New Interagency SLR Report

"Global and Regional Sea Level Rise Scenarios for the United States"

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Summary

This report, for the first time, provides a set of regionally appropriate sea level rise scenarios for the entire U.S. coastline, synthesizing the most up-to-date sea level rise science. This new product is intended to fill a major gap in climate information needed to support a wide range of assessment, planning, and decision-making processes.

Background

Strong demand for authoritative, consistent, accessible SLR and associated coastal flood hazard scenarios for the entire U.S. coastline, to serve as a starting point for coastal preparedness planning and risk management

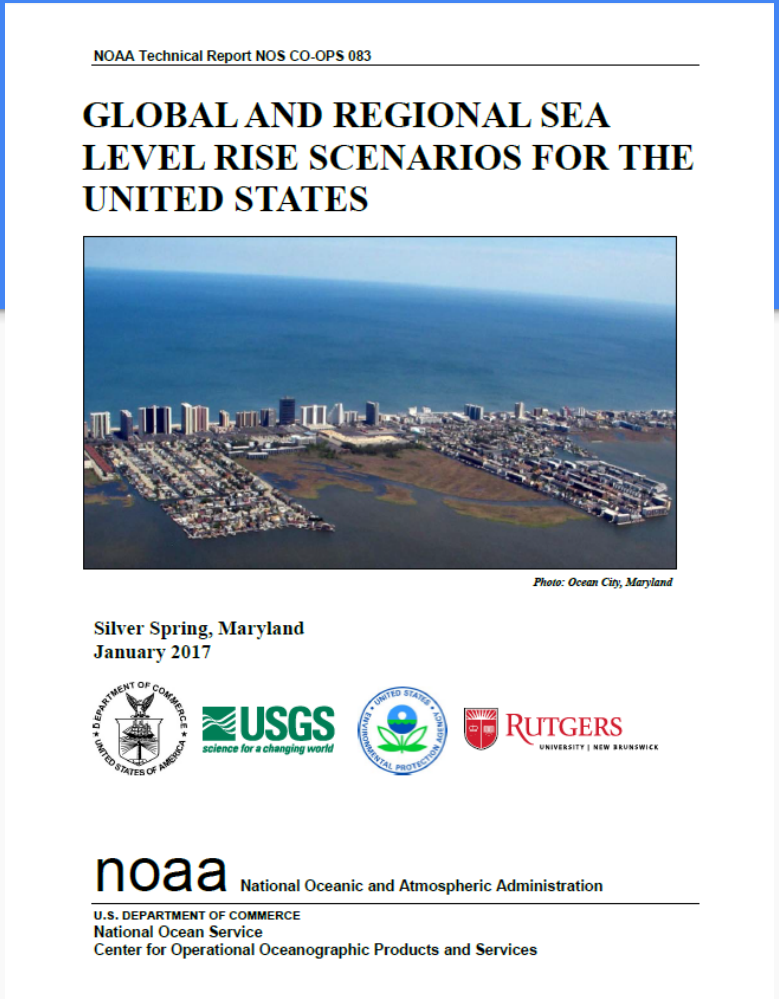
Much of the foundation exists in individual agency efforts and capabilities, but with a lack of (1) synthesis and (2) nationwide coverage

The WH Resilience Council asked USGCRP and the NOC to form Interagency Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Task Force

Report

1. Update Federal estimates of the range of future global SLR based on existing scientific evidence (0.3 - 2.5 m by 2100)

2. Develop scenarios of regional SLR across this range for the U.S. (incl. AK and HI), the Caribbean and the Pacific Island Territories



NOAA Technical Report NOS CO-OPS 083

GLOBAL AND REGIONAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES

Photo: Ocean City, Maryland

Silver Spring, Maryland
January 2017

noaa National Oceanic and Atmospheric Administration

U.S. DEPARTMENT OF COMMERCE
National Ocean Service
Center for Operational Oceanographic Products and Services

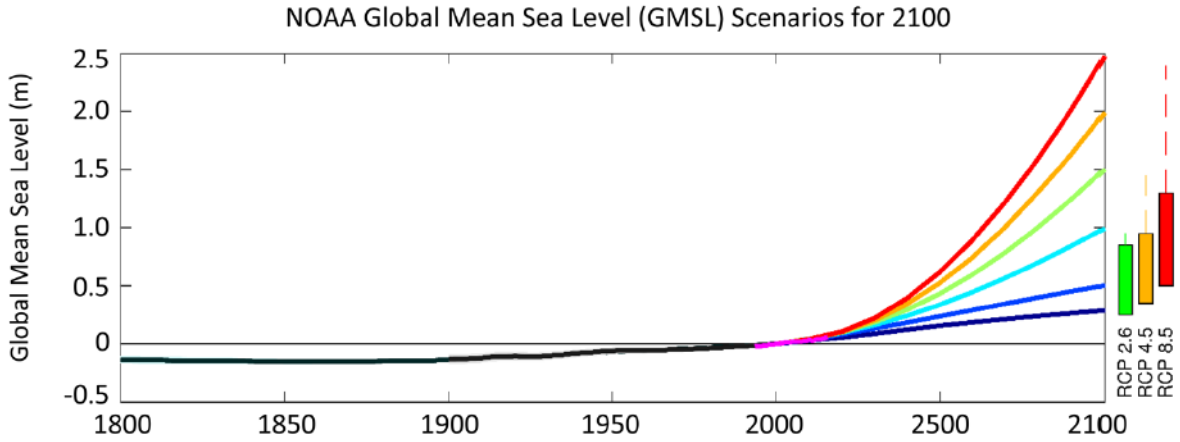


Figure 8. This study's six representative GMSL rise scenarios for 2100 (6 colored lines) relative to historical geological, tide gauge and satellite altimeter GMSL reconstructions from 1800–2015 (black and magenta lines; as in Figure 3a) and central 90% conditional probability ranges (colored boxes) of RCP-based GMSL projections of recent studies (Church et al., 2013a; Kopp et al., 2014; 2016a; Slangen et al., 2014; Grinsted et al., 2015; Mengel et al., 2016). These central 90% probability ranges are augmented (dashed lines) by the difference between the median Antarctic contribution of Kopp et al. (2014) probabilistic GMSL/RSL study and the median Antarctic projections of DeConto and Pollard (2016), which have not yet been incorporated into a probabilistic assessment of future GMSL.

