

# HAZUS HOT ZONE

February 2010 Issue

## In This Issue

**HAZUS User of the Year:**  
Congratulations Kate Ploeger!

**Training Opportunities:**  
FEMA's Emergency Management Institute, Online, and in the Regions

**HAZUS User Group Updates:**  
Welcoming the Rocky Mountain HUG

**Participate in the HAZUS User Study:**  
Win a Ready Auto Emergency Kit

**Software Updates:**  
MR4 Patch 1 and Fixes  
HAZUS-MH Flood Average Annualized Loss (AAL) Assessment  
HAZUS-MH Coastal Surge Methodology and Software Development

## 4th Quarter HAZUS User of the Year!

This year Congratulations to S. Kate Ploeger, Ph.D. Student, University of Ottawa, the 2009 4th Quarter HAZUS User of the Year. Ms. Ploeger is the first international recipient of the HAZUS User of the Year award. Ms. Ploeger's research sets an example for using HAZUS for earthquake mitigation and emergency management strategies in eastern Canada.

She worked with HAZUS to identify areas that are physically and socially vulnerable to earthquake ground shaking as well as presented earthquake loss estimations for two census tracts (ten dissemination areas) in downtown Ottawa, Canada.

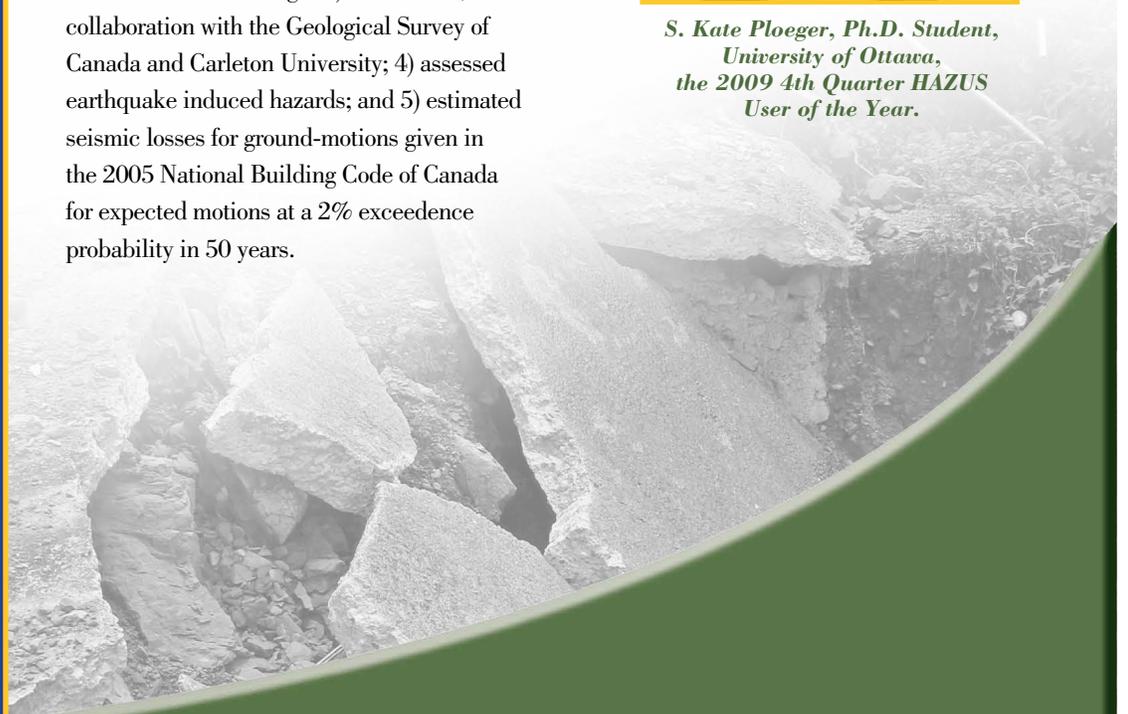
To create "HAZUS-ready" databases for her research she: 1) completed a detailed building inventory of downtown Ottawa; 2) tallied relevant census information; 3) conducted microzonation studies to allow mapping of the study area by NEHRP (National Earthquake Hazard Reduction Program) site classes, in collaboration with the Geological Survey of Canada and Carleton University; 4) assessed earthquake induced hazards; and 5) estimated seismic losses for ground-motions given in the 2005 National Building Code of Canada for expected motions at a 2% exceedence probability in 50 years.

