



Taking Stock of Hazus

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Hazus Users Conference
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FEMA

Prior Conferences

- **2007: San Diego**
- **2008: San Diego**
- **2009: Raleigh**
- **2010: Indianapolis**
- **2011: Seattle**
- **2013: Indianapolis**
- **2014: Indianapolis**
- **2015: Atlanta**
- **2016: Charleston**



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HAZUS

If Hazus were a building, what kind of building would it be?

Hazus is a Solidly Built Structure in a High Risk Environment

- **Hazus is like an old building that has been recently renovated.**
 - It was not razed and rebuilt from scratch, but has seen significant improvements after a period of neglect.
 - Many of those renovations position Hazus well for the future.
 - We are currently building a major addition, the first in over a decade.
- **Even renovated, the building is not without it's flaws**
 - Although many of the systems within the structure have been updated, a number of issues remain from before the building was renovated.
 - In general, we've sought to update those flaws that have been inherent in the renovation work being done.

Hazus as a Building, continued

- **The Hazus Building has a lot of diverse tenants.**
 - There are an estimated 10,000+ international users of Hazus
 - there are different ideas about what the occupancy/use class of Hazus should be
- **Hazus exists in a high rent area of town.**
 - In order to substantially improve Hazus and keep it up to code and industry best practices, labor and materials are expensive.
- **The Hazus structure exists in a hazards-rich environment**
 - There are competing priorities to build other structures
 - The funding stream to keep the building maintained and improved is not diversified
 - At heart, it's still an old building in an environment that favors newer building stock and critical facilities.



The Value of the Property

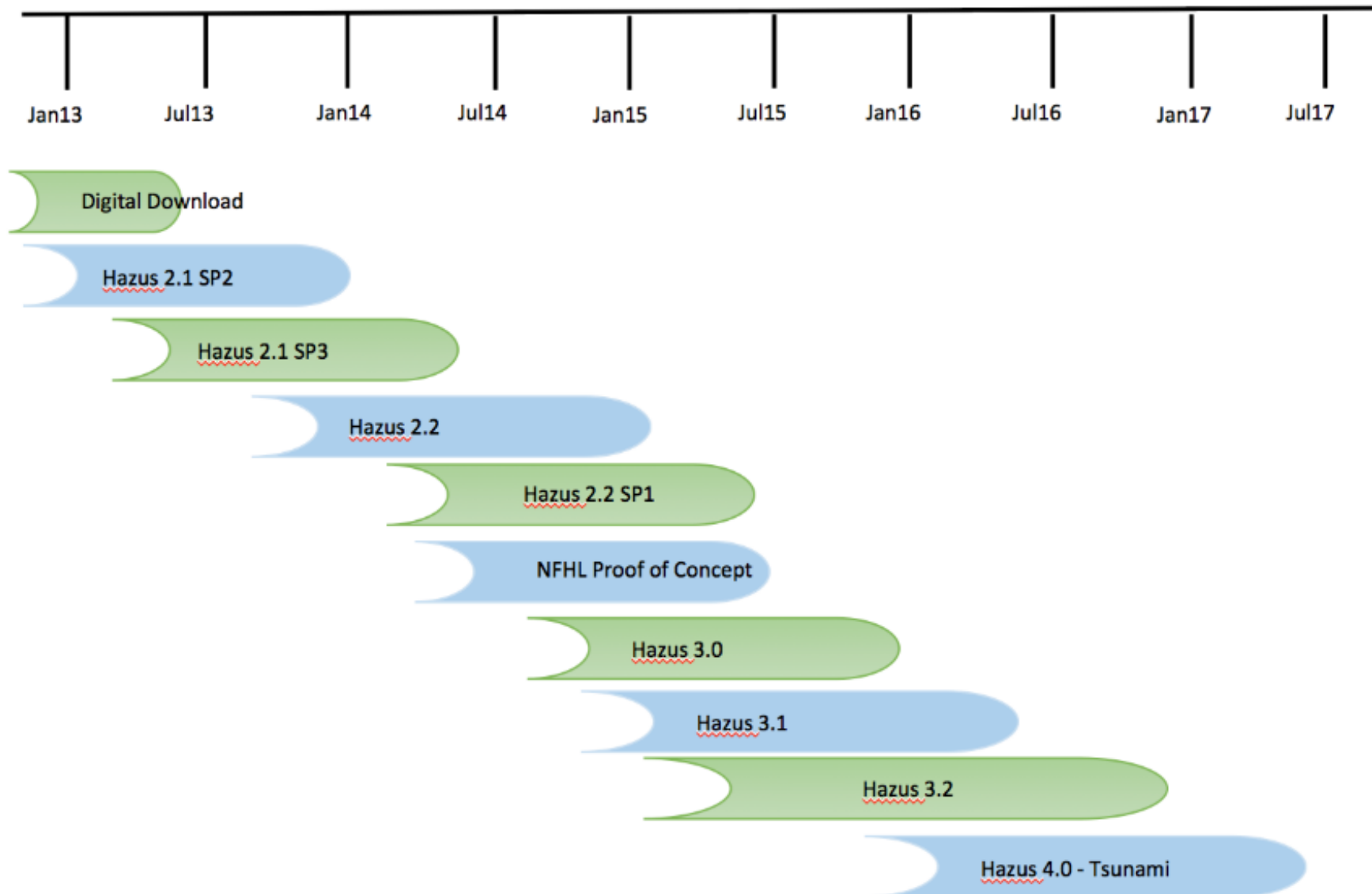
Hazus provides more value than any other hazard loss estimation tool currently available within the United States (perhaps worldwide).

