Tackling Sea Level Rise in Maine

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Photo credit: Jack Sullivan
MAINE COAST & ISLAND COMMUNITIES

Just over 452,000 people live along Maine’s coast and on the islands. That’s about 34% of the state’s total population. There are 105 communities along the coast and 15 year-round island communities. Most are individual municipalities (towns or cities). Some are plantations or townships. Others are part of larger municipalities, Peaks Island, Great Diamond Island, and Cliff Island in Casco Bay are part of the city of Portland.

These Are Small Towns

92.2% of them have fewer than 10,000 residents compared to 85% of towns in the U.S. overall.

9 have more than 10,000 residents (all are south of Brunswick)
14 have 5,000 - 10,000 residents
16 have 2,500 - 5,000 residents
42 have 1,000 - 2,500 residents
14 have 500 - 1,000 residents
19 have fewer than 500 residents

Why is this important?

The size of communities impacts how well residents are supported in their ability to make a living. Smaller communities have human and financial challenges that can limit investments in local infrastructure or economic development projects. It can be difficult for small communities to change these dynamics themselves and challenging for private sector companies that provide economic development services (e.g., broadband internet) to construct business models that work in small, remote locations.

ISLAND POPULATION AT A GLANCE

YEAR-ROUND RESIDENTS
SUMMER RESIDENTS

Population estimates are less precise in the smallest communities due to under-sampling.
Talk Overview

1. Current impacts of sea level rise in Maine’s island and coastal communities
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2. Efforts currently in place to improve coastal resilience
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3. Tools and scenarios being used for planning
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4. Best strategies to increase community awareness and facilitate adaptation
1) Current impacts of sea level rise in Maine’s island and coastal communities
Highest astronomical tide, plus 6.1 ft SLR

https://www.maine.gov/dacf/mgs/hazards/slr_ss/
Based on this, there could potentially be a tenfold increase in the frequency of flooding in Portland with 1 foot of sea level rise.

Changes in Annual Flooding Frequency in Portland with SLR (using 2006-2016 Average)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Flood Stage (ft, MLLW)</th>
<th># times per year</th>
<th>% of high tides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>12</td>
<td>9.8</td>
<td>1.3%</td>
</tr>
<tr>
<td>+1 ft SLR</td>
<td>11</td>
<td>98</td>
<td>13.5%</td>
</tr>
<tr>
<td>+2 ft SLR</td>
<td>10</td>
<td>461</td>
<td>63.3%</td>
</tr>
</tbody>
</table>
With 2ft of SLR, on a calm day, Portland will see this more than once a day
Brown’s Boatyard, North Haven

Winter Storm Greyson- Jan 4, 2018
Monhegan Island-Freshwater Drinking Supply
2) Efforts currently in place to improve coastal resilience
Ex) CCG- Damariscotta Downtown

Photo credits: Matt Lutkus
Option 1

Ground & Door Elevations

Option 2
Ex) CCG- Vinalhaven “Downstreet”

Economic Heartbeat
- 30+ businesses
- $13 million in RE value
- Emergency Services
- Boatyard
- Lobster Buyers
- Mixed Use
Critical Wave Envelope for the 1000-year storm event
Recommendations

- **Complete the Maine Flood Resilience Checklist.**
- Update hazard information to include possible impacts from tropical storms and hurricanes, and purely tidal events.
- **Evaluate the feasibility of elevating low-lying areas of Main Street.**
- Provide property owners with educational tools and resources to evaluate the feasibility of elevating their buildings. Consider retreat as a possible option in certain cases, especially for residential buildings and/or properties with low value.
- Evaluate the feasibility of installing a flood gate at the Carvers Pond inlet.
- Evaluate the vulnerability of Ferry Terminal infrastructure to extreme wave impacts, and consider construction of a breakwater.
- Evaluate the timing when vehicle access to the Ferry boat will be difficult.
- Allow planning to be flexible and evolve with new information and experiences.
Ex) Maine Flood Resilience Checklist

What Is It?

Practical self-assessment tool and integrated framework for:

• Examining local flood risk and preparedness
• Assessing vulnerability of the social, built, and natural environments
• Identifying strategies for increasing resilience

Who Should Use It?

