



FEMA

# FEMA's Risk MAP Risk Assessment HAZUS-MH Overview

Phoenicia, NY and Margaretville, NY  
January 26 & 27, 2012

**RiskMAP**  
Increasing Resilience Together



# Risk Assessment

## Identify Hazards

-Earthquake, Floods (Riverine & Coastal), and Hurricane (Wind & Surge)

## Profile Hazard Events

-Attributes based on return period of hazard event

## Inventory Assets

-Building Stock, Population, Critical Facilities, etc...

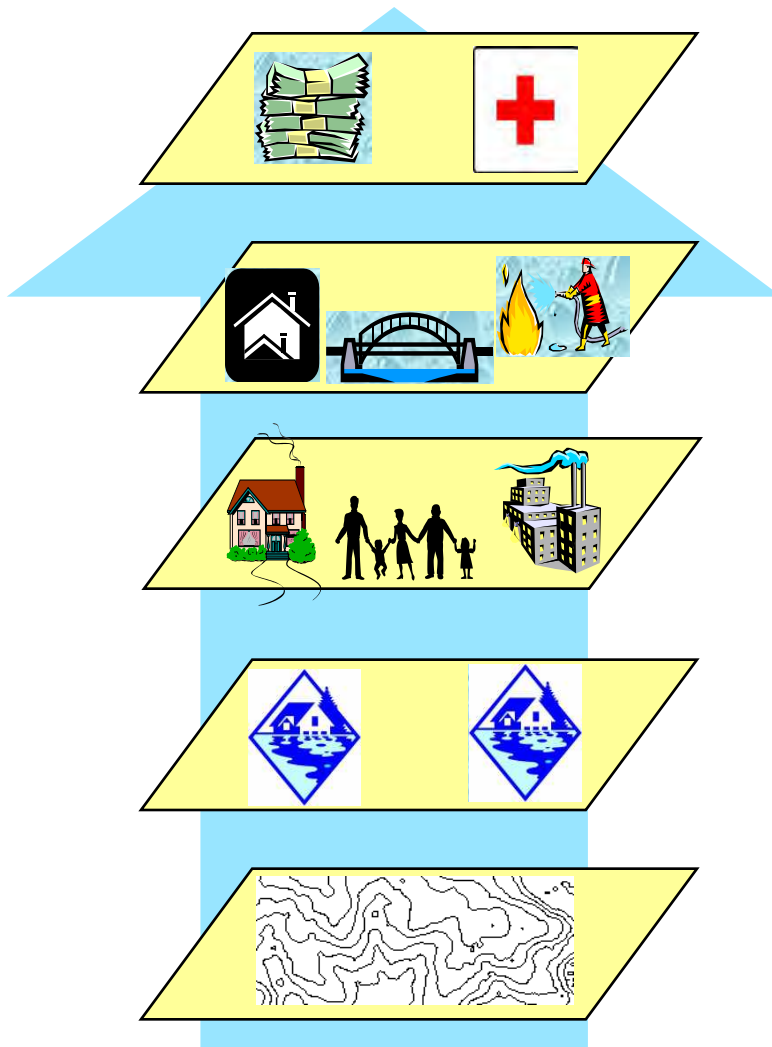
## Estimate Losses

-The "What Ifs" based on the previous 3 items



Assess Risk

# How HAZUS-MH estimates losses



**Produces maps, tables,  
and reports**

**Analyzes social and  
economic impacts**

**Considers what is at risk**

**Identifies hazard**

**Analyzes physical  
landscape**

# Levels Of Analysis

3  
Input  
of detailed  
