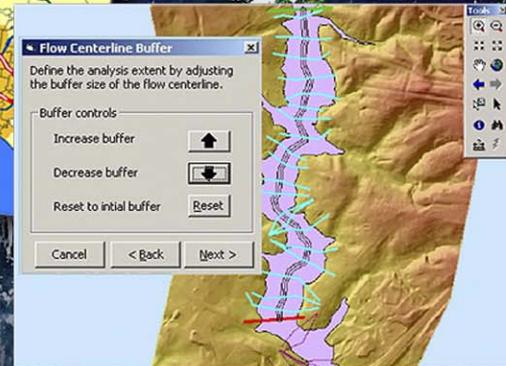
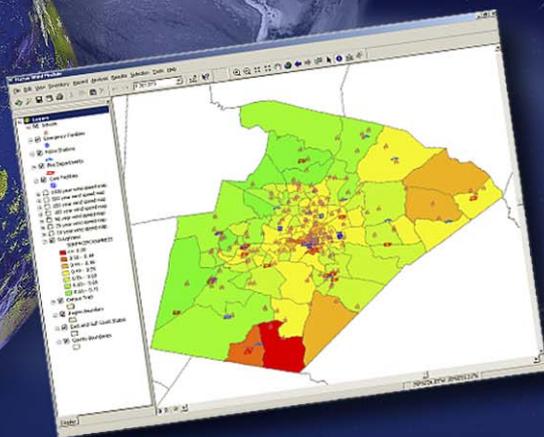


HAZUS[®] MH

EARTHQUAKE • WIND • FLOOD

FEMA's Software Program for Estimating Potential Losses from Disasters



FEMA



HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

Earthquakes,



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Earthquakes, Hurricanes,



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Earthquakes, Hurricanes, and Floods Will Continue to Occur...



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

Earthquakes, Hurricanes, and Floods Will Continue to Occur...

How can we **plan** to minimize
damage and loss of life to prevent
natural hazards from becoming
natural disasters?



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH: Features



GIS Technology

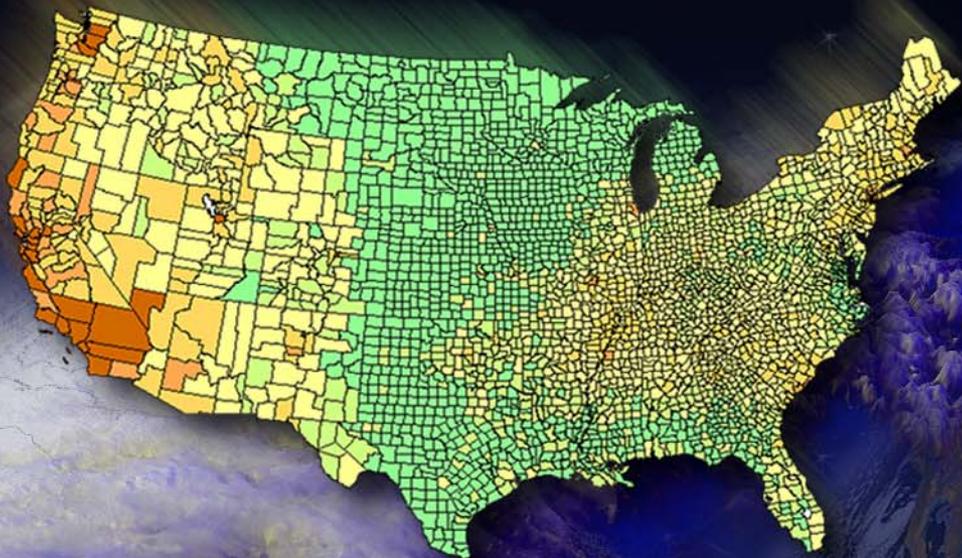


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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH: Features



GIS Technology
Nationwide Databases

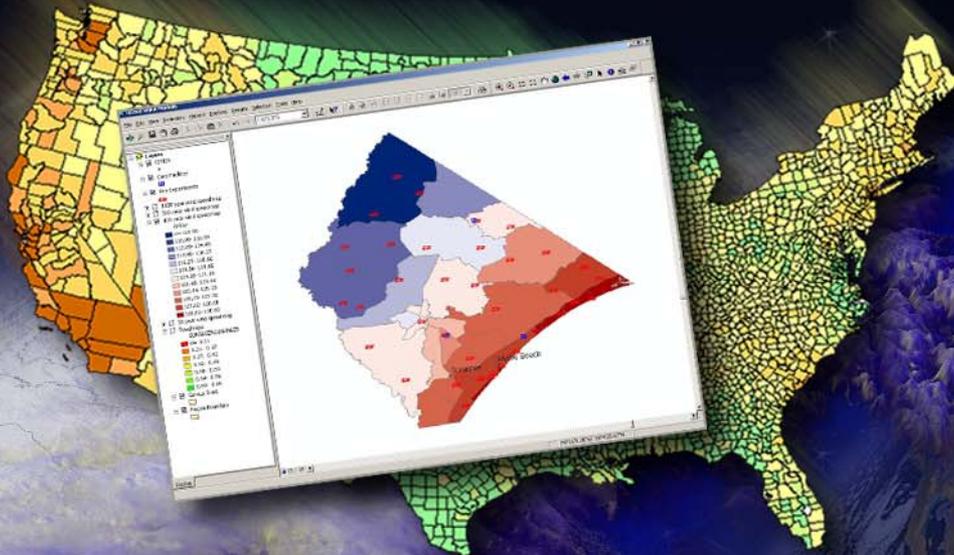


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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH: Features



GIS Technology

Nationwide Databases

**Nationally Standardized Loss
Estimation and Risk
Assessment Methodology**

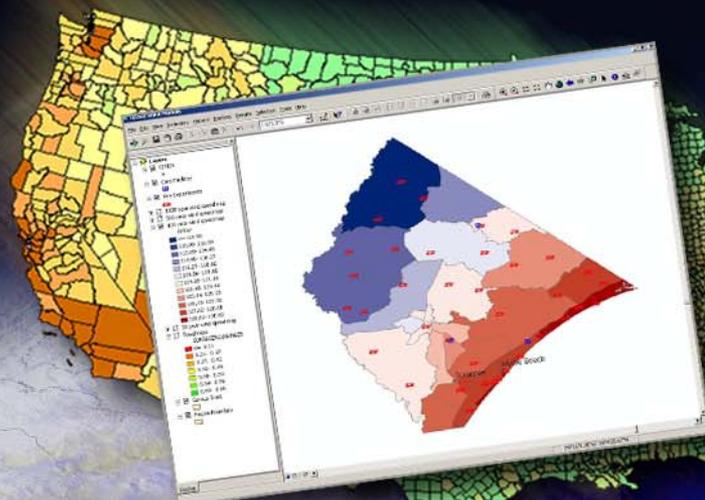


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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH: Features



