Climate Change and Infrastructure: Implementing Solutions

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The Dilemma

• If climate change means Sea Level Rise (SLR) and more rainfall, climate change will impact coastal and non-coastal infrastructure.

• If it was designed to handle water, it will be impacted by climate change.

• How are we adapting?
Mother’s Day 2006 – NE Wide

14 MAY, 2006

New England floods - the worst in 70 years.

The worst flooding in 70 years in Massachusetts, Maine and New Hampshire forced thousands of people from their homes on Monday after the heaviest rainfall in a decade.

- Boston Globe

The worst flooding in 70 years in New Hampshire forced thousands of people from their homes on Monday after the heaviest rainfall in a decade. Residents waded through waist-high water on washed out roads, some people used boats, in canoes, and meteorologists predicted more rain on Tuesday in all three states which have declared states of emergency.

- Reuters

The Boston Globe has a photo album here and another here, contributed by readers.

Patriots Day 2007 – Casco, ME
August 2008 – Freeport, ME

March 2010 – Warwick, RI
October 2012 – Hurricane Sandy

April 2013 – Grand Rapids, MI
How are we adapting?

- Updating the data
- Increasing conveyance piping
- Increasing infiltration
- Utilizing green infrastructure
- Flood proofing structures
- Relocating infrastructure
- Modifying emergency routes
- Tide gate manipulation

Updating the data

- Need to update storm definitions
- 10-yr storm is no longer 10-yr storm
- Climate change will worsen the issue
Updating the data

Traditional TP-40 Atlas (1958)


Northeast Region Climate Center
Cornell University (2008)

Cornell NRCC (www.precip.net)

- Updated through 2008
- Stations
  - 2,070 Daily
  - 603 Hourly
  - 30 5-Min
  - 649 Canadian
- 0.43B data pts
100-year event comparison

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Inches

Increasing conveyance piping

[Image of conveyance piping]
Increasing infiltration

Utilizing green infrastructure

- Infiltration Basins
- Pervious Pavement
Flood proofing structures

- Old Orchard Beach, ME

Relocating infrastructure

- Ogunquit, ME
Modifying emergency evacuation routes

Tide gate manipulation
What will it cost?

Cost to replace a 20 MGD POTW?

$125M to $175M

What will it cost?

- New England Environmental Finance Center at USM (Dr. Sam Merrill)
- LD 1725: Stream Crossings
- Culvert Replacement Study
  - 30,000 culverts
  - 40 foot length
  - increase capacity by 200% to 350%

$350M - $400M
Adaptation costs

- Nationwide
- Through 2050
- Just water and wastewater
- To adapt by 2050?

$448B - $944B

The Take Home

- Climate change will impact coastal and non-coastal infrastructure.

- If it was designed to handle water, it will be impacted by climate change.

- Adapting will be significant.

- Adapting will be costly.
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