engineering data

2  
Combination of local  
and default

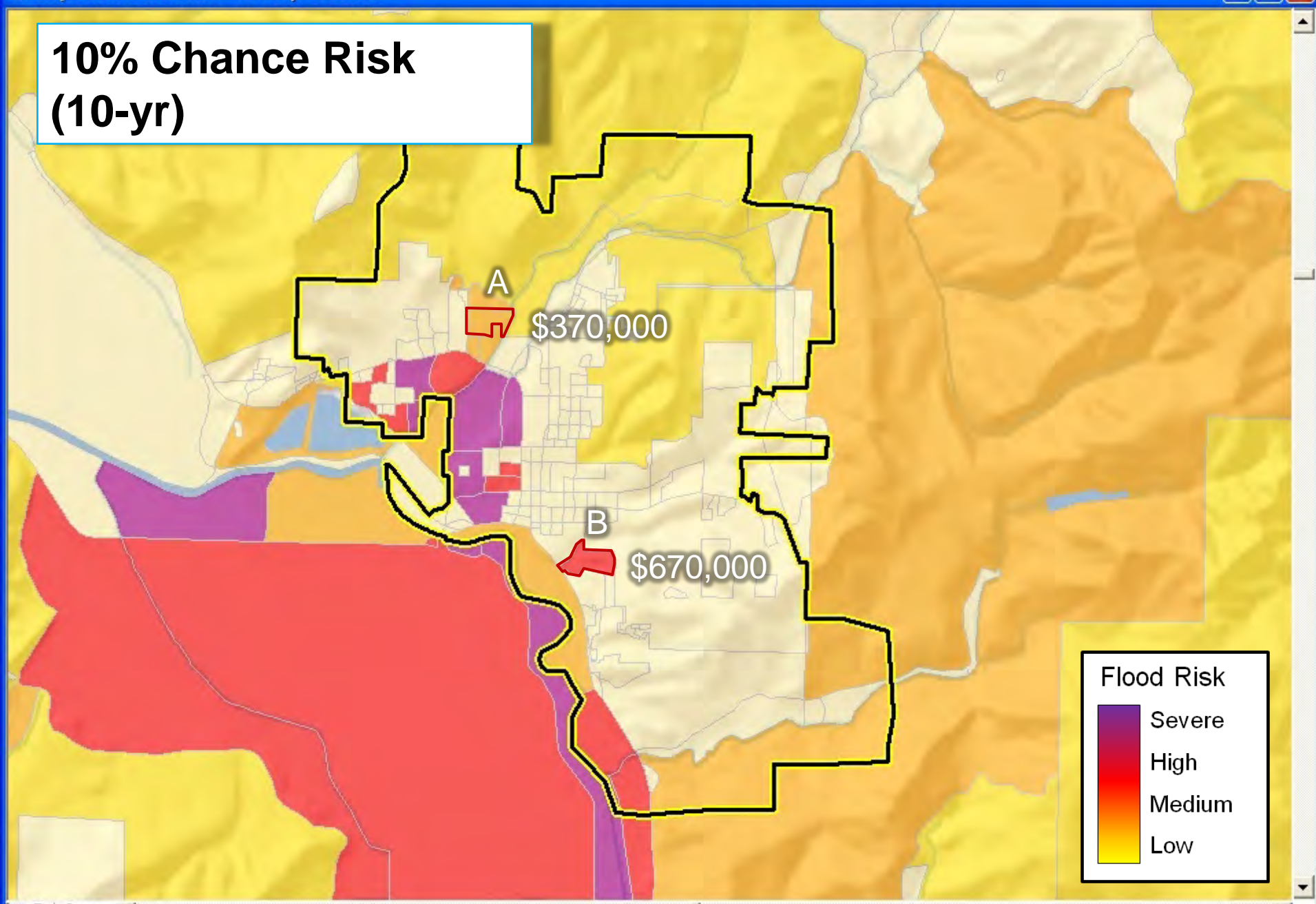
1  
Default hazard, inventory and  
damage information

User effort  
and  
proficiency

# HAZUS Outputs

	Earthquake Ground Shaking Ground Failure	Flood Frequency Depth Discharge Velocity	Hurricane Wind Pressure   Missile   Rain
<b>➤ Direct Damage</b>			
General Building Stock	✓	✓	✓
Essential Facilities	✓	✓	✓
High Potential Loss Facilities	✓		
Transportation Systems	✓	✓	
Utility Systems	✓	✓	
<b>➤ Induced Damage</b>			
Fire Following	✓		
Hazardous Materials Release	✓		
Debris Generation	✓	✓	✓
<b>➤ Direct Losses</b>			
Cost of Repair	✓	✓	✓
Income Loss	✓	✓	✓
Crop Damage		✓	
Casualties	✓	Generic Output	
Shelter Needs	✓	✓	✓
<b>➤ Indirect Losses</b>			
Supply Shortages	✓	✓	
Sales Decline	✓	✓	
Opportunity Costs	✓	✓	
Economic Loss	✓	✓	

