Using LiDAR for Floodplain Mapping

KGS Annual Meeting

May 16, 2014

Division of Water

Department for Environmental Protection
Energy & Environment Cabinet

To Protect and Enhance Kentucky's Environment

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Risk MAP in Kentucky

- Risk Mapping, Assessment, and Planning (Risk MAP) is a collaborative effort that will provide communities with flood information and tools they can use to better protect their citizens.
  - Builds on traditional

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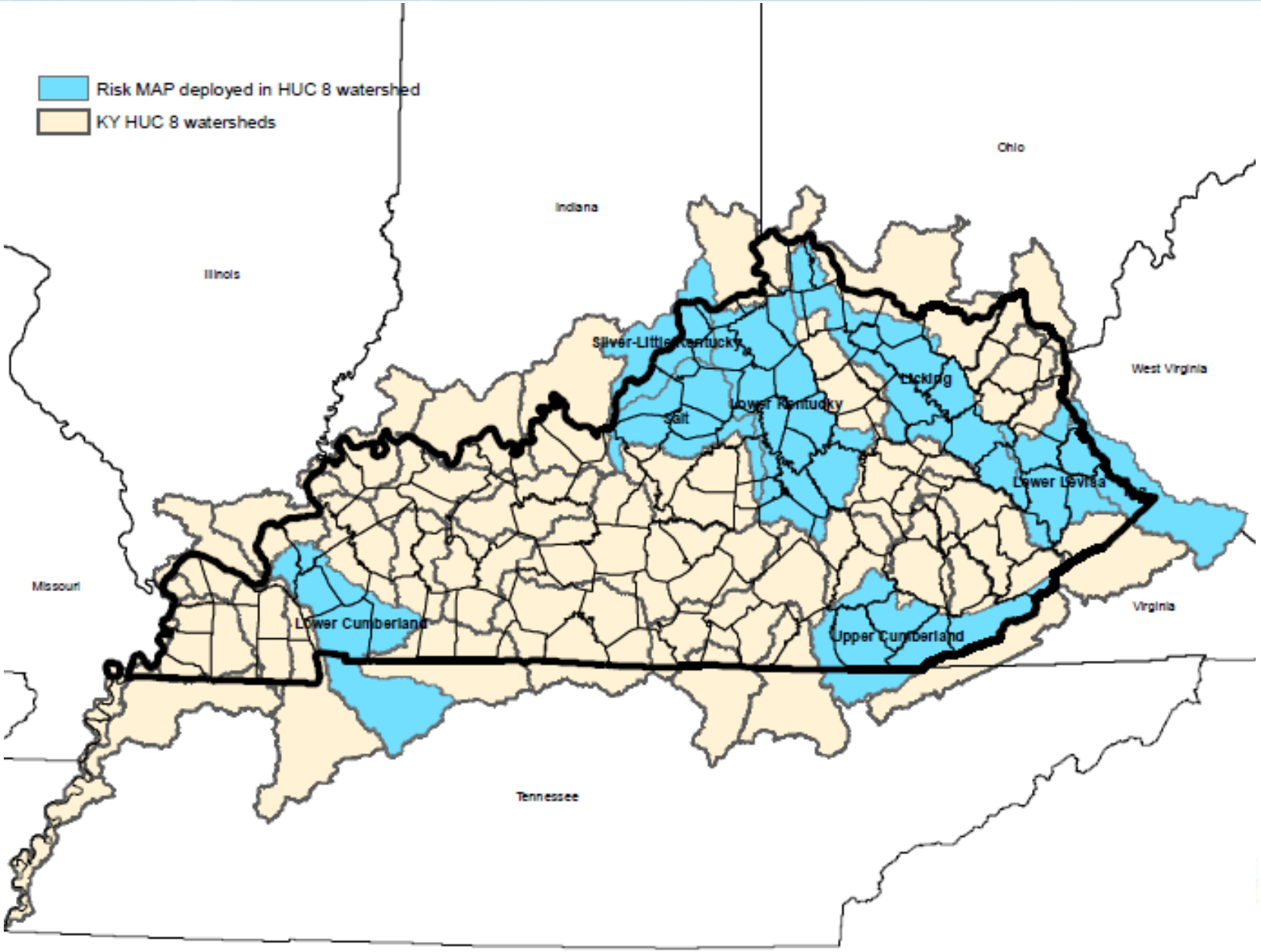
Risk MAP Deployment



