A Turnkey System for the Development of Inundation Models and Maps
Ignite Session
US Government-World Bank
Remote Sensing Event on Water

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Problem:

- Chronic flooding is a major problem in many parts of the world

- A warmer earth is changing the frequency, location, and distribution of areas subject to chronic flooding

- Floodplain models and maps often do not exist or are outdated

- Where land use planning exists in these existing and evolving flood-prone areas, its effectiveness is reduced by the absence of effective modeling and mapping tools
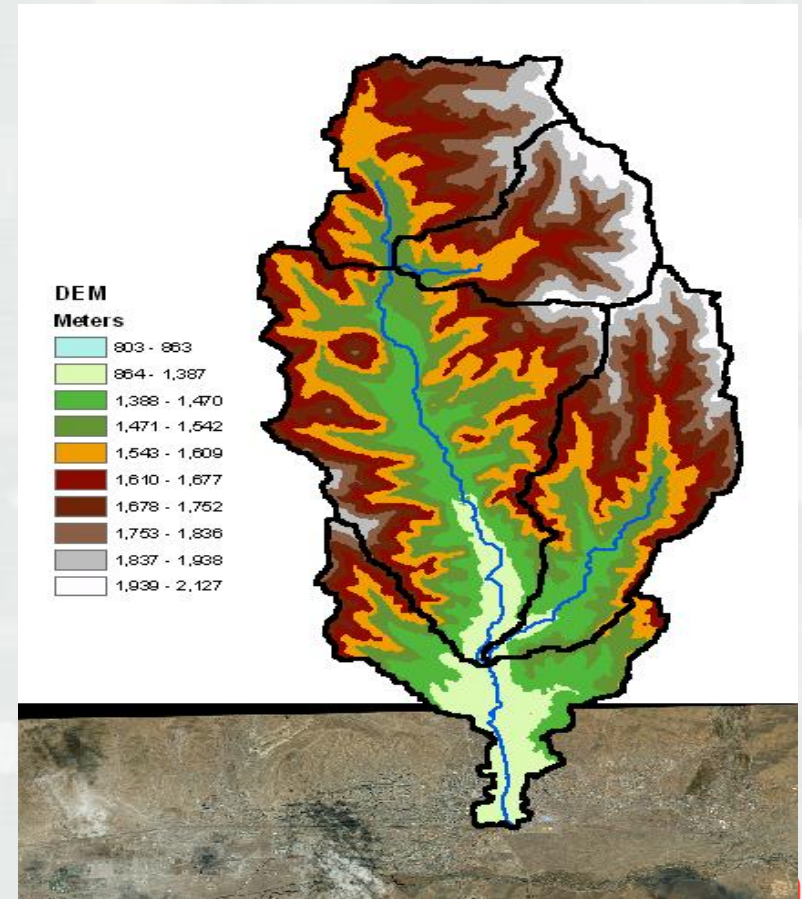
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Hydrologic and Hydraulic Analysis

- Hydrologic analysis is performed to determine frequency rainfall analysis for a watershed
- Hydraulic modeling is used to estimate flood extents.
- Flood estimates are then used to identify flood risk to structures and identify floodplain management activities to reduce flooding in the region

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Hydrologic Modeling

- How much flow is generated from different amounts of precipitation?

- Digital elevation data is obtained and used to delineated the watershed drainage using HEC-GeoHMS

- 300 km^2

DEM
Meters
- 803 - 863
- 864 - 1,387
- 1,388 - 1,470
- 1,471 - 1,542
- 1,543 - 1,609
- 1,610 - 1,677
- 1,678 - 1,752
- 1,753 - 1,836
- 1,837 - 1,938
- 1,939 - 2,127