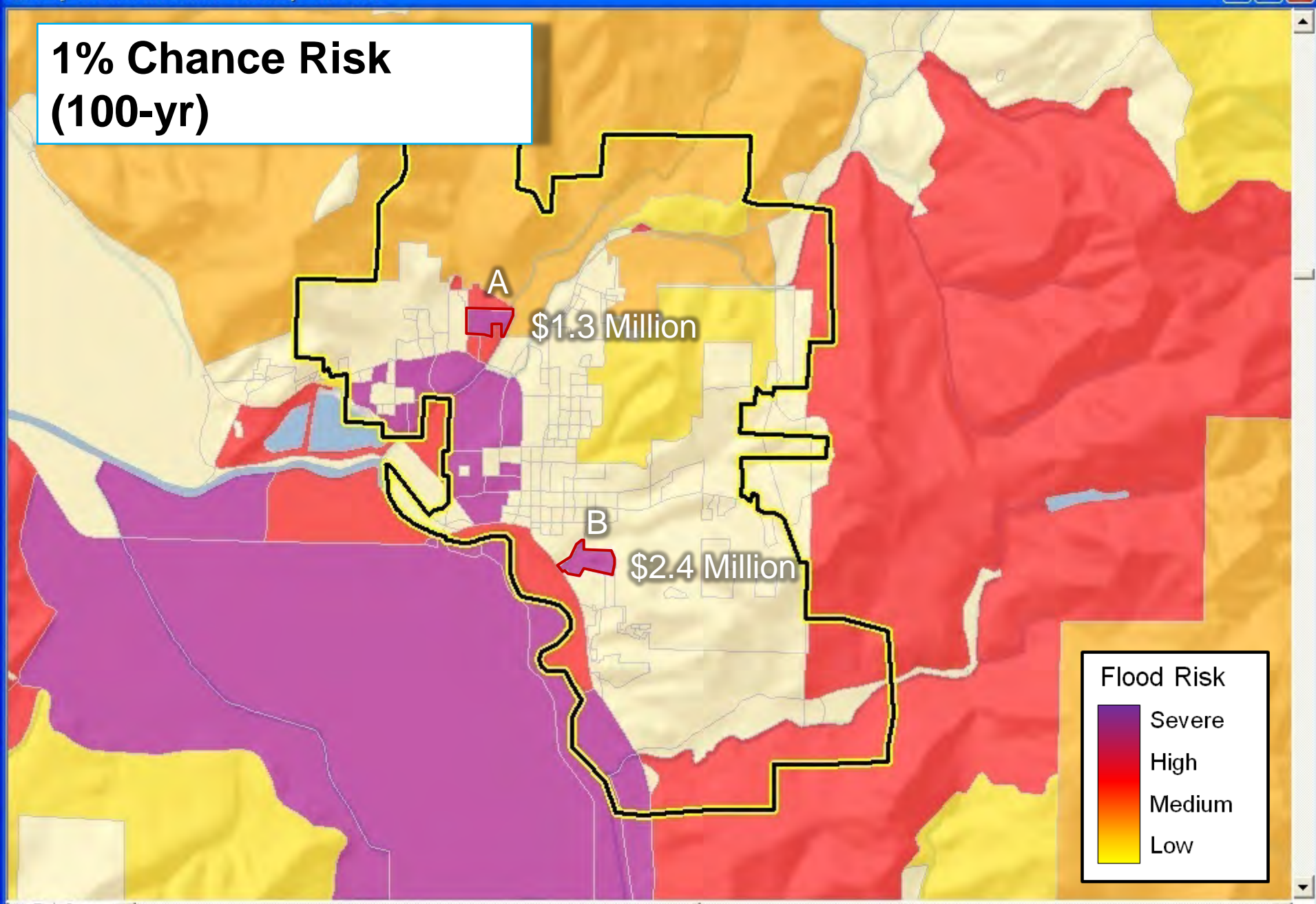
# 10% Chance Risk (10-yr)