- **Rent is Free.** Any user, either in the United States or abroad, can obtain a copy of the Hazus software free of charge
- **However, operational costs are high.** *Users need to procure ArcGIS Software*
- **Anyone can Live there.** Despite the academic nature of Hazus methodology, incorporating structural engineering, natural hazard science, and economic principles, Hazus does not require in-depth knowledge of these topics to be used and understood
- **Hazus is a very unique, ambitious, and amazing software application and methodology**

A Deep History of Hazus

- ▶ **1995** Work on Hazus Earthquake begins – focus was on methodology, not software
- ▶ **1997** Hazus97 Released
- ▶ **1999** Hazus99 released
- ▶ **2004** Hazus-MH released, adding flood and hurricane wind
- ▶ **2006 -2009:** MR2 to MR4 and patches
- ▶ **2011** Hazus-MH 2.0 – storm surge added; CDMS integrated
- ▶ **2012** Hazus 2.1
- ▶ **2013** Hazus Modernization begins

Hazus Modernization



Hazus Modernization

- **Hazus 2.2 – January 2015:**
 - Upgrade to compatibility with ArcGIS 10.2 and Windows 8.1
 - Updated default data (Census 2010)
- **Hazus 2.2 SP1 – May 2015:**
 - Dasymetric Data
 - Community-based study regions
- **Hazus 3.0 – November 2015:**
 - Re-architecture of Hazus Flood to C# and .NET
 - Migration of databases to SQL Spatial
 - Fifteen additional enhancements/fixes covering all three hazards, default data, and CDMS. Migrating and re-architecting backend code within Hazus removed obsolete technology from the model, and made it more adaptable for future enhancements
- **Hazus 3.1 – April 2016:** Re-architecture of Hazus Earthquake to remove VB6, re-architecture of Hazus Shell to remove VB6, Access Jet Engine, registry keys, and unified installation
 - Upgrade to SQL Server 2014. Twenty-three additional enhancements/fixes covering all three hazards, default data, and CDMS

Hazus 3.2: Final Release of Hazus Modernization

Release Date: 10/31/16

Release Contents:

- ArcGIS 10.4 Upgrade
- Minimize impact of ArcGIS version change
- Address latent defects in both software and Census 2010 data