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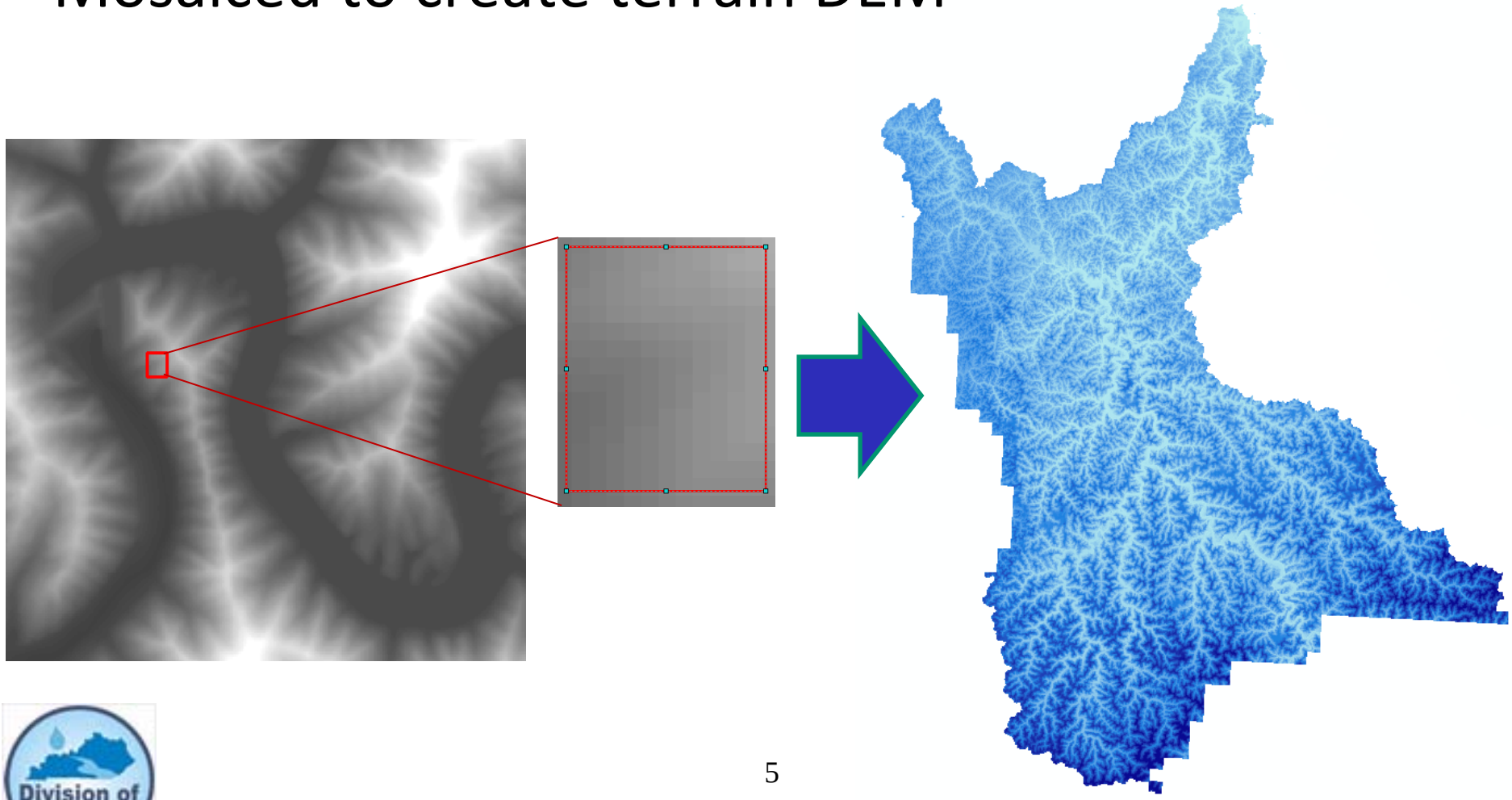
LiDAR for Floodplain Mapping

- Used for:
  - Base terrain layer
  - Hydraulic analyses
  - Floodplain delineation
  - Non-regulatory Risk MAP datasets

Base Terrain Layer

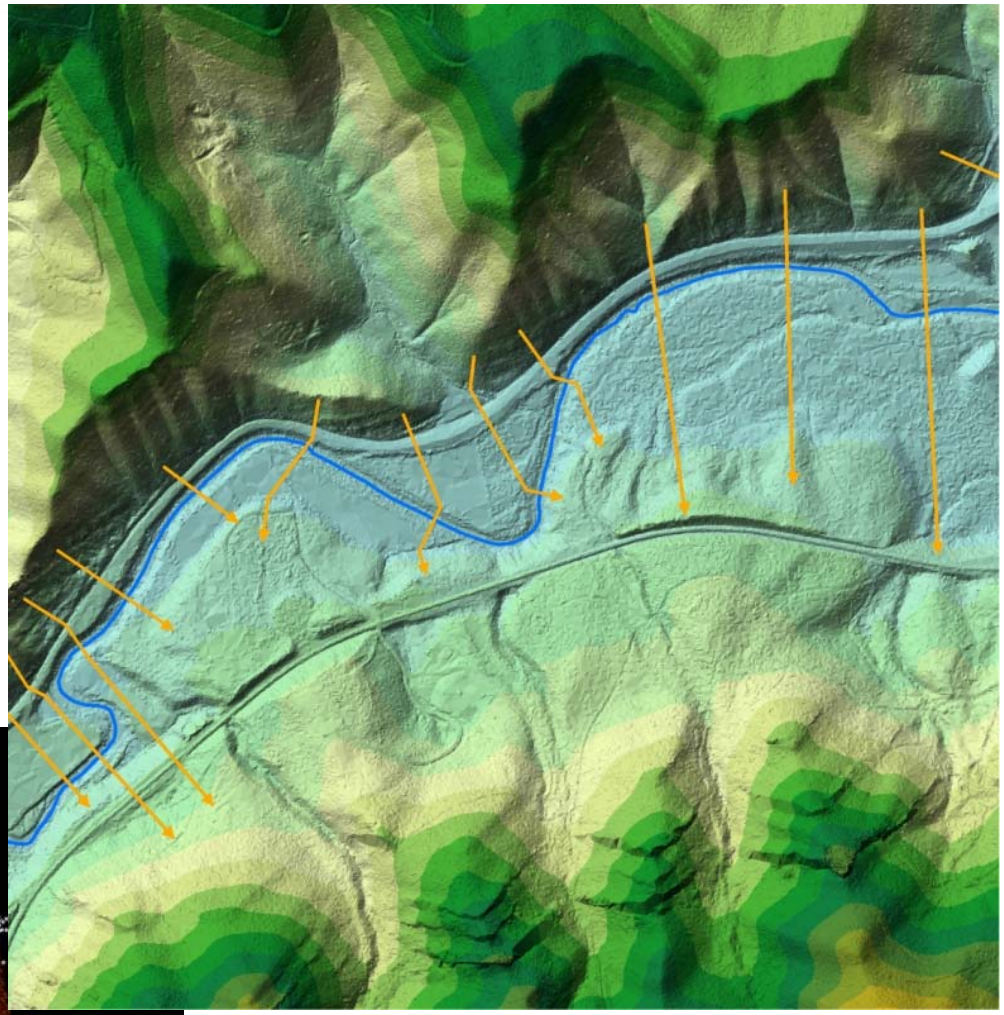
- 5ft cell size DEMs
- Mosaiced to create terrain DEM



LOWER LEVISA WATERSHED DEM

Hydraulic Analyses

- Creation of modeling cross sections
- Identification of hydraulic structures
  - Bridges
  - Culverts



