

More holistic planning for long-term coastal resilience? Port of Providence Demonstration Project



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Social Coast Forum

Using innovative techniques for stakeholder engagement
Charleston, SC -- February 10, 2016



How can a more holistic approach to planning reduce climate risks within the environmental, social, economic, and political landscape?



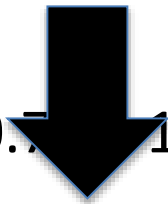
- Framing the problem
- Our team's approach
- Use of three boundary objects
- Discussion/results/next steps



Coastal hazard challenges for Rhode Island



Doubling of Cat 4 and 5 tropical storms
1-in-100 year storm event of today



Sea levels to rise 0.7-1.9 meters by 2100

1-in-3 year storm event of 2100

Inland flooding

Coastal Hazards - A Wicked Problem

- *Complex issue that defies complete definition*
- *No formal solutions*
- *Any resolution generates further issues*
- *Solutions are neither good nor bad, but the best that can be done at the time.*

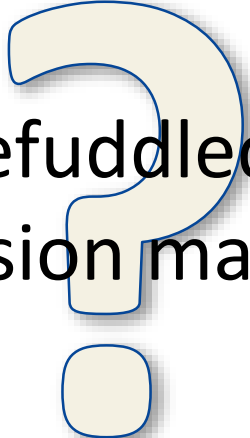
Uncertain rates of change

Feedback loops

Misaligned incentives

Unclear funding streams

Complex adaptation options



Befuddled
Decision makers

(Rittel and Webber 1973; Brown et al. 2010)

(Ward 2001; Bryson 2004; Few, Brown, and Tompkins 2007; Chapin et al. 2010; Tompkins, Few, and Brown 2008)

Boundary Objects to Stimulate Transformational Thinking

- *Maps, repositories, performances, software tools, etc.*
- *Allow groups with different perspectives, backgrounds, or motivations to work together without prior consensus*
- *Jumpstart dialogue, lead to co-production of strategies, more successful policy and implementation*



- Understand and comment on storm scenario & consequences
- Review long-range transformational resilience concept
- Review possible long-range “resilience goals” for the port and weigh importance of each using multi-criteria decision support tool

