Georgia Flood M.A.P. Program

Flood Risk Assessment in the Upper Chattahoochee River Basin

GAFM Annual Conference
March 28, 2012
Agenda

• Map Mod to Risk MAP (Georgia Flood M.A.P.) transition
• Flood Risk Assessment process
• Flood Risk Datasets and Products
• Hazus loss estimation analysis
• Questions
Paradigm Shift: Map Mod to Risk MAP

- Map Modernization used increasingly-available technology to increase the quality, reliability, and availability of flood hazard maps and data
- It focused on digitizing maps to provide timely, accurate information to community planners

Risk MAP further enhances the maps, involves communities during the assessment and planning stages, and guides and encourages them to communicate risk to their constituents
Traditional products are regulatory and subject to statutory due-process requirements.

Risk MAP products are non-regulatory and are not subject to statutory due-process requirements.
Flood Risk Assessment

- Quantitative flood hazard data is used in combination with qualitative data and potential flood loss calculations to analyze flood risk vulnerability to exposed infrastructure, building and contents, business, and people.
  - Understand where flood hazards exist and assess the associated flood risk to the built environment
  - Communicate flood risk to stakeholders
  - Increase flood risk awareness and understanding
  - Enable actionable mitigation strategies
  - Facilitate implementation of those mitigation strategies at the local level
Flood Risk Assessment Process

**Figure 3: Flood Risk Assessment Process**

1. **STEP 1** Identify flooding sources for development of flood hazard and flood risk data; perform comprehensive flood risk data mining.
2. **STEP 2** Perform preliminary flood risk triage using data gathered in Step 1 to identify and target high risk hot spots.
3. **STEP 3** Create Discovery Map and Prepare for Discovery Meeting.
4. **STEP 4** Conduct Discovery Meeting; perform First Pass Analysis and make decisions on flood risk dataset creation elements.
5. **STEP 5** If needed, perform supplemental data mining at the local level to enable creation of flood risk datasets and associated enhancements.
6. **STEP 6** Perform hydrologic and hydraulic analyses; then create companion flood risk data (depth grids, etc.) and quantify flood risk.
7. **STEP 7** Create and communicate draft Flood Risk Dataset and Products.
8. **STEP 8** Create and deliver final Flood Risk Report, Flood Risk Map, and Flood Risk Database.
9. **STEP 9** Use Flood Risk datasets and products to communicate flood risk and assist with implementation of local mitigation activities. Measure and monitor costs vs potential benefits to risk reduction.

Decision Point #1

- **Yes**: Do the results of Steps 1-5 validate reasonably well stakeholder needs?
- **No**: Go back to Step 1.

Decision Point #2

- **Yes**: Do draft flood risk data and products meet stakeholder expectations?
- **No**: Revisit previous steps.

**NOTE:** Additional steps may be required based on local conditions and stakeholder requirements.
FEMA Appendix N & O

- Guidelines and Specifications for Flood Hazard Mapping Partners
- Google: *fema fhm guidelines*
Flood Risk Datasets & Products

• Four Flood Risk Datasets
  – Changes Since Last FIRM
  – Flood Depth and Analysis Rasters
  – Areas of Mitigation Interest
  – Flood Risk Assessment Results

• Three Flood Risk Products
  – Flood Risk Database
  – Flood Risk Report
  – Flood Risk Map
Changes Since Last FIRM

- Compares horizontal difference in floodplains
- Used in FRD and for outreach
Flood Depth Grids

• Subtract Terrain from WSEL
• Basis for all further grid analysis
• One grid created for each return period
Percent Annual Chance Grid
Percent 30-Year Chance Grid

Percent 30-Year Chance of Flooding:
- 5 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100%
Other Flood Risk Analysis Grids

- Water Surface Elevation Change Grids
  - Vertical equivalent to CSLF
- Riverine Velocity Grids
  - Insight into potential mitigation opportunities
- 1% Plus Flood Elevation
  - Highlights uncertainty in the hydrologic model
Areas of Mitigation Interest

- Procured during Discovery
  - Dams
  - Levee and non-levee embankments
  - Areas of stream flow constriction
  - Coastal structures
  - At risk critical facilities
  - Past claims hot spots
  - Individual Assistance and Public Assistance claim areas
  - Areas of significant land use change
  - Areas of significant coastal or riverine erosion
Forsyth County Study

- Extensive parcel data available (60,000+ parcels)
- Building footprints
- New SFHAs developed for current Risk MAP study
Atkins’ FloodMap Desktop

- ArcGIS extension
- Support for new non-regulatory products
  - Discovery module
  - Risk MAP DFIRM module
  - Flood Insurance Study Report
  - Flood Risk Module

Floodmapdesktop.com
Forsyth County
Flood Risk Database
• Potential flood damage estimates from flood depth analysis of the built environment

• Two data sources:
  – Hazus AAL analysis
  – Refined Hazus analysis
    o The AAL and refined results combined in a “Composite” dataset or the “Best available flood risk results”
    o Data populates the Flood Risk Database tables used by the Flood Risk Report and Flood Risk Map
Hazus AAL Study

- FY 2010 Hazus Average Annualized Flood Loss (AAL) Study
- National county-based Level 1 Hazus riverine and coastal analysis
- Census block-based loss estimates using “out-of-the-box” Hazus GBS inventory data
Refined Hazus Analysis – Buildings

• Use locally-supplied building stock to update the default data that comes pre-packaged with Hazus

• Use terrain data with a greater resolution than 30 meter USGS DEM data

• Perform site-specific and structure-specific flood loss assessments rather than calculating losses at the census-block level
Refined Hazus Analysis – Depth Grids

• Hazus dataset creation requires the following depth grids be used:
  ─ 10% annual chance (10-year)
  ─ 4% annual chance (25-year)
  ─ 2% annual chance (50-year)
  ─ 1% annual chance (100-year)
  ─ 0.2% annual chance (500-year)
Building Replacement Value (BRV) Tool

• Rapid calculation of an approximate residential BRV for large numbers of properties using existing assessor’s information
  —Occupancy, square footage, construction type, age, number of stories, basement, location factor

• Output is the foundation for Hazus analysis
Building Replacement Value (BRV) Tool

- Uses RS Means for cost information to provide accurate estimates of project costs
Hazus UDF Tip
Hazus – 2010 Census

- Not available for Hazus yet (Hazus still using 2000), but can update with ACS projections
- Tract and block geometries vary from 2000 to 2010 datasets
Forsyth County Flood Risk Map
Forsyth County Flood Risk Report

Flood Risk Report
Forsyth County

Georgia

*Spans more than one watershed. This report covers only the area within the studied watershed.
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Draft/Final
Questions

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