Using Risk MAP Coastal Non-Regulatory Products to Plan for Coastal Resilience

Emily L. Schmidt, CFM
Yong S. Jung P.E., CFM
Agenda

• Introduction
• FEMA Region IV Coastal Studies Status
• Risk MAP Coastal Non-Regulatory Products
• Planning for Resiliency
• Conclusions
• Question and Answer
FEMA Region IV Coastal Flood Risk Studies
Risk Mapping, Assessment, and Planning (Risk MAP)

• Coastal flood risk changes over time – current studies are based on 1970’s hurricane modeling

• Need to more accurately define risk and account for significant development in the affected areas

- A complete, current picture of your coastal flood hazards and risks will help you better:
  • Plan for the risk using quality data
  • Communicate the risk to your citizens
  • Take action to protect your communities
Traditional NFIP products are regulatory and subject to statutory due-process requirements.

New Risk MAP products are non-regulatory and are not subject to statutory due-process requirements.
Coastal Flood Risk Database

Flood Risk Map

Flood Risk Database
- Flood Risk Assessment Data
- Flood Depth & Analysis Grids
- Changes Since Last FIRM Data
- Areas of Mitigation Interest

Ad-Hoc Flood Risk Analyses

Flood Risk Report
### Flood Risk Report

#### Area of Study

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi²)</th>
<th>Increase (mi²)</th>
<th>Decrease (mi²)</th>
<th>Net Change (mi²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
</tbody>
</table>

#### Buildings

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Increase</th>
<th>Decrease</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
</tbody>
</table>

#### Population

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Increase</th>
<th>Decrease</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
</tbody>
</table>

#### Coastal Wave Hazard Severity

<table>
<thead>
<tr>
<th>Coastal Wave Hazard Severity</th>
<th>Total Area (mi²)</th>
<th># of Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>#.#</td>
<td>#</td>
</tr>
<tr>
<td>Moderate</td>
<td>#.#</td>
<td>#</td>
</tr>
<tr>
<td>Minimal</td>
<td>#.#</td>
<td>#</td>
</tr>
</tbody>
</table>

#### Flood Event Frequency

<table>
<thead>
<tr>
<th>Flood Event Frequency</th>
<th>1-ft Increase</th>
<th>2-ft Increase</th>
<th>3-ft Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Newly Inundated</td>
<td>Total</td>
<td>Newly Inundated</td>
</tr>
<tr>
<td>10%-annual-chance</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
<tr>
<td>2%-annual-chance</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
<tr>
<td>1%-annual-chance</td>
<td>#.#</td>
<td>#.#</td>
<td>#.#</td>
</tr>
</tbody>
</table>
Coastal Areas of Mitigation Interest (AoMIs)

• AoMIs are identified through
  – coordination with local stakeholders
  – through revised hydrologic and hydraulic and/or coastal analyses
  – by leveraging other studies or previous flood studies
  – from community mitigation plans, floodplain management plans, and local surveys
  – and from the mining of federal government databases (e.g., flood claims, disaster grants, and data from other agencies)

• Coastal Structures
  – Cause erosion hot-spots
  – Design life or criteria exceeded
  – Maintenance
Risk MAP
Coastal Non-Regulatory Products
Coastal Non-Regulatory Products

- Changes Since Last FIRM
- Coastal Depth Grids
- Increased Inundation Areas
- Wave Height Raster
- Simplified Coastal Zones
- Primary Frontal Dune (PFD) Erosion Areas
- Dune Peak
- Coastal Flood Risk Assessments
Coastal Changes Since Last FIRM

- Makes it easy for communities and homeowners to identify impacts of new FIRM
- Assists in prioritizing mitigation actions
- Helps identify reasons for changes
Coastal Depth Grids

- Standard Non-Reg Product
- The depth reflect the difference between the wave crest elevation and the ground
Coastal Depth Grids

• Useful for variety of planning and decision making.
  – Flood Emergency Preparedness
  – Flood Emergency Response
  – Flood Hazard Mitigation Planning
  – Community Planning
Coastal Increased Inundation Areas

- aka Increased Flooding Scenarios
- Estimates hypothetical Increase (ex. 1, 2, and 3ft) above the base flood elevation.
Coastal Increased Inundation Areas

• Add other specific values
  – Enforce a specific freeboard
  – Investigate sea level rise scenarios
  – Local Planning
  – Floodplain management
  – Mitigation purpose

• Intelligent development decision near SFHAs
Wave Height Raster

- The height reflects the difference between the wave crest elevations and the still water elevations from storm surge model.
Simplified Coastal Zones
Simplified Coastal Zones