**Physical
Impacts**

**Economic
Impacts**

Social Impacts

GIS Technology

Nationwide Databases

**Nationally Standardized Loss
Estimation and Risk
Assessment Methodology**



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GIS Technology

Spatial Relationships

- Layers
- Computations



FEMA



HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

GIS Technology

Spatial Relationships

- Layers
- Computations



FEMA

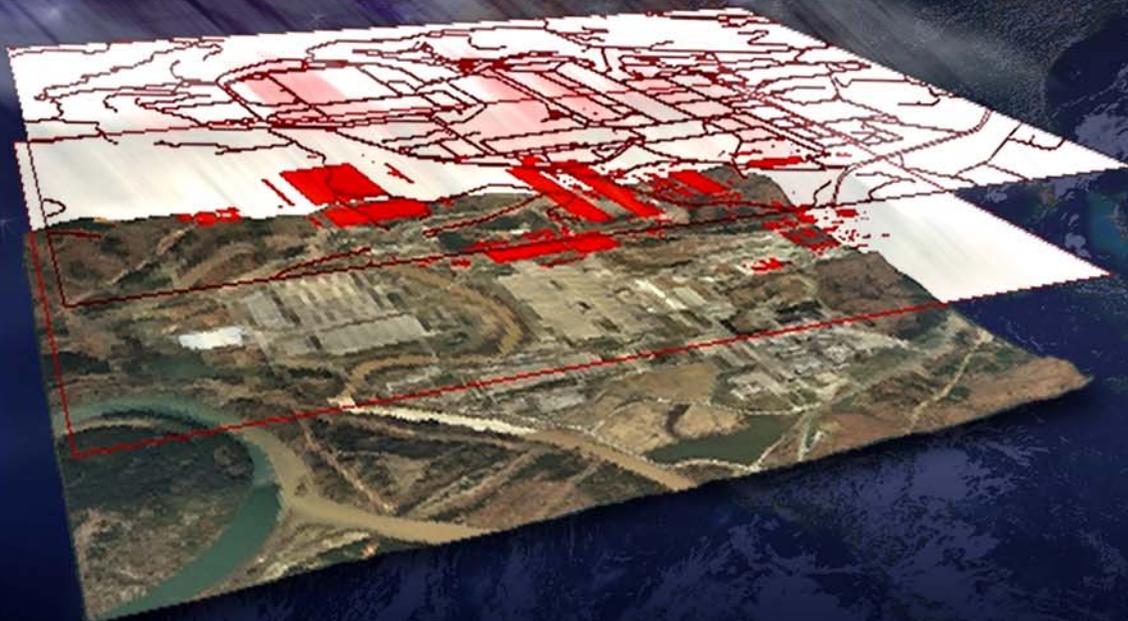


HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

GIS Technology

Spatial Relationships

- Layers
- Computations



FEMA



HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

GIS Technology

Spatial Relationships

- Layers
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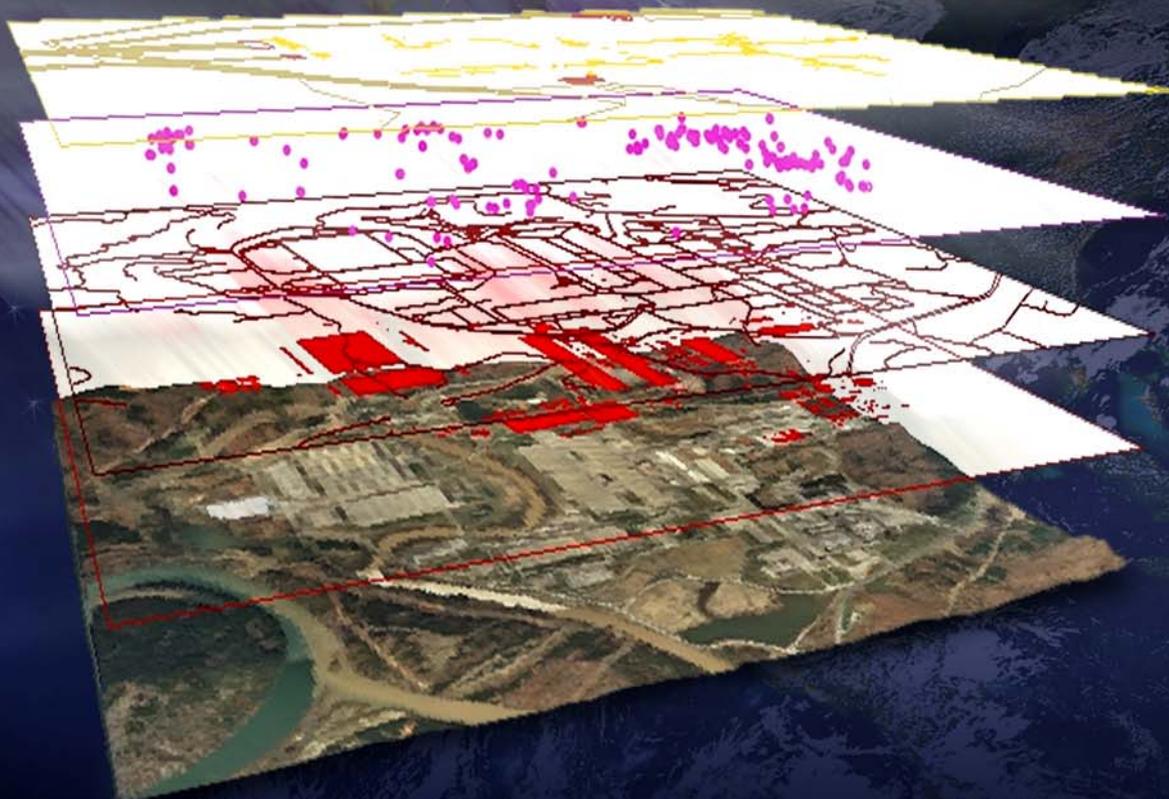


HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

GIS Technology

Spatial Relationships

- Layers
- Computations



FEMA

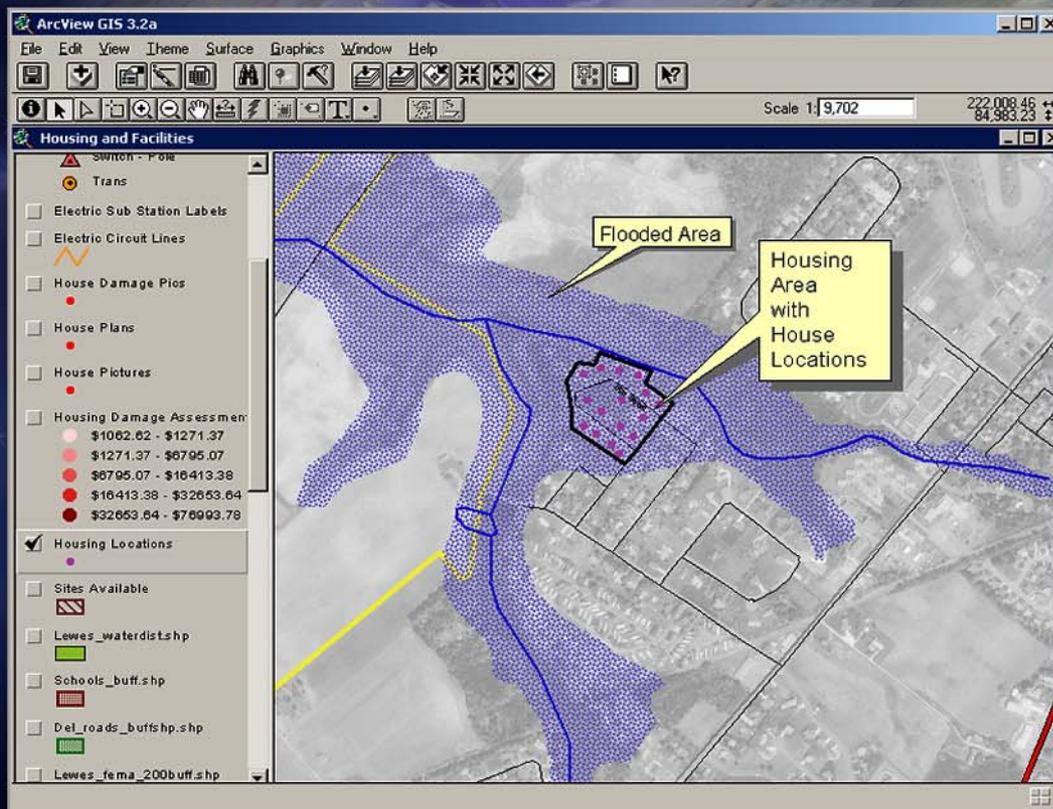
GIS Technology

Spatial Relationships

- Layers
- Computations

Risk Communication

- Risks
- Solutions



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Nationwide Databases

Demographics – Population, Employment, Housing

Building Stock – Residential, Commercial, Industrial

Essential Facilities – Hospitals, Schools, Police Stations, Fire Stations

Transportation – Highways, Bridges, Railways, Tunnels, Airports, Ports and Harbors, Ferry Facilities

Utilities – Waste Water, Potable Water, Oil, Gas, Electric Power, Communication Facilities

High Potential Loss Facilities – Dams and Levees, Nuclear Facilities, Hazardous Material Sites, Military Installations



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

Nationwide Databases



Non-Proprietary • Easily Customized



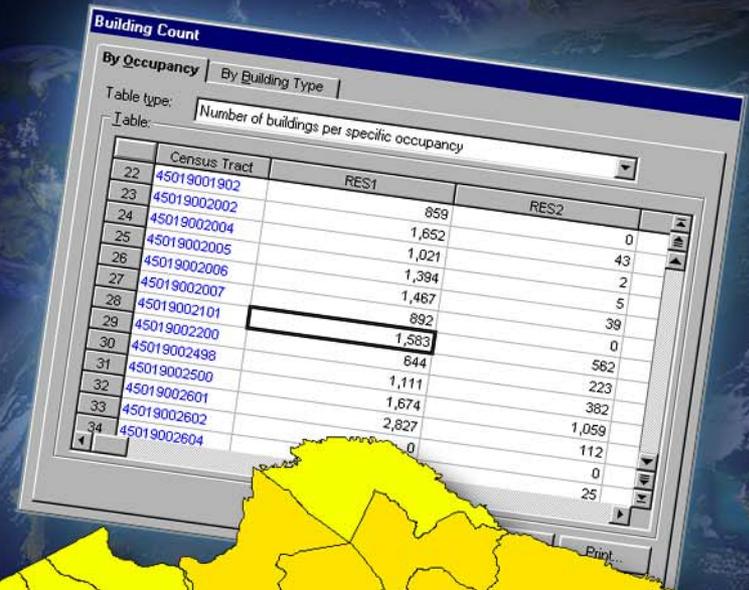
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Nationally Standardized Loss Estimation and Risk Assessment Methodology

Engineering Analysis
Hazard-Specific Oversight
Committees

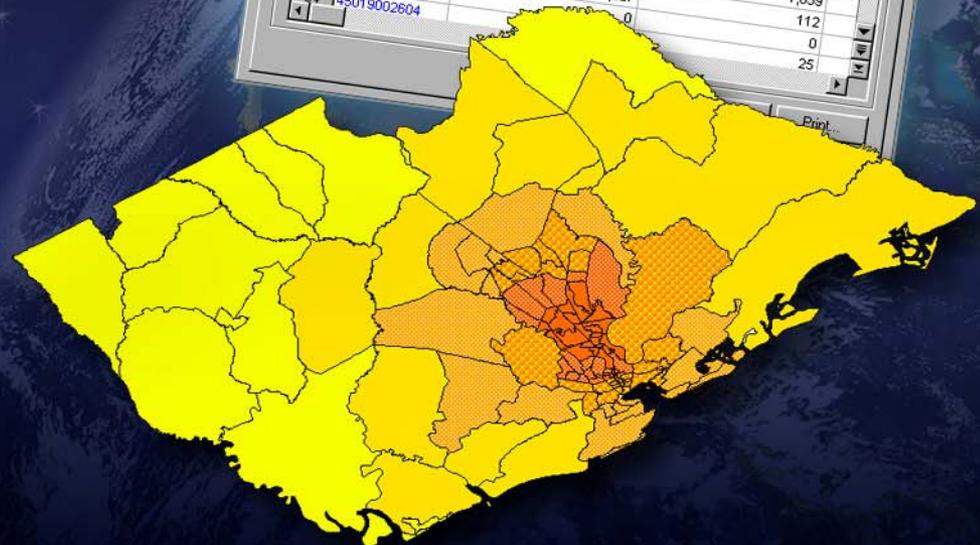
- Expert Practitioners
- Academics

Non-Proprietary
Well Documented



The screenshot shows the 'Building Count' window in HAZUS-MH. It features a table with columns for 'Census Tract', 'RES1', and 'RES2'. The table lists 13 census tracts with their corresponding building counts for residential occupancy types. The 'Table type' is set to 'Number of buildings per specific occupancy'.

Census Tract	RES1	RES2
22 45019001902	859	0
23 45019002002	1,852	0
24 45019002004	1,021	43
25 45019002005	1,384	2
26 45019002006	1,467	5
27 45019002007	892	39
28 45019002101	1,583	0
29 45019002200	844	582
30 45019002498	1,111	223
31 45019002500	1,674	382
32 45019002601	2,827	1,059
33 45019002602	0	112
34 45019002604	0	0



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH is for a study area of any size

Region

Community

Neighborhood

Individual Site



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH and Risk Management



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Preparing for a Natural Hazard

What are our risks?

Where are the best locations for shelters and do we have enough space?

Where should we target outreach activities?



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Mitigating the Effects of a Natural Hazard

Where should we put our resources to achieve maximum benefit?

How much will this mitigation strategy decrease our losses?

Where are we in our mitigation plan? How have we progressed?



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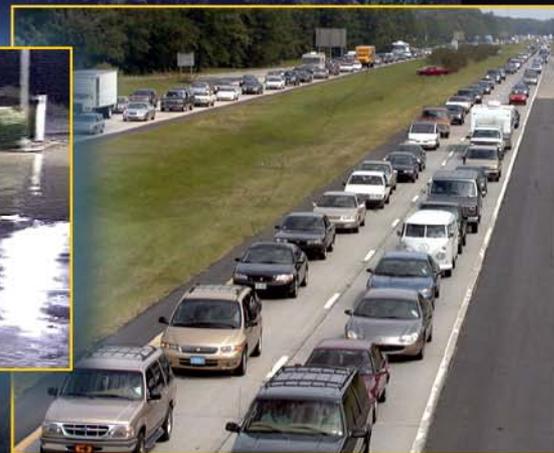


Responding to a Natural Hazard

How many injuries do we expect?

What are the best evacuation routes?

What hospitals were damaged and where should we take our injured?



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Recovering from a Natural Hazard

What is the demand on recovery staff?

