Shore Up Maine
Adaptation in Boston
27 Sept. 2019
Belfast, Maine

With thanks to:

GRC
Barr Foundation
City of Boston
SSL team!

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• Costs of Inaction

• $306 billion US damage weather-related disasters
  2017 - NOAA

• Jan and March 2018 – 2 x 100 year storms hit Boston
CLIMATE READY BOSTON: PHASE I

1. Climate Projections
   Science-based consensus of likely ranges for future climate conditions across multiple risk factors for several time periods

2. Vulnerability Assessment
   Comprehensive evaluation of future risks associated with each of three climate hazards: extreme heat, stormwater flooding and coastal and riverine flooding

3. Resilience Initiatives
   Set of actions to address the key risks identified in the Vulnerability Assessment.

4. Implementation Roadmap
   Recommendations for execution of resilience initiatives, including responsible parties and milestones
BOSTON RESEARCH ADVISORY GROUP: SCIENTIFIC CONSENSUS ON CLIMATE PROJECTIONS

Mean Sea Level Trend
8443970 Boston, Massachusetts

2.81 +/- 0.16 mm/yr

The mean sea level trend is 2.81 millimeters/year with a 95% confidence interval of +/- 0.16 mm/yr based on monthly mean sea level data from 1921 to 2016 which is equivalent to a change of 0.92 feet in 100 years.

- 30 experts from area universities
- Extreme Temperatures
- Extreme Precipitation
- Sea Level Rise
- Coastal & Riverine Flooding
SEA LEVEL RISE PROJECTIONS

RELATIVE SEA LEVEL RISE IN FEET (ABOVE 2000)

- 2000: 4" (Likely under all emission scenarios)
- 2030: 8" (Likely under all emission scenarios)
- 2050: 1.5' (Likely under moderate to high emission scenarios)
- 2070: 3.1' (Likely under moderate to high emission scenarios)
- 2100: 7.4' (Low probability under high emission scenario)

Data Source: BRAG Report
By the middle of the century, exposure will increase across waterfront neighborhoods, and start to be significant in Dorchester.
DOWNTOWN

- Average Monthly High Tide
- 10% Annual Chance Storm
- 1% Annual Chance Storm
Based on existing assets.  
Source: CRB 2016
Impact on Municipal Finances

• Emergency services
• Repairs to buildings + infrastructure
• Lost tax, fee revenues
• Loss of inward investment
• Outward migration
• Business disruption

S&P Oct. 2017
Moody’s Nov. 2017

“S&P Global Ratings believes that what previously were viewed as the credit implications associated with transitory storms must now increasingly be viewed through the lens of climate change risk.”

Sandy: cost to New York: $42 bn.
Year 2100 5’ Sea Level Rise + 5’ Storm Surge
Climate Adapted District
International Boston Living with Water Competition
South Boston, MA
Key Challenges: Market Failures, Low cash flow

- Cities pay for resilience, private property owners benefit
- Incorrect pricing of risk – insurance, bonds, property prices
- Prevents damage, but low cash flow
- Some benefits non-financial, uncertain
- Collective action challenges
- Inadequate information
  + storms, resilience metrics, disruption costs
- \textbf{Misaligned} incentives
  - for developers, building owners, cities etc.
- Capital budget constraints
Cost of Investing in Resilience

Boston Harbor Barrier
6 km+ $7-15 billion?

520 m.
$2.5 bn
(2017 dollars)
District Level Investments, $ million

Scenarios for Boston:
Total $1.5 – 2.5 billion near to medium term

<table>
<thead>
<tr>
<th>District</th>
<th>2018–2025</th>
<th>2026–2030</th>
<th>2030–2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Boston</td>
<td>$43–$69</td>
<td>$28–$46</td>
<td>$46–$77</td>
</tr>
<tr>
<td>Charlestown</td>
<td>$16–$30</td>
<td>$14–$26</td>
<td>$3–$6</td>
</tr>
<tr>
<td>South Boston</td>
<td></td>
<td>$600–1200</td>
<td></td>
</tr>
<tr>
<td>Downtown</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
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Source: City of Boston, Coastal Resilience Solutions for East Boston and Charlestown, 2017
Municipal Vulnerability Preparedness (MVP)

2017-2018

State and local partnership to build resiliency to climate change

1. Engage Community
2. Identify CC impacts and hazards
3. Complete assessment of vulnerabilities & strengths
4. Develop and prioritize actions
5. Take Action
Resilience with Equity

• **Fairness**: cost burden broadly reflects benefits provided

• **Equity**: cost burden reflects ability to pay, investments address disparities

• Avoid **exacerbating inequalities**, gentrification

• **Spread the Cost Burden**: over multiple levels (state, city, district, parcel) and a range of funding mechanisms (carbon, property taxes, water/sewer fees)

• **Channel Investments** to revitalize neighborhoods - workforce training, resilient housing and infrastructure

• **Inclusive planning and decision-making**
Thank You!

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