- **V**: Wave height ≥ 3 ft
- **A**: 3 ft > ft Wave height > 1.5 ft
- **X**: 1.5 ft > Wave height

- **BFE including wave effects**: Properly elevated building
- **100-year stillwater elevation**: Unelevated building constructed before community entered the NFIP
- **Datum**: Shoreline, Sand beach, Buildings, Overland wind fetch, Vegetated region, Limit of SFHA
Simplified Coastal Zones

- Waves of 1.5 feet or higher cause significant damage to the structures.
- LiMWA shows the limit of the Coastal A Zone.
- Adopting higher construction standards per LiMWA can benefit the participating communities through CRS credits.

Table 1: Simplified Coastal Zone Classification

<table>
<thead>
<tr>
<th>Merged FLD_ZONE Type</th>
<th>Simplified Coastal Zone Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>VE Zone (wave height 3.0 ft +)</td>
<td>High Wave Action (V Zone)</td>
</tr>
<tr>
<td>Coastal A Zone, wave height 1.5 ft – 3.0 ft</td>
<td>Moderate Wave Action (Coastal A Zone)</td>
</tr>
<tr>
<td>Coastal A Zone, wave height of 0.0 ft – 1.5 ft</td>
<td>Low Wave Action (A Zone)</td>
</tr>
</tbody>
</table>
LiMWA

- FEMA Procedure Memorandum No. 50, 2008
- At present not a regulatory requirement
- No Federal Insurance requirements tied to LiMWA
- CRS benefit for communities requiring VE Zone construction standards in areas defined by LiMWA or areas subject to waves greater than 1.5 ft.
Primary Frontal Dune (PFD) Erosion Areas
Primary Frontal Dune (PFD) Erosion Areas

• Require pre existing PFD polygon to compare.
• Not applied for all the coastal communities.
• Help identifying the potential mitigation project areas.
  – Beach Bulldozing to restore dunes.
  – Beach Nourishment
Primary Frontal Dune (PFD) Erosion Areas

- Based on the dataset, the community may be able to implement dune protection activities.
  - Dune grass planting
  - Walkovers,
  - Signage
Dune Peak
Coastal Flood Risk Assessments
Planning for Resiliency
Why Are We Updating the Surge Analysis?

- Flood risk changes over time – current studies are based on 1970’s hurricane modeling
- Need to more accurately define risk and account for significant development in the affected areas

- **A complete, current picture of your coastal flood hazards and risks will help you better:**
  - Plan for the risk using quality data
  - Communicate the risk to your citizens
  - Take action to protect your communities
Goal: Reduce Risk

Through collaboration with State, Local, and Tribal entities, Risk MAP will deliver quality data that increases public awareness and leads to action that reduces risk to life and property.
How Can We Reduce Risk and Become Resilient

- What kinds of mitigation have you tried or would like to try?
- Elevation of at-risk structures
- Higher Regulatory Standards
  - Freeboard
  - Coastal A Zones
- Open Space Preservation
- Outreach Activities
  - Meetings
  - Newsletters
- What is working? What is not working?
How Can We Reduce Risk and Become Resilient

• Where would you use these products to aid your current mitigation methods?
  – Depth Grids, Simplified Coastal Zones/LiMWA

• Are you planning for sea level rise?
  – Increased Inundation Areas

• Have you tried green solutions?
  – Living shorelines, dune restoration, etc.
  – Primary Frontal Dune Erosion Areas
Conclusions
Coastal Risk MAP Project Timelines

Coastal Risk MAP Project Timelines

Year 1
- Discovery Meeting
  - Discovery Kickoff Meeting
  - Updated Discovery Map
  - Draft Project Plan

Year 2
- Technical Update Meeting
  - Provide update on study
  - Review Risk MAP goals and objectives

Year 3
- Storm Surge Analysis
  - Update Meeting
  - Provide update on study and information on expected changes to SWEL and BFE
- Flood Risk Review & Resilience Meeting
  - Discuss Outreach Strategy and Communication
  - Review Risk MAP Products
  - Discuss potential actions to incorporate into mitigation plans

Year 4
- Changes Since Last Map & Impacts
- Consultation Coordination Officer (CCO) Meeting
  - Open House
  - FIRM (Regulatory)
  - Risk MAP Products
  - Flood Risk Map, Report, & Data Sets

Year 5
- Preliminary FIRM Issuance
- FIRM Effective
Thank You

Emily Schmidt, CFM  Emily.Schmidt@aecom.com
Yong Jung, P.E., CFM  YongSun.Jung@aecom.com