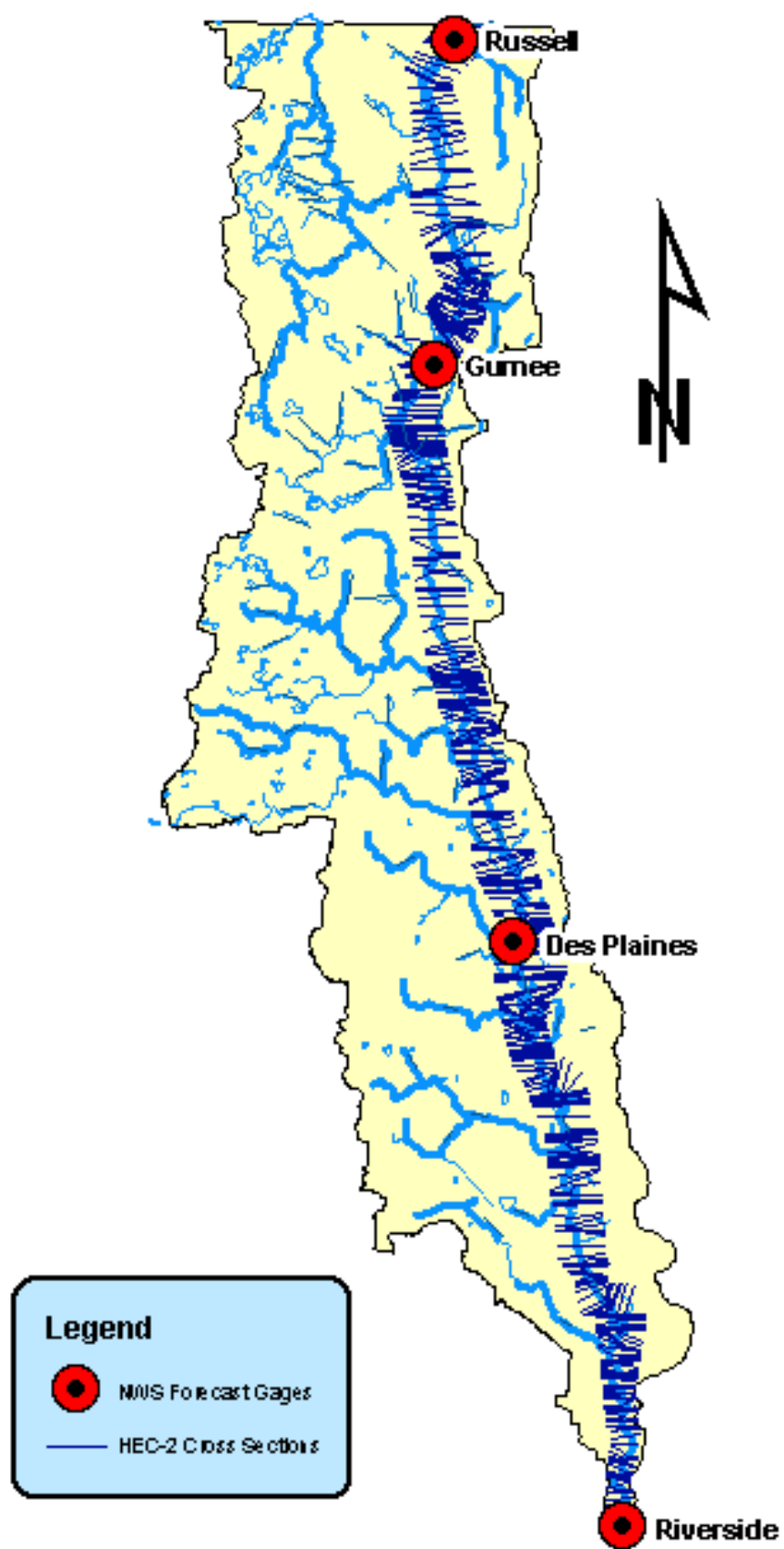




Development and Implementation of River Forecast Inundation Mapping for the Des Plaines River in Northeastern Illinois

March 2006





The basic function of the Forecasted River Inundation Mapping system is to translate the forecasted river stages along the Des Plaines River, generated by the National Weather Service (NWS) at four locations, to a pseudo-forecasted river stage along the length of the Des Plaines River at numerous locations (surveyed cross sections) in a time frame where this information is useful for directing the distribution of flood response resources.