- EQ module integration with USGS ShakeMap, allowing direct import of scenario
- CDMS desktop enhancements – new import features for UDF, Polyline, and AEBM inventory data
- Upgrade to Crystal Reports 2011 – reports now include color graphics, charts, and maps

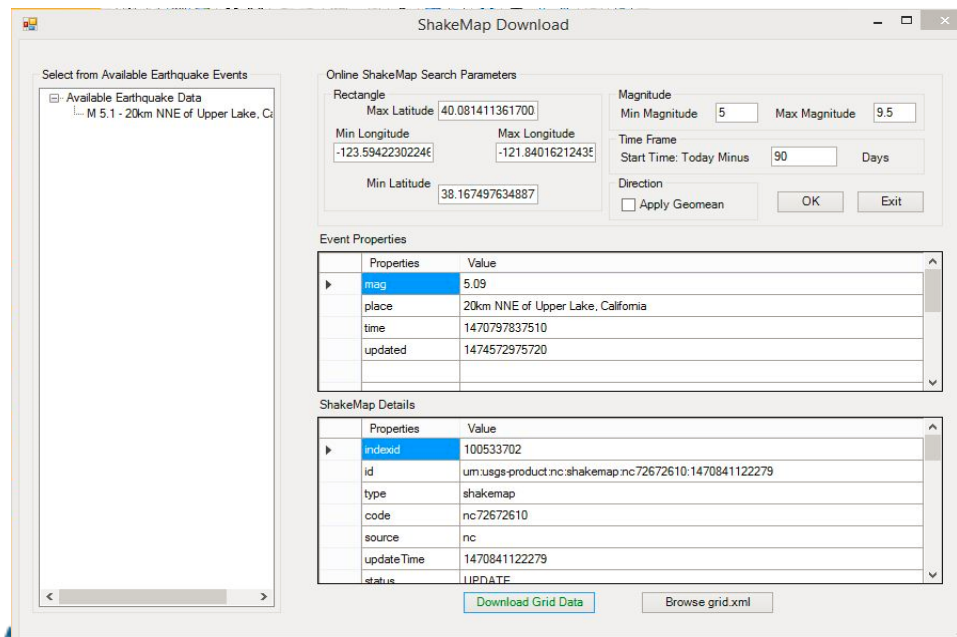


Hazus 3.2

Release Date: 10/31/16

Release Contents:

- EQ module integration with USGS ShakeMap, allowing direct import of scenario
- Directly connects to USGS JSON API for accessing ShakeMap data and downloading the data directly into the Hazus EQ Scenario Wizard



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Hazus 3.2

Release Date: 10/31/16

Release Contents:

- CDMS desktop enhancements – new import features for UDF, Polyline, and AEBM inventory data
- Option to edit fields before updating the statewide repository

The screenshot displays the Comprehensive Data Management System (CDMS) interface. The main window is titled 'Welcome to the Hazus-MH Comprehensive Data Management System'. It features a sidebar with navigation options: 'Import into CDMS Repository from File', 'Import into CDMS Repository from Hazus-MH Study Region', 'Building-Specific Data', 'Query/Export Statewide Datasets', and 'Current State' (set to California). The main area is titled 'Import into CDMS Repository' and includes options for 'Point' and 'Life Line' data, a file selection field, and checkboxes for 'Earthquake', 'Flood', and 'Hurricane Wind'. A 'Required Fields' section lists necessary data fields for updates.

An inset window titled 'CDMS Detail Information' shows a table of data for the 'Transportation Systems' category, specifically 'Highway Segments'. The table includes columns for HazardID, Analysis Class, County Fips, Daily Capacity (cars/day), Daily Traffic (cars/day), Highway Segment Name, and Misc. Comments. The table contains 17,588 records.