Table 4. Probability of exceeding GMSL (median value) scenarios in 2100 based upon Kopp et al. (2014).

GMSL rise Scenario	RCP2.6	RCP4.5	RCP8.5
Low (0.3 m)	94%	98%	100%
Intermediate-Low (0.5 m)	49%	73%	96%
Intermediate (1.0 m)	2%	3%	17%
Intermediate-High (1.5 m)	0.4%	0.5%	1.3%
High (2.0 m)	0.1%	0.1%	0.3%
Extreme (2.5 m)	0.05%	0.05%	0.1%

- Divided the 0.3-2.5 m range into six discrete scenarios, each associated with a given probability of exceedance under different assumptions about GHG emissions
- Also looked out beyond 2100 to 2200

Change in Relative Sea Level (RSL):

$$\Delta RSL = \Delta SL_G + \Delta SL_{RM} + \Delta SL_{RG} + \Delta SL_{VLM}$$

Global: f(scenario, time epoch)

Regional: f(oceanographic factors; dynamic SLR)

Regional: f(changes in Earth's g-field due to ice melt redistribution)

Local: f(uplift/ subsidence, GIA)

1-degree x 1-degree data product for the U.S. (incl. AK, HI, Caribbean, Islands)

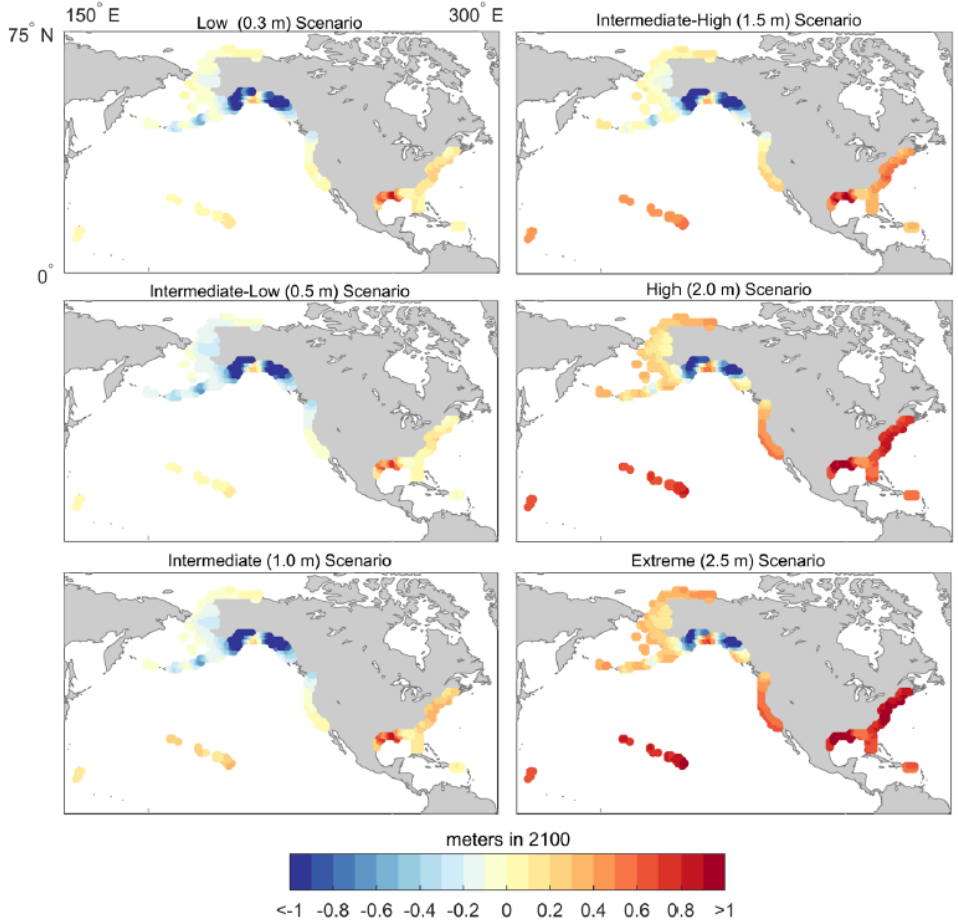


Figure 13. Total RSL change at 1-degree resolution for 2100 (in meters) relative to the corresponding (median-value) GMSL rise amount for that scenario. To determine the total RSL change, add the GMSL scenario amount to the value shown.

- Along essentially all U.S. coasts outside Alaska, RSL projected to be higher than the global average under the higher-end scenarios
- Along much of the Pacific Northwest and Alaska coasts, RSL projected to be less than the global average
- RSL change increases NOAA coastal flood 'warning' conditions >25-fold at the majority of coastal locations examined

Next Steps

- Report available: https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf
- Geospatial data to follow very soon
- Expanded analysis of coastal flood frequency changes for the U.S. coastline implied by these new SLR numbers
- In the process of integrating these updated scenarios into existing Federal tools and capabilities for coastal planning and decision support