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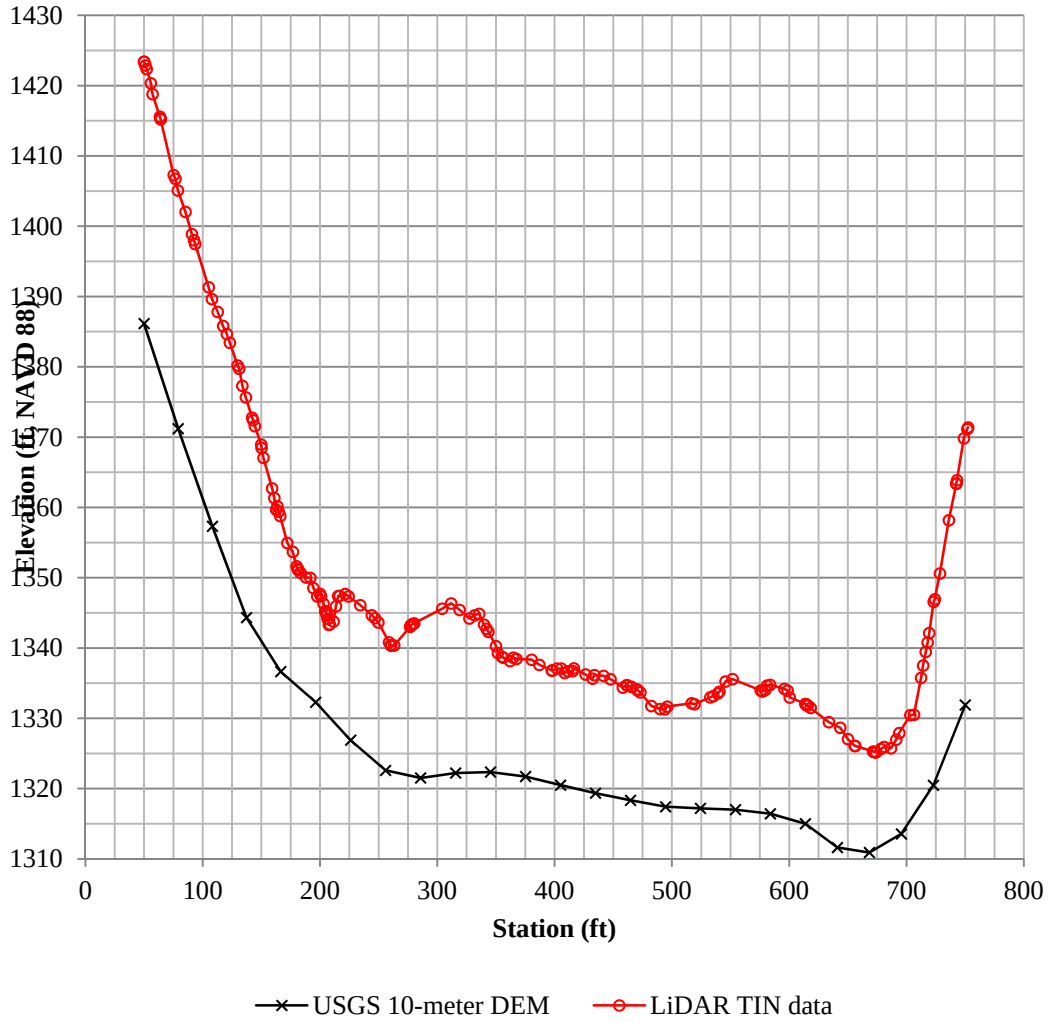
Hydraulic Cross Sections

Cross-section profile of USGS 10-meter DEM and LiDAR-based TIN data



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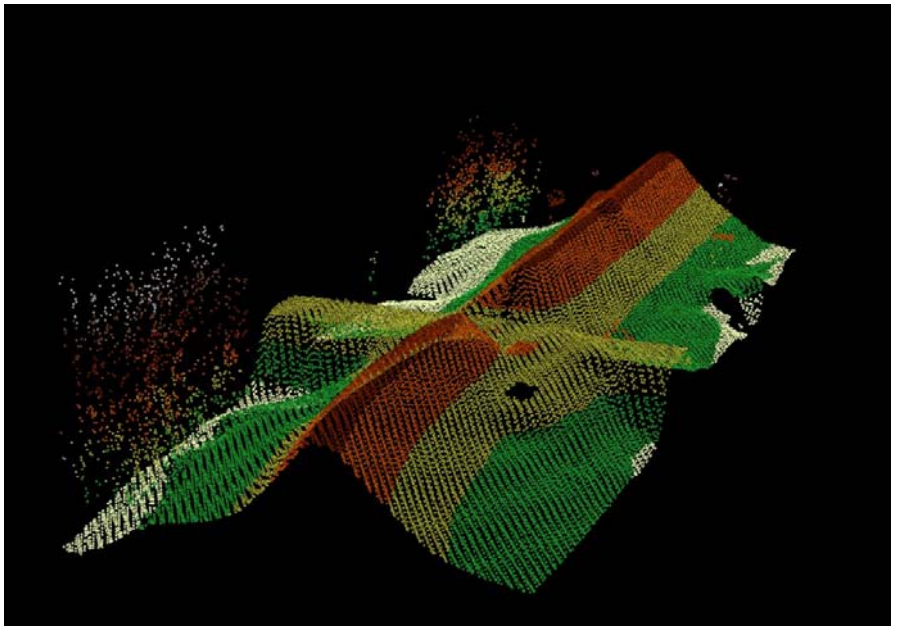
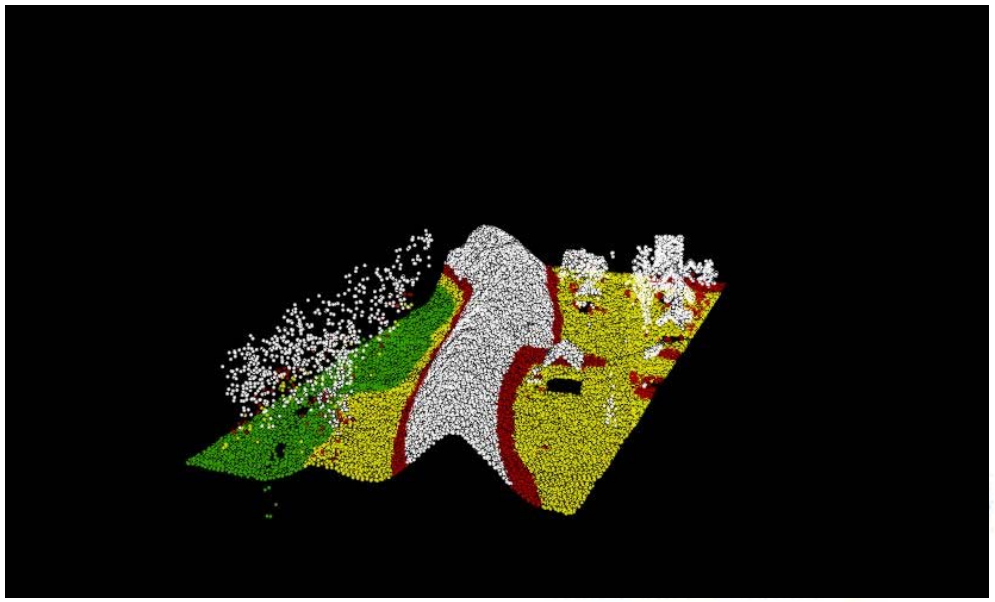
Levee Analyses and Mapping