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Hydraulic Modeling

- Where will the water go for various flood events?
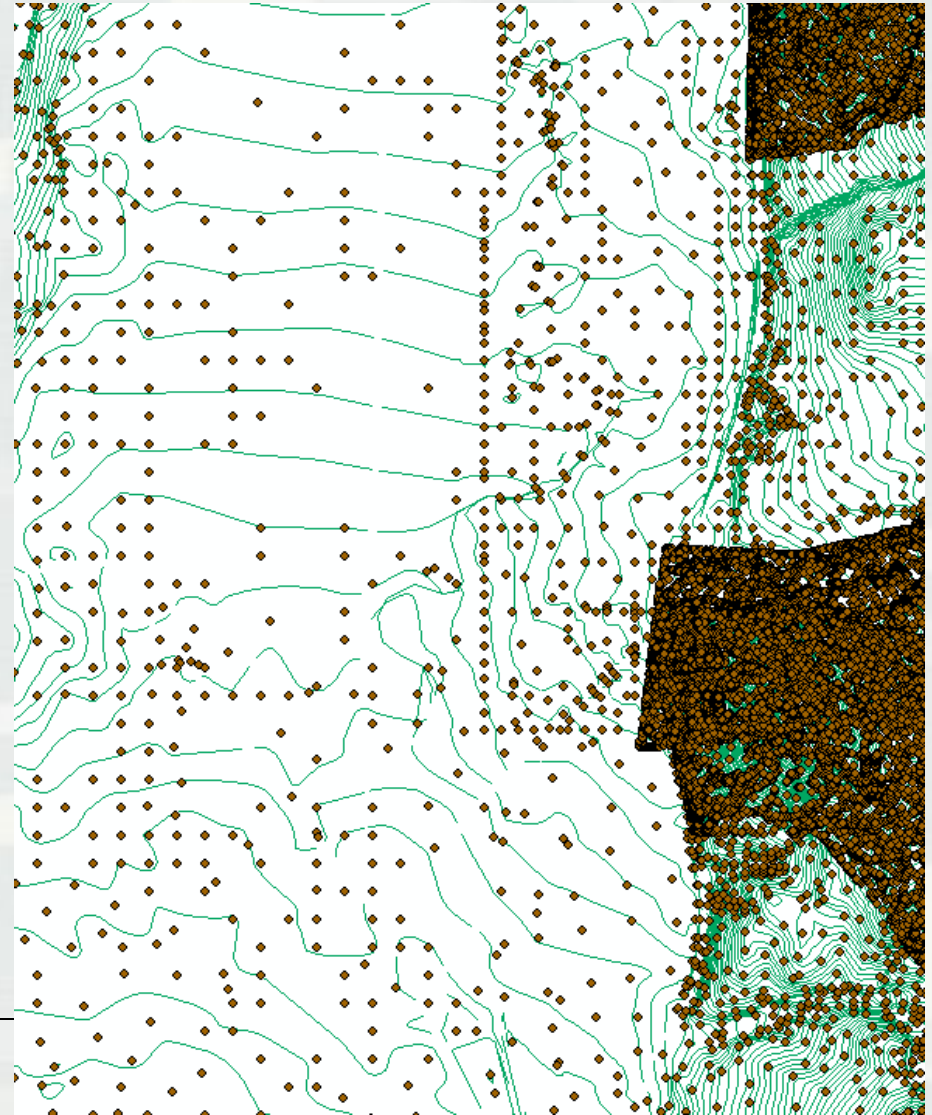
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Hydraulic Modeling