Hypothetical Example

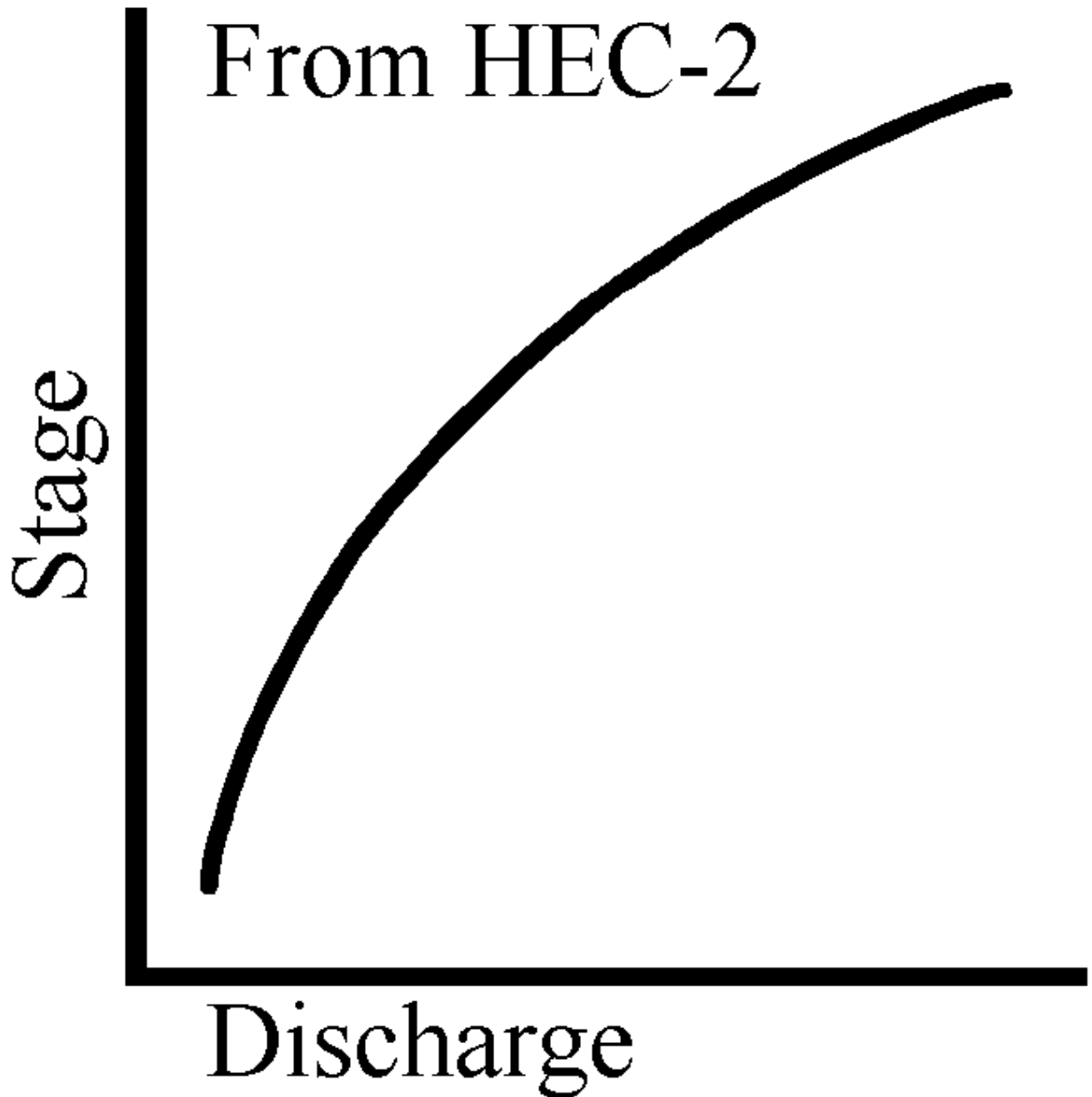


National Weather Service Forecast

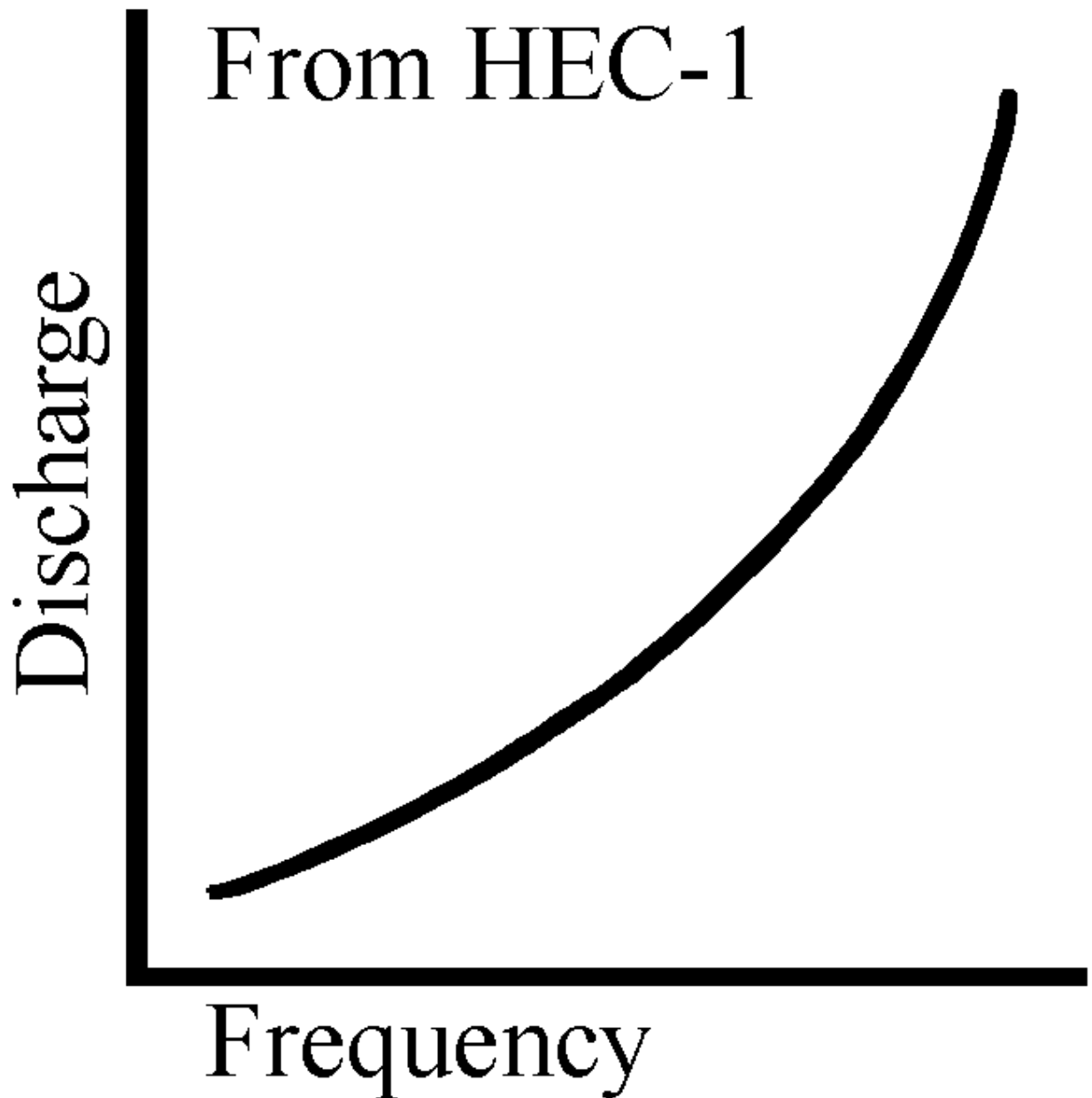
Gage	Forecasted Stage	Forecasted Elevation
Russell	11.2	672.9
Gurnee	11.7	661.7
Des Plaines	6.69	632.7
Riverside	5.52	599.9



