

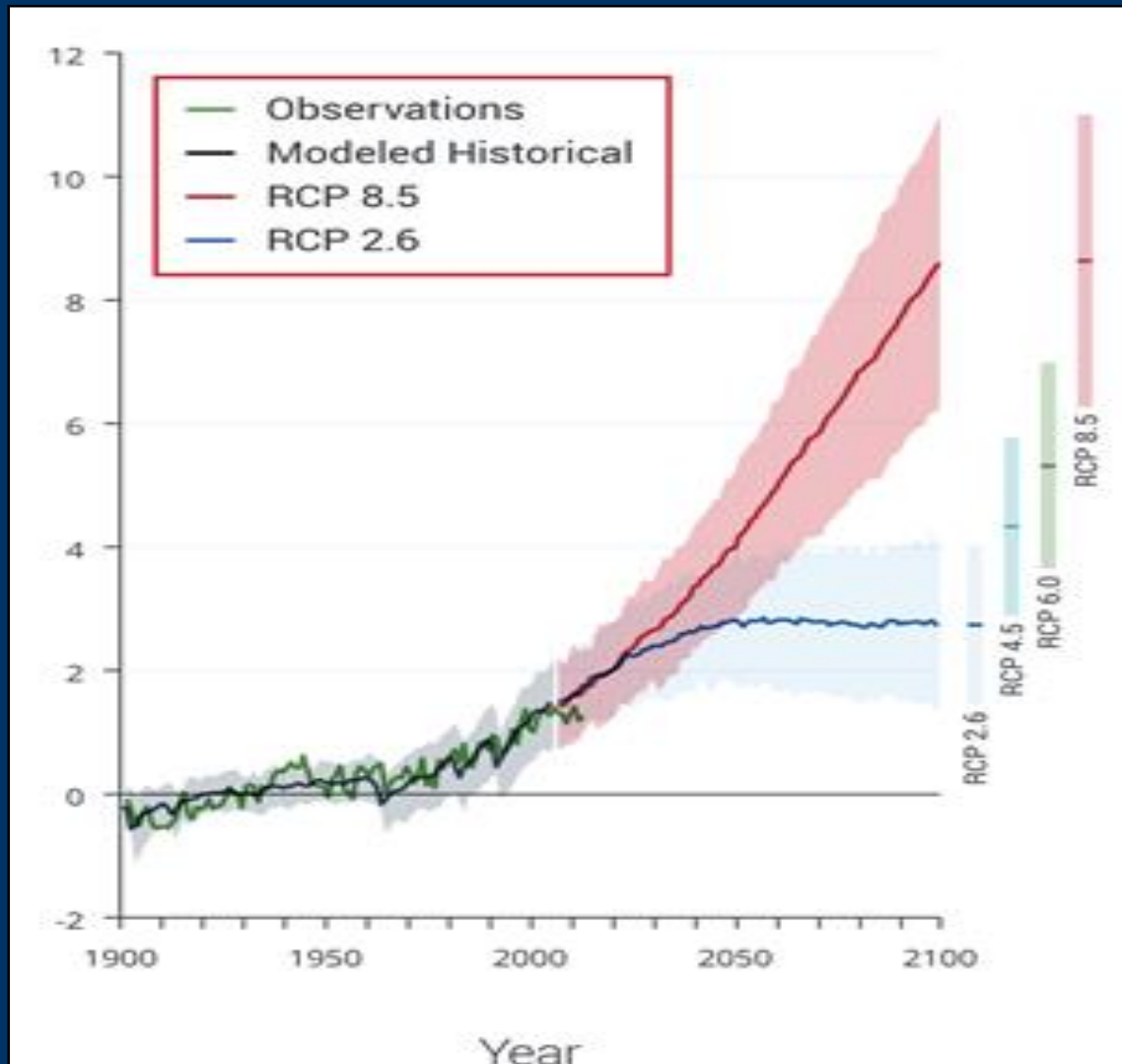
Understanding and Using Local SLR Scenarios

Doug Marcy
NOAA Office for Coastal Management



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Future Temperature



Sea Level Change

What causes the sea level to change?

Terrestrial water storage,
extraction of groundwater,
building of reservoirs,
changes in runoff, and
seepage into aquifers