- FEMA Levee Analysis and Mapping Procedures pilot project
  - Condition of levee
  - Closures
  - Mapping





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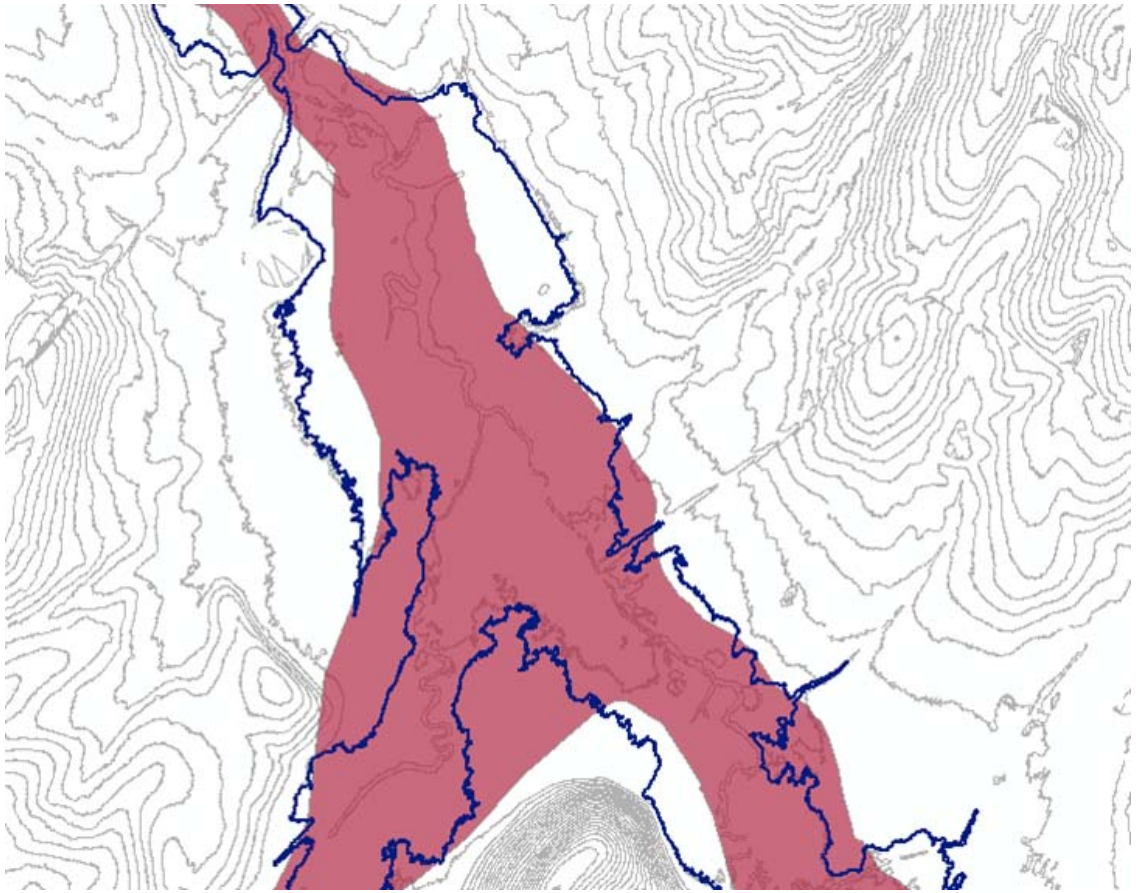
Floodplain Delineation

- More precise identification of flood hazard areas
- Useful for
  - New studies
  - Redelineation of older studies
- LiDAR DEM
  - 15 cm RSME
- NED 10M DEM
  - +/- ½ contour interval