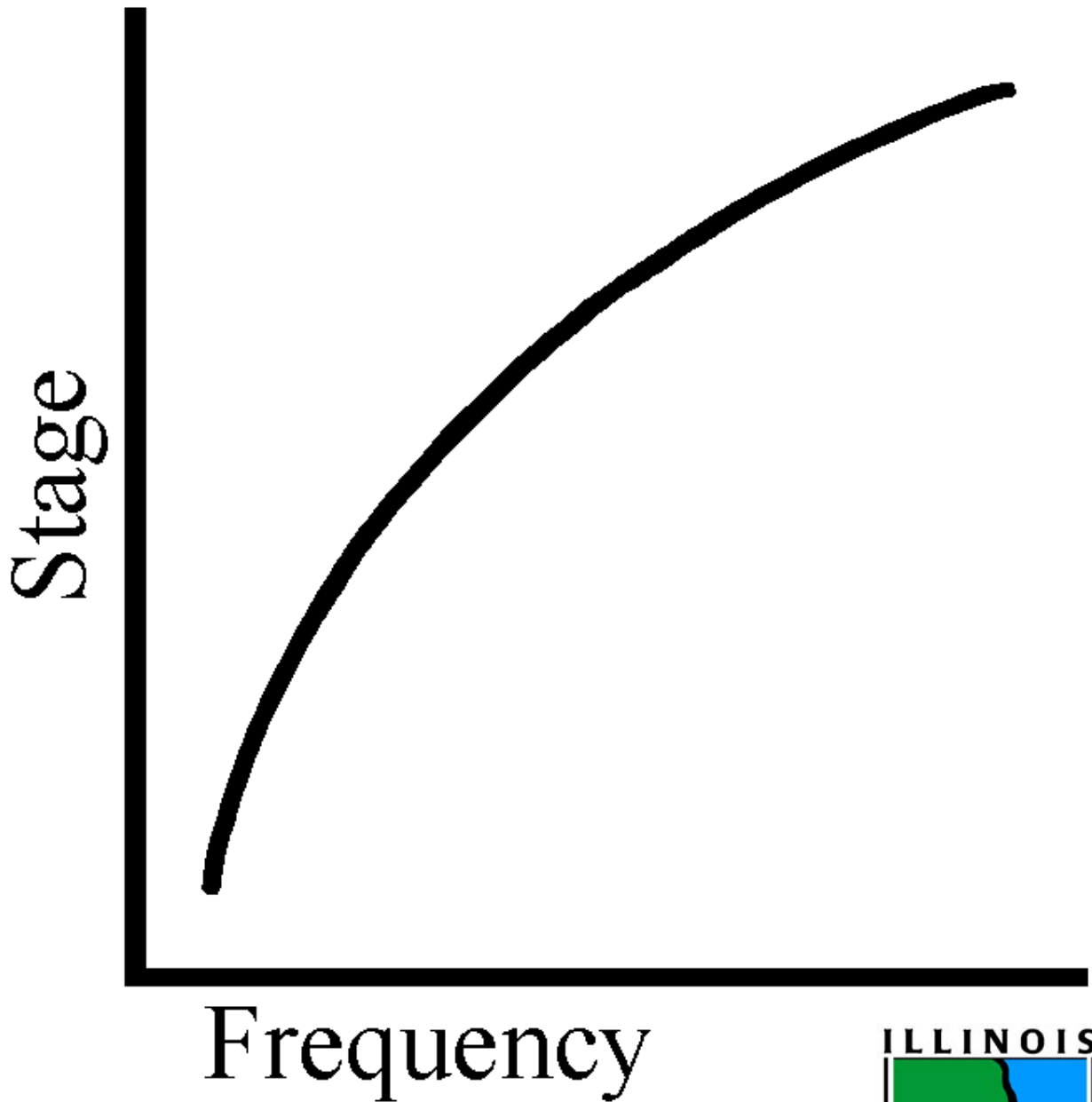
Step 1: Derive Stage – Discharge Relationship