Surface and deep ocean
circulation changes, storm surges

Subsidence in river
delta region,
land movements, and
tectonic displacements

As the ocean warms,
the water expands

Exchange of the water
stored on land by
glaciers and ice sheets
with ocean water

Past, Present, and Future

16 Sea-Level Rise Modeling Handbook: Resource Guide for Coastal Land Managers, Engineers, and Scientists

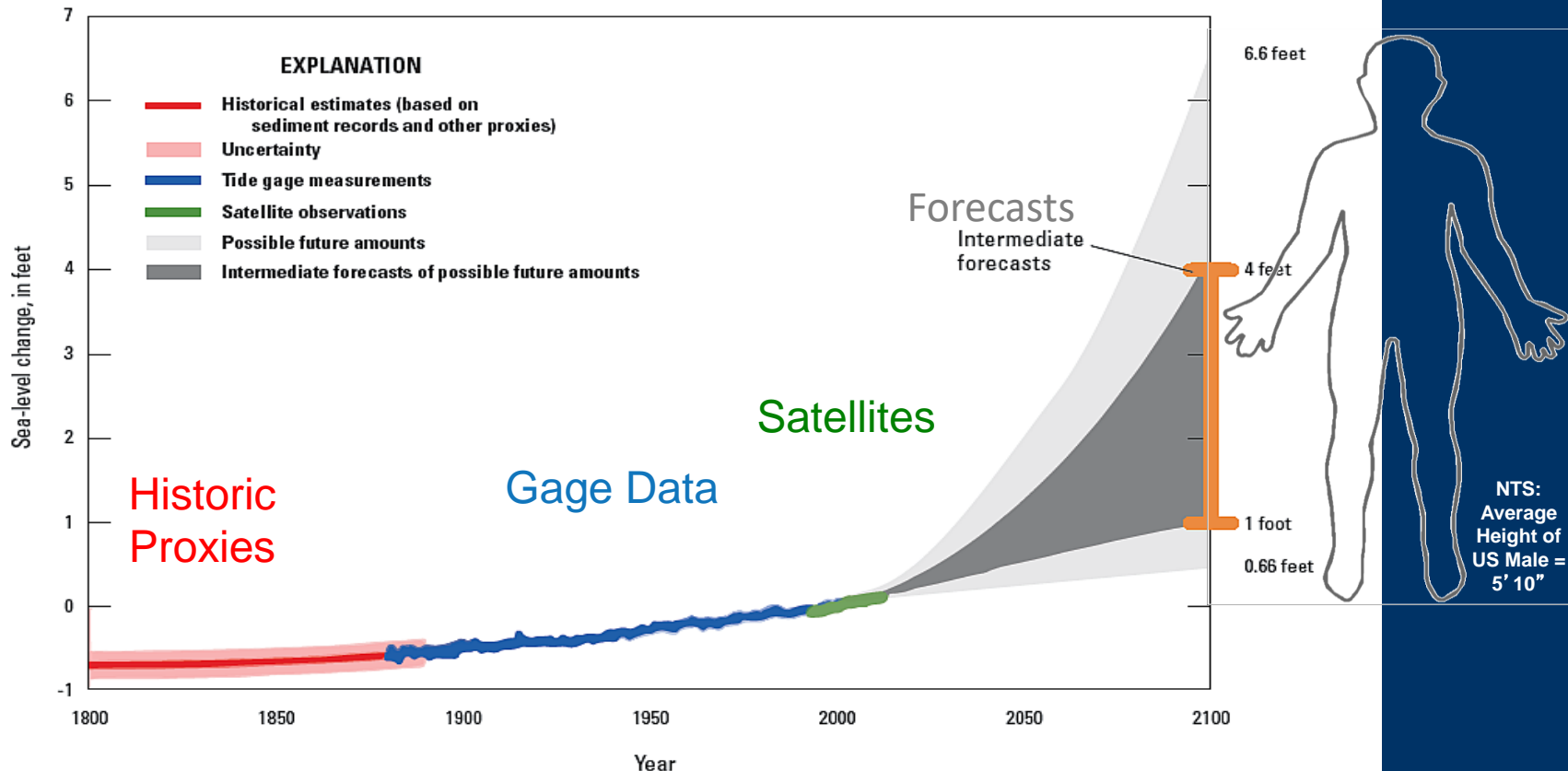
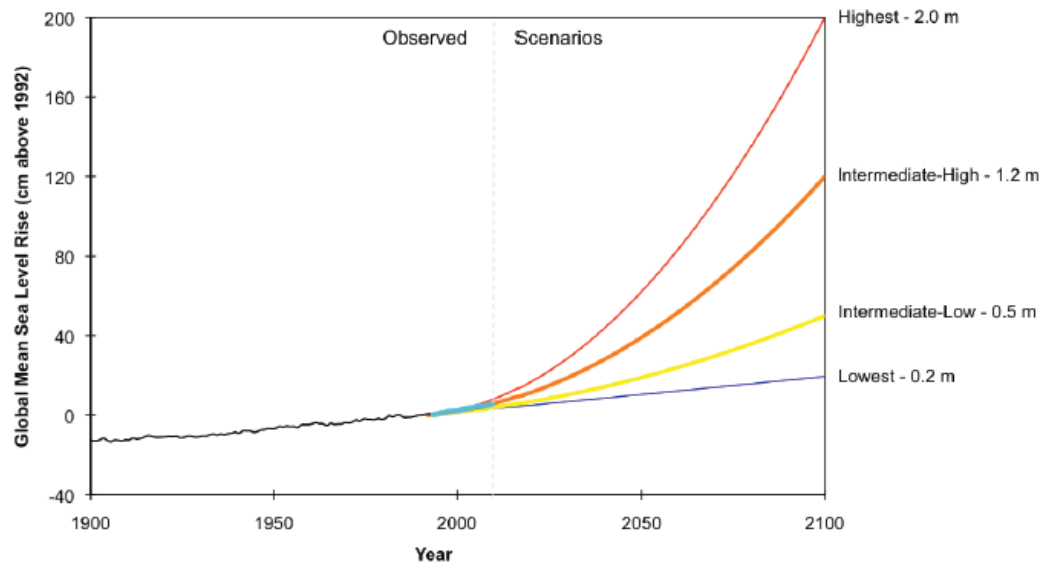


Figure 9. Historical, observed, and possible future amounts of global sea-level rise from 1800 to 2100 (from Melillo and others, 2014). Historical estimates (based on sediment records and other proxies) are shown in red (pink band shows uncertainty range), tide gage measurements in blue, and satellite observations in green.



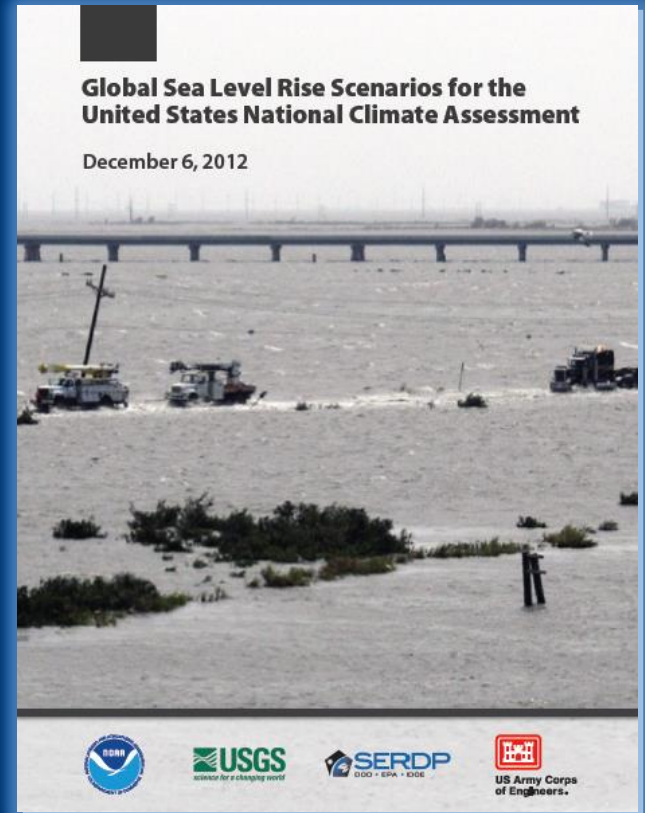
Global Sea Level Rise Scenarios for the United States National Climate Assessment

http://cpo.noaa.gov/sites/cpo/Reports/2012/NOAA_SLR_r3.pdf



Global Sea Level Rise Scenarios for the United States National Climate Assessment