**Flood Risk**

- Severe
- High
- Medium
- Low

# 1% Chance Risk (100-yr)



**Flood Risk**

- Severe
- High
- Medium
- Low

# HAZUS Reports

## Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

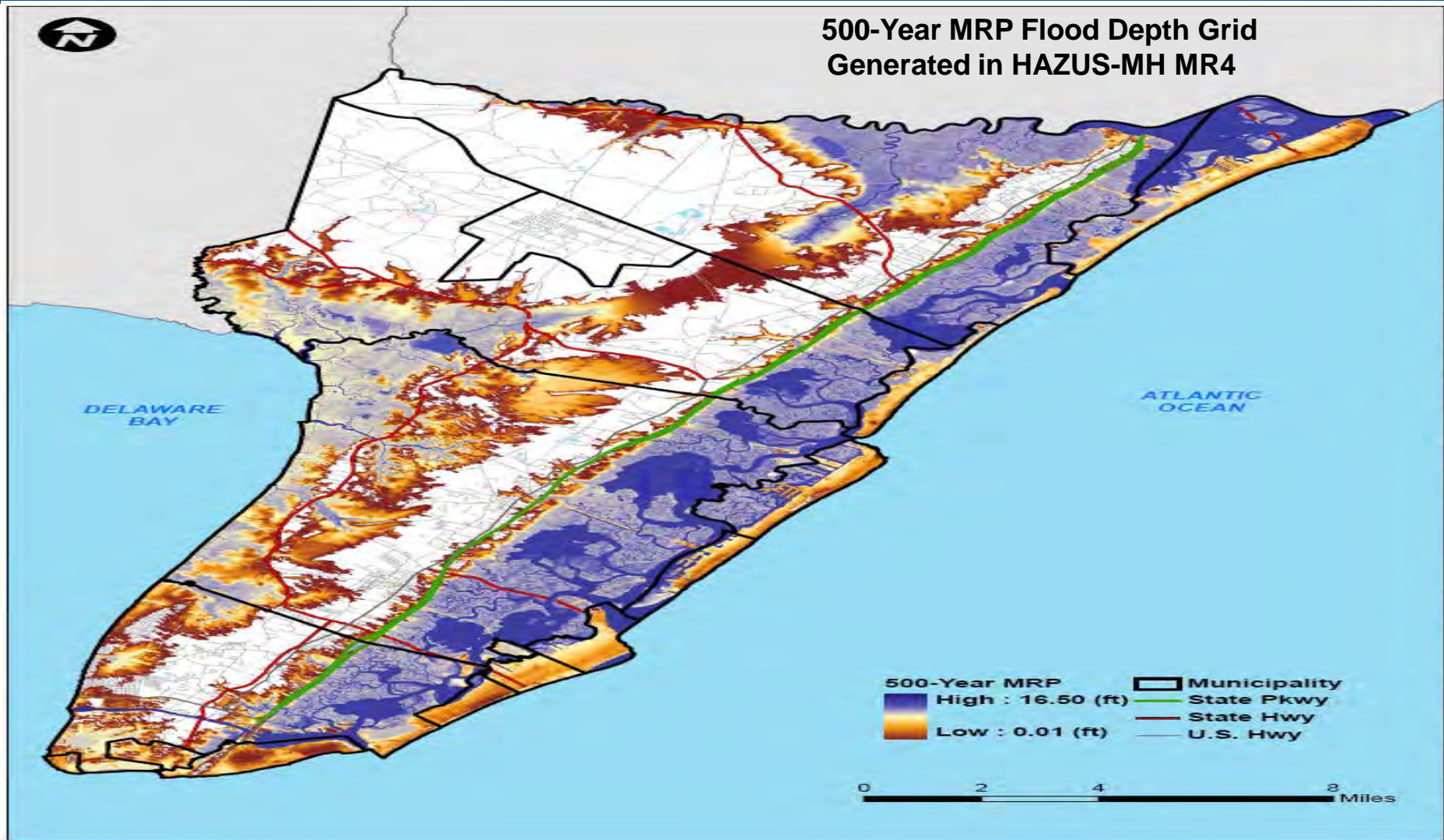
The model estimates that a total of 13,165 tons of debris will be generated. Of the total amount, Finishes comprises 67% of the total, Structure comprises 19% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 527 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Table 6: Building-Related Economic Loss Estimates  
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	59.47	82.13	42.28	1.73	185.61
	Content	37.20	212.31	118.13	9.00	376.65
	Inventory	0.00	9.57	14.09	0.10	23.77
	<b>Subtotal</b>	<b>96.67</b>	<b>304.02</b>	<b>174.50</b>	<b>10.83</b>	<b>586.02</b>
<u>Business Interruption</u>						
	Income	0.01	1.13	0.01	0.02	1.17
	Relocation	0.07	0.52	0.02	0.01	0.62
	Rental Income	0.08	0.27	0.00	0.00	0.35
	Wage	0.03	1.51	0.02	0.27	1.82
	<b>Subtotal</b>	<b>0.19</b>	<b>3.43</b>	<b>0.05</b>	<b>0.29</b>	<b>3.96</b>
<u>ALL</u>	<b>Total</b>	<b>96.86</b>	<b>307.45</b>	<b>174.55</b>	<b>11.12</b>	<b>589.98</b>



# Outcomes Mapped



# Other Outputs

- **Identify Areas and Communicate Relative Flood Risk:**
  - Flood prone areas.
  - Vulnerable people and property.
- **Provide Flood Risk \$:**
  - Potential damage severity for different flood frequencies.
  - Identify locations with possible cost effective mitigation options.
- **Shelter requirements**
  - Help communities and organizations to determine how many people they may need to shelter.
- **At Risk Critical Facilities**
  - Helps emergency managers to plan for alternatives and mitigation actions.