Step 2: Derive Frequency – Discharge Relationship

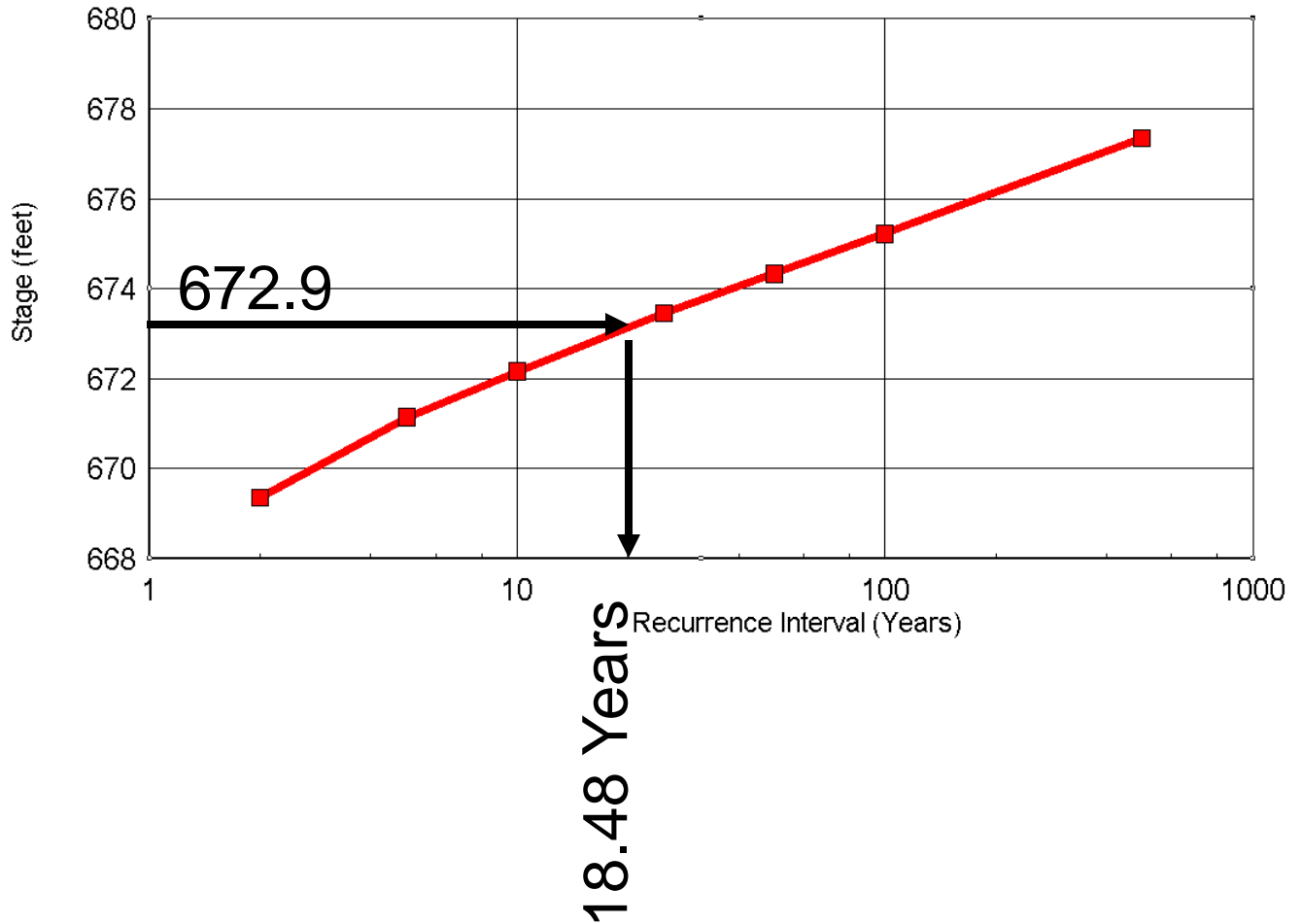


Step 3: Combine for Stage – Frequency Relationship



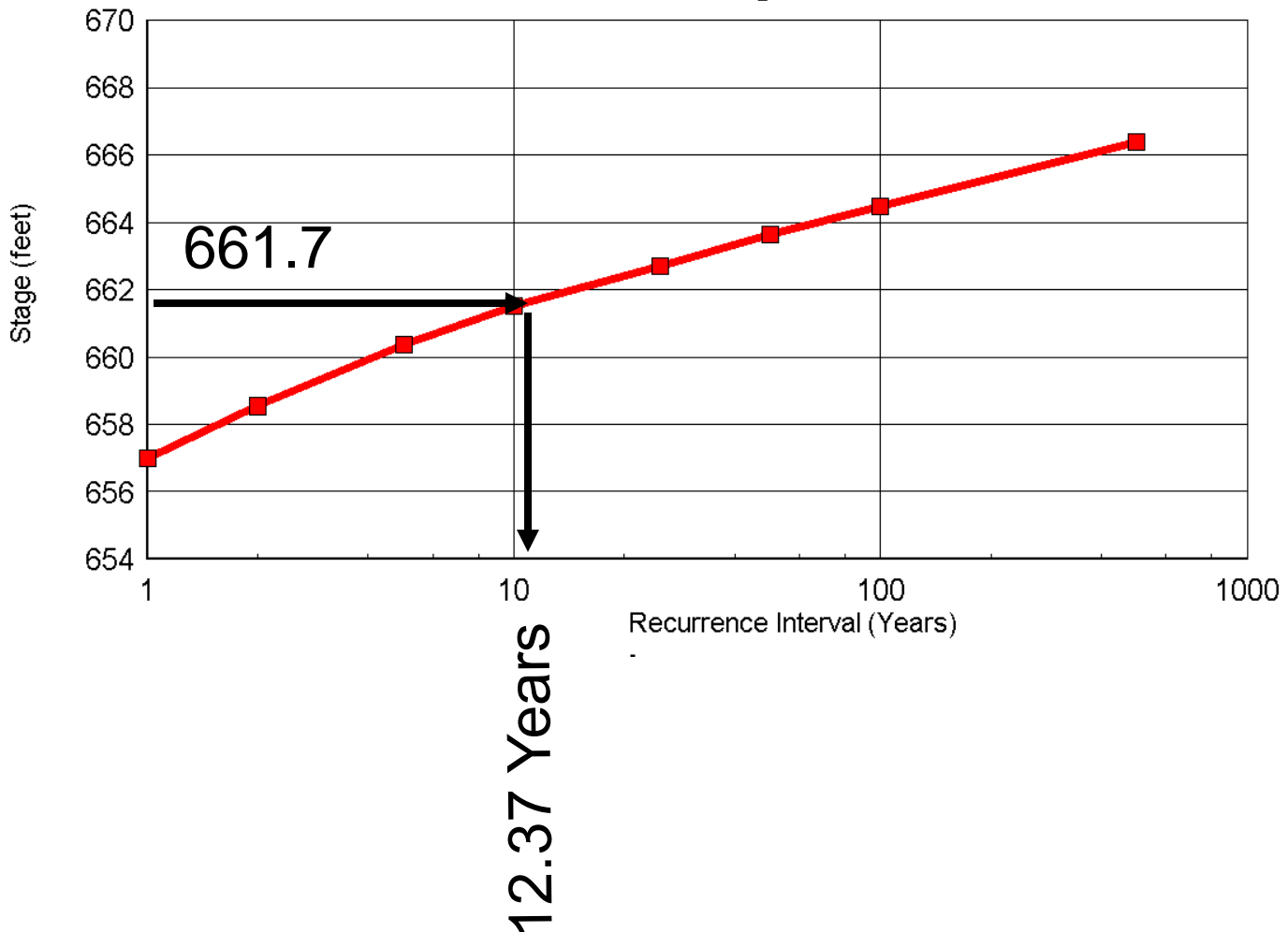
Step 3 @ Russell Road

Russell Road Gage