All collected data were assembled into a set of standard geodatabases that were compatible with HAZUS-MH using a GIS specific procedure. The final research identified areas with the greatest amount of losses in downtown Ottawa.

Ms. Ploeger's expertise in using HAZUS-MH for seismic risk makes her an outstanding HAZUS-MH champion. FEMA is proud to recognize Ms. Ploeger as the 2009 4th Quarter HAZUS User of the Year.



*S. Kate Ploeger, Ph.D. Student,  
University of Ottawa,  
the 2009 4th Quarter HAZUS  
User of the Year.*



## New and Improved Courses

# Training Opportunities at EMI, Online, and in the Regions

Several courses have been vastly improved with updates and redesign at the Emergency Management Institute (EMI) and online.

### HAZUS Training at EMI

- **ArcGIS for Emergency Managers**  
Mar 15, 2010 - Mar 18, 2010  
*Course Number E190*
- **Basic HAZUS-MH**  
Apr 12, 2010 - Apr 15, 2010  
*Course Number E313*
- **HAZUS-MH for Earthquake**  
Apr 19, 2010 - Apr 22, 2010  
*Course Number E174*
- **Application of HAZUS-MH for Risk Assessment**  
Apr 26, 2010 - Apr 29, 2010  
*Course Number E296*
- **Basic HAZUS-MH**  
Jul 12, 2010 - Jul 15, 2010  
*Course Number E313*
- **Application of HAZUS-MH for Risk Assessment**  
Aug 02, 2010 - Aug 05, 2010  
*Course Number E296*
- **Comprehensive Data Management**  
Sep 13, 2010 - Sep 16, 2010  
*Course Number E317*

To enroll, download the Admission Application at <http://training.fema.gov/Apply/> or contact *Philip Moore* at (301) 447-1248.

### Online Training

Eight virtual self-study courses are available for HAZUS at ESRI.

#### Introduction to the HAZUS-MH Comprehensive Data Management System (NEW and IMPROVED)

The HAZUS-MH Comprehensive Data Management System (CDMS) helps HAZUS-MH users generate more accurate hazard loss estimations by integrating their own data into the HAZUS-MH analysis process. In this course, you will learn the basic workflow for importing site-specific and aggregate data to update HAZUS-MH inventories. This course focuses on the process of using CDMS rather than HAZUS-MH data requirements or data preparation.