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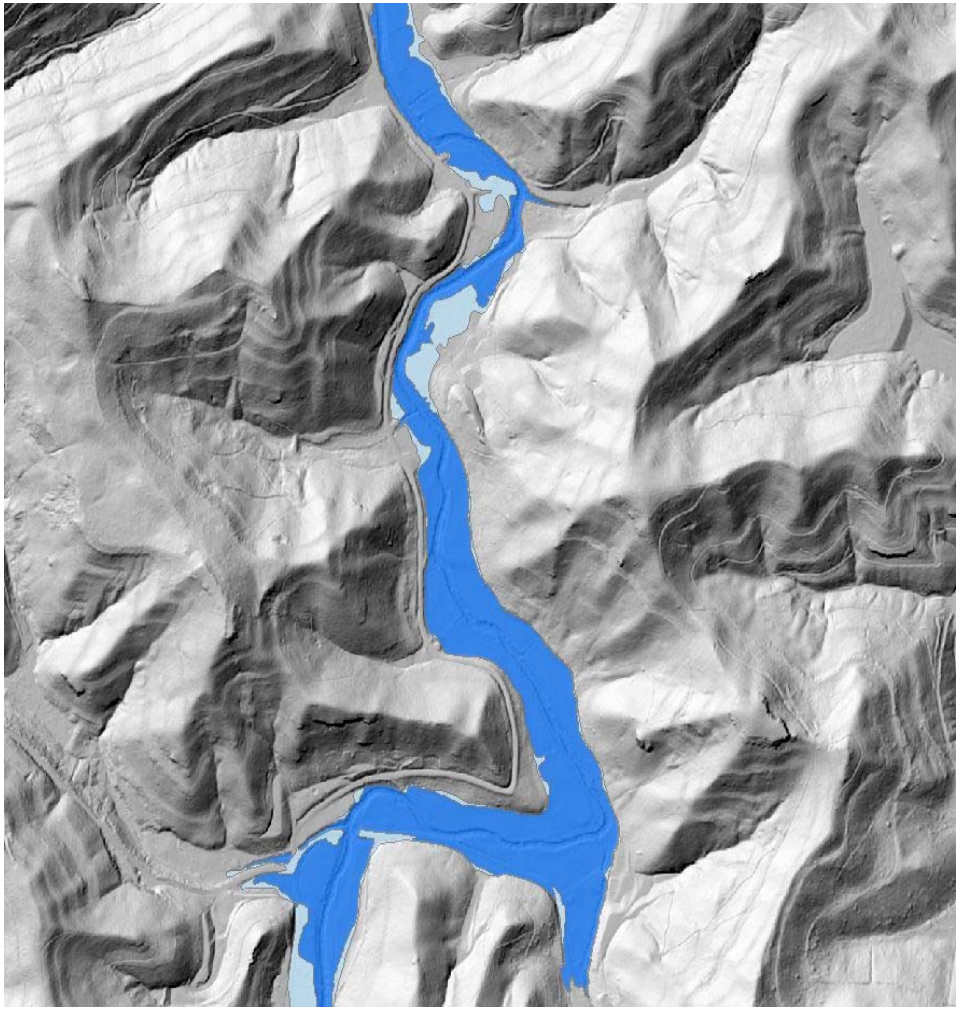
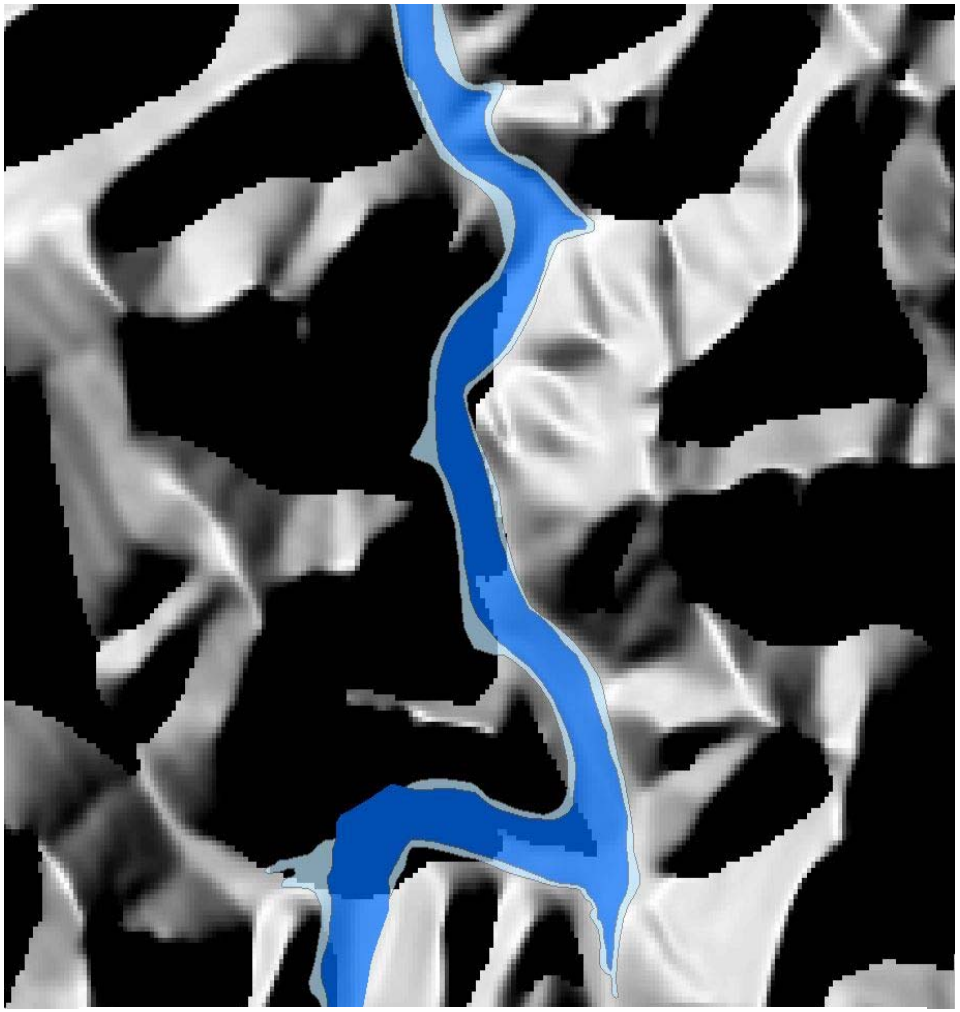
Floodplain Delineation