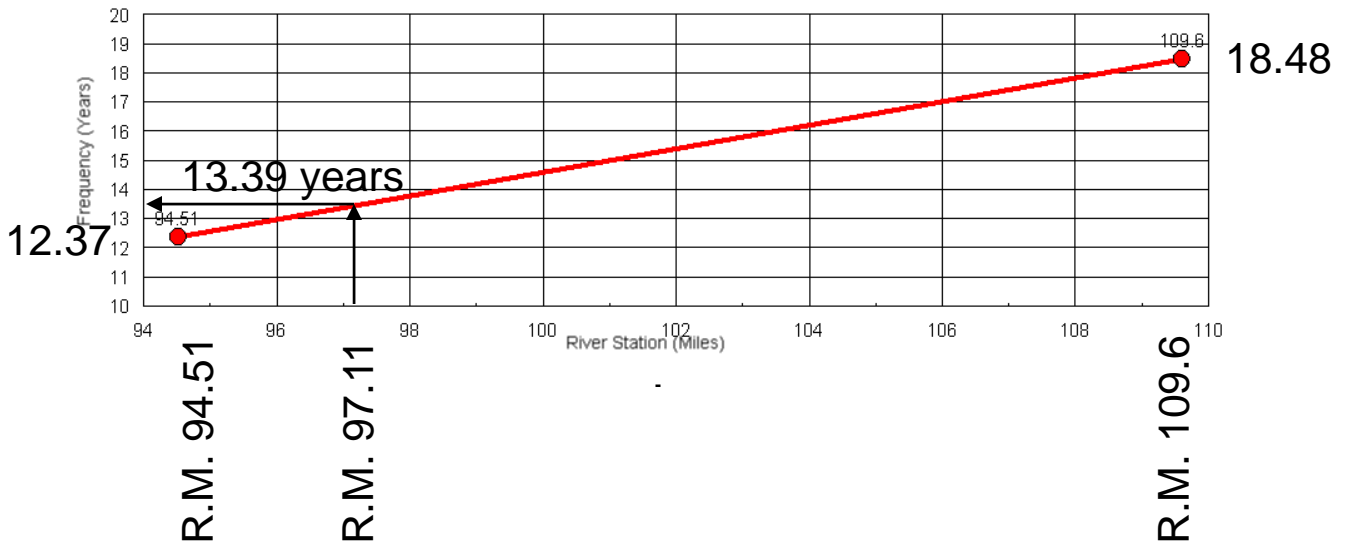


Step 3 @ Gurnee Gage

Gurnee Gage

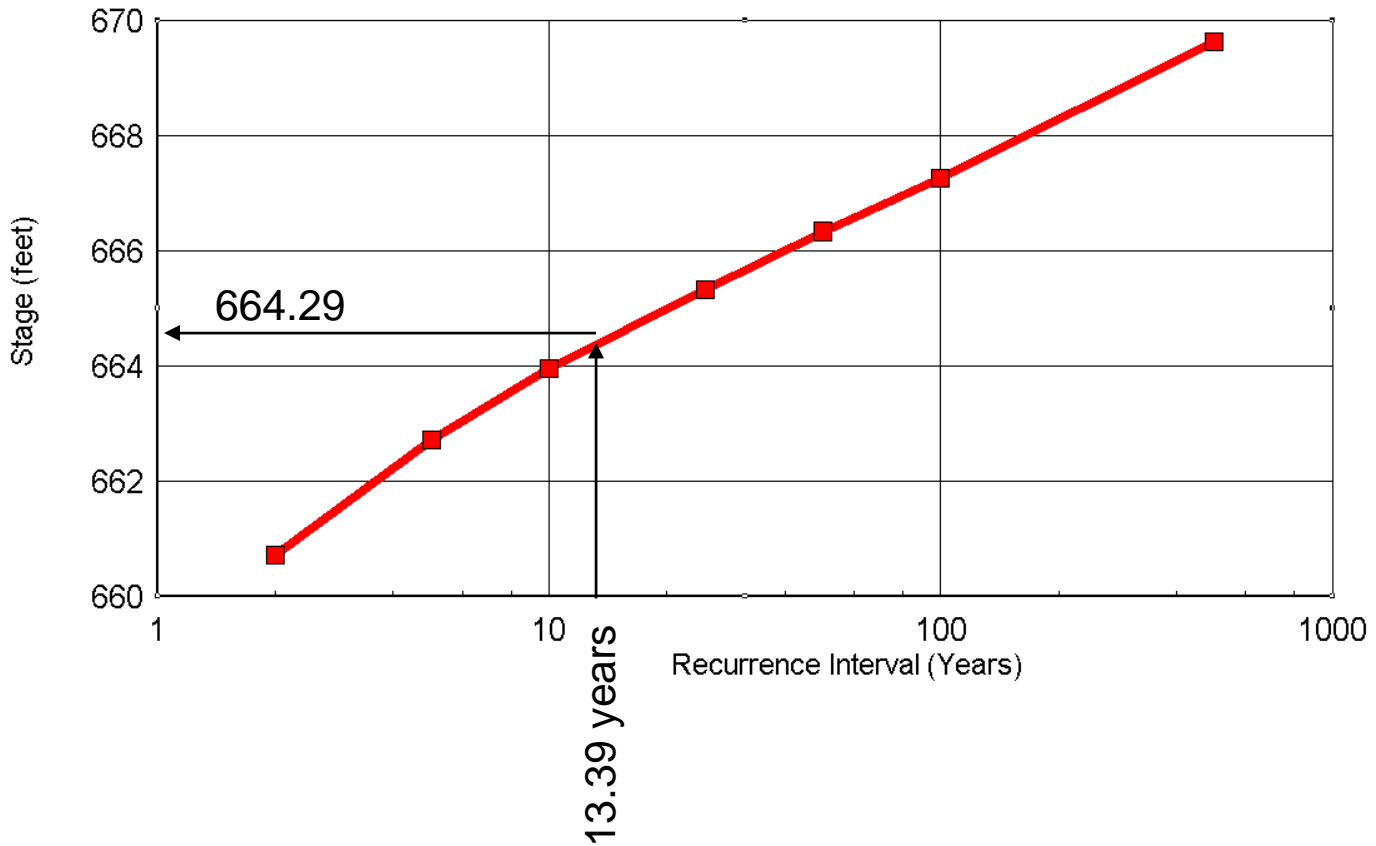


Step 4 & 5: Frequency Interpolation



Step 6: Stage – Frequency Relationship

Grand Ave (R.M. 97.11)

