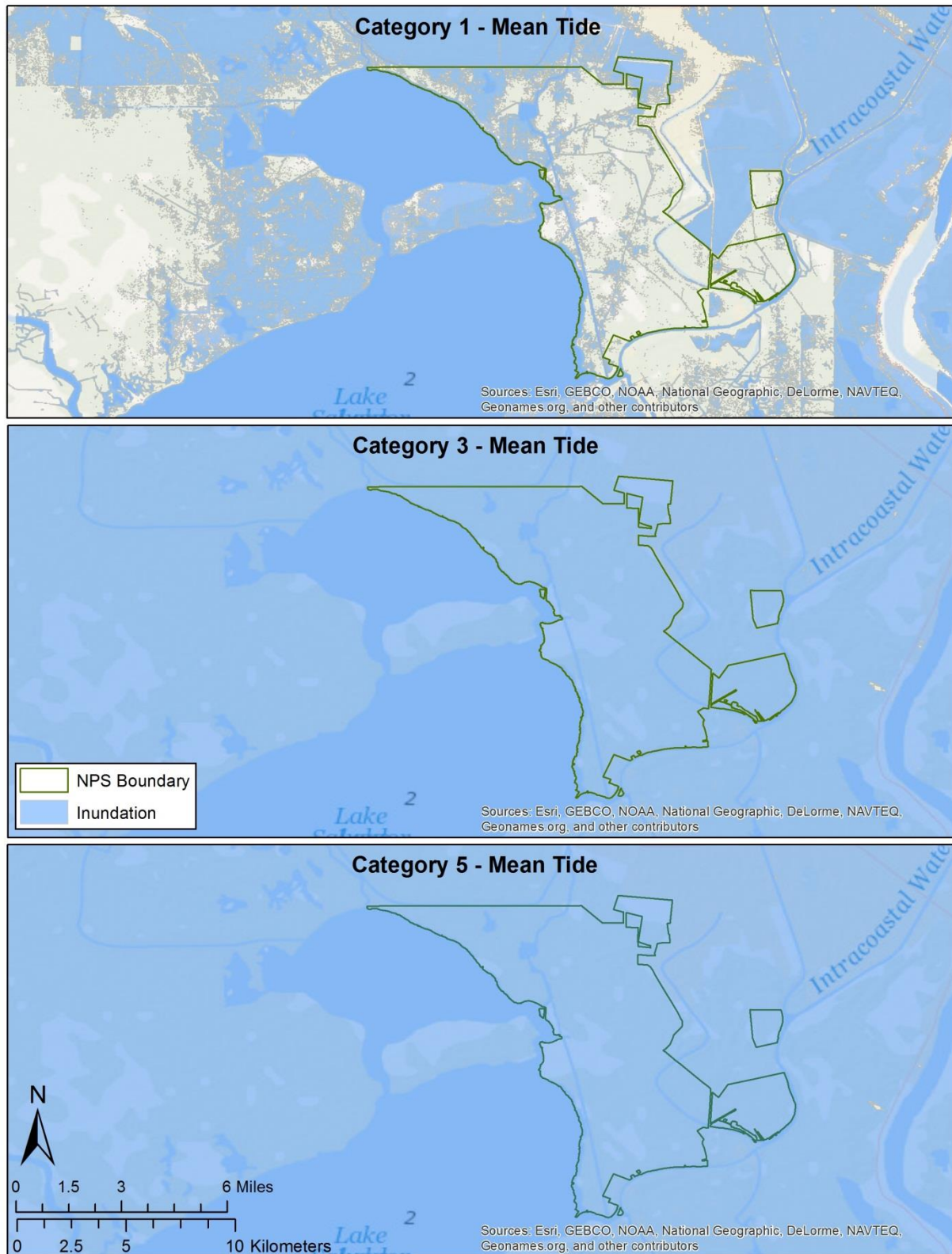


Figure 2.

