Using Technology to Enhance Mitigation Capability

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– Over 25 Years experience in floodplain management
– Former ISO/CRS specialist
– Facilitated 30 successful mitigation planning efforts since 2003
Today's Speakers

Alison Miskiman, CFM – Project Manager and Mitigation Lead Risk Assessor, Tetra Tech, Inc.

- Project Manager for State and Local Mitigation Plans
- Lead Risk Assessor for > 30 Tt FEMA Region 1, 2, 3 HMPs
- FEMA HMA Grant Writer and BCA Analyst
- GIS and Hazus-MH Analyst
What are We Going to Talk About?

- The importance of risk-assessment
- Data gaps
- Technological options to addressing data gaps
- Using technology to support public outreach
- Web-based mapping applications
- Case Studies- Arc-Flex Viewer: Cook County IL and Suffolk County, NY.
Why do a Risk Assessment?

- Because it is required!
- Fundamental requirement for a Hazard Mitigation Plan

_BUT, What about......_

- Public education tool
- Risk-based analysis of capital projects
- Benefit-cost analysis
- Critical facilities planning
If we want to drive Communities to Action

• They must clearly understand what is Risk!
• This is not county-wide scale, 1-dimensional maps.
So what is Risk?

- Risk = (Probability x Impact)
  - Probability-How often has it occurred (historic data) or how after can it occur (probabilistic data).
  - Impact-The impact on the people, property, economy, and environment of a planning area.

- These are key parameters to the development of a Risk Assessment model
What do you need for a good Risk Assessment?

- Extent and location of the hazard
- Frequency of the hazard
- Severity of the hazard (i.e., flood depths)
- Inventory of the assets exposed to the hazard
  - General building stock
  - Critical facilities/infrastructure
- A good terrain model
Typical Data Gaps

- Detail of inventory
- Information to determine the value of the assets
- High resolution terrain data
- Data to gauge severity (flood depths)
- Damage functions
So How Can Technology Help Us?

• Allow us to create models to measure Risk
• Enhance data capture capability
• Provide basis for logical assumptions
• Provide damage functions
• Transform risk from 1 dimension to 3
• Give us versatility to analyze multiple scenarios
• Can give us access to a constituency
What Kind of Technology?

• Spatial data-GIS (assessor data, land use data)
• Web-based data (Google Earth and other mapping applications)
• Web-based applications (websites, Survey-Monkey)
• LiDAR
• Hazus-MH
• 2-D flood models
Hazus-MH

• Hazus-MH is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds, earthquakes, and tsunamis

• GIS interface

Hazus outputs include:

• *Number, location, types, and occupancy of vulnerable buildings*
• *Actual or assessed values of the vulnerable buildings*
• *Critical facilities*
• *An estimate of losses per hazard*
• *Debris accumulation*
4. Estimate losses

3. Determine severity

2. Define and overlay inventory

1. Define hazard: flood surface and terrain

How it works
Approach Highlights

- Level 1: Default Databases
- Level 2: User Modified Data
- Level 3: Expert Supplied Data
Using Technology with Hazus

• Level 2, user-defined analysis for general building stock
• LiDAR data for DEM-5m resolution or better
• Assessor data
  – Occupancy class
  – Date of construction
  – Area
  – Foundation type
• Flood study data
Technology and Public Information

• So, once you define risk, how do you gauge the public’s perception of that risk?
  – Ask them!
  – To ask them, you have to reach them

• Technology can give you that access
  – Social Media
  – QR code readers
  – Web-based survey tools (Survey Monkey)
Work-stations can be setup to provide:

- Extent and location of hazards of concern
- Asset exposure value
- Site-specific Hazus loss estimate for the Hazus hazards (flood, EQ, and dam failure)
- Data was searchable by address
- Printout of data was provided to all that requested it
- Requires level 2, user defined protocol to be viable
Hazus Workstation examples
I am trying to figure out a way to insert the video clip in to this slide

Flaner, Robert, 5/28/2014
News Clip
Technology and Public Outreach

Websites and surveys

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**KNOW YOUR RISKS**

FLOODS – EARTHQUAKES – DAM FAILURE – SEVERE WEATHER – LANDSLIDES – WILDFIRE

1. **Take our survey.**
   
   www.surveymonkey.com/s/KCHazards

2. **Attend a public meeting.**
   
   www.kingcounty.gov/hazardmitigation

3. **Learn more about this effort.**
   
   www.surveymonkey.com/s/KCHazards

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**Featured Services**

- **Hazard Mitigation Plan**
- **Latest News**
  - Health Commissioner Reports Dengue Virus Case
  - County Executive Bellone and the East End Tourism Announce Successful "Taste North Fork" Campaign
  - Board of Review Hearings
  - Upcoming Falls-Prevention Workshops
  - Health Commissioner Reports Fourth Human Case of West Nile Virus this Year

**DID YOU KNOW THAT...**

**VIDEO GALLERY**

- **PLAIST**
- Hurricane Preparedness: YouTube

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The Regional Hazard Mitigation Planning Partnership

kcPubComment@kingcounty.gov
Technology and Public Outreach Success Stories!