Port of Providence

1500 Acres
30 businesses
46th port in US
~3000 jobs

Methodology

Guided by steering committee

½ Day workshop

15 private sector

*12 public sector (local,
state, fed)*

2 research/academia

Introduced three boundary
objects and discussion



Providence



East Providence



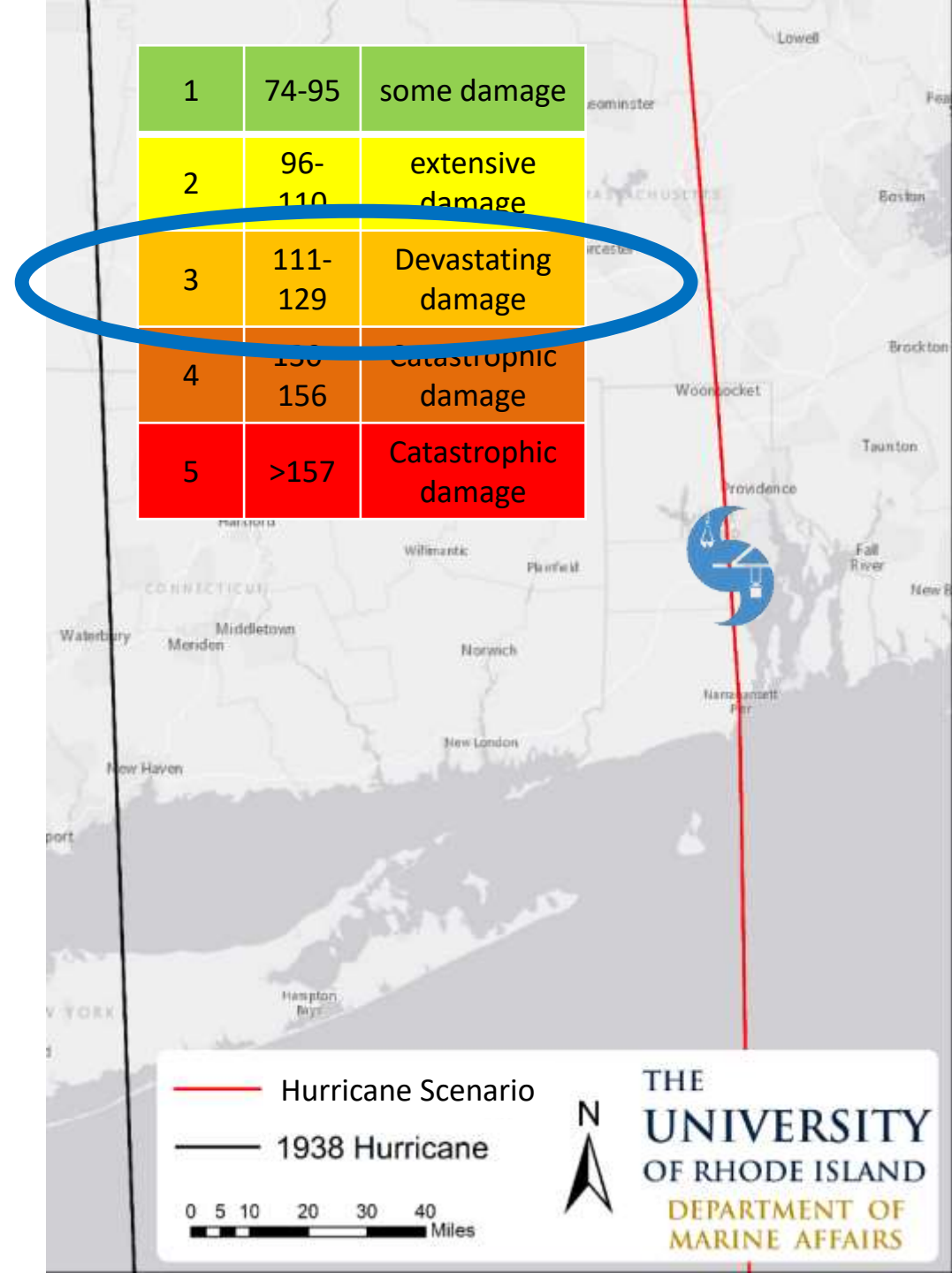
BOUNDARY OBJECT 1

Storm Visualizations

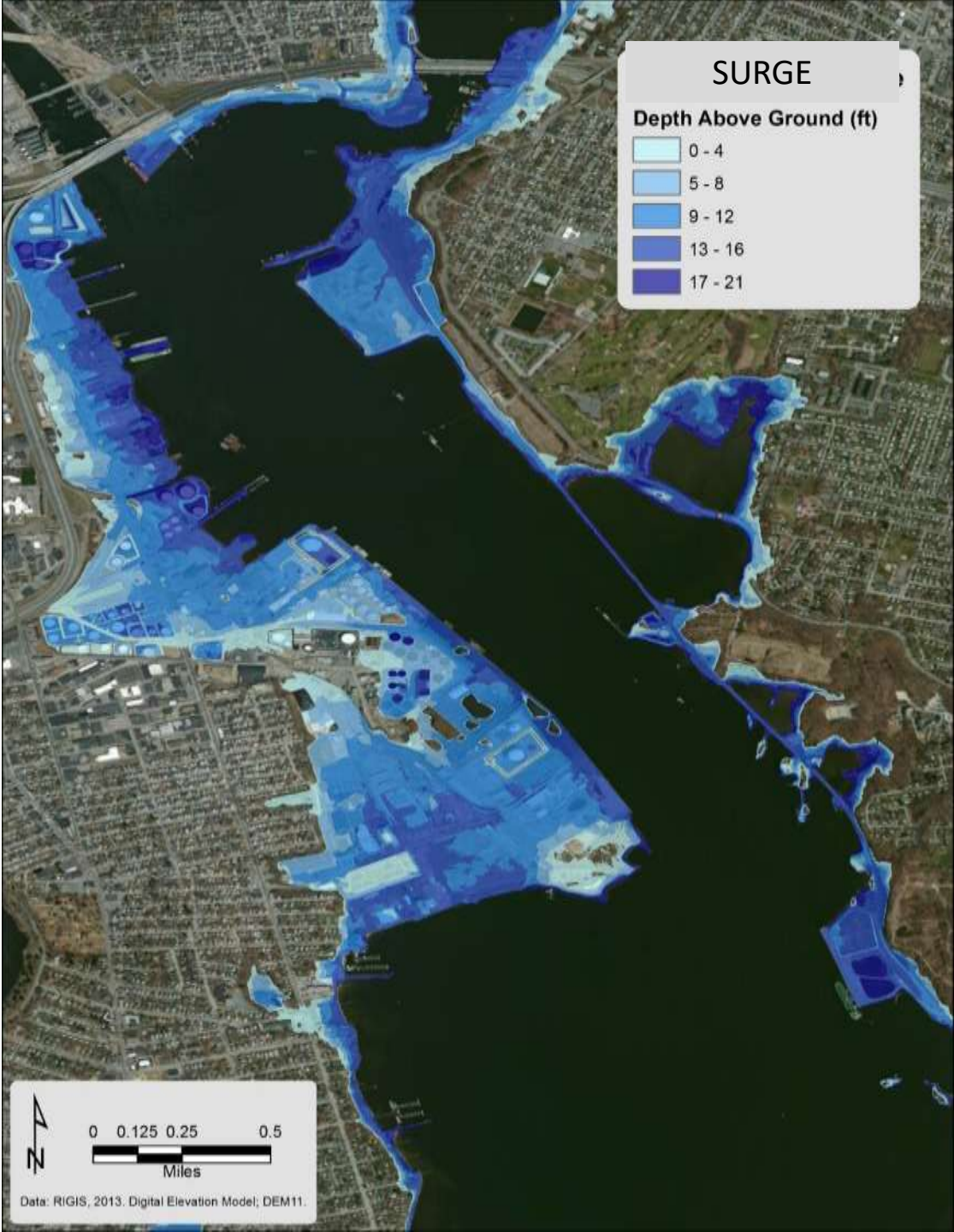
What are the cascading consequences?

Cat 3 Scenario

- 'Direct hit'
- 1938 hurricane, but shifted ~ 80 mi East
- Superstorm Sandy without the 'left hook'



- GIS Visualization of 21 ft “bathtub” inundation
- Assumes Fox Point Barrier not overtopped
- Only shows passive level of surge
- Does not show expected 6-10’ wave action



Based on RIGIS, 2013 DEM derived from a 1-meter resolution digital elevation model originally produced as part of the Northeast LiDAR Project in 2011.

0 0.125 0.25 0.5
Miles
Data: RIGIS, 2013. Digital Elevation Model; DEM11.

Example Visualization: ProvPort



Example Visualization: Metals Recycling, Inc.



Example Visualization: Motiva Enterprises



Example Visualization: Sprague Energy



Example Visualization:

Wilkes-Barre Pier (Capital Terminals, E. Providence)