December 6, 2012



Scenario	SLR by 2100 (m)*	SLR by 2100 (ft)*
Highest	2.0	6.6
Intermediate-High	1.2	3.9
Intermediate-Low	0.5	1.6
Lowest	0.2	0.7

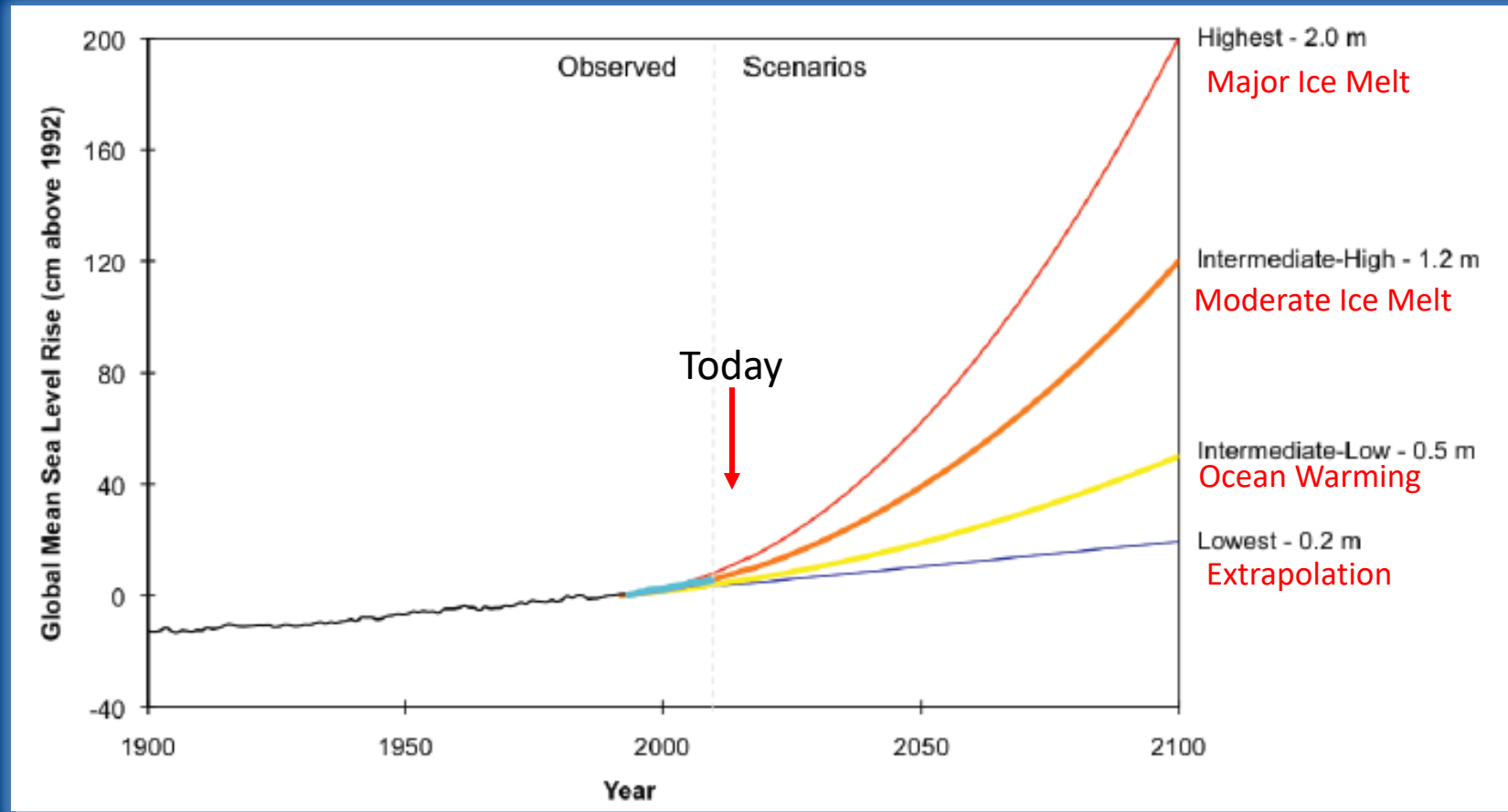
* Using mean sea level in 1992 as a starting point.



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“Consensus Scenarios” that fed the NCA 3rd Assessment

http://cpo.noaa.gov/sites/cpo/Reports/2012/NOAA_SLR_r3.pdf



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New Global and Regional Scenarios

https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

GMSL Scenario (meters)	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2120	2150	2200
Low	0.03	0.06	0.09	0.13	0.16	0.19	0.22	0.25	0.28	0.30	0.34	0.37	0.39
Intermediate-Low	0.04	0.08	0.13	0.18	0.24	0.29	0.35	0.4	0.45	0.50	0.60	0.73	0.95
Intermediate	0.04	0.10	0.16	0.25	0.34	0.45	0.57	0.71	0.85	1.0	1.3	1.8	2.8
Intermediate-High	0.05	0.10	0.19	0.30	0.44	0.60	0.79	1.0	1.2	1.5	2.0	3.1	5.1
High	0.05	0.11	0.21	0.36	0.54	0.77	1.0	1.3	1.7	2.0	2.8	4.3	7.5
Extreme	0.04	0.11	0.24	0.41	0.63	0.90	1.2	1.6	2.0	2.5	3.6	5.5	9.7

GMSL Scenario Rates (mm/year)	2010	2020	2030	2040	2050	2060	2070	2080	2090
Low	3	3	3	3	3	3	3	3	3
Intermediate-Low	4	5	5	5	5	5	5	5	5
Intermediate	5	6	7	9	10	12	13	14	15
Intermediate-High	5	7	10	13	15	18	20	22	24
High	6	8	13	16	20	24	28	31	35
Extreme	6	10	15	20	25	30	35	40	44

NOAA Technical Report NOS CO-OPS 883

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



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Probabilities Related to RCPs