#### HAZUS-MH Overview and Installation

#### Integrating User-Supplied Hazard Data into the HAZUS-MH Flood Model

#### HAZUS-MH Flood Model Output and Applications

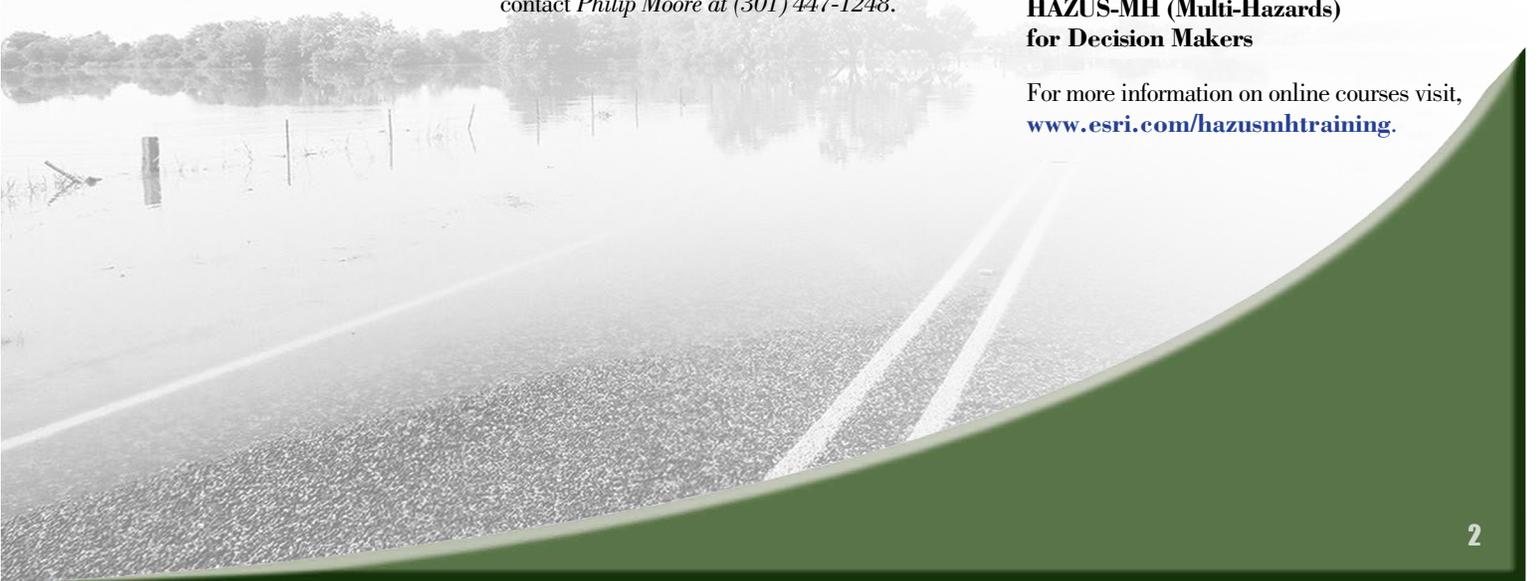
#### Introduction to Using HAZUS-MH to Assess Losses from a Riverine Flood Hazard

#### Introduction to Using HAZUS-MH for Hurricane Loss Estimation

#### Introduction to Using HAZUS-MH for Earthquake Loss Estimation

#### HAZUS-MH (Multi-Hazards) for Decision Makers

For more information on online courses visit, [www.esri.com/hazusmhtraining](http://www.esri.com/hazusmhtraining).



# HAZUS User Group Updates

In the last several months we have seen exciting occurrences from the HAZUS User Groups. The **Hawaii HAZUS User Group (HIHUG)** launched a new website, <http://www.usehazus.com/hihug>. Andrea Chatman with the Pacific Disaster Center leads the HIHUG. Under Andrea's leadership, the HIHUG and Pacific Disaster Center plan to update and expand the Hawaii HAZUS Atlas in 2010.

Jeff Brislaw and Shelby Hudson from AMEC Earth and Environmental, Inc. launched the **Rocky Mountain HAZUS User Group (RMHUG)**. They are looking forward to holding the group's first meeting sometime in the next couple of months. Information on this HUG can be found at <http://www.usehazus.com/rmhug>.

The **Central HAZUS User Group (CHUG)** has expanded their website, <http://www.usehazus.com/chug>, with links to two U.S. Geological Survey earthquake websites, one is a Shakemap data site and the other shows graphic and HAZUS formats for New Madrid Seismic Zone scenarios, for the Wabash Valley Seismic Zone scenario, and for Shoal Creek/Southern Illinois Basin scenario.

If you are interested in CDMS and its implementation, visit the **South Carolina HUG (SCHUG)** website, <http://www.usehazus.com/schug>, and download the April 2009 report on the web portal project. In addition, you can read an article recently published in Emergency Management Magazine related to how South Carolina is using HAZUS.

The **Washington HAZUS User Group (WAHUG)** has been meeting every other month to discuss training opportunities, find out about collaboration opportunities, and to discover best practices for use of HAZUS for preparedness and mitigation planning throughout the state of Washington.