- Survey Monkey Rocks! You can customize surveys to targeted audiences.
- The use of QR codes have increased our survey completion percentage by 25%.
- Website technology has evolved enabling more interaction with the planning process.
- Taking risk awareness from 1 dimension (paper maps on the wall) to 3 dimensional, property specific awareness.
- Social media gives us more access
Technology and Public Outreach Examples

• For examples of these success stories, search “hazard mitigation plan” under the following websites:
  ✓ Suffolk County, NY
  ✓ Cook County, IL
  ✓ King County, WA
  ✓ Spokane County, WA
  ✓ Humboldt County, CA
Web-Based Mapping Applications

• Web driven GIS tools and mapping information bundled into a “viewer”
• Securable, customizable, and scalable
• Requires no software installation
• Easily distributes large volumes of information
• Hosted internally – we have complete control
• Leverages multi-level security
  – User’s e-mail security
  – ESRI token based security
  – Application level security
• Great collaboration tool
• Mobile data access
ArcGIS Viewer for Flex

- Type/style of web-based mapping application
- Based on Adobe Flex and Flash Builder technology
- Can be used "out of the box" or customized to suit
  - Interactive querying of data
  - Google street view
  - Splash screens
- Viewer functionality is defined by widgets
- Leverages the ArcGIS Resource Center and Code Gallery
Advantages

• No software installation required
• Support GIS functionality
  – Enhanced search and query functionality, etc.
• Built to suit to meet project needs
• Support large volumes of data
• Enhance security and user management
• Easy to update, adding new data and layers
• Support mobile applications
• Collaboration tool
ArcGIS for Server – “ArcGIS Server”

• Gives you the ability to create, manage, and distribute GIS services over the Web to support desktop, mobile, and Web mapping applications

• Simplifies access to GIS services for GIS professionals, mobile workers, as well as knowledge workers without any GIS experience

• Centralized management of spatial data

• Scalable
Success Stories!

- The ArcGIS Viewer for Flex was utilized to create a Mitigation Mapping Tool
- Used to address an issue in updating the Critical Facilities/Infrastructure inventory
- This tool streamlined the traditional process of using the CDMS extension to Hazus
- The tool outputs were developed to seamlessly interface with CDMS and Hazus
- Users could locate and update over 30 attributes per facility
- Secure application
• Background
  – Development of a Multi-jurisdictional hazard mitigation plan
  – Will cover 115 of the 135 municipalities within Cook County
  – Nations largest Multi-jurisdictional planning effort
  – Assesses 7 natural hazards of concern
  – Identifies over 1000 mitigation actions for the planning area
• 117 users received credentials to access viewer
• 6,220 facilities were originally loaded into the Flex Viewer; 3,236 were essential facilities (EOC, Fire, Police, Medical, Schools) reviewed by the jurisdictions
• 6,602 facilities were exported from the Flex Viewer--this is a combination of additions and deletions; 3,788 were essential facilities
• Cook County DHSEM plans to utilize this tool to support other aspects of Emergency Management (CIKR inventory, Training and Exercise, response support)
Case Study
Cook County, Illinois

• Constructed Hazus models for earthquake, flood, and dam failure to support development of Hazard Mitigation Plan
• Level 2, UDF model
• Updated 1,190,135 facilities using assessors data
  – 36,429 for flood
  – 14,563 for dam failure
• County-wide, 3M resolution LiDAR data from MWRD was utilized to create the DEM
• The detail of the assessors data allowed for logical assumptions in the flood model
  – Finished floor elevations
  – Replacement costs
Case Study
Suffolk County, New York

- 43 municipalities, 2 Tribal Nations, 1 Special Purpose District – each with at least one user
- Updated original 2008 HMP critical facility inventory using application (>3,000 facilities)
- Tribes used application to identify 911 addresses
- Also identified:
  - Recent and new development
  - Potential mitigation projects
  - Not mapped hazard areas
Security
Security

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(FOUO) DISTRIBUTION

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Basic Navigation
Basic Navigation
Basic Navigation
Identify Potential Mitigation Projects
Tribal Nations
911 Addresses
Event Response

- **ArcGIS Collector App**: The Collector app was used in conjunction with ArcGIS Online to collect site photos.
So what if?

– Real-time data capture during events
  • Road closures
  • Areas that need assistance
  • Post-event documentation (high water marks, damages)
– Environmental Response (pictures, data)
– Risk Communication
– Real-time modeling
– Diversity of end users (Banks, Insurance Companies)
– State-wide modeling
– Drone technology for data capture
Questions

Thank you!

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