Communities wanting to:

• Understand flood vulnerability and sea level rise
• Build flood resilience
• Enhance coastal hazard recovery
Ex) Guidance Series for Maine Communities

1. Overview
2. Transportation
3. StreamSmart Crossings
4. Wastewater Management
5. Drinking Water
6. Storm Water
7. Comprehensive Planning
8. Shoreland Zoning Ordinance
9. Site Plan Review Ordinance
10. Subdivision Ordinance

Available at: www.maine.gov/dacf/municipalplanning/docs/CAGS_01_Overview.pdf
3) Tools and scenarios being used for planning
Coastal Risk Explorer

A web tool for assessing road flooding, lifelines, and social vulnerability in Maine

You can’t get there from here!

Photo credit: John Skroski
Data Driven Maine Specific

View coastal areas under several sea level rise scenarios

Sea Level Rise Prediction

Current 1 ft 2 ft 3.3 ft 6 ft
Data Driven Maine Specific

View coastal areas under several sea level rise scenarios

Number of addresses inaccessible to emergency services

Approximate cost to update inundated roads
Data Driven Maine Specific

View coastal areas under several sea level rise scenarios

Number of addresses inaccessible to emergency services

Approximate cost to update inundated roads

Overall social vulnerability of a town or block group

Measures included in the social vulnerability index:
- Socioeconomic status
- Household Composition & Disability
- Minority Status & Language
- Housing & Transportation
Submerged properties and economic repercussions of SLR-implications for municipal finance

All coastal/island communities-

- % land area of towns submerged
- HAT + 6.1 ft scenario
Land Value Impact - calculated by reducing the land value by the % of land inundated by the flood scenario.

Building Value Impact - calculated by reducing the full value of the building if it is more than half in the inundation zone, if less, only reduce the building value by 20%.
4) Best strategies to increase community awareness and facilitate adaptation
Staying Above High Water: Helping Prepare Maine’s Coastal Communities for Coastal Flooding and Sea Level Rise

November 28, 2017, 9:30am-4:00pm
The Wishcamper Center, Rm. 102, University of Southern Maine
Facilitated by Liz Hertz, Blue Sky Planning Solutions

- Coastal hazards
- Overview of map viewers
- FEMA flood maps and insurance
- Maine Flood Resiliency Checklist
- Impacts on real estate
- Salt water intrusion
- Community case studies- local and beyond
- Adaptation options
- Engineering company overviews

Presentations available at:  www.islandinstitute.org/sea-level-rise-symposium
Sea Level Rise and Coastal Flooding
The Basics for Maine Communities

Sea level rise is a persistent and long-term problem. The predicted impacts on homes, businesses, and critical infrastructure including working waterfronts could structurally change the communities and economies along our coast. These changes may happen over a long period of time, or they may happen abruptly if we are hit with a large storm.

SEA LEVEL RISE 101

Sea level rise is primarily due to:
- Melting of land-based ice sheets and glaciers
- Expanding ocean water as it warms (thermal expansion)

GLOBAL SEA LEVEL HAS RISEN BY ABOUT 8 INCHES SINCE RECORD KEEPING BEGAN IN 1880.

On average, sea levels are projected to rise another one to four feet globally by 2100, but sea level change will vary regionally (2017 U.S. National Climate Change Assessment). The Gulf of Maine is especially susceptible to fluctuations in sea level due to changes in the strength of the Gulf Stream and seasonal wind patterns. Sea levels in the Gulf of Maine are projected to rise faster than the global average.

In Maine, a sea level rise of one foot will mean that the 10-year storm of the 21st century could cause the same flooding that the 100-year storm caused during the 20th century.

A sea level rise of two feet, without any changes in storms, could more than triple the frequency of coastal flooding throughout most of the Northeast.

Join the ShoreUp Maine Google group!

The intent of this group is to share information and provide tools to coastal communities so that they better understand implications of sea level rise in their communities and can make informed adaptation decisions, especially around critical waterfront infrastructure.

Tools include resources, events, and best practices that help build community awareness and resilience around rising seas and Maine coastal flooding.

Managed by the Island Institute, this group strives to leverage, connect and expand existing coastal and island networks necessary for communities to prepare for changing impacts.

https://groups.google.com/forum/#!forum/shoreup-maine
Students study sea level rise in Barrington and Warren

Coastal impacts of climate change draws UPenn planning students to

Teresa Crean, a coastal community planner for Coastal Resources Center at the University of Rhode Island, shows how high sea level is expected to rise in the coming years. Ms. Crean worked closely with University of Pennsylvania students during their recent tour of Barrington and Warren.

PHOTOS BY RICHARD W. DIDONNE JR.
SEA LEVEL RISE

It's Happening!

https://www.youtube.com/watch?v=fJSGvxoHV3g
Questions?

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