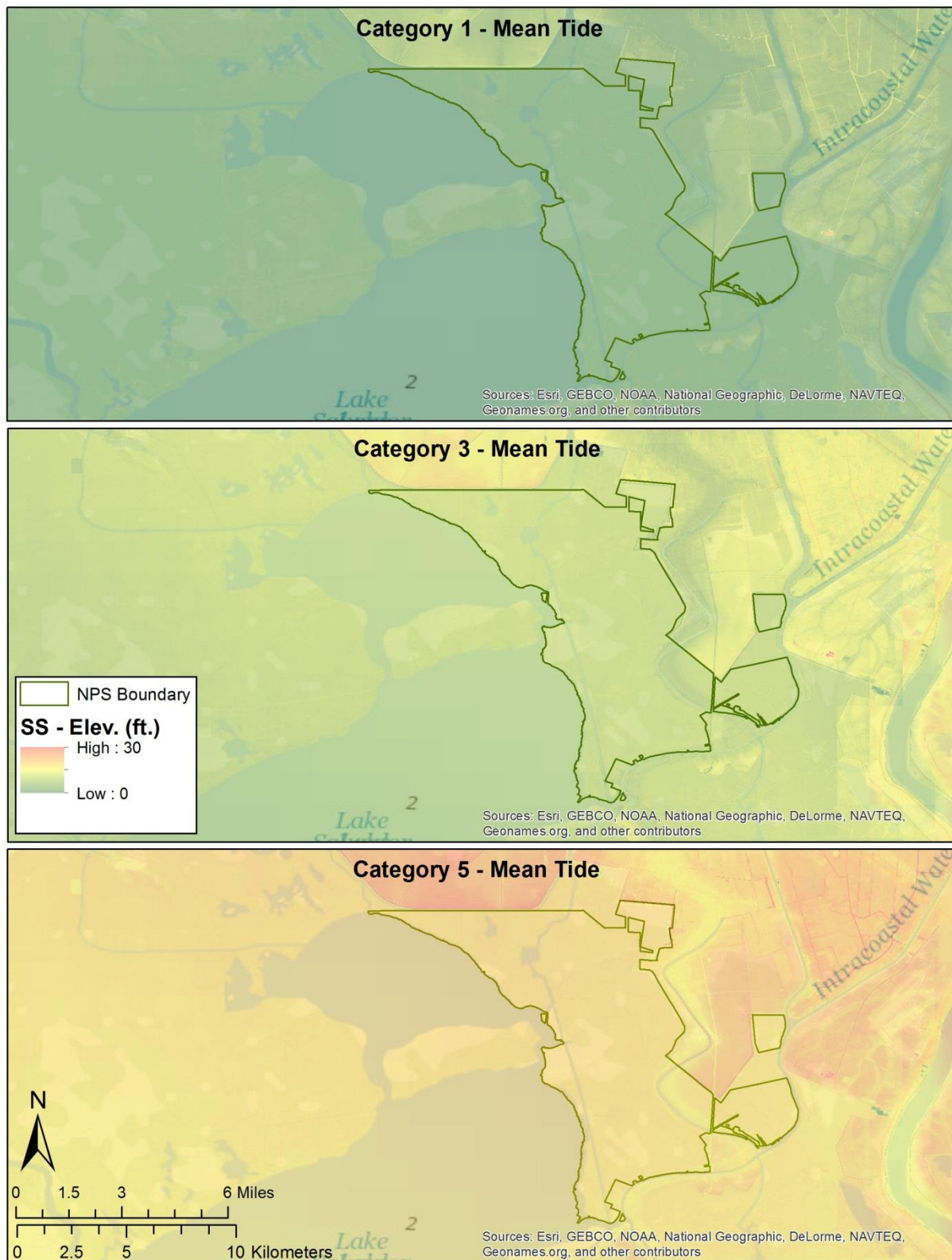


Figure 3.