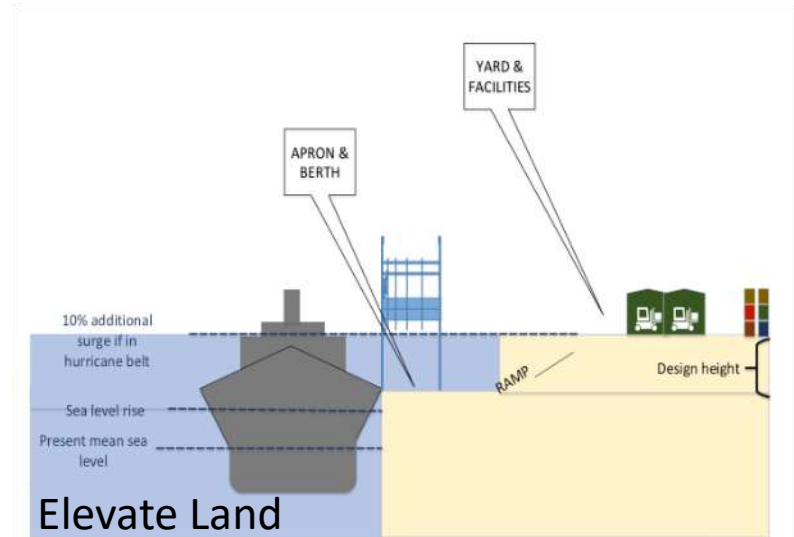
Boundary Object 2 – Long-term resilience planning concepts

Introduce and discuss three “transformational concepts”

“...Those that are adopted at a much larger scale or intensity, those that are truly new to a particular region or resource system, and those that transform places and shift locations.”

1. Accommodate –

Site-specific improvements to increase resilience



<https://www.walthers.com/prodimage/0933/09330000003168.gif>

2. Relocate –

Move port uses to less vulnerable location.



3. Protect –

New storm barrier for Providence Harbor.



Boundary Object 3



<http://www.wecision.com/>

- 1) How well does each concept meet each “resilience goal”?*
- 2) How important is each goal to you?*

- Ensure post-hurricane **business continuity** for waterfront business
- **Minimize hurricane damage** for infrastructure and waterfront business
- Minimize hurricane-related **environmental damage** from port uses.
- Build **public support** for port resilience
- Minimize **hazard insurance** rates
- Foster **port growth**
- Protect **human safety & critical lifelines**



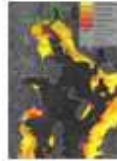


Protect



18.71

Relocate



13.41

Accomodate



8.79

Do Nothing



1.16

Ensure post-hurricane business continuity for water front business

4 1-5

Minimize hurricane to damages to infrastructure and waterfront businesses

4 1-5

Minimize hurricane-related environmental damage from port uses

4 1-5

Build public support for hurricane resilience measures &

Minimize hazard insurance rates

Foster port growth

4 1-5

Protect human safety & critical lifelines

5 1-5

Ensure post-hurricane business continuity for water front business

4 1-5

Minimize hurricane to damages to infrastructure and waterfront businesses

Minimize hurricane-related environmental damage from port uses

4 1-5

Minimize hazard insurance rates

Foster port growth

3 1-5

Protect human safety & critical lifelines

4 1-5

Ensure post-hurricane business continuity for water front

Minimize hurricane to damages to

Minimize hurricane-related environmental

Build public support for hurricane

Minimize hazard insurance rates

Foster port growth

3 1-5

Build public support for hurricane

20

10

0

Preliminary findings

- **No long-term plan** for major hurricane events
- Difficult to entice private business to participate when **next steps are not clear**
- **No clear champion** (gov't or private) to take the lead on long-term planning
- Stakeholders found it difficult to engage, as **costs were not addressed**
- **Boundary objects effective**, percolating through system, need some improvements

Preliminary Recommendations

- Revise tools and workshop methodology and **re-test**
- **Create database** of experts and best practices to include in resilience dialogues
- **Create *ad hoc* stakeholder group** to initiate formal dialogue around long-term resilience planning for the port and **engage** with existing climate efforts in the state
- Create “**post storm rebuilding goals and strategies**”
- Identify **business-continuity opportunities** before the storm hits (e.g., contingency contracts, debris destinations)
- Conduct **economic assessment** of “port shutdown”

Research Team

Leads

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Questions?



Hurricane Sandy photos courtesy Mary Lee Clanton, Port of NYNJ

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