Delaware River Flood Inundation Mapping Effort

General Overview

- Inundation mapping and structure surveys prepared under multiple Corps studies
- Utilized existing hydraulic models and best available digital base data due to time & budget constraints
- Created flood inundation maps for about 100-miles of the main stem Delaware River and select other areas
- Economic component for damage centers
- Two products to be used for planning purposes:
  - Stand-alone GIS application for Emergency Managers
  - NWS/AHPS inundation mapping available to the public
Data and Analysis

• Existing hydraulic models from 1996 & 1999 FEMA Flood Insurance Study (Main Stem Delaware River): Run multiple flood scenarios at 1-foot increments.

• Available digital topography: Develop digital floodplains for all flood scenarios; depth of interior flooding at select structures

• Once modeling and mapping was developed, it was tested against high water marks, any new data that was available, and NWS impact statements with satisfactory results.

• User input at one or more river forecast points on main stem by stage/elevation

• Damage estimates for each flood scenario are available for limited number of structures in database
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Structure Inventory

- Type of data Collected:
  - First floor elevation
  - Digital photos
  - Type of building
  - Value of structure and contents

New Jersey
Belvidere: 73 Residential, 20 Commercial
Harmony: 143 Residential, 3 Commercial
Lambertville: 109 Residential, 63 Commercial
Stockton: 95 Residential, 33 Commercial

Pennsylvania
Easton: 18 Residential, 80 Commercial
New Hope: 88 Residential, 68 Commercial
Upper Makefield: 318 Residential, 48 Commercial
Yardley: 282 Residential, 35 Commercial
NWS Coordination

- Map layers created, edited, QA/QC’ed for nine forecast points (Trenton, New Hope-Lambertville, Stockton, Frenchtown, Riegelsville, Easton-Phillipsburg, Belvidere, Montague, Port Jervis)
- Hydraulic profiles run for increments <= 1-foot
- Submission to NWS: Lowest inundation level depth grid & 33 shapefiles covering range of flooding for each forecast point
- NWS has their own review process. Most forecast points went through 4 or 5 submissions before considered final
• Topographic data limitations (some areas use 4-foot contour interval)
• Supporting hydraulic modeling is old
• Static mapping; no real-time calculations of flood depths
• NWS forecast limitations will carry through
• Not meant to be used for flood depths in the channel
• Quick: static mapping means displays are readily available
• User can add their own data easily as overlay/underlay
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- Stand alone GIS application runs with ArcMap 9.x
- Graphical user interface added as custom toolbar
- Screen shots follow that illustrate function of each button on toolbar
- Input @ one or more gage forecast points

- "Map Forecast" displays flooding for area of interest (near gage point)
- Zoom location option (drop down menu) allows you to save specific map limits as area of interest
- This allows for easy comparison of different flood scenarios at the same location
-Flood Depth tool allows you to check depth of flooding at any location within inundation area
-Select structures contain demographic, elevation, and economic data; plus digital photographs
-Economic data can be rendered as potential damages by community & county (based on depth of flooding)
Specific structures can be selected in GIS; potential damages and interior depth of flooding expected are displayed with structure owner & address.
- Flood Impact Response Tables are fully customizable by municipality
- Forecasted flood stage is highlighted