Poor Fork – Harlan County



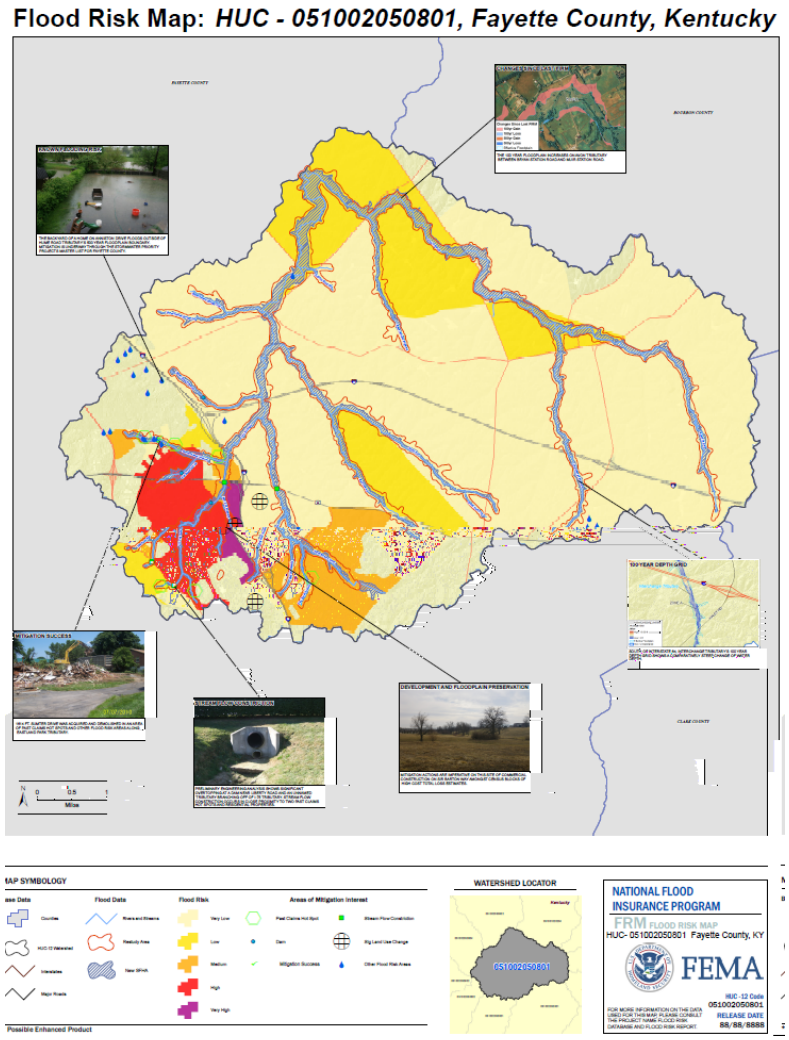
LiDAR Floodplain (1% & 0.2 % annual chance floodplain)



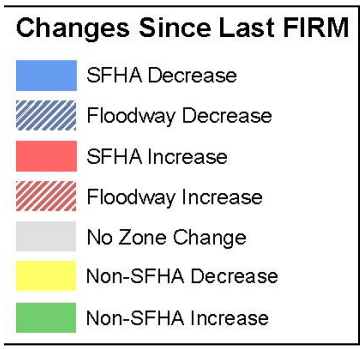
10M DEM Floodplain (1% & 0.2% annual chance floodplain)

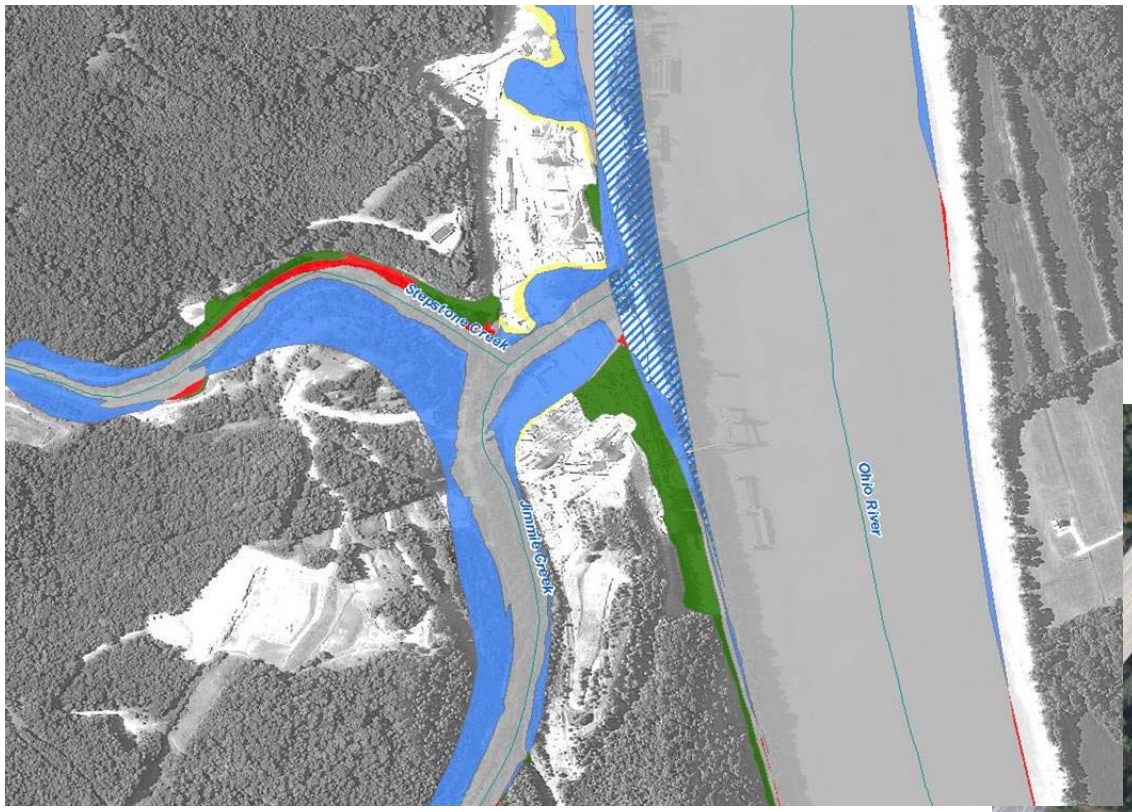
Risk MAP Datasets

- Non-regulatory datasets to better communicate flood risk
  - Changes Since last FIRM
  - Flood Depth and Analysis Grids
  - HAZUS risk assessment



