

**Title:** ArcGIS, HAZUS-MH, and MitigationPlan.com: Arkansas' Mitigation Strategy

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### **ABSTRACT**

Combining HAZUS-MH (FEMA's newest loss estimation model running on the ArcGIS 8.3 platform) with MitigationPlan.com (the Visual Risk Technologies Hazard Mitigation Planning System), the State of Arkansas Department of Emergency Management developed a unique method of incorporating county mitigation plans into the State Plan with the click of a button. Contracting with private consultants, Arkansas was able to streamline the planning process to create their statewide plan as counties developed individual plans. Integrating the methodologies set forth in FEMA's "How-to Guides", HAZUS-MH generated reports and maps to develop "what-if" scenarios to determine the best mitigation strategies for counties to pursue, saving lives, property, and tax dollars.

### **INTRODUCTION**

HAZUS-MH, which stands for Hazards US Multi-Hazard, was funded by FEMA to provide a standard method of loss estimation for hazards such as earthquake, hurricane and flood. Developers chose the ArcGIS 8.3 platform on which to build their customized application because of its ability to perform complex functions quickly and efficiently. With the geodatabase structure, multiple data sets may be imported and allow users to view the spatial data in maps in an easy to understand format.



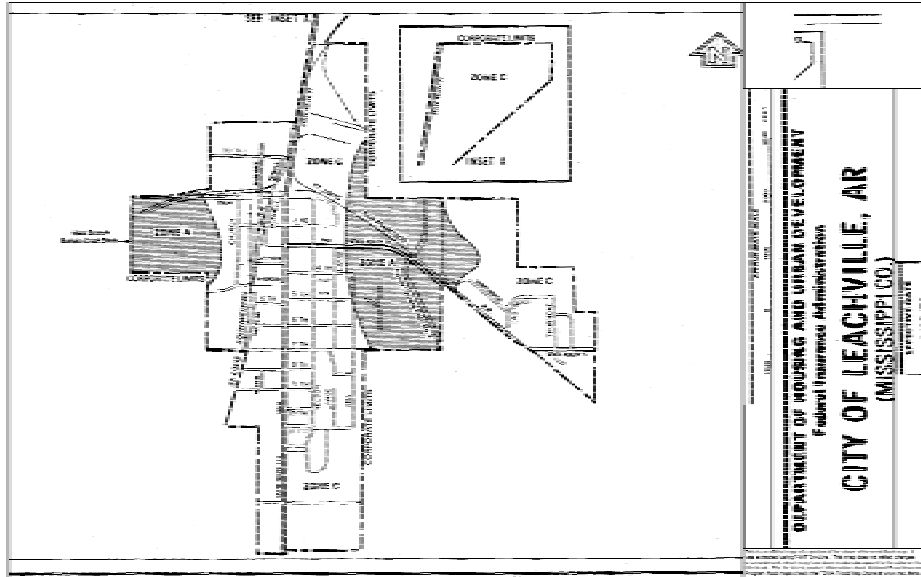
## METHODOLOGY

For the flood module, the Spatial Analyst extension was chosen. Because of its unique integration and function within the geodatabase environment, which is able to analyze vector and raster data to create reports and maps, users are able to display water elevations, model potential flood areas and perform vulnerability assessments. Using Census 2000 block-level data, the flood model calculates complex hydraulics and hydrology analysis based on imported digital elevation models of study regions, USGS stream-gage data and pre-defined damage curves. It is able to perform what-if functions, such as the long-term impact to building inventory, shore protection (for coastal regions), addition of levees or flow regulation stations. Channel cross-sections are created and analyzed to determine the boundary of floodwaters, which is then checked against the inventory database to show what areas could be damaged.

### VALIDATION PROCESS:

ArcView map  
utilizing Q3  
data layer





FEMA anticipates development of an expanded wind module in 2005. At this time, only hurricane is addressed, however, depending on available funding, thunderstorm, hail and tornado are slated for future releases. It is hoped that communities besieged by natural hazards will embrace HAZUS-MH to perform risk and vulnerability assessments to determine the best mitigation measures to undertake.

According to FEMA Region 6, the Arkansas Department of Emergency Management (ADEM) was the most successful of all states in Region 6 in receiving grant money for Pre-Disaster Mitigation. The agency chose to utilize the funds in three phases:

- 1) Provide data and educational outreach to emergency managers in the use of ArcGIS and HAZUS-MH
- 2) Developing an online mitigation website following FEMA "How-to" series 386 workbooks to input plans and
- 3) Providing funding for individual counties' mitigation plan writing.

The first two items were accomplished by combining the skills of:

- An ESRI Authorized Training Site (University of Arkansas-Little Rock GIS Lab)
- An ESRI Authorized Developer (VisualRisk Technologies) and
- An ESRI Authorized Instructor (Rusti Liner)
- Two FEMA Trained HAZUS-MH instructors (Geofemme)

for a week-long class instructing emergency managers on how to meet the requirements of the Disaster Mitigation Act of 2000 (DMA2K) using the mitigation website and HAZUS-MH.

UALR Environmental Geology professor, Dr. Jeffery Connelly, provided invaluable data for all class participants to import into ArcView and use with HAZUS-MH in addition to instructing participants in FEMA's 386 "How-to" series.

Mr. Fulton Would of Nashville-based VisualRisk provided instruction in how to navigate and utilize their mitigation website that, in their words:

"...consists of a user-friendly, password-protected website that allows users to enter detailed information about their community, potential and known hazards that affect their areas, and mitigation projects under consideration."<sup>1</sup>



As communities upload their mitigation plans, they are instantly integrated into the State Plan.

Finally, ESRI authorized instructor Rusti Liner and her Geofemme partner, Mary Sharp, provided training on the HAZUS-MH software.

<sup>1</sup> [https://www.mitigationplan.com/MP1\\_MASTER1/DevDefault.asp](https://www.mitigationplan.com/MP1_MASTER1/DevDefault.asp), June 24, 2004

## **CONCLUSION**

ADEM selected Mississippi County, Arkansas as the Pilot Project for the state's first Natural Hazard Mitigation Plan, which was submitted to ADEM on June 23, 2004. It is currently undergoing review and will be submitted to FEMA after meeting all crosswalk items required by the Disaster Mitigation Act of 2000 (DMA2K). Once approved by FEMA, and contingent on the approval of the Arkansas State Mitigation Plan, the residents of Mississippi County will be eligible to receive additional grant funding to assist in carrying out their mitigation goals and plans.

The State of Arkansas has seen the successful merger of customized GIS applications with Internet technology in ESRI's ArcView, FEMA's HAZUS-MH and VisualRisk's mitigation.com website, enabling them to save lives and taxpayer money.

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