The July WAHUG meeting was turned into a 2-Day HAZUS training workshop. This workshop was put together due to requests by WAHUG members to have a localized HAZUS training session. This training workshop was held at the University of Washington-Tacoma's GIS laboratory and brought together 19 students from state, local, and county government agencies. The workshop curriculum covered both basic and advanced topics on using the flood and earthquake models in HAZUS. The September meeting of WAHUG had speakers present their uses of HAZUS for mitigation and preparedness planning in Washington. Kelly Durst, a Risk Analysis Specialist with FEMA Region X, presented her team's analysis of the potential effects of the Howard Hanson Dam situation using the HAZUS flood model and level 2 data inventory. Ed Whitford, a Senior GIS Analyst with Tetra Tech, presented his flood risk assessment for the City of Snoqualmie, WA using the HAZUS flood model and local data inventory. Both of these presentations were well received and gave WAHUG members a greater understanding of the potential benefits of using HAZUS for developing hazard risk assessments for mitigation and preparedness planning. Future plans for WAHUG are to host a week-long local EMI HAZUS training in Washington after the first of the year. This training will include using HAZUS for risk assessments.

**Nevada HAZUS User Group (NVHUG)** members Craig dePolo and Bill Hammond of the Nevada Bureau of Mines and Geology, Glenn Biasi of the Nevada Seismological Lab, and Ian Buckle of the Department of Civil & Environmental Engineering/Center for Civil Engineering Earthquake Research were featured in a National Geographic Channel special called Earthquake Swarm. This aired on November 5, 2009. For more information on this earthquake special visit the National Geographic website at: <http://channel.nationalgeographic.com/series/naked-science/4232/Overview#tab-Overview>.

**Heartland HAZUS User Group (HHUG)** leaders, Shane Hubbard, Indiana University, Purdue University, Indianapolis, Indiana and Kent McLaughlin, Wisconsin Emergency Management, Madison, Wisconsin presented a paper titled, "A Study Of the GIS Tools Available During Tornado Events and Their Effectiveness for Meteorologists, First Responders and Emergency Managers," at an American Meteorological Society conference in October 2009. You can visit the Heartland HAZUS User Group website for a copy of this paper at <http://www.hazus.org/HeartlandHUG>.

The December 2009 National HAZUS User Group conference calls featured several guest speakers. The HUG Leadership call featured John Aucott, FEMA National Exercise Program Manager and Dan O'Brien, Program Manager, New York State Emergency Management Office speaking about using HAZUS for disaster exercises. Mr. Aucott explained that the National Exercise Program is Whitehouse directed. They are currently planning an earthquake exercise for May 2011. This will be the first natural hazards national level exercise. FEMA plans to follow the New Madrid Catastrophic Planning Initiative. This earthquake exercise will be a functional exercise. This means the priority is standing up emergency operation centers and establishing lines of communication.

Several opportunities may exist for the HAZUS User Groups with this exercise including running HAZUS for ground truthing purposes and participating in the actual exercise. For more information on the exercise and to participate Mr. Aucott recommends that HAZUS users contact their state emergency management agency.

Dan O'Brien reported on his direct experience with using HAZUS for the New York State June 2008 Empire Express Exercise and the November 2009 Vigilant Guard Exercise.

**A four-page success story has just been released detailing these experiences.** For more information on this story please read the article on the adjacent page.

**2 Page Synopsis  
of the Latest 4 Page  
Success Story**

# Using HAZUS for Exercise Scenarios

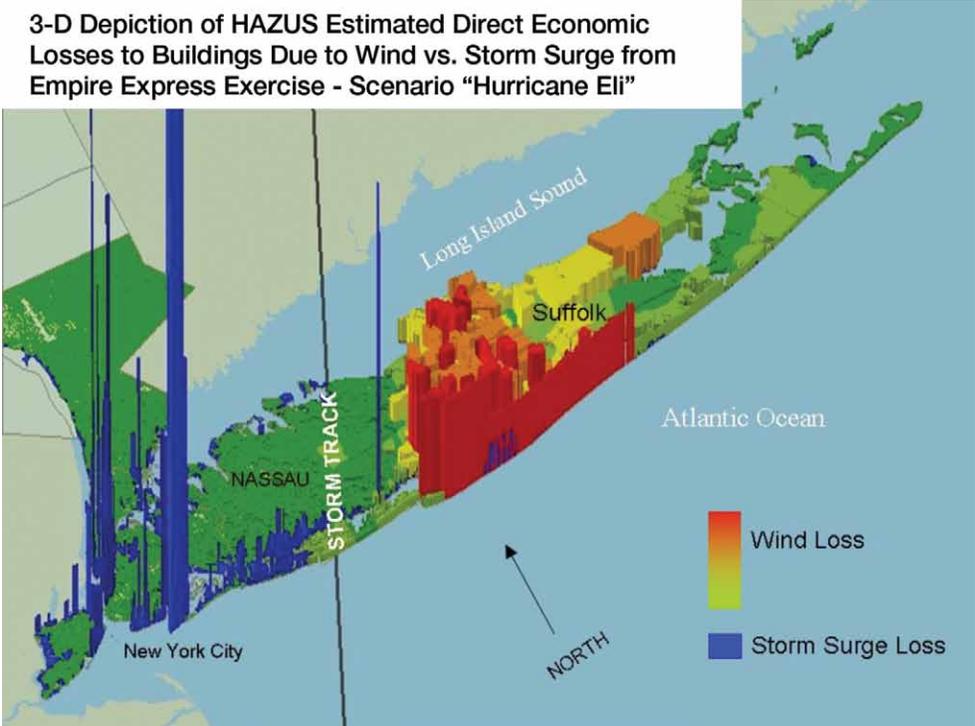
Dan O'Brien, Program Manager, New York State Emergency Management Office