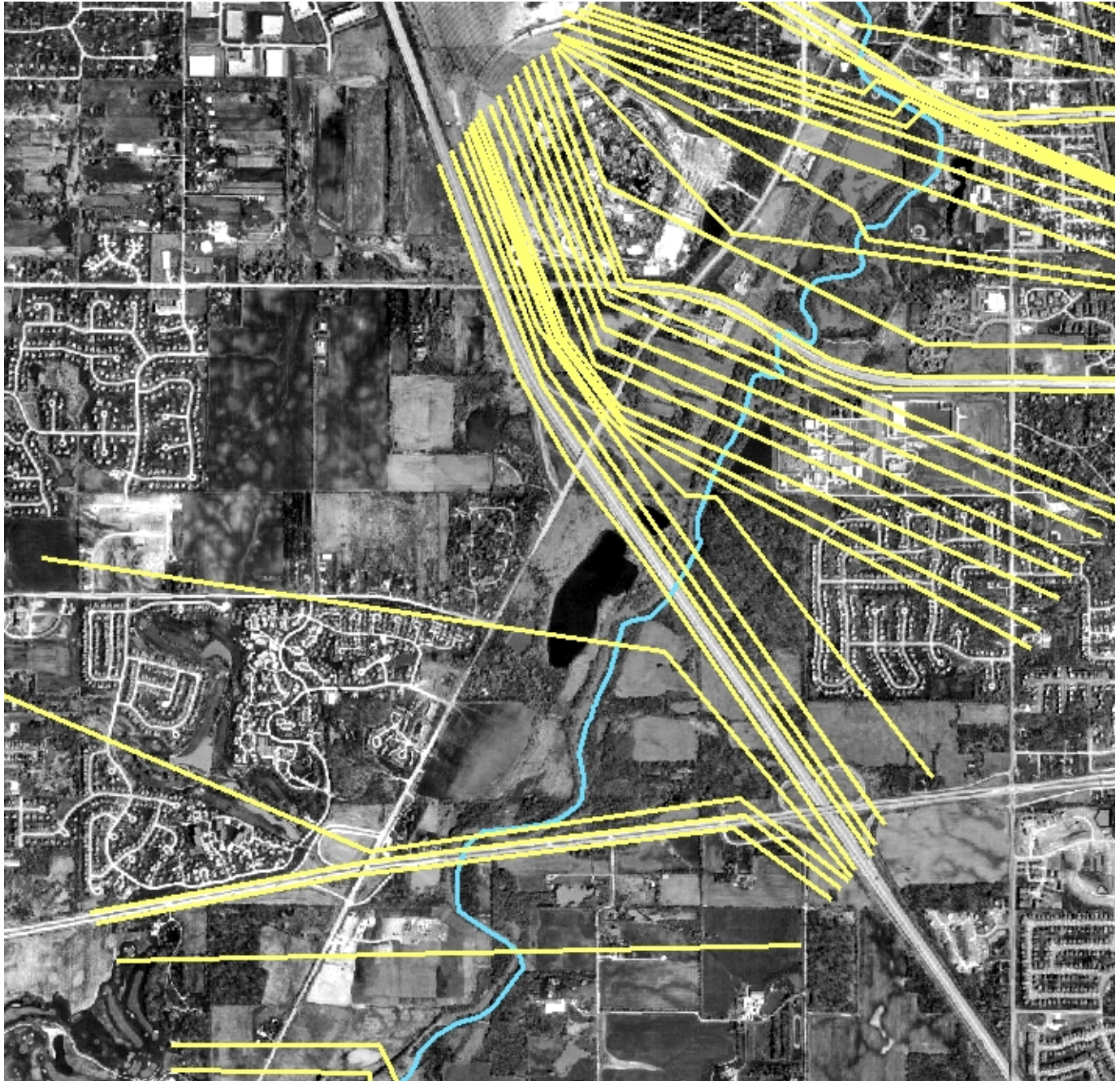


Step 7: Map Floodplain



Step 7: Map Floodplain

Cross Sections From Hydraulic Model



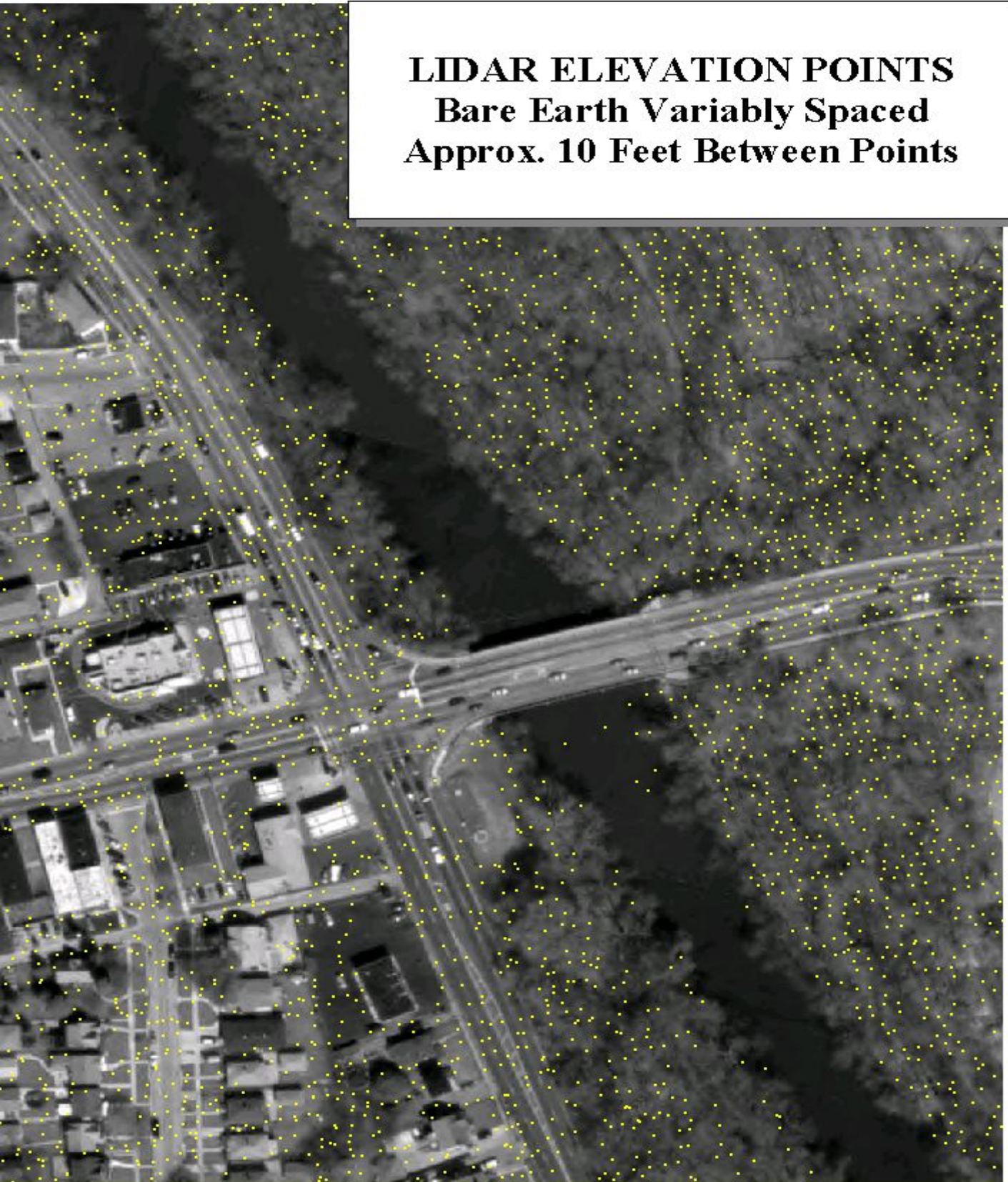