Changes Since Last FIRM

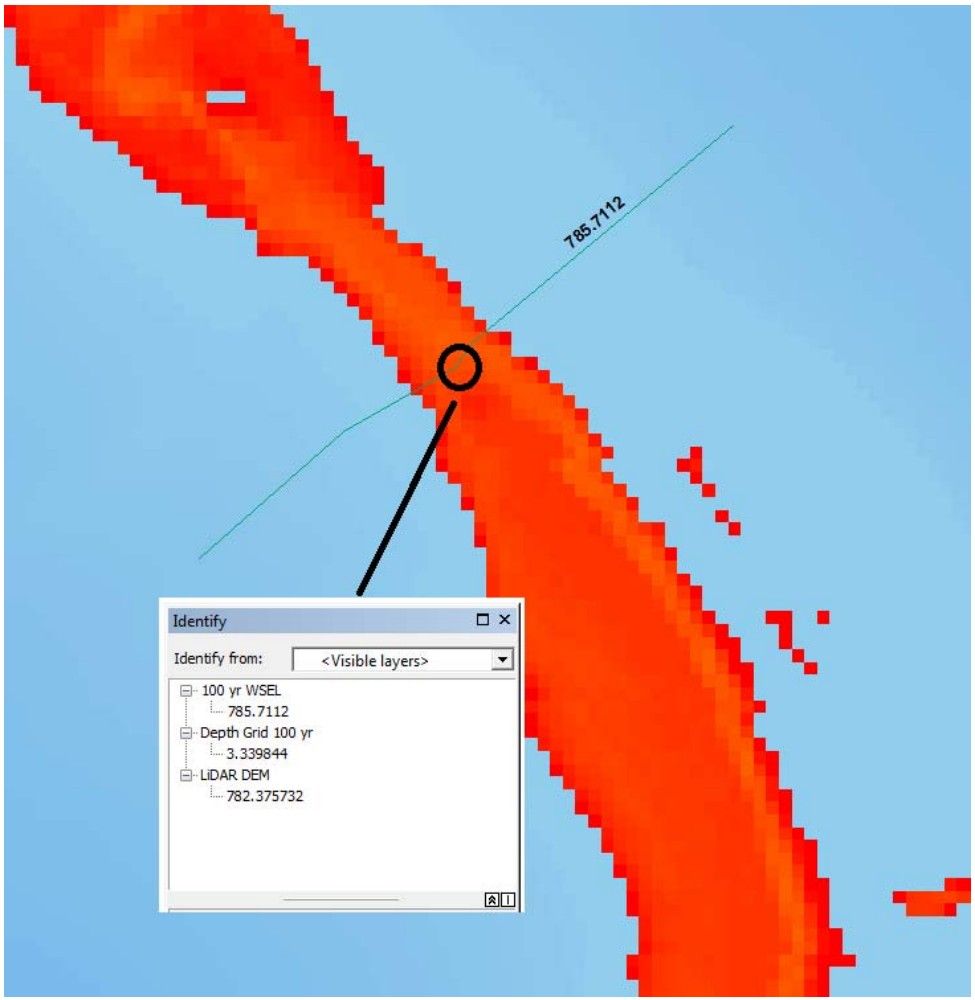




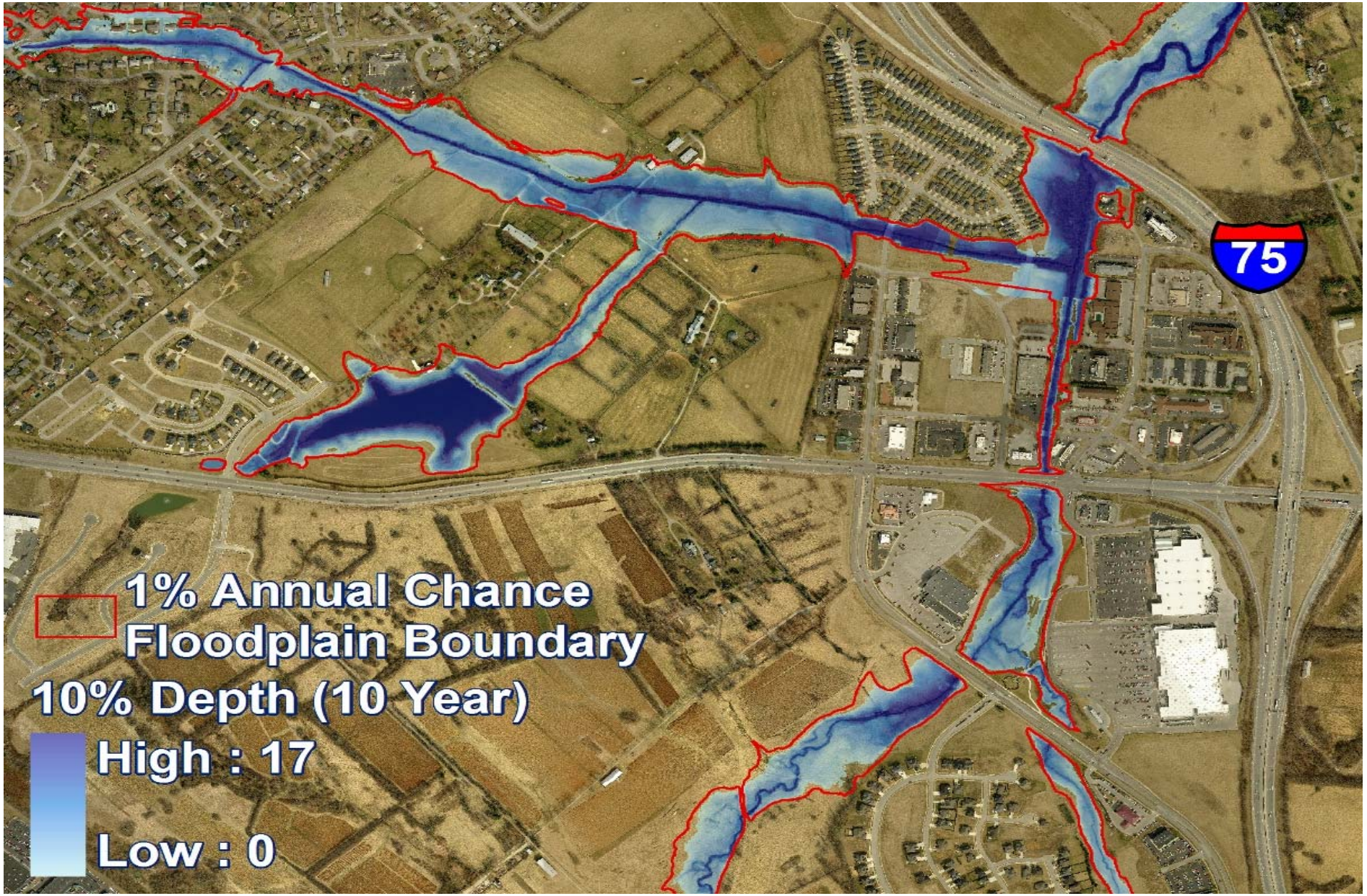
- Communicates areas that have changed since a communities' last FIRM