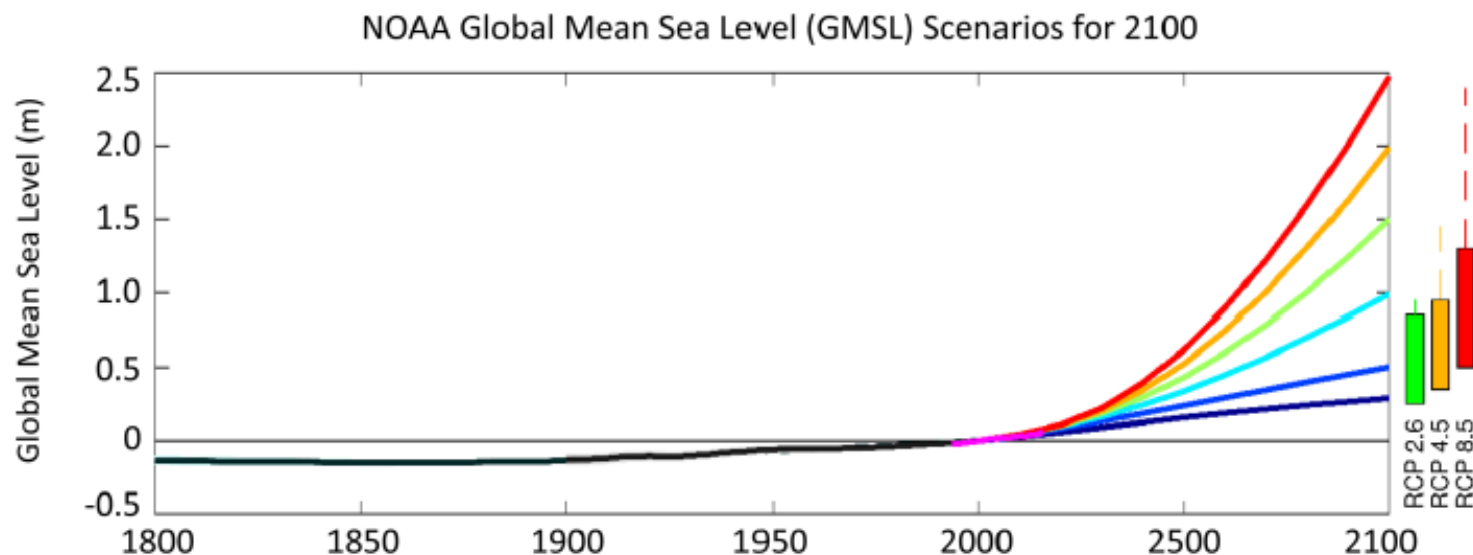
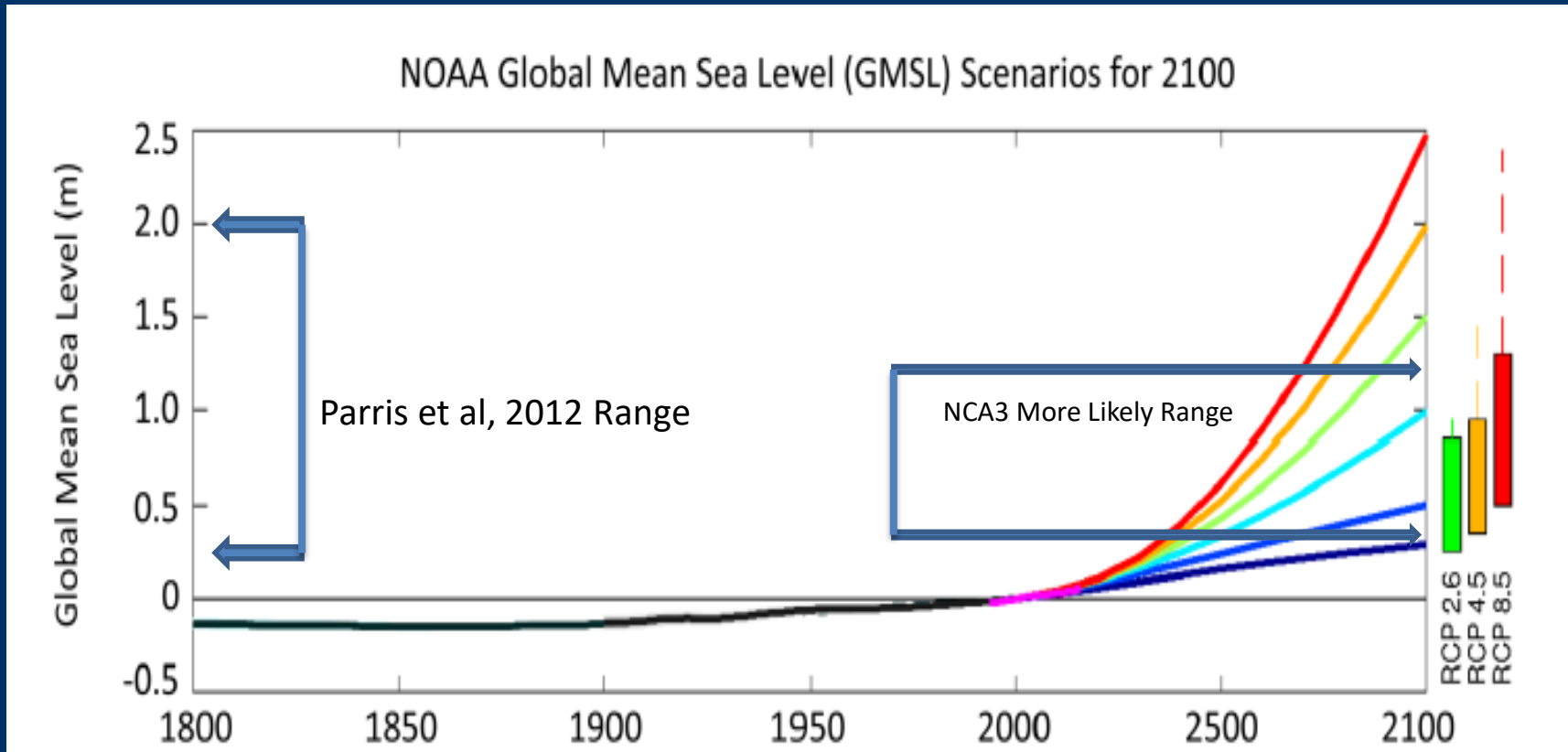


Table 4. Probability of exceeding GMSL (median value) scenarios in 2100 based upon Kopp et al. (2014).