Exercises are a major component of emergency preparedness. They provide the testing, evaluation and groundwork for improving target emergency management capabilities as outlined by FEMA's Homeland Security Exercise and Evaluation Program (HSEEP). Short of a major disaster, exercises assemble and focus the emergency management community more than any other activity or event. As such, tools that can contribute to the success and value of these exercises take on a particular significance.

The New York State Emergency Management Office and its partner Exercise Planning Teams, responsible for the design and oversight of exercises, have found that HAZUS, FEMA's loss estimation tool for earthquakes, hurricanes and floods, is very useful supporting their efforts to create exercise scenarios that are well tailored to specific regions, are realistic and more accurate than would be possible to develop without significant additional investment. The "enhanced" scenarios made possible by HAZUS can be a great benefit to exercises. For exercise players, they can foster a realism that increases the intensity of play and help stimulate critical thinking and discussion amongst players through commonly shared and familiar real world references. For the exercise participants at large they can provide new insights on risk and contribute to the overall awareness of the hazard used for the scenario.

Exercise planners responsible for developing the Master Scenario Event List - MSEL (the chronological timeline of expected actions and events to be injected into exercise play) are able to use the range of loss calculations that HAZUS provides, i.e. building damage, essential facility functionality, casualties, debris, sheltering, fire, economic loss, utility outages and restoration rates, to establish a broad foundational picture of a situation from which site specific incidents, not necessarily modeled by HAZUS, can be scripted. This helps the weaving of a cohesive storyline. For instance, HAZUS will predict a certain number of ignitions from an earthquake, fire station functionality, debris distribution by census tract and number of pipeline leaks and breaks. This information helps craft the MSEL establishing specific locations of fires as well

**3-D Depiction of HAZUS Estimated Direct Economic Losses to Buildings Due to Wind vs. Storm Surge from Empire Express Exercise - Scenario "Hurricane Eli"**



of complications encountered by certain fire departments such as fire station garage doors that don't open, low water pressure or roads that are impassible.

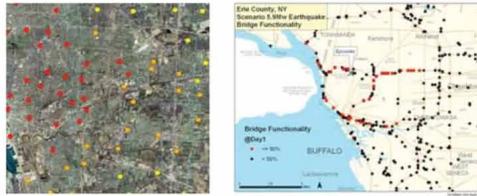
Notable examples of applying HAZUS for exercises that have taken place in New York State are the state and coastal counties June 2008 Empire Express Exercise, which simulated a high range category 2 hurricane crossing Long Island, and the November 2009 Vigilant Guard Exercise, which used a 5.9M earthquake in the City of Buffalo as the backdrop to the largest military/civilian exercise in the State's history. This exercise involved over 1,700 National Guard troops from five states in addition to several hundred civilian players from Erie and Niagara Counties, search and rescue units from several cities across the state and New York State agencies.

The HAZUS modeling of scenario "Hurricane Eli" used for the Empire Express Exercise included use of the flood module for estimating storm surge losses and the hurricane module for wind losses.