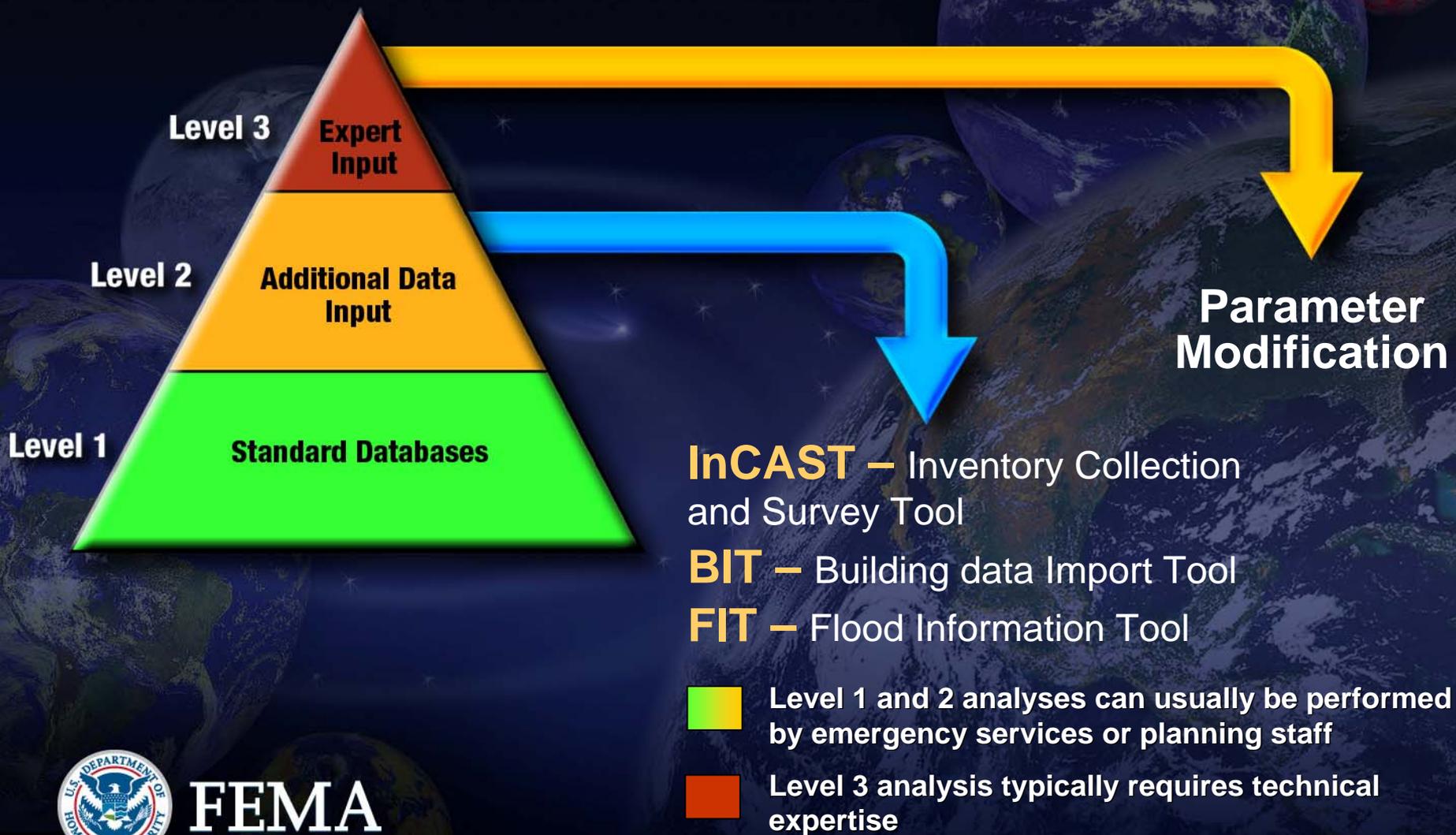
How much debris do we have to remove?

How much funding does the community need to request to recover?



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HAZUS-MH: Analysis Levels



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH: Models



Earthquake
Ground Motion
Ground Failure

Flood
Frequency Depth
Discharge Velocity

Hurricane
Winds
Pressure | Missile | Rain

	Earthquake	Flood	Hurricane
Direct Damage			
General Building Stock	✓	✓	✓
Essential Facilities	✓	✓	✓
High Potential Loss Facilities	✓	✓	✓
Transportation Facilities	✓	✓	
Lifelines	✓	✓	
Induced Damage			
Fire Following	✓		
Hazardous Materials Sites	✓	✓	✓
Debris Generation	✓	✓	✓
Direct Losses			
Cost of Repairs/Replacement	✓	✓	✓
Income Loss	✓	✓	✓
Crop Damage		✓	
Casualties	✓		
Shelter and Recovery Needs	✓	✓	✓
Indirect Losses			
Supply Shortages	✓	✓	
Sales Decline	✓	✓	
Opportunity Costs	✓	✓	
Economic Loss	✓	✓	

