Boston Harbor Now is the steward of the waterfront, harbor and islands for the economic, social, and environmental health of our city and region for the benefit of us all.
BOSTON HARBOR NOW GOALS:

• Providing waterfront and island programming that is accessible to all while increasing equitable access for our people and the vitality of our places;
• Promoting sustainable waterfront policies and planning as part of enhanced waterfront development;
• Increasing affordable public access to the waterfront and the islands by bringing Boston’s water transportation system to scale;
• Investing in a robust, innovative working port that provides well-paying jobs as well as goods and services to the entire region, and
• Providing leadership and serving as a national model for climate resilience while helping to prepare Boston’s waterfront neighborhoods for increased coastal flooding.
Managing Boston’s Wet Future

Julie Wormser
Boston Harbor Now
Superstorm Sandy
Rt. 12
Outer Banks
Boston’s Waterfront,
October 29, 2012
Why Coastal Flooding Happens

• Storm surges and/or
• “Wicked high tides” during full & new moons and/or
• Sea level rise
100-Year Wave Condition Applied at Wave Boundary

Incident wave characteristics:

- Significant wave height: 9 m
- Wave period: 10 s
- Wave direction: 210°

no wind

Wave direction
100-, 500- and 1,000-year Surges
New York City + Boston Harbor

Storm Surge (feet)

Probability of Storm Surge (years)

New York City

Boston Harbor

0 2 4 6 8 10 12

100 500 1000

BOSTON HARBOR NOW
The Battery, NY - Return to List

NOAA/NOS/CO-OPS
Preliminary 6 min. Water Level vs. Predicted Plot
8518750 The Battery, NY
from 10/29/2012 12:00 - 11/01/2012 12:00

Height
(Feet relative to MLLW)

Date/Time (EDT)

Predicted Tide
Observed WL
(Obs-Pred)
HAT

Tides
NOAA/NOS/CO-OPS
Preliminary 6 min. Water Level vs. Predicted Plot
8443970 Boston, MA
from 10/29/2012 12:00 - 11/01/2012 12:00

Date/Time (EDT)

Predicted Tide
Observed WL
(Obs-Pred)
HAT

Height (Feet relative to MLW)

14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0

10/29 12:00
10/29 00:00
10/30 12:00
10/30 00:00
10/31 12:00
10/31 00:00
11/01 12:00
11/01 00:00
Sea Level Rise vs. Carbon Emissions

Height at Which 1/3 of Boston Floods at High Tide

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2030</th>
<th>2050</th>
<th>2070</th>
<th>2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation (Feet)</td>
<td></td>
<td>4”</td>
<td>1.5’</td>
<td>3.1’</td>
<td>7.4’</td>
</tr>
</tbody>
</table>

1 - Likely under all emission scenarios
2 - Likely under moderate to high emission scenarios
3 - Low probability under high emission scenario

Data Source: BRAG Report
Today’s High Tide + 2.5 ft.
Could flood nearly 7% of Boston

Current 100-Year Flood Annual Flood by 2050

Daily High Tide by 2100 by 2050

Today’s High Tide + 5.0 ft.
What Floods at High Tide +5?
Could Flood Over 30% of Boston 100-Year Flood around 2050

Today’s High Tide + 7.5 ft.

Annual Flood by 2100
What Floods at High Tide + 7.5?
City of Boston Actions

• 2015: Climate Action Plan update
• 2016: Climate Ready Boston and Imagine Boston 2030 plan
• 2017: Hosting Global Summit
• Need to update regulations, capital budgets to anticipate changing climate
Rainfall trends

• Boston’s annual rainfall and one-day rain totals have gone up by 10% since the 1960s.
• Both “flash floods” and “flash droughts” are increasing.
• Our stormwater infrastructure is not designed to handle future volumes of water.
**Projected future heat**

- Days above 100°F
- Days above 90°F

**Likely range of days above 90°F in future**

- 20 to 40 days including up to 5 days above 100°F
- 25 to 90 days including up to 33 days above 100°F

**1990 to 2070**

- 11 days above 90°F now

*Baseline represents historical average from 1971-2000
Upper values from high emissions scenario. Lower values from low emissions scenario.*

Data source: Rossi et al. 2015
What the Dutch say:

1. Regional barrier (e.g., dam, levee, sea wall) and/or
2. Floodable transition zone and/or
3. Building-specific designs
“Living With Water”

• Phrase coined in New Orleans
• Favor “resilience” over “resistance” where possible.
• Elevate vulnerable resources, pair with floodable areas.
• Favor flood control solutions that enhance livability.
Phase Plans Over Time

- Mechanical, electrical and emergency services on roof out of harm’s way
- Key floors above 2085 High Estimate 100 Year Flood
- Operable windows keyed open in event of systems failure
- Critical patient programs above ground floor
Create Double-duty Solutions
Seoul, South Korea
Design for Resilience
Community Resilience
Gloucestershire Village Agents, UK
Institutionalize Resilience
Room for the Waal, The Netherlands
Summary of Findings

- Under business as usual carbon emissions, 1/3 of Boston could flood twice daily by 2100.
- Boston will be different. It doesn’t have to be worse.
- Preventing flood damage will cost money. Make it count by solving other problems at the same time.
Thank You

jwormser@bostonharbornow.org

617-223-5255