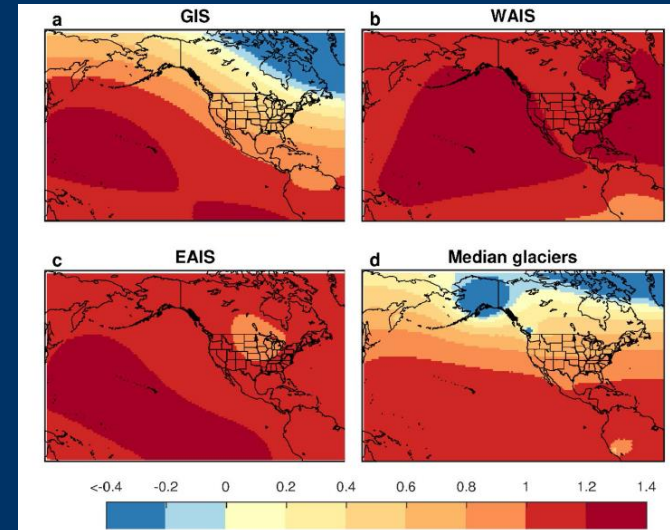
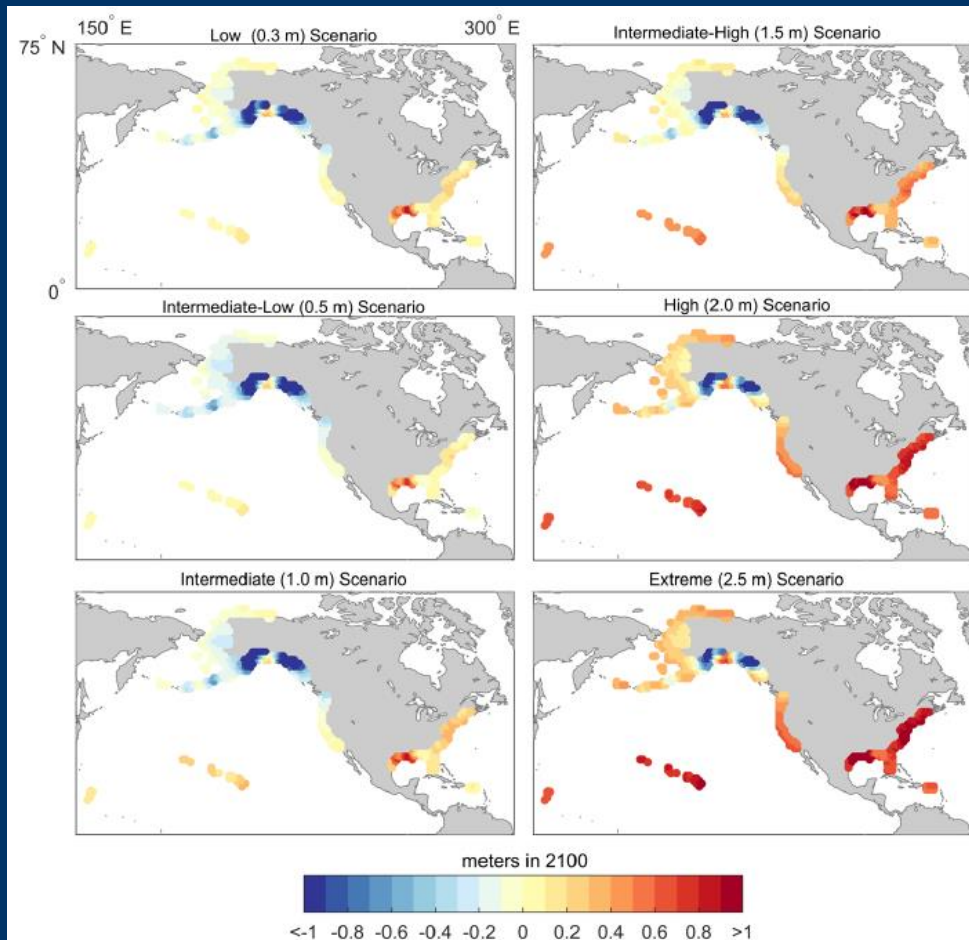
GMSL rise Scenario	RCP2.6	RCP4.5	RCP8.5
Low (0.3 m)	94%	98%	100%
Intermediate-Low (0.5 m)	49%	73%	96%
Intermediate (1.0 m)	2%	3%	17%
Intermediate-High (1.5 m)	0.4%	0.5%	1.3%
High (2.0 m)	0.1%	0.1%	0.3%
Extreme (2.5 m)	0.05%	0.05%	0.1%



How Do The New Ones Compare?



