GOVERNOR'S OFFICE OF Policy Innovation & the Future

Sea Level Rise in Maine: An Accelerating Problem

DEPARTMENT OF ENVIRONMENTAL PROTECTION · STATE OF MAINE ·

Maine's 5,000 miles of coastline and offshore islands make us especially sensitive to ocean climate change. Sea level rise from human-driven climate change poses a substantial and growing challenge for our waterfront and shorefront communities, industries, and environments. Historical patterns of sea level rise do not account for accelerating impacts from climate change. The future path of climate and sea level impacts in Maine will depend on society's success in reducing emissions and feedbacks in Earth's climate system. Because of this, the Maine Climate Council has recommended that the State of Maine manage for 1.5 feet of relative sea level rise (SLR) by 2050 and 3.9 feet by 2100.

The Problem

- Maine SLR has accelerated since the early 1990s to about 1 ft/century (3 to 4 mm/year), up from ~0.6 ft/century (1.8 to 2 mm/year)
- Long-term average SLR in Maine has been 7 to 8 inches since the early 1900s, with more SLR expected until 2100 and beyond
- Abrupt +/- 1 foot annual changes in sea level have happened on top of long-term SLR
- "Nuisance" flooding and coastal storm impacts will be than **10x more frequent with just 1 foot of SLR**

King Tide Flooding, Portland, Nov. 2020
Portland experienced 4x more nuisance flooding in the last decade than the 20th century average

Impacts and Adaptation Solutions

- Between 2020 and 2050, SLR and storm surge will cause substantial damage and costs in the absence of planning for climate change, up to:
  - » Over 20,000 jobs lost
  - » $17.5B in coastal building damage
  - » 336 miles of public roads, 61 miles of rail, and ~1400 crossings and culverts with restricted flow exposed to inundation
- Valuable coastal ecosystems -like beaches, sand dunes, bluffs, eelgrass beds, and salt marshes – and associated ecosystem services may be lost if they cannot keep pace with sea level rise. These include flood control, water quality improvements, valuable habitat, carbon sequestration, and much more.
- New and upgraded infrastructure must be designed to withstand the conditions expected over its decades-long lifetime. Otherwise, any modest cost savings today are purchased at the expense of much higher repair and replacement costs in the future, not to mention the public safety, health, and economic losses incurred when infrastructure fails.
- Where appropriate, **nature-based solutions** like living shorelines and "green infrastructure" can provide effective and lower-cost protection (6:1 to 12:1 benefit-cost ratio on average) for climate change-related challenges while restoring coastal and marine habitats.

SEA LEVEL RISE Causes the Following to Rise Too:

Nuisance & Sunny-Day Flooding · Coastal Erosion · Groundwater Contamination by Saltwater

Flooded:
Businesses | Beaches | Wetlands
Roads & Coastal Infrastructure

Some access roads to communities may be cut off with rising sea levels, or occasionally impassable for emergency services

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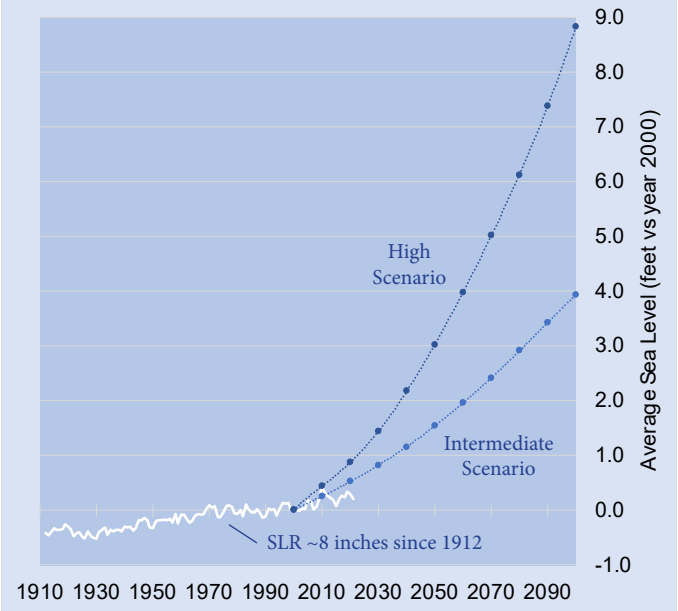
Sea Level Rise Scenario (over 2000 sea level)	Statewide Annual GDP Loss from Lost Jobs (2019$)	Dry Beach Area Lost	How Many Fewer Annual Tourist Beach Visits	Annual Tourism Spending Lost (2018$)
+1.6 ft	$119M (0.2% GDP)	42%	1,088,000	$136M
+ 3.9 ft	$665M (1.1% GDP)	75%	6,120,000	$765M
+ 8.8 ft	$2.4B (4.1% GDP)	98%	13,328,000	$1.7B

Estimated impacts to annual Maine gross domestic product (GDP) from lost jobs, dry beach width, number of tourists, and annual tourism spending from 1.6 feet, 3.9 feet, and 8.8 feet of sea level rise. Source: Maine Climate Council report "Assessing the Impacts Climate Change May Have on the State's Economy, Revenues, and Investment Decisions, Vol. 1: Cost of Doing Nothing Analysis"

Future SLR Projections for Maine

- Maine's sea level will continue to rise through 2100 and well beyond, but the exact trajectory will depend in large part on humanity's success in curbing greenhouse gas emissions.
- The Maine Climate Council has recommended managing for these science-based SLR projections:
  - » **Commit to manage** for an intermediate SLR scenario of 1.5 feet by 2050 and 3.9 feet by 2100 (over a baseline year of 2000).
  - » **Prepare to manage** for a high SLR scenario of 3.0 feet by 2050 and 8.8 feet by 2100, depending on the risk tolerance of different kinds of infrastructure.
- Northeast and New England cities and states taking a similar risk tolerance-based approach to SLR: Portland/South Portland, Portsmouth, Connecticut, New Hampshire, and New Jersey.



Historical annual average sea level in Maine and intermediate and high projections of Maine's future SLR.

LD 1572 A Resolve to Analyze the Impact of Sea Level Rise

- **A Resolve to Analyze the Impact of Sea Level Rise** (LD 1572, link) directs DACF, DVEM, MEMA, DEP, DIFW, DMR, and DOT to review the laws and rules they administer and recommend to the Legislature by January 1, 2022 any changes necessary to:
  - » Incorporate projections of SLR of 1.5 ft by 2050 and 3.9 ft by 2100 into administration of those laws and rules
  - » Implement strategy F3 in the State Climate Action Plan, Maine Won't Wait, to enhance community resilience to flooding and other climate impacts through updated land-use regulations, laws, and practices
- LD 1572 will:
  - » Establish the sea-level rise scenario to be used throughout Maine for regulating development and other activities that impact our natural environment
  - » Ensure science-based projections of future SLR impacts will be used for the first time in Maine laws and rules

Explore Maine's historical sea level rise data and future projections for yourself on GOPIF's Climate Science Dashboard, climatecouncil.maine.gov/maine-climate-science-dashboard

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