

## Case Study 24: Storm Surge and Sea Level Change Data Support Planning, NPS Geologic Resources Division, Colorado

**Contributing Authors:** Rebecca Beavers (NPS Geologic Resources Division) and Maria Caffrey (University of Colorado Boulder)

### Goals

The National Park Service Geologic Resources Division (NPS GRD) is working with the University of Colorado Boulder to develop sea level change and storm surge data that parks can use for planning purposes over multiple time horizons.

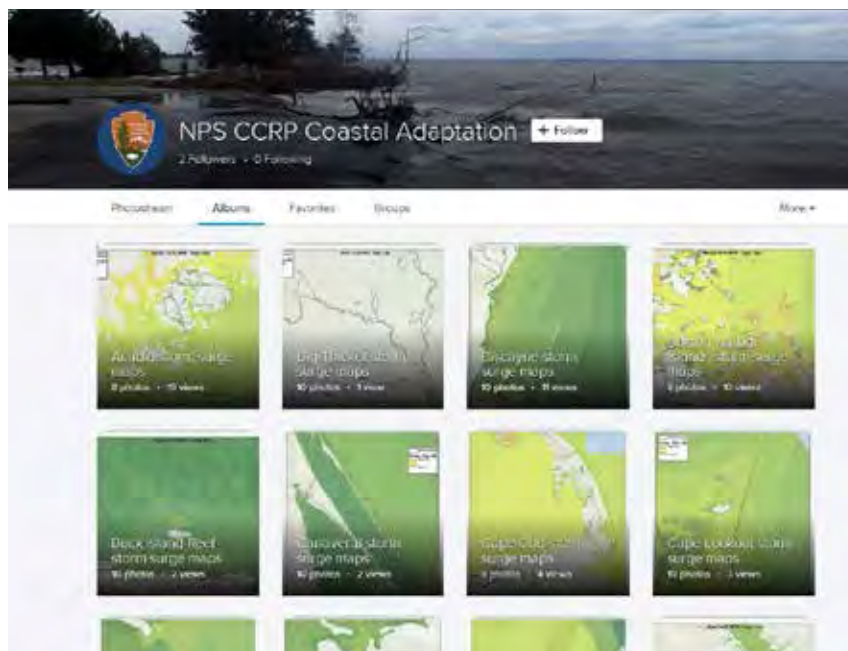
### Challenges and Needs

Coastal parks frequently ask the division how individual parks will be impacted by sea level change. Parks need this information to prepare foundation documents and to calculate storm surge projections. Many park managers would prefer data for shorter time horizons (e.g., 2030, 2050) than is widely available in the academic literature. Although several National Oceanic and Atmospheric Administration (NOAA) models can simulate storm surge, most parks do not have tide gauges or other historical records of sea level to input into the models. The NPS GRD is using the latest Intergovernmental Panel on Climate Change (IPCC) data to “fill in the gaps” between tide gauges to give parks the latest sea level change data tailored specifically for their park.

### Responsive Actions

The NPS GRD is collecting the most recent data on sea level change and storms, primarily from the academic literature, in addition to projection data generated in-house and provided by other researchers. These data are used to assist with state of the parks reports, general management plans, and foundation documents at parks including, most recently, Santa Monica Mountains National Recreation Area, Cumberland Island National Seashore, Cape Lookout National Seashore, Timucuan Ecological and Historic Preserve, and San Juan National Historic Site.

The division uses IPCC and US Army Corps of Engineers data to generate new data that can be projected on multiple time horizons to help the parks. A three-year project began in fiscal year 2013 to analyze rates of sea level change coupled with potential storm surge in 118 of the coastal parks in order to project, for each park, the combined elevations of storm surge and sea level by 2030, 2050, and 2100.



Storm surge maps completed for the parks (available at <https://www.flickr.com/photos/125040673@N03/sets/>). Image credit: NPS.

NOAA Sea, Lake and Overland Surges from Hurricanes (SLOSH) model data have already been incorporated into 34 foundation documents, 9 state of the parks reports, and various assistance requests (e.g., Gulf Islands National Seashore, Acadia National Park, Assateague Island National Seashore, Boston Harbor Islands National Recreation Area, Colonial National Historical Park, Gateway National Recreation Area, Fire Island National Seashore, and Statue of Liberty National Monument). Individual sea level change and storm surge projections for each park will be released in a full report during the NPS Centennial Celebration in fiscal year 2016. Interim products that have been supplied to the parks as part of foundation documents or state of the parks reports can be found at <https://irma.nps.gov>. Sea level change and storm surge data will be featured in the park atlas and as a separate interactive website. In the meantime, storm surge maps are already available at <https://www.flickr.com/photos/125040673@N03/sets/>.

Three parks will also be selected for funding to install waysides highlighting the issue of sea level change. Gulf Islands National Seashore has been selected as the first park to receive funding, which they have used to install two waysides explaining the challenges of rising sea levels along the Gulf of Mexico coast.



A wayside explaining sea level rise. This wayside is one of two that were installed at Gulf Islands National Seashore in 2015. Image credit: NPS.



This project is ongoing and will take three years to complete. This case study is an example of the following adaptation strategies:

- Monitoring climate change impacts and adaptation efficacy
- Coordinating planning and management across institutional boundaries
- Increasing/improving public awareness, education, and outreach efforts
- Conducting/gathering additional research, data, or products
- Conducting vulnerability assessments and studies
- Communicating climate change or adaptation actions to the parks

**For more information:**

Dr. Maria Caffrey, Research Associate  
University of Colorado Boulder  
(303) 969-2097  
[Maria\\_A\\_Caffrey@partner.nps.gov](mailto:Maria_A_Caffrey@partner.nps.gov)

Dr. Rebecca Beavers, Coastal Geology and Coastal Adaptation to Climate Change Coordinator  
NPS Natural Resource Stewardship and Science  
(303) 987-6945  
[Rebecca\\_Beavers@nps.gov](mailto:Rebecca_Beavers@nps.gov)