HAZUS-MH Tsunami Model Update

Mitigation & Education Subcommittee Summer Meeting
National Tsunami Hazard Mitigation Program

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Overview

- HAZUS is a FEMA loss estimation tool used for hazard mitigation, preparedness, response, and recovery.
- Released in March 2017 as part of the HAZUS 4.0 release
- 72 Counties in the 5 Very High Risk States (AK, CA, HI, OR and WA)
- Territory Analysis - Guam, American Samoa, Commonwealth of Northern Mariana Islands, and U.S. Virgin Islands
- New Point Format - National Structure Inventory
Overview

- Case Studies – User-provided data from authoritative sources. Five case study datasets available for download: Homer, AK; Westport, WA; Garibaldi, OR; Crescent City, CA; and Kahului, HI.

- Two Types of Damage Analysis – Near source: combined earthquake and near source tsunami; distant source tsunami
### Overview

#### Hazus Tsunami Model Output

<table>
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<tr>
<th>Maps of Tsunami Inundation</th>
<th>User Defined Facilities</th>
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<tr>
<td>Median Inundation Depth (ft)</td>
<td>Damage probabilities by occupancy</td>
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<tr>
<td>Median Momentum Flux (ft³/sec²)</td>
<td>Damage probabilities by building type</td>
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<td>Inundation/Hazard Boundary (depth ≥ 0)</td>
<td>Cost of building repair or replacement</td>
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<td>Fatality Boundary (depth ≥ 2m)</td>
<td>Loss of content</td>
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<td>General Building Stock</td>
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<td>Damage probabilities by occupancy</td>
<td>Loss of rental income</td>
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<td>Damage probabilities by building type</td>
<td>Relocation costs</td>
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<td>Loss of contents</td>
<td>Employee wage loss</td>
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<td>Business inventory loss</td>
<td><strong>Casualties</strong></td>
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<td>Loss of rental income</td>
<td>Evacuation Travel Time (Under 65, 65 and Over)</td>
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<td>Relocation costs</td>
<td>Day and Night Population Exposure</td>
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<td>Business income loss</td>
<td>Day and Night Probability of Casualties</td>
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<td>Employee wage loss</td>
<td>Casualties Based on Community Preparedness Levels</td>
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</table>

**Levels**

- Evacuation Travel Time (Under 65, 65 and Over)
- Day and Night Population Exposure
- Day and Night Probability of Casualties
- Casualties Based on Community Preparedness Levels
Overview

- **Hazard Type:**
  - Near Source – combined earthquake and tsunami impacts
  - Distant tsunami – tsunami impacts only

**Input Layers**
- Runup elevation limit
- Max Inundation depth throughout zone
- Max Inundation elevation throughout zone
- Max Velocity throughout zone
- Max Momentum Flux throughout zone
- Topography
- Deformed Topography
- Land Use

**Required for Analysis**
- Maximum Inundation Depth (ft)
- Maximum Momentum Flux ($ft^3/sec^2$)
Updates

- HAZUS-MH Tsunami User and technical manual under review
- Strategic plan identifies development of training. No funding support at this time.
- New Hazus Help Desk can be reached at hazus-support@riskmapcds.com
- Hazus 4.1 (September 2017) – ArcGIS 10.4 Compatible
Implementation in Region X

- Focus on update of past RiskMap risk assessments
- Coordinating with state partners to conduct data gap analysis of data and determine risk assessment priorities
- Coordinating with NTWC to fill gaps using SIFT model outputs
Implementation in Region X

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