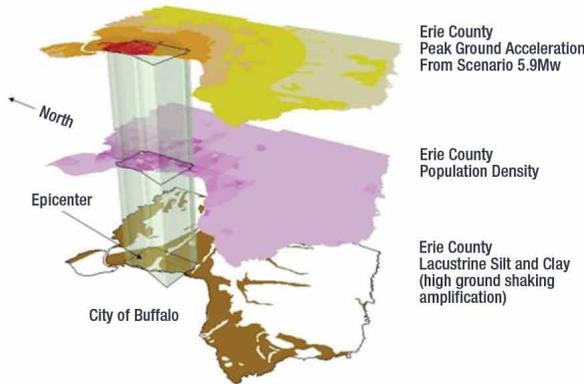
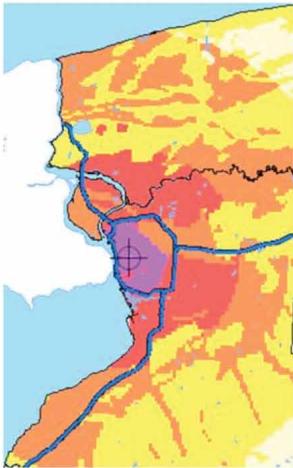
For storm surge losses, "user defined" inundation grids were developed based on storm surge height values for Eli that were provided by NOAA from an "operational" SLOSH model run. The wind damages were based on an input of a storm file prepared by Sea Island Software, the developers of HURREVAC and from ARA, the prime contractor for the HAZUS wind module. The results of the effort revealed that a storm such as Hurricane Eli may result in an overall 3:1 ratio of storm surge related losses to wind losses and those jurisdictions receiving the greatest storm surge damages may receive only limited damages from wind. These data served as the backdrop to test hospital evacuation plans and sheltering amongst other capabilities.

**VIGILANT GUARD EXERCISE**  
November 1-5, 2009

**Scenario 5.9Mw Earthquake**  
**City of Buffalo, NY**



The damages from the scenario 5.9Mw earthquake are considerable due to an epicenter within an urban area, significant number of older unreinforced masonry buildings and soil conditions that amplify earthquake ground shaking



In certain locations where exercises are being planned you may have experienced HAZUS users or an active HAZUS Users Group qualified to assist with scenario development, but these same individuals may be expected to be exercise players, serving as GIS staff as they would be in any EOC activation. This creates a conflict. As players, they should not be privy to the scenario, at least in any detail. This is akin to having a copy of the exam before test day.

An approach used in the Empire Express and Vigilant Guard exercises to address these conflicts was to establish certain GIS staff and HAZUS users as “trusted agents”. As trusted agents they are members of the Exercise Planning Team, supporting the scenario development, yet also serving in a limited capacity as players when the exercise takes place.

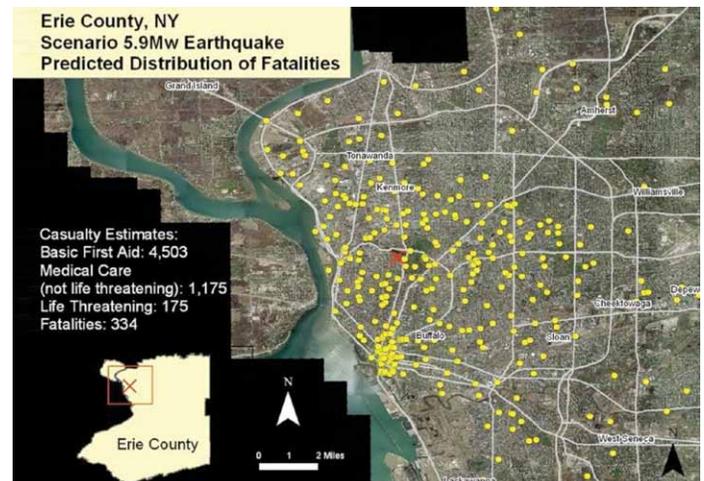
The scope of hazards addressed by HAZUS also limits its use with certain exercises, such as with the June 2009 New York State/FRMAC Empire '09 Exercise which used an improvised radiological device (dirty bomb) detonated in the City of Albany for its scenario. Despite these and other challenges, many of which are well known to HAZUS users, HAZUS is now recognized as a standard tool for exercise planning.