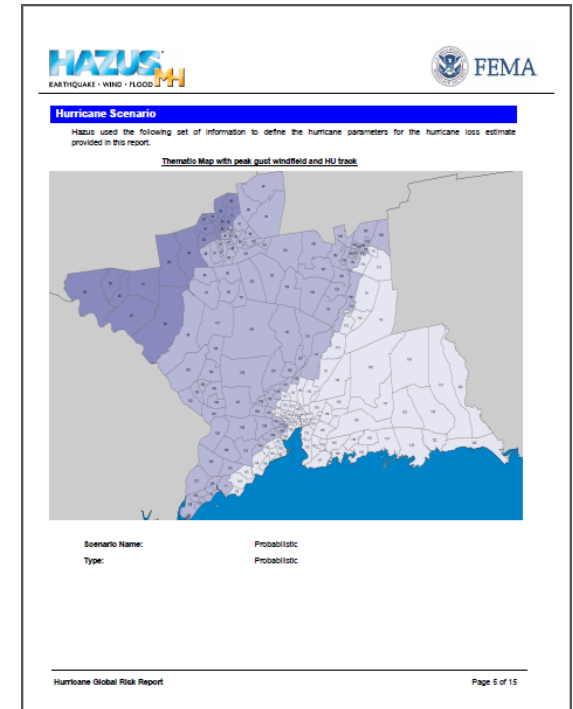
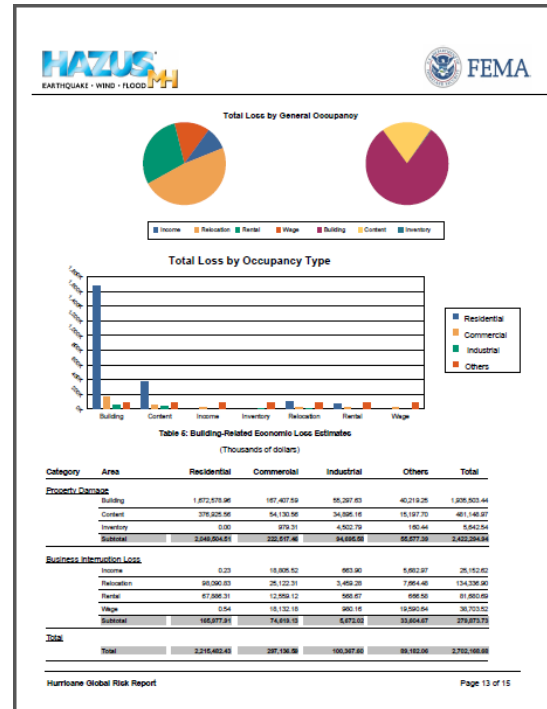
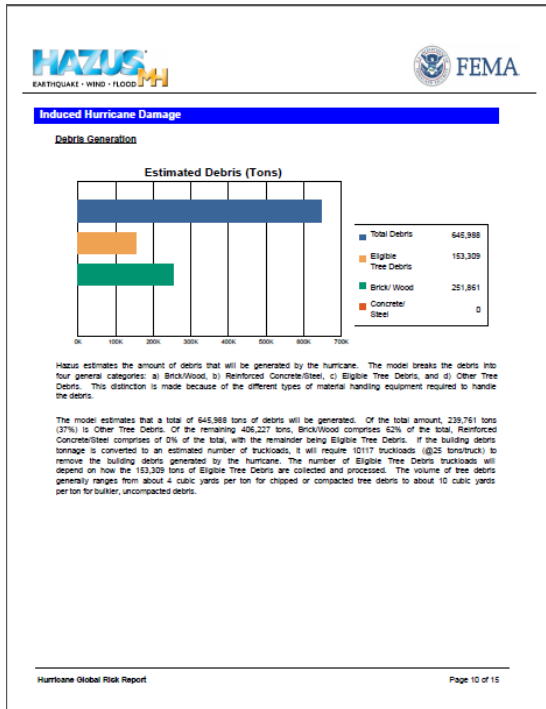
	HazardID	Analysis Class	County Fips	Daily Capacity (cars/day)	Daily Traffic (cars/day)	Highway Segment Name	Misc. Comments
Remove Edit	CA017753	HRD1	06059			B Toro Rd	Urban Principal Arterial
Remove Edit	CA012659	HRD1	06059			IS	Urban Interstate
Remove Edit	CA012386	HRD1	06066			IT5	Urban Interstate
Remove Edit	CA016071	HRD1	06066			Dillon Rd	Unknown
Remove Edit	CA059889	HRD2	06111			S150	Rural Minor Arterial
Remove Edit	CA059226	HRD2	06071			Starfield Court	Rural Minor Arterial
Remove Edit	CA013240	HRD2	06073			S905	Rural Principal Arterial
Remove Edit	CA013265	HRD1	06073			805	Urban Interstate
Remove Edit	CA006230	HRD1	06073			81	Rural Interstate
Remove Edit	CA001502	HRD1	06085			Bowers Ave	Urban Principal Arterial
Remove Edit	CA004037	HRD1	06081			U101	Urban Freeway or Express
Remove Edit	CA033754	HRD1	06076			Gough St	Urban Principal Arterial
Remove Edit	CA005732	HRD1	06075			Oshaughnessy Blvd	Urban Principal Arterial
Remove Edit	CA008105	HRD1	06041			Red Hill Rd	Unknown
Remove Edit	CA002144	HRD1	06087			Lakeville Hwy	Urban Principal Arterial
Remove Edit	CA011610	HRD2	06025			550	Rural Minor Arterial
Remove Edit	CA001688	HRD1	06087			41st Ave	Urban Principal Arterial
Remove Edit	CA002276	HRD1	06085			El Camino Real	Urban Principal Arterial

