30-Years of FEMA Sea Level Rise Studies and Future Focus Areas

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Outline

• Purpose of Study
• Brief history of FEMA SLR Studies
• What the community is doing
• Looking forward
Study Purpose

Inform future FEMA SLR and long-term erosion efforts, and compliment TMAC recommendations by:

• Summarizing key elements of previous efforts in one document
• Identifying achievements and limitations
• Reviewing external efforts to increase awareness
• Provide gap analysis, focus areas, and considerations for future efforts
Review of FEMA SLR Studies

- Projected Impact of SLR on NFIP (1991)
- The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100 (2013)
- North Carolina Sea Level Rise Impact Study (2009-2013)
- Sea Level Rise Tool for Sandy Recovery (2013)
- FEMA SLR Pilot Studies
  - R2 - Puerto Rico (2010)
  - R9 - San Francisco, CA (2015)
  - R3 - Anacostia River & Prince George’s Co, MD. (Riverine, 2016)
  - R4 - Hillsborough/Pinellas Counties, FL (2018)
<table>
<thead>
<tr>
<th>Study</th>
<th>SLR Integration into Surge Heights</th>
<th>Other Scope Elements</th>
<th>Key Items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATIONAL PROGRAMMATIC STUDIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected Impact of Relative Sea Level Rise on the National Flood</td>
<td>Approximate, linear superposition and proportional increases in floodplain</td>
<td>Future population</td>
<td>Initial consideration of erosion</td>
</tr>
<tr>
<td>Insurance Program through 2100</td>
<td></td>
<td>Future shoreline position</td>
<td></td>
</tr>
<tr>
<td>The Impact of Climate Change and Population Growth on the National</td>
<td>Approximate, linear superposition and proportional increases in floodplain</td>
<td>Scale, goals of application</td>
<td>Monte Carlo approach</td>
</tr>
<tr>
<td>Flood Insurance Program through 2100</td>
<td></td>
<td>Quantification of uncertainty</td>
<td>Simplified changes in storm frequency and</td>
</tr>
<tr>
<td>Regional SLR analysis</td>
<td></td>
<td>Regional SLR analysis</td>
<td>intensity</td>
</tr>
<tr>
<td>Programmatic Environmental Impact Statement, Climate Change Analysis</td>
<td>Linear superposition</td>
<td>National mapping of future extent</td>
<td>Sub-regional SLR projections</td>
</tr>
<tr>
<td><strong>METHOD/PRODUCT FOCUSED STUDIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puerto Rico SLR Pilot Study</td>
<td>Linear superposition</td>
<td>Depth-limited assessment</td>
<td>Modeled linear response</td>
</tr>
<tr>
<td></td>
<td>Dynamic Modeling</td>
<td>Wave height modeling</td>
<td>Mapping concepts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SLOSH</td>
<td>Conservative freeboard calculations</td>
</tr>
<tr>
<td>North Carolina Sea Level Rise Impact Study</td>
<td>Dynamic Modeling</td>
<td>Future storm frequency/intensity</td>
<td>Changes in non-linearity by scenario,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Future coastal landscape</td>
<td>surge pathways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Future land development</td>
<td>Increase in high-frequency floodplain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flood risk from future development</td>
</tr>
<tr>
<td>Sea Level Rise Tool for Sandy Recovery</td>
<td>Linear superposition</td>
<td></td>
<td>Tools to see both changes in extent and BFE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extensive use by stakeholders</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Differing scenarios by geography</td>
</tr>
<tr>
<td>Future Conditions Analysis and Mapping, San Francisco County,</td>
<td>Dynamic</td>
<td>Long-term shoreline retreat</td>
<td>Pacific Coast</td>
</tr>
<tr>
<td>California</td>
<td></td>
<td>Wave runup modeling</td>
<td>Mapping Products integrating SLR and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>erosion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stakeholder Input</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-linearity by shore type</td>
</tr>
<tr>
<td>Incorporating Climate Change into Future Conditions Riverine Floodpl</td>
<td>Linear superposition</td>
<td>Transitional coastal to riverine areas</td>
<td>Non-linearity in tidal elevations</td>
</tr>
<tr>
<td>ain Modeling</td>
<td></td>
<td></td>
<td>Guidance for riverine modelers</td>
</tr>
<tr>
<td>Hillsborough &amp; Pinellas Counties, Florida</td>
<td>Linear superposition</td>
<td>Gulf of Mexico</td>
<td>Non-linearity by coastal environment</td>
</tr>
<tr>
<td></td>
<td>Dynamic Modeling</td>
<td>Long-term shoreline retreat</td>
<td>Mapping products with future condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storm suite optimization</td>
<td>extent and BFE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approximate methods for lower scenarios</td>
<td>Large bay environment</td>
</tr>
</tbody>
</table>
Non-linear surge response