Flood Depth Grids

- Create TIN from LiDAR based DEM
- Create TIN from Water Surface Elevations (WSELs)
- Subtract DEM elevation from WSEL to obtain flood depth grid

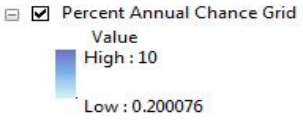


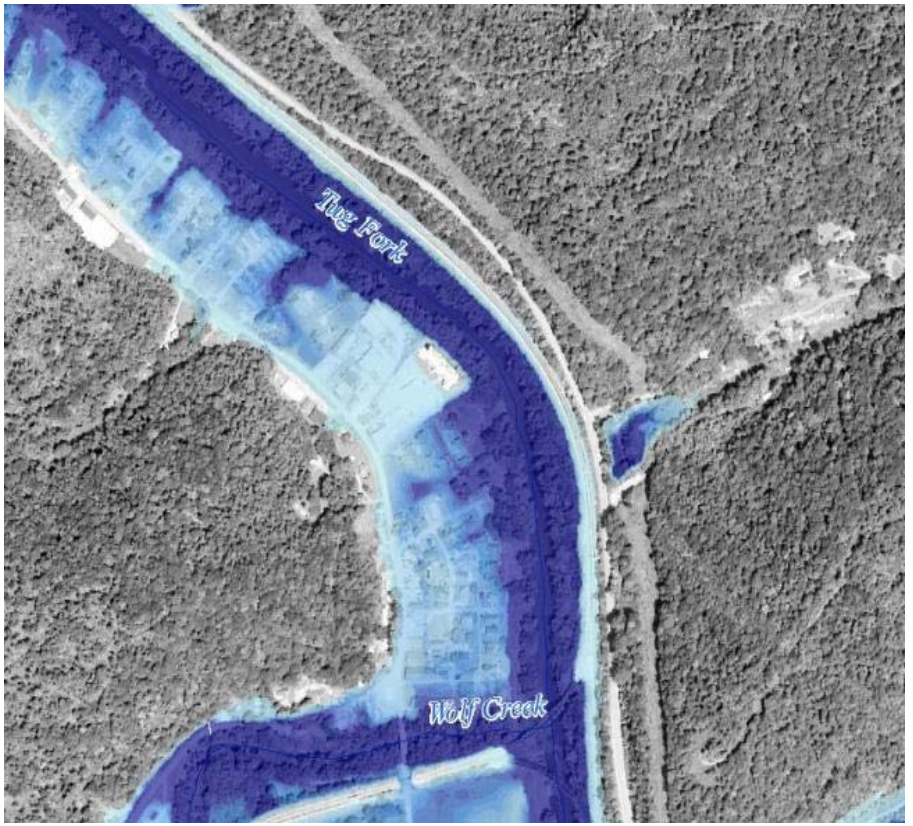
Flood Depth Grids

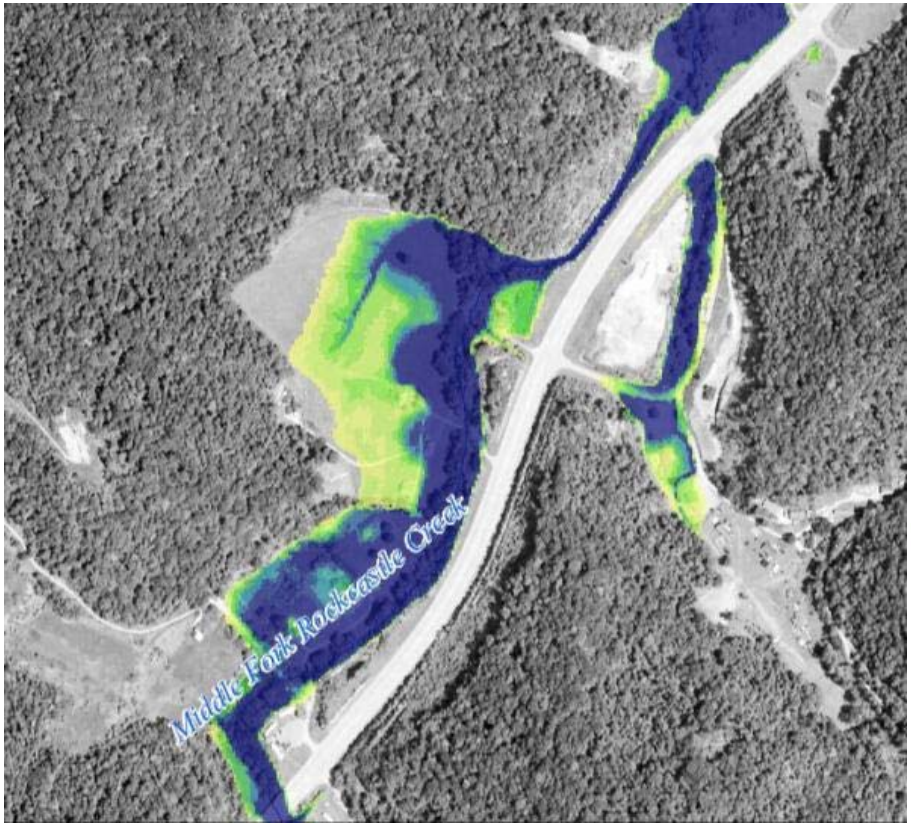


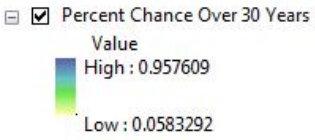
Flood Analysis Grids

- Grids to depict
  - Probability of flooding in any given year
  - Probability of flooding in 30-year period









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Questions?

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