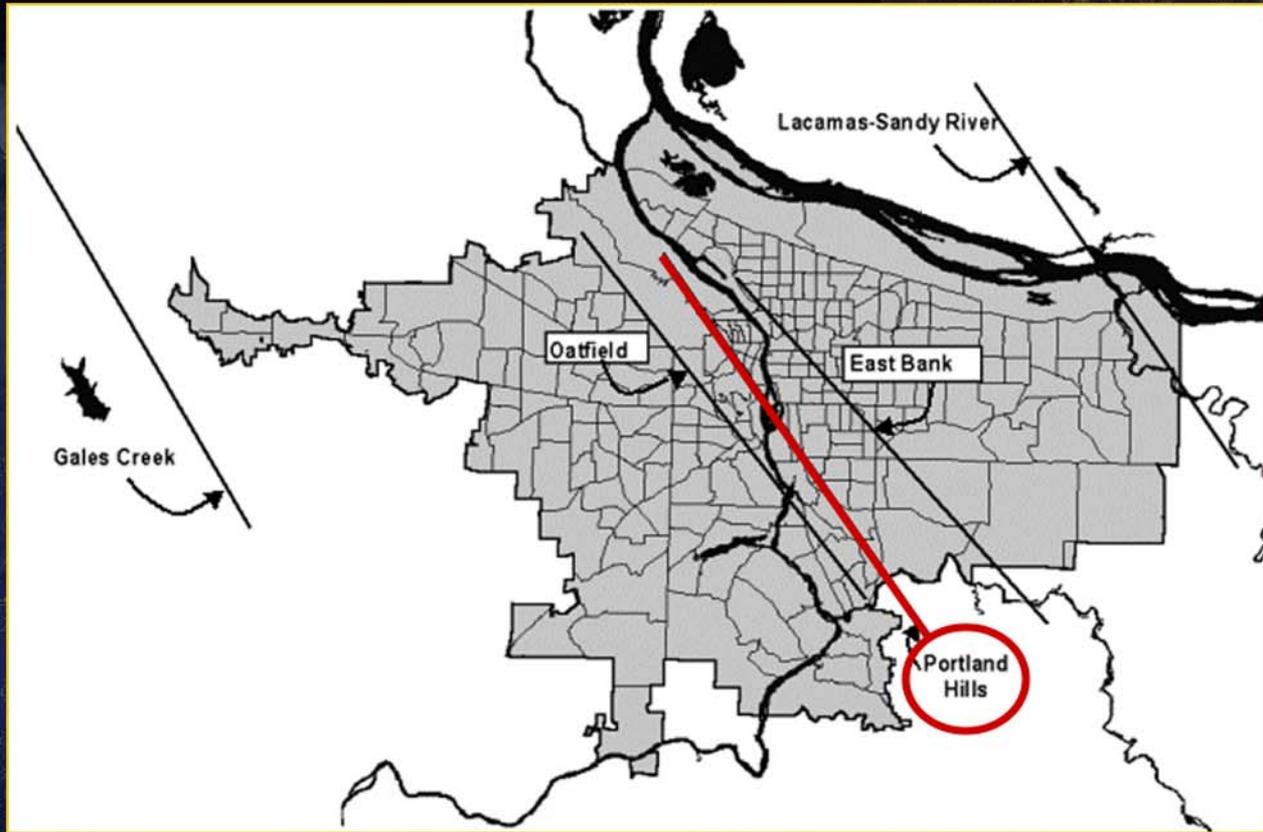


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Study Region Fault Traces



Portland, OR Local Crustal Faults

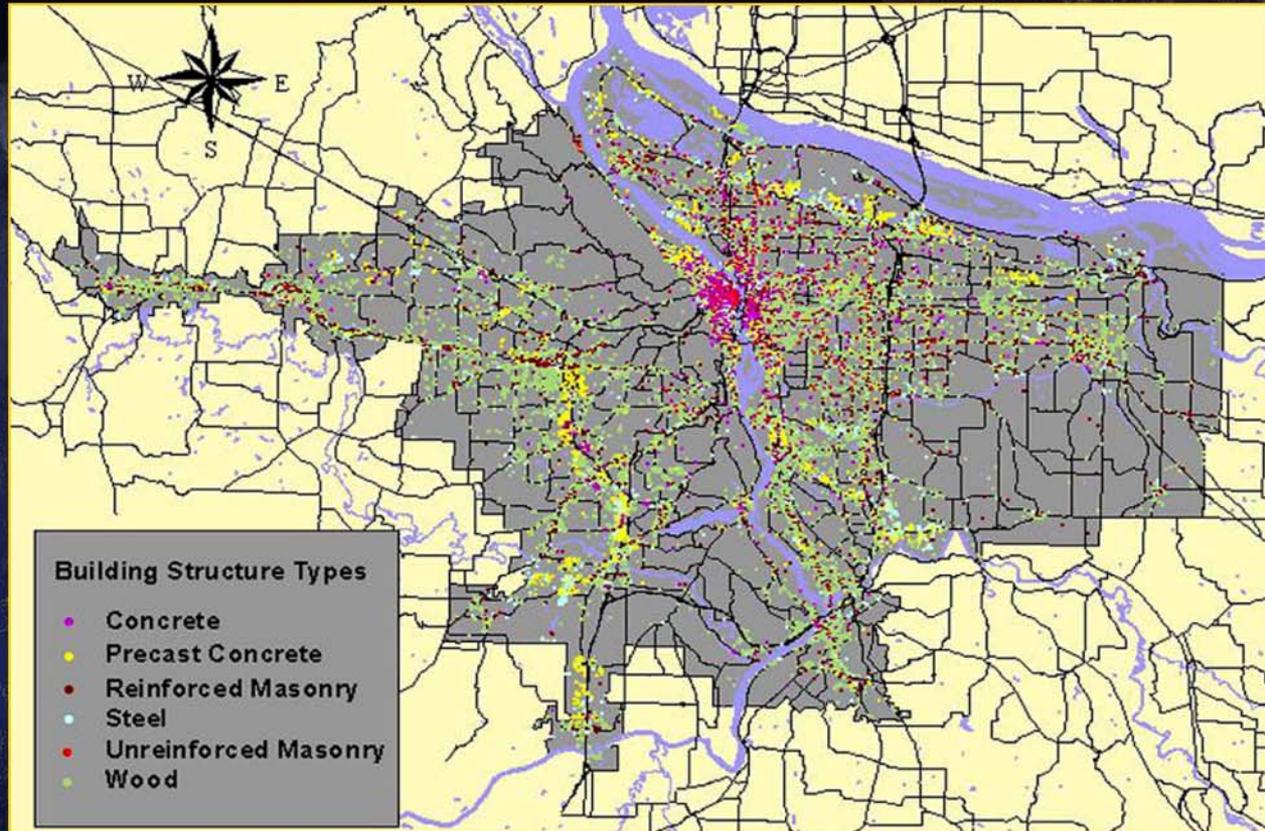


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Portland Building Inventory

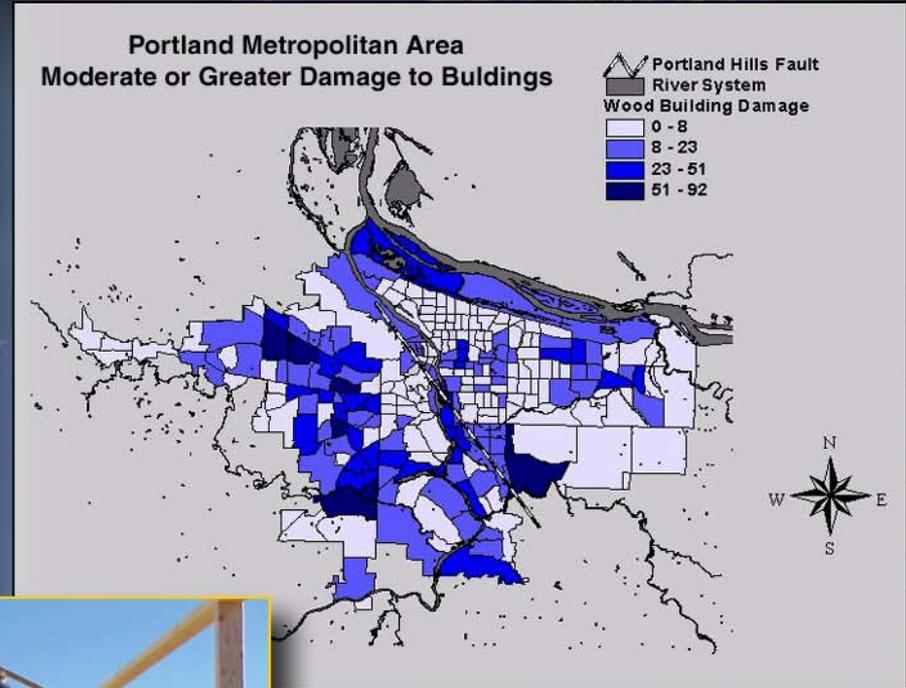
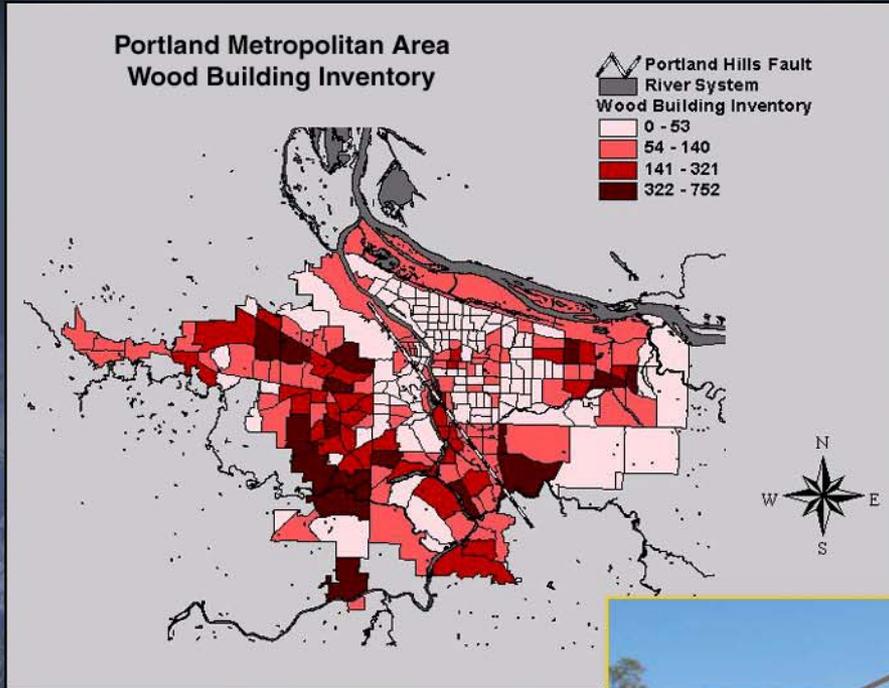