# Some Drawbacks

- **The uncertain nature of natural hazards.**
- **Analysis relies on the completeness of the data on inventory.**
  - *Ex: Default data is 10 years old.*
- **Estimation is a result of approximations and simplifications.**
  - *Ex: flood models are done on a census block level that is makes it more susceptible to rounding errors.*

# HAZUS–MH 2.0

## SYSTEM REQUIREMENTS

- 2.2 GHZ dual core or higher, 2 GB or higher of memory/RAM
- 10 GB of disk space (30 GB is needed for the entire US)
- 24-bit capable video card with a minimum of 128 MB memory
- MS Windows XP SP3 or Windows 7 Professional/Enterprise
- ESRI ArcGIS 10 SP1, but FEMA has older versions that are compatible with 9.3

# Ordering HAZUS-MH 2.0

Contact FEMA's Map Service Center (MSC)

<http://msc.fema.gov>

<i>Call:</i>	<i>Email:</i>
<b>1-877-336-2627</b>	<a href="mailto:mscservices@riskmapcds.com"><u>mscservices@riskmapcds.com</u></a>

*The MSC is the official government distribution center for digital and paper flood hazard mapping products created by FEMA. Customer Service Representatives are available to answer any questions.*

# Resources

- **ESRI Virtual Campus Online Courses** [training.esri.com](http://training.esri.com)
  - HAZUS-MH Overview and Installation
  - Introduction to Using HAZUS-MH for Hurricane Loss Estimation
  - Using HAZUS-MH to Assess Losses from a Riverine Flood Hazard
  - Using HAZUS-MH for Earthquake Loss Estimation
  - Integrating User-Supplied Hazard Data into the HAZUS-MH Flood Model
  - HAZUS-MH Flood Model Output and Applications
  - HAZUS-MH for Decision Makers
  
- **FEMA HAZUS:** <http://www.fema.gov/plan/prevent/hazus/index.shtm>
- **Using HAZUS:** [http://www.fema.gov/plan/prevent/hazus/hz\\_app.shtm](http://www.fema.gov/plan/prevent/hazus/hz_app.shtm)
- **HAZUS Users:** <http://www.hazus.org>
- **National Tool:** [http://www.fema.gov/plan/prevent/floodplain/data\\_tool.shtm](http://www.fema.gov/plan/prevent/floodplain/data_tool.shtm)
- **SDE:** <http://www.fema.gov/library/viewRecord.do?id=4166>

# Resources

- **FEMA:** [www.fema.gov](http://www.fema.gov)
- **Floodsmart, the official site of the National Flood Insurance Program (NFIP):** [www.floodsmart.gov](http://www.floodsmart.gov)
- **Risk Assessment, Mapping and Planning Partners:** [www.RAMPP-team.com](http://www.RAMPP-team.com)
- **NFIP Reform:** [www.fema.gov/business/nfip/nfip\\_reform.shtm](http://www.fema.gov/business/nfip/nfip_reform.shtm)
- **Hazus-MH software:** <http://www.fema.gov/plan/prevent/hazus/index.shtm>
- **Hazus User Groups:** [http://www.fema.gov/plan/prevent/hazus/hz\\_users.shtm#4](http://www.fema.gov/plan/prevent/hazus/hz_users.shtm#4)
- **National Tool software:**  
[http://www.fema.gov/plan/prevent/floodplain/data\\_tool.shtm](http://www.fema.gov/plan/prevent/floodplain/data_tool.shtm)
- **Substantial Damage Estimator (SDE):**  
<http://www.fema.gov/library/viewRecord.do?id=4166>
- **Risk MAP Non-Regulatory Products:** Appendix N and O (will go effective soon)
- New York Department of Environmental Conservation - NFIP Coordinator
- New York State Office of Emergency Management