Step 7: Map Floodplain

Create Water Surface of Pseudo-Forecast Stage



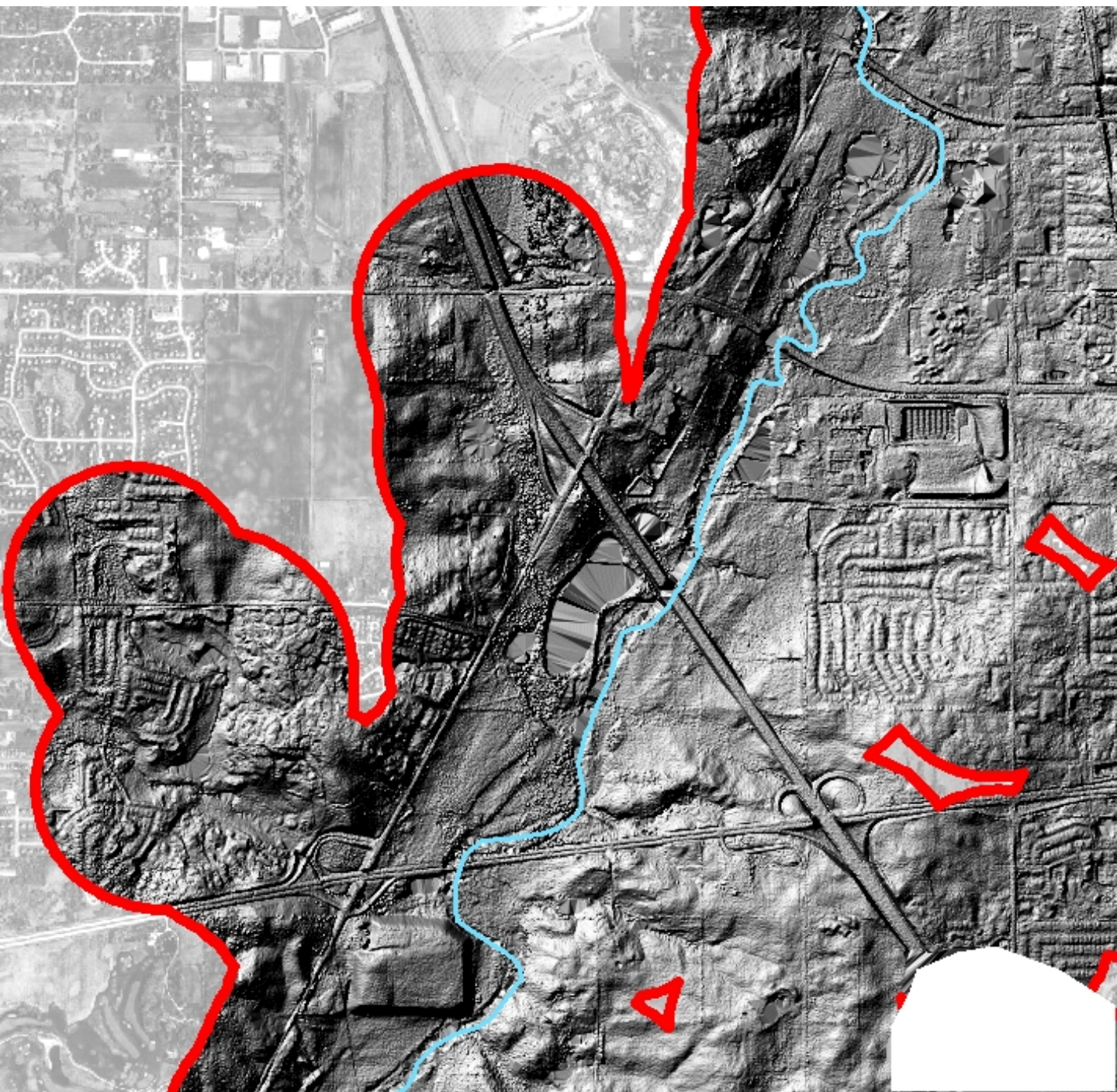
Step 7: Map Floodplain

LIDAR ELEVATION POINTS