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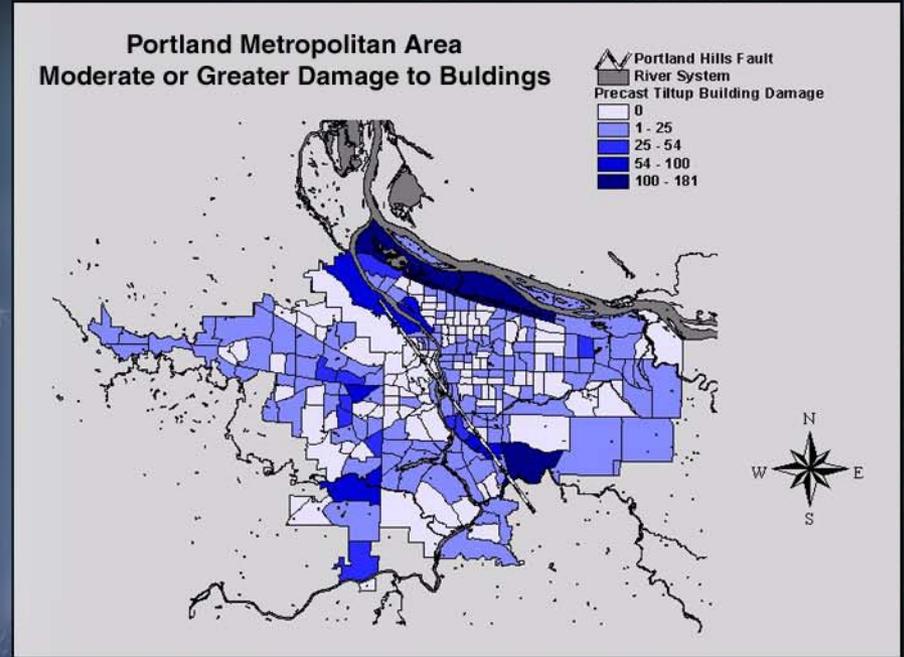
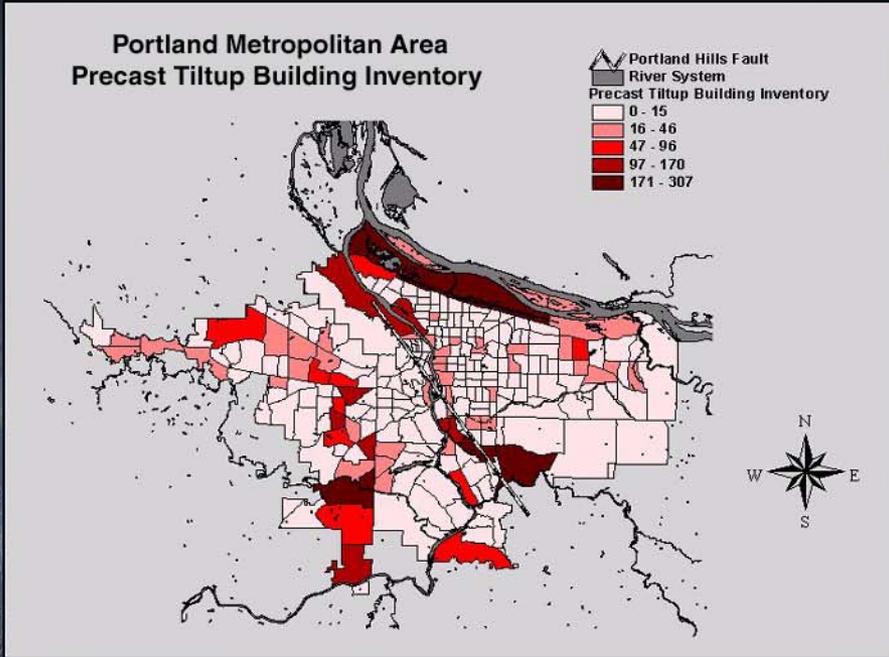
Wood Construction