With the Vigilant Guard Exercise, the New York State Geological Survey's surficial geologic soil map, which is cross referenced with NEHRP soil site classifications, was used in replacement of the HAZUS default. A modified essential facility database was also incorporated through FEMA's Comprehensive Data Management software (CDMS). The modeling revealed that this moderate sized earthquake would result in significant losses given the urban location of the epicenter, the concentration of older unreinforced masonry structures, and glacial silt and clay deposits that amplify ground shaking that underlie much of the City of Buffalo and surrounding region.

The ability of HAZUS to run several caparison scenarios – a 5.0M, 5.5M, 5.7M and finally settling on a 5.9M – provided exercise planners with a better feel of how various magnitudes affect damage levels and help focus on the question of how big does this earthquake have to be. The desire was to find the lowest magnitude that would result in losses that would trigger actions and test the capabilities the exercise was intended to address. This would maximize the plausibility of the scenario by not selecting an event with unnecessarily low probability of occurrence.

In the early stages of the exercise planning leading up to the Initial Planning Conference, it was not clear what level of damage and casualties would be commensurate with the capabilities that the exercise was designed to test.

While HAZUS has shown to be an effect tool supporting exercises, challenges remain. GIS professionals as well as good data may be available to support exercise plans, but not all jurisdictions have a trained cadre of HAZUS users.



## Participate in the HAZUS User Study – Win a Ready Auto Emergency Kit

In an effort to better understand the needs of the HAZUS user community, the User Groups conducted a study. All participants in the study were eligible to win a Ready Auto Emergency Kit from <http://www.givingpreparedness.com>. User study results will be compiled in March and results will be shared with the user community sometime thereafter.



## Software Updates

### MR4 Patch 1 and Fixes

Patch 1 for MR4 has been rebuilt. The fix and the release notes are available on the FEMA site and usehazus.com.

The FixSRBP utility was also added to allow for creation of boundary polygons for riverine and coastal depth grids (in case they're missing). There is a "Create boundary polygons" checkbox under the "Scenario ID" combo box, if checked; the FixSRBP will create the boundary polygon(s) as applicable to the scenario's selected features (R, C, or R&C hazards). Selecting "Create boundary polygons" checkbox is optional since the user may not need to create the boundary polygon(s) every time the utility is run.

### HAZUS-MH Flood Average Annualized Loss (AAL) Assessment

A major undertaking was performed in running 3000 plus counties to estimate the average annualized loss for coastal and riverine flooding. This will bring the whole nation to same level for all three models. The same was done for earthquake and wind has previously been completed and been published. This helped to eliminate two reoccurring issues, general building stock analysis and average annualized loss analysis. The third issue is assessing the flood hazard at level 1 and is currently being examined. The results of this study will be presented at the ASFPM conference in 2010.

### HAZUS-MH Coastal Surge Methodology and Software Development

By September 30, 2010, the prototype for the flood and wind model will be marrying and the new coastal surge methodology will be available. It will be based on the Sea, Lake and Overland Surges from Hurricanes (SLOSH) and very likely the Simulating Waves near Shore (SWAN) models which are surge and wave models respectively.

## Contact Information

### HAZUS Program Manager

Eric Berman, FEMA  
[eric.berman@dhs.gov](mailto:eric.berman@dhs.gov)

### HAZUS Outreach

Vincent Brown, FEMA  
[vincent.brown@dhs.gov](mailto:vincent.brown@dhs.gov)

Beth Miller Howser, PBS&J  
[bmhowser@pbsj.com](mailto:bmhowser@pbsj.com)

Jamie Caplan, Jamie Caplan Consulting, LLC  
[jamie@jamiecaplan.com](mailto:jamie@jamiecaplan.com)

### HAZUS Training

Vincent Brown, FEMA  
[vincent.brown@dhs.gov](mailto:vincent.brown@dhs.gov)

### HAZUS Development

Mourad Bouhaf, PBS&J  
[mbouhaf@pbsj.com](mailto:mbouhaf@pbsj.com)