Comparison of Sea Level Height
40cm (1.31 ft) Scenario vs Baseline
1% Annual Chance Elevations
min: -0.5 ft
max: 3.3 ft
mean: 1.3 ft
std dev: 0.1 ft
count: 138658

Comparison of Sea Level Height
100cm (3.28 ft) Scenario vs Baseline
1% Annual Chance Elevations
min: 0.8 ft
max: 6.7 ft
mean: 3.7 ft
std dev: 1 ft
count: 138063

Gulf of Mexico
Old Tampa Bay
Pasco County
Hillsborough County
Manatee County
Sarasota County
Pinellas County
Tampa
Bay
Mapping Products
Looking outwards – what products are out there?
What is being mapped?

Base Water Level for SLR Maps

- Tidal or Geodetic Datum
- Storm Surge (SLOSH)
- Future FEMA Floodplain or Surge AEP

Count

0 2 4 6 8 10 12 14 16 18 20
LOOKING BACK

LOOKING FORWARD
It’s all inter-related...
Modeling focus areas

• Holistic representation through *entire* hazard modeling process and map products, where feasible

• Site future pilots to leverage available products
  • i.e., where SLAMM available or other research activities completed or ongoing

• Consider both episodic and long-term erosion in surge modeling

• If not feasible, recognize uncertainty through documentation or error bounds in products
But, if you bite off too much...
What about the Wave Runup?

• How important is it?
• Many methods – how sensitive are they?
• Urban areas w/ overtopping, i.e., NYC.
• Weigh need to model, coast type and elevation = guidance
Is there need for guidance?

• Yes!

• We can leverage completed work to cover:
  • Scenario selection
  • Community input
  • When modeling needed vs. linear superposition
  • Decision-tree to help scope studies
  • Product standards
  • Uncertainty
From the established past to an uncertain future
Outcomes of uncertainty

Ralph Stacey
Complexity Matrix

Far from Agreement

1. Close to Certainty
   - Technically rational decision making
   & monitoring form of control

2. Political decision making & control,
   compromise, negotiations, dominant coalitions
   - Political decision making & control,
   compromise, negotiations, dominant coalitions
   - Brainstorming & Dialectical enquiry
   - Intuition
   - Muddling through
   - Search for error
   - Unprogrammable Decision-making ‘outcomes’ rather than solutions

3. Close to Certainty
   - Judgmental decision making & ideological control;
   logical incrementation
   - Identification, Development & Selection
   - Agenda building

4. Far from Certainty
   - Disintegration & Anarchy
   - Massive avoidance
   OR

5. Far from Agreement
   - Garbage-can decision making

Ralph Stacey
Complexity Matrix
“Empirical” data...

Norfolk (Sewells Point), Virginia

Boon et al. 2018

RSL Rise Rate: 5.14 mm/year
Acceleration: 0.119 mm/year

Figure III-4. Relative sea level trends, Norfolk, Virginia, 1969–2017 series
How to handle scenarios?

Scenario Selection:

• Develop a consistent approach or protocol for selection
  • Minimum standards?
  • Top down, bottom up?
  • Appropriate level of community input and engagement, flexibility to encourage recognition and use for risk reduction?
  • Need both near and long-term time horizons to accommodate resilient comprehensive and infrastructure planning

• Coordination needed across FEMA program areas
  • CRS issuing a minimum standard, too rigid or more flexibility needed across program?
  • Program should have consistency
Where does this all leave us?

DON’T
OVER
THINK

JUST LET
IT GO

WWW.LIVELIFEHAPPY.COM
How Can Future Condition Maps Make a Difference?
Questions?