FEMA



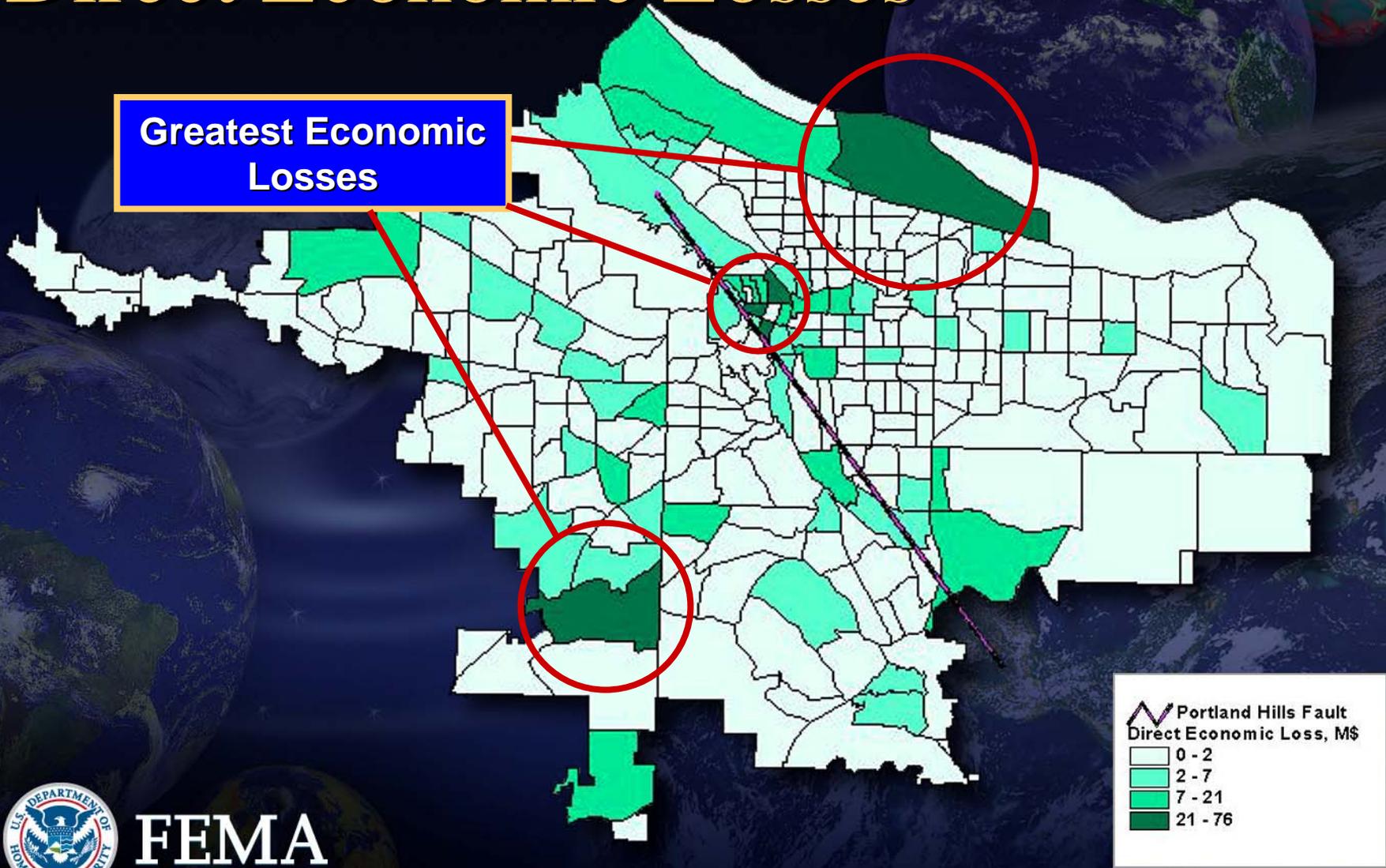
Precast Tiltup Construction Damage



FEMA



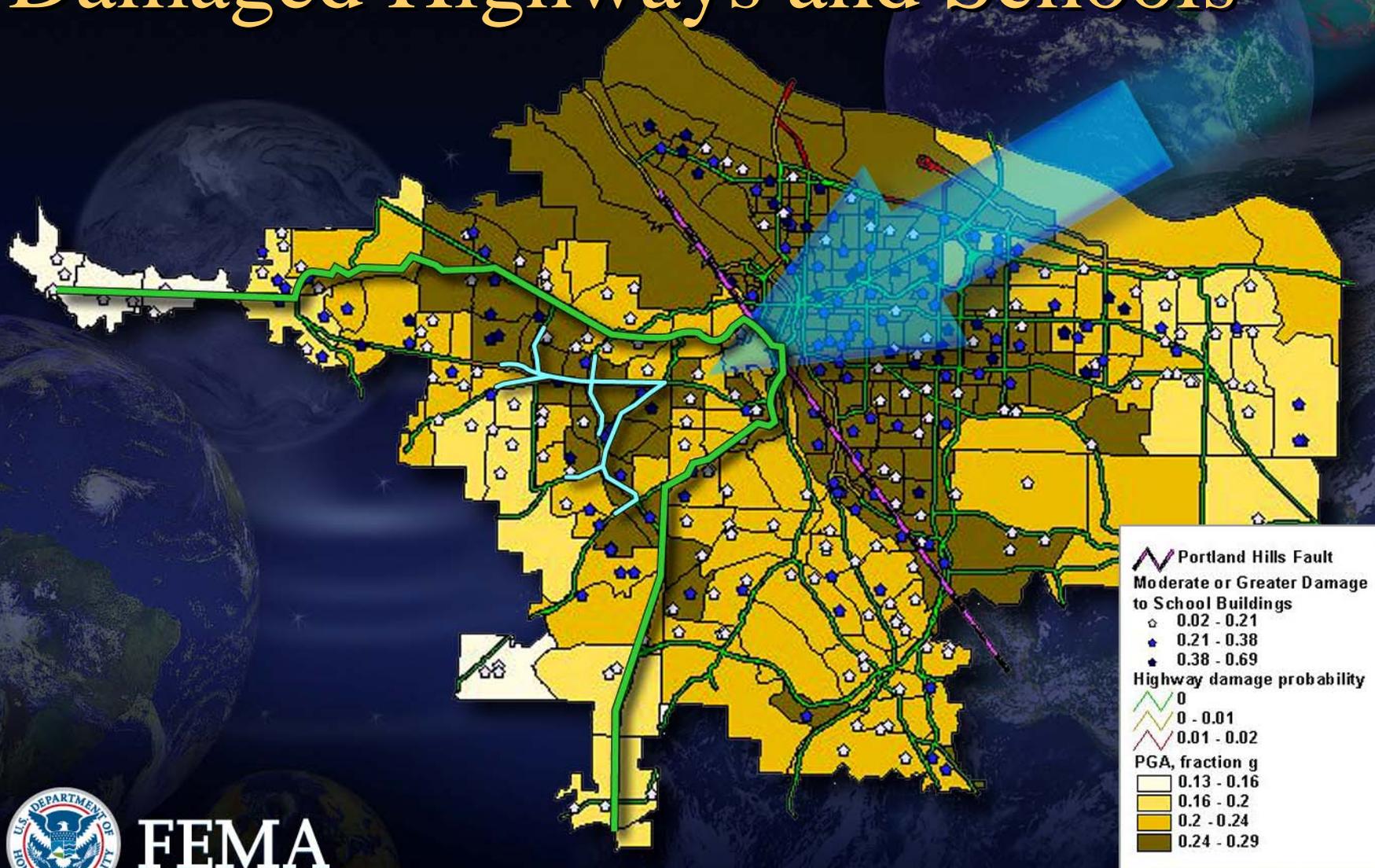
Direct Economic Losses



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Damaged Highways and Schools



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Building Damage Survey

The screenshot displays the HAZUS99 for ArcView software interface. The main window title is "HAZUS99 for ArcView - Charleston SC". The menu bar includes "File", "Inventory", "Hazard", "Analysis", "Results", "Query", "Window", "Map", and "Help". The toolbar contains various navigation and analysis tools. The status bar shows "Scale 1: 950,000" and coordinates "80.72" and "33.58".

A "HAZUS Summary Reports" dialog box is open in the center, with tabs for "Inventory", "Buildings", "Lifelines", "Induced", "Losses", and "Other". The "Inventory" tab is selected. The dialog contains a list of reports to view:

- Global Summary Report
- AEEM-Individual Building Report
- AEEM-Portfolio Building Report
- Quick Assessment Report -2AM
- Quick Assessment Report -2PM
- Quick Assessment Report -5PM

Buttons for "View" and "Close" are located at the bottom of the dialog.

On the left side of the interface, a vertical list of building types is visible, including "Wood", "Steel", "Reinf", "Precast", "Reinf", and "Unrei". On the right side, a vertical bar shows percentages for different categories, including ".0%", ".5%", ".9%", ".3%", ".7%", and ".2%".