Relative Sea Level Rise



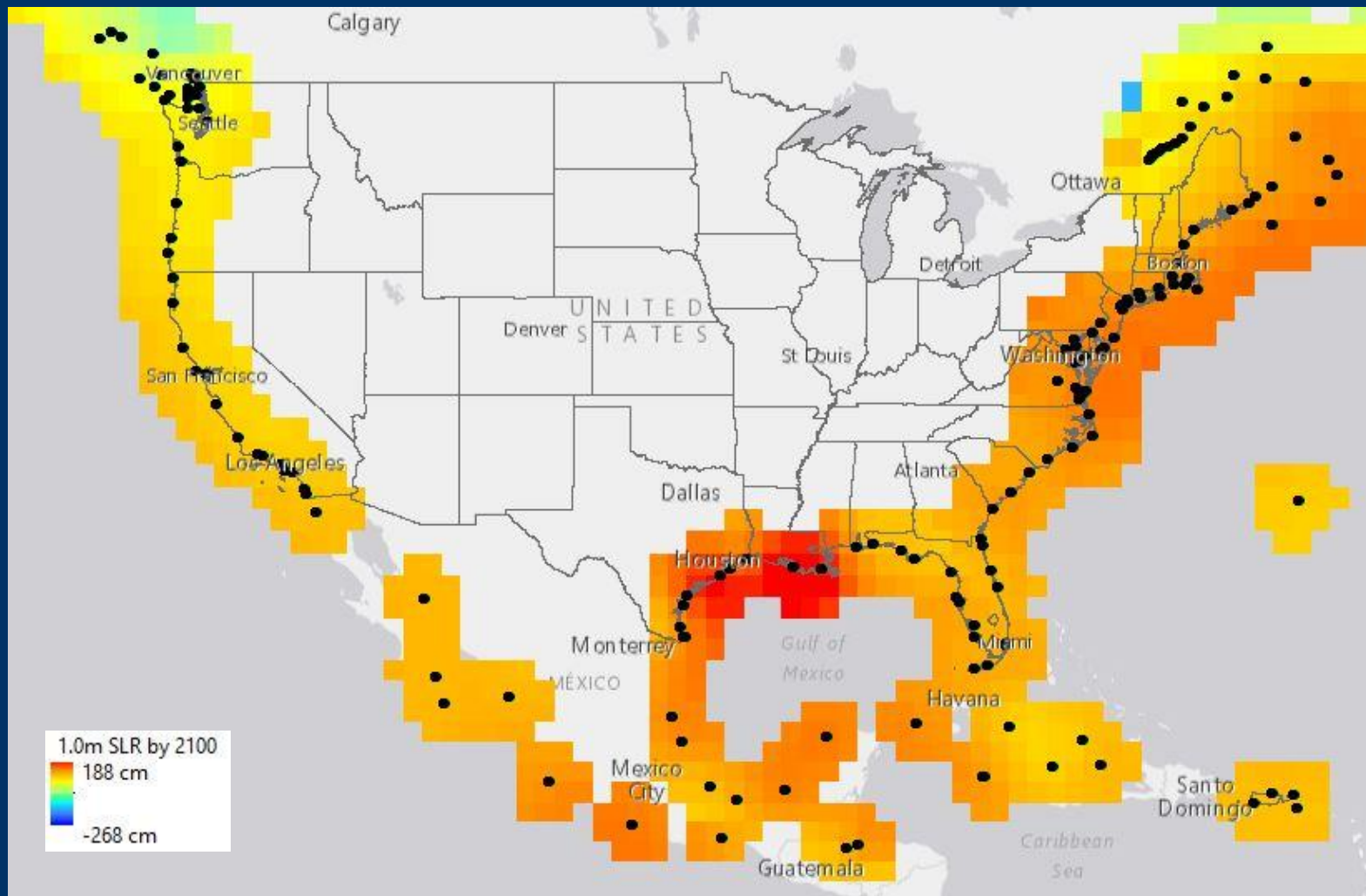
GMSL adjusted for

- 1.) Oceanographic Factors
- 2.) Gravity Changes due to Melting Land Based Ice
- 3.) Vertical Land Movement