Bare Earth Variably Spaced
Approx. 10 Feet Between Points

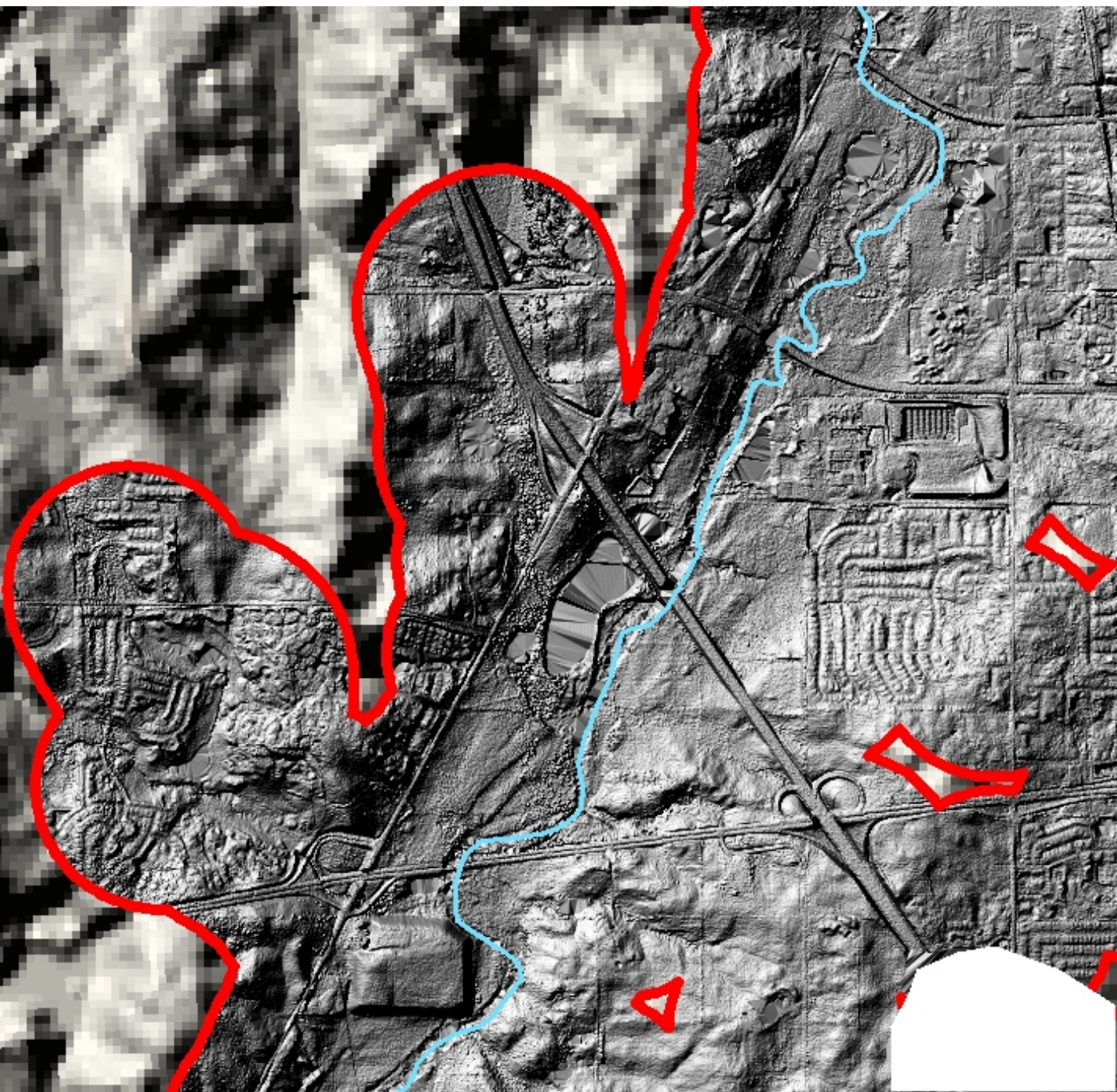


Step 7: Map Floodplain

Elevation Model of River Corridor