Hazus 3.2

Release Date: 10/31/16

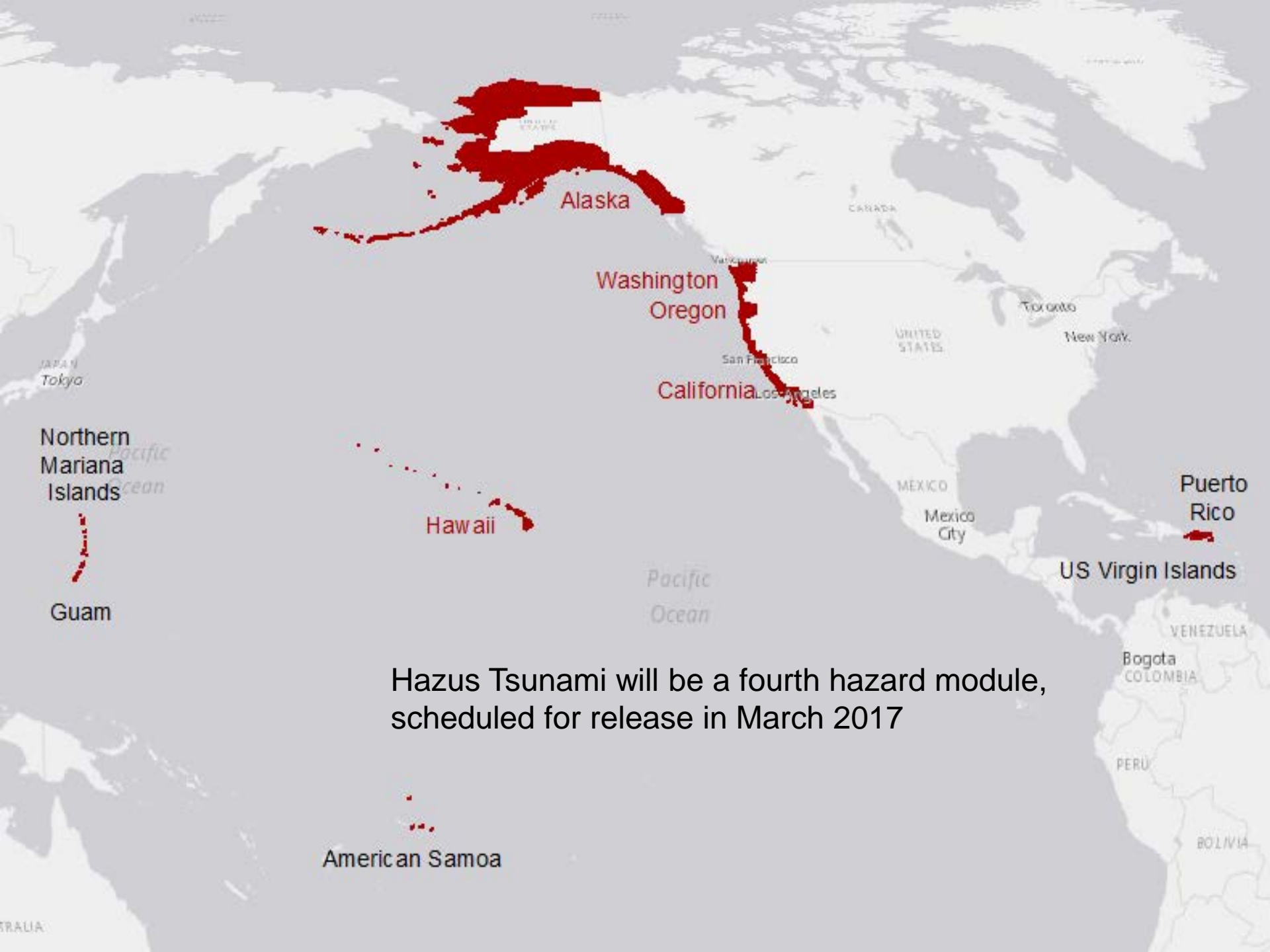
Release Contents:

- Upgrade to Crystal Reports 2011 – reports now include color graphics, charts, and maps



The Future of Hazus

- ▶ Hazus 4.0 – Tsunami
- ▶ Updates to Hazus Courses
- ▶ Updates to Hazus Documentation
- ▶ Hazus Strategic Plan – Jesse Rozelle



Alaska

Washington
Oregon

California

Hawaii

Puerto
Rico

Northern
Mariana
Islands

Guam

American Samoa

Hazus Tsunami will be a fourth hazard module,
scheduled for release in March 2017

Resources for our Users

EMI Courses

Updates for Hazus EMI courses coming March 2017

- ▶ E0313: Basic Hazus
- ▶ E0172: Hazus for Floods
- ▶ E0174: Hazus for Earthquake
- ▶ E0317: Comprehensive Data Management for Hazus

Online Courses at Esri

Courses were updated July 2017
All courses on ESRI Catalog free with maintenance account

- Getting Started with Hazus 3.0
- Introduction to the Hazus 3.0 Comprehensive Data Management System
- Integrating User-Supplied Data into the Hazus 3.0 Flood Model
- Introduction to the Hazus 3.0 Inventory
- Introduction to the Hazus 3.0 Storm Surge Model
- Introduction to the Hazus 3.0 Flood Model
- Loss Estimation Using the Hazus 3.0 Hurricane Model
- Loss Estimation Using the Hazus 3.0 Earthquake Model
- And More



Hazus Documentation Updates

- ▶ **February 2017: Updated for Hazus 3.2 (4 documents)**
 - User Guides: 1) Flood, 2) Hurricane, 3) Earthquake
 - New Technical Guide: 4) Inventory (combined for all hazards)
- ▶ **Late Summer 2017: Updated for Hazus 4.0 (10 documents)**
 - User Guides: 1) Flood, 2) Hurricane, 3) Earthquake
 - Technical Guide: 4) Inventory (combined for all hazards)
 - New Technical Guides: Hazard Modeling Methods for 5) Flood, 6) Hurricane, 7) Earthquake
 - New Technical Guides: Hazus Analysis and Loss Results for 8) Flood, 9) Hurricane, 10) Earthquake
- ▶ **To Be Determined:**
 - CDMS