- Elevation data obtained
  - ► Point elevations
  - ► Contour lines
- Data may lack important features
  - ► Channel information
  - ► Levees
- Data may have lower resolution than is desirable
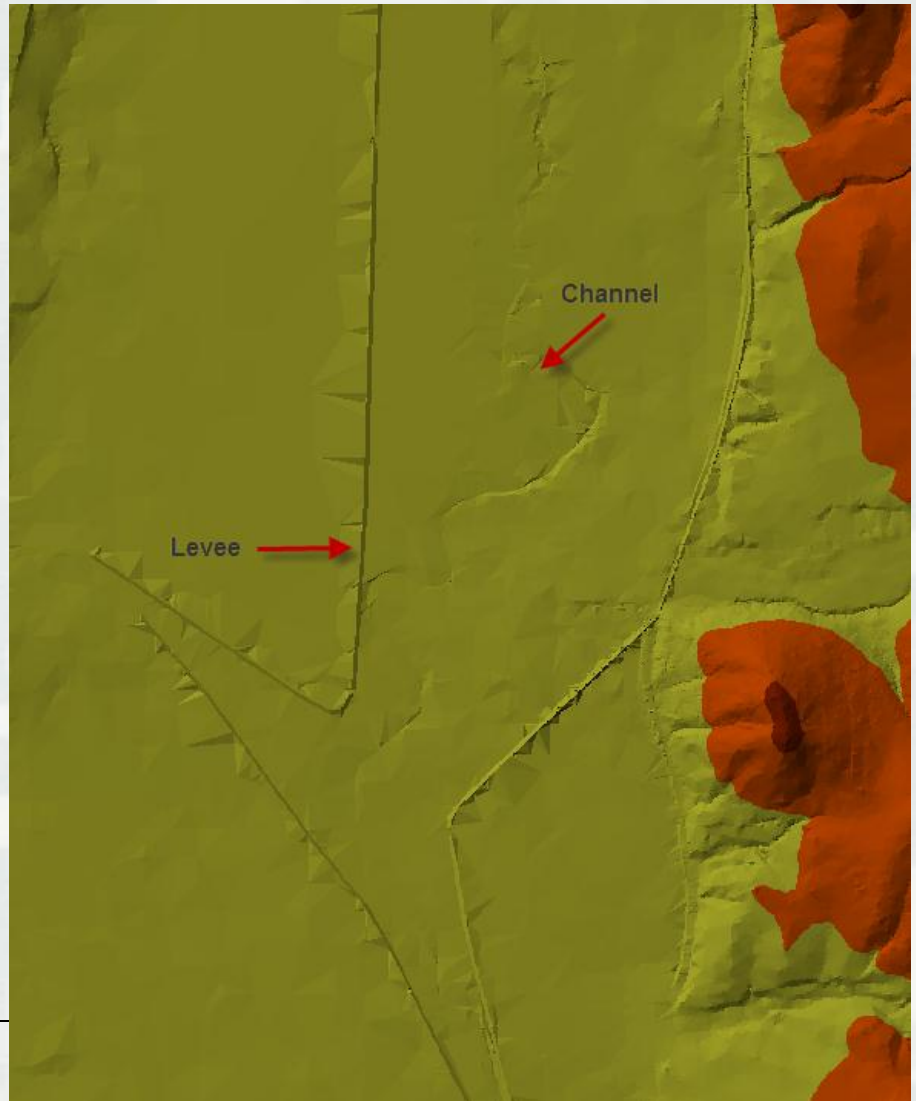
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Hydraulic Modeling