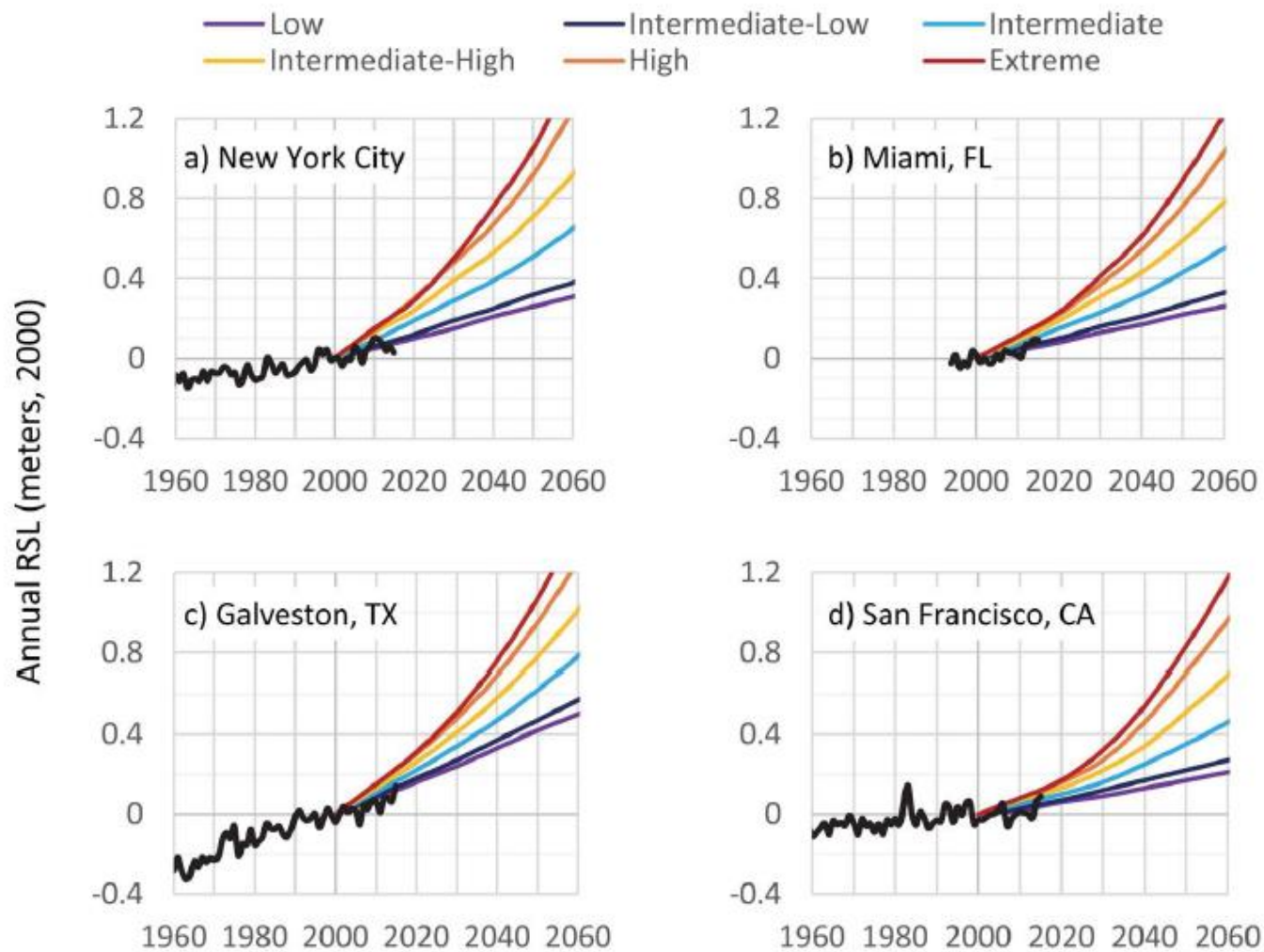


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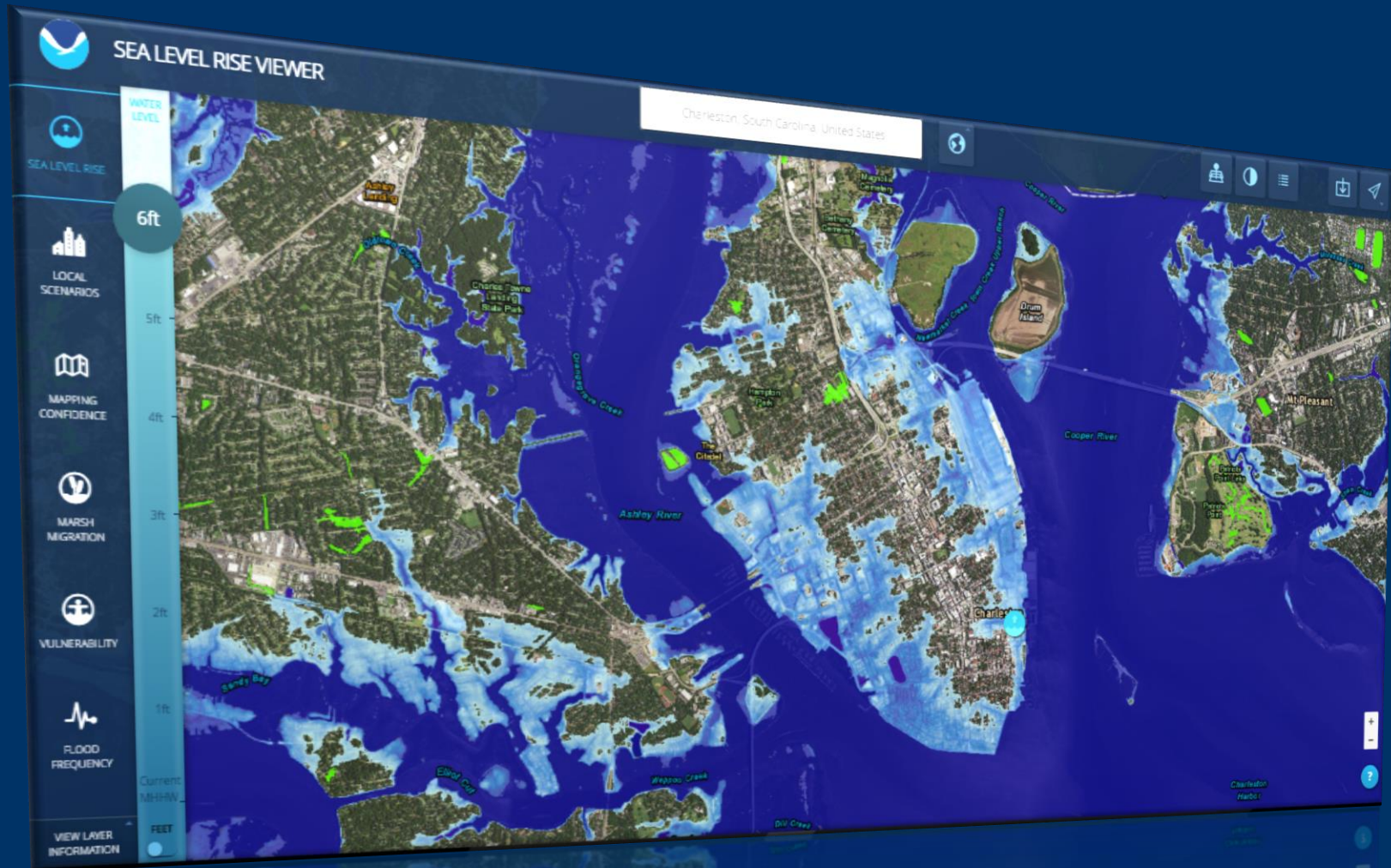
Gridded Regional Scenarios



Local Impacts



NOAA Sea Level Rise Viewer V3.0



coast.noaa.gov/slr/beta



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DATA UPDATES



SEA LEVEL RISE VIEWER



Sea Level Rise

View sea level rise and potential coastal flooding
impact areas and relative depth.