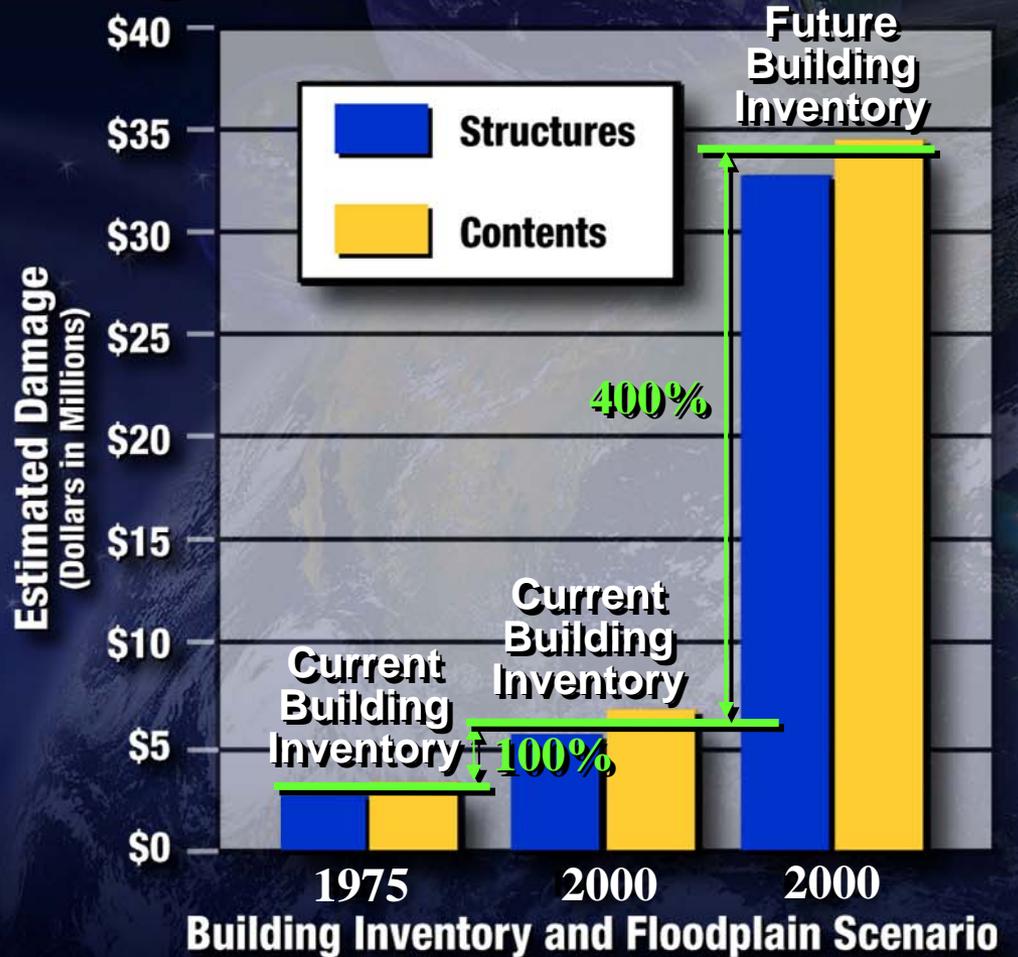




A Flood Study - Mecklenburg, NC Study Results – Sugar Creek

Support Adoption of
New Floodplain
Studies

Saved the County
\$74 Million Dollars
in Damage Reduction
Through Increased
Floodplain
Regulations



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HAZUS Reaching Beyond Natural Disasters

ALOHA
Dispersion
Modeling

FLDWAV Dam
Breach Modeling



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HAZUS: User Groups



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Summary

HAZUS-MH allows you to:

- **IDENTIFY** vulnerable areas that may require planning considerations (e.g., land use or building code requirements)
- **ASSESS** the level of readiness and preparedness to deal with a disaster before the disaster occurs
- **ESTIMATE** potential losses from specific hazard events, including pre-event, near real-time, and post-event report capability
- **DECIDE** on how to allocate resources for the most effective and efficient response and recovery
- **PRIORITIZE** the mitigation measures that need to be implemented to reduce future losses



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EARTHQUAKE • WIND • FLOOD

...helping develop,
implement, and
track local and
state risk assessment
and mitigation plans



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HAZUS-MH: FEMA'S SOFTWARE PROGRAM FOR ESTIMATING POTENTIAL LOSSES FROM DISASTERS

HAZUS-MH Information

Visit the HAZUS website:

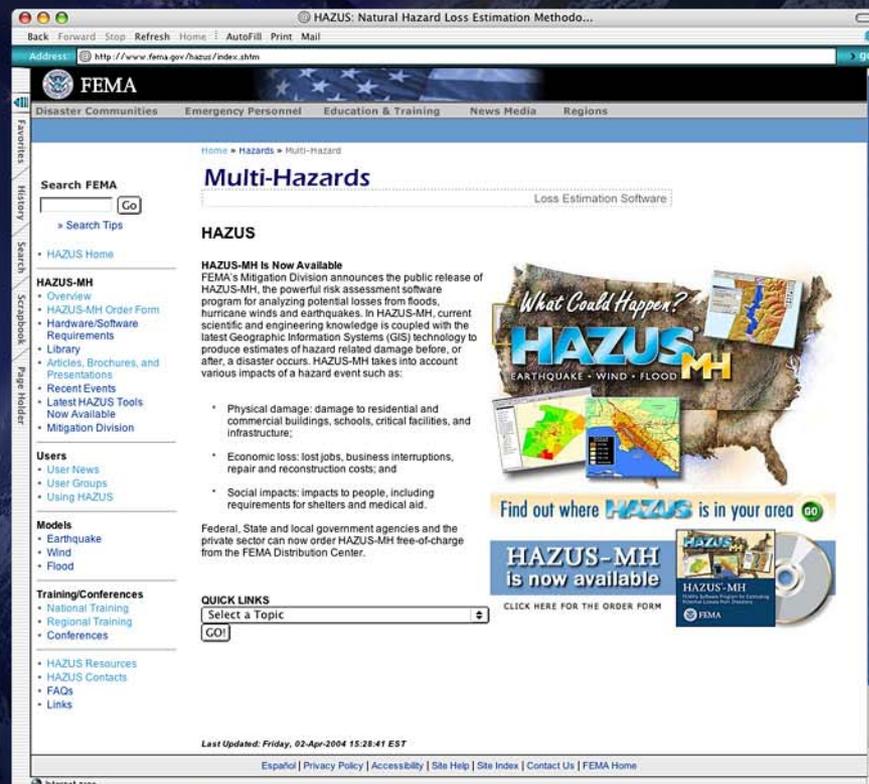
<http://www.fema.gov/plan/prevent/hazus>

or email inquiries to:

FEMA-HAZUS@dhs.gov



FEMA

A screenshot of the FEMA website's HAZUS-MH page. The browser window title is "HAZUS: Natural Hazard Loss Estimation Methodo...". The address bar shows "http://www.fema.gov/hazus/index.shtml". The page features the FEMA logo and navigation tabs for "Disaster Communities", "Emergency Personnel", "Education & Training", "News Media", and "Regions". A search bar is present. The main content area is titled "Multi-Hazards" and "Loss Estimation Software". It includes a "HAZUS" section with the heading "HAZUS-MH is Now Available" and a detailed description of the software's capabilities. A graphic shows a map of the United States with the text "What Could Happen? HAZUS-MH EARTHQUAKE • WIND • FLOOD". Below this is a "Find out where HAZUS is in your area" button. A "HAZUS-MH is now available" banner with a CD-ROM image and a "CLICK HERE FOR THE ORDER FORM" link is also visible. A "QUICK LINKS" section includes a "Select a Topic" dropdown and a "GO!" button. The footer contains "Last Updated: Friday, 02-Apr-2004 15:28:41 EST" and links for "Español", "Privacy Policy", "Accessibility", "Site Help", "Site Index", "Contact Us", and "FEMA Home".