- Point and contour line information
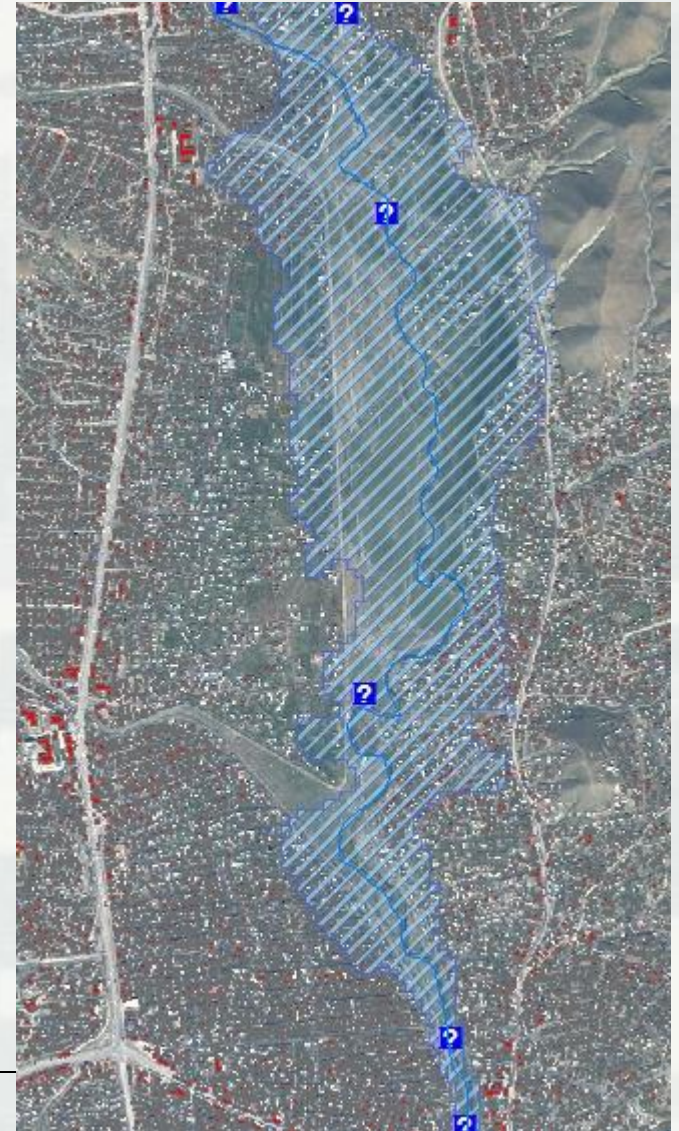
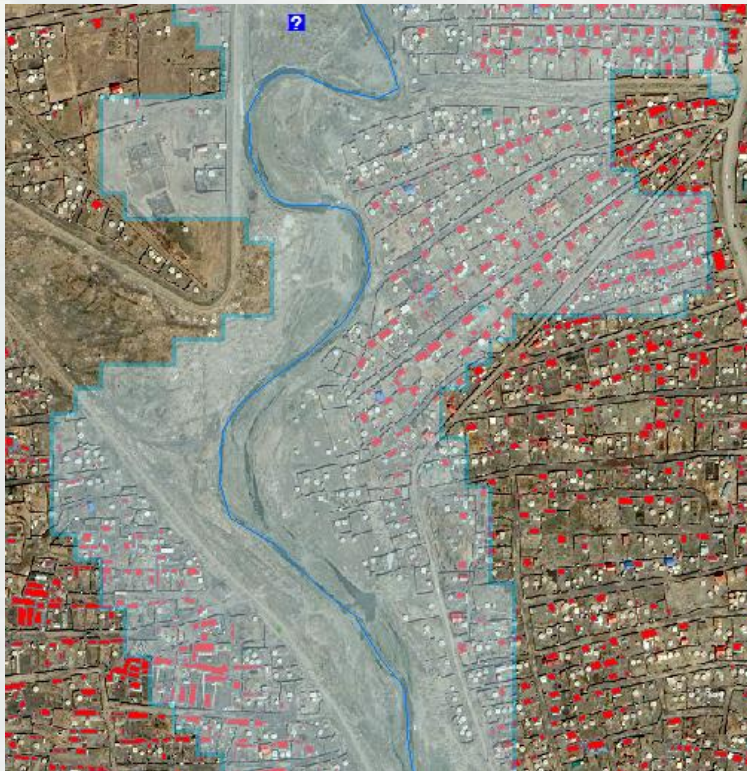- Important linear features may be missing

Hydraulic Modeling

- Levee locations and elevations are added to terrain data

- Channel information is added (and then later refined in the hydraulics model)

- Recent LIDAR data are particularly useful

Hydraulic Modeling

- Flood inundation maps

H&H Technology Transfer

- Models and results are provided to local experts (emergency management, hydro-meteorological, and university) and a training workshop is provided so that they can use the model for future analysis and planning

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H&H Technology Transfer - Step 2

- Table Top Exercises to determine success of technology transfer
- Ability to develop models for new basins and sub-basins
- Integration of H&H modeling into local university curricula

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Summary

- Elevation and flow data are obtained
  - ► Point elevations
  - ► Contour lines
  - ► Precipitation amount and frequency
- Hydrologic and hydraulic modeling for one basin/sub-basin
- Training for emergency management, hydro-meteorologists, university faculty
- Table Top Exercise

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