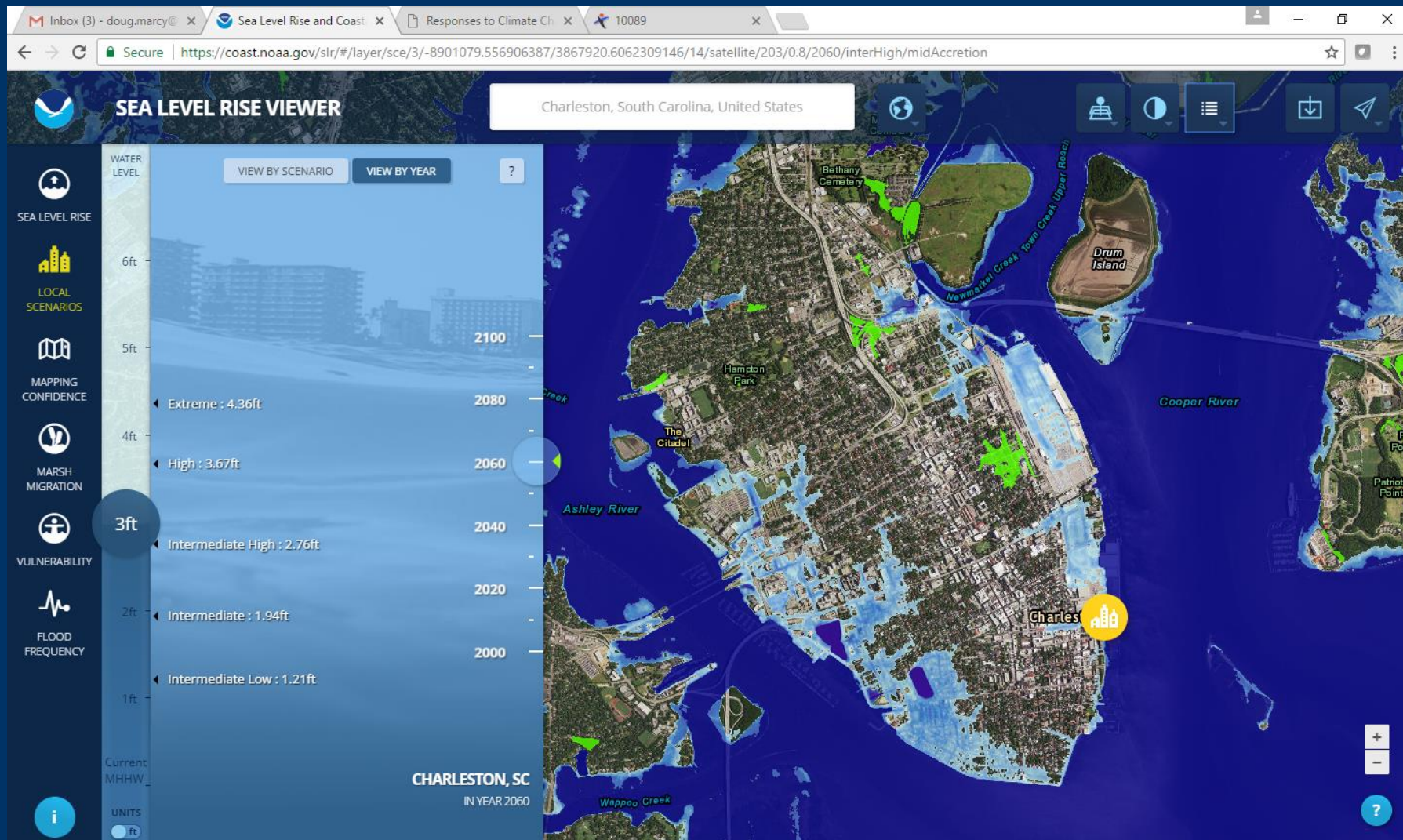


GET STARTED

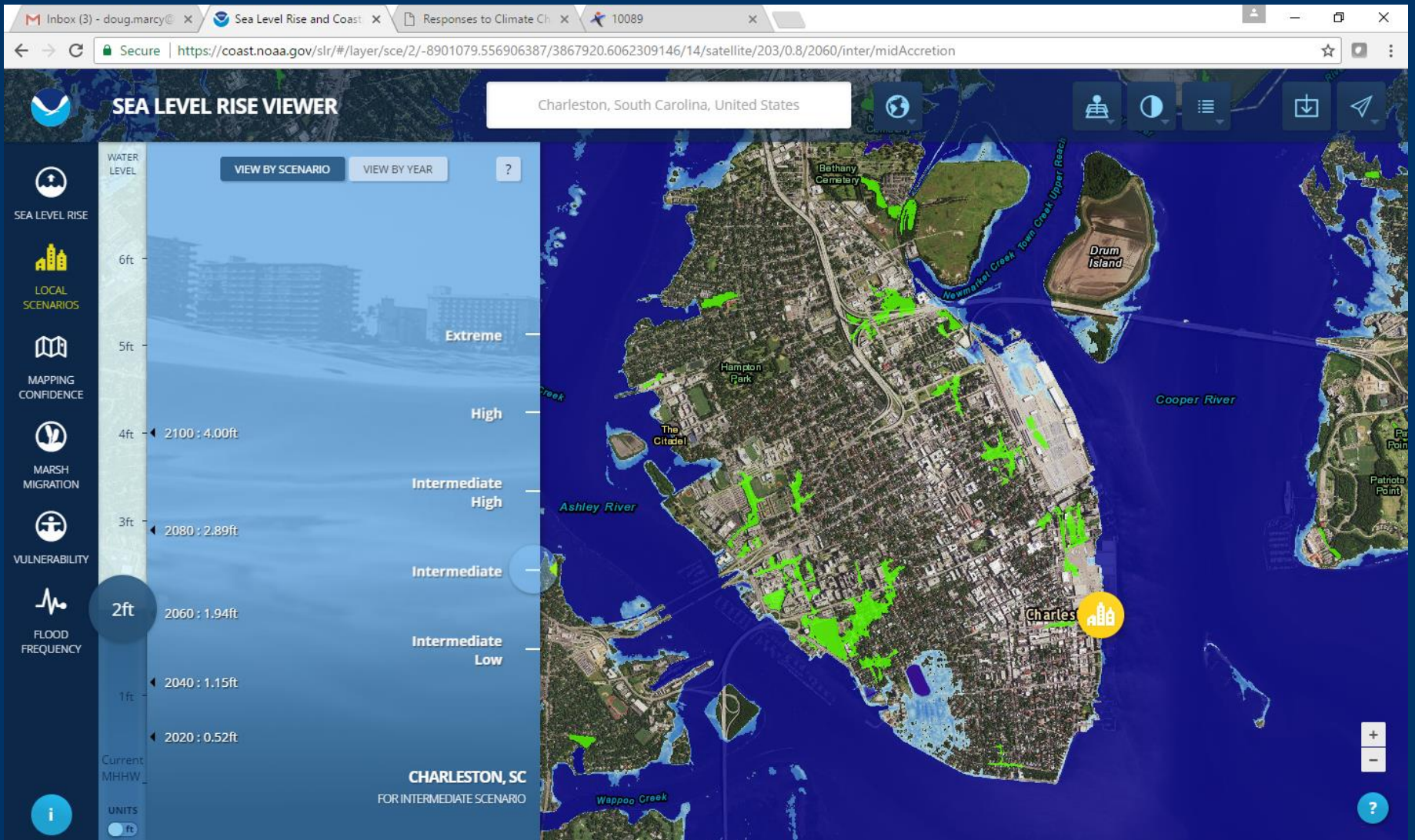
DISCLAIMER



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SEA LEVEL RISE VIEWER

Charleston, South Carolina, United States



SEA LEVEL RISE



LOCAL
SCENARIOS



MAPPING
CONFIDENCE



MARSH
MIGRATION

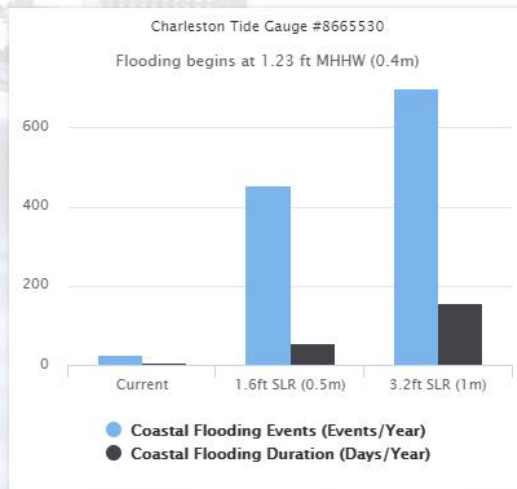


VULNERABILITY



FLOOD
FREQUENCY

Coastal Flood Frequency



[Real-Time Tidal Data](#) | [Sea Level Trends](#)



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Questions?

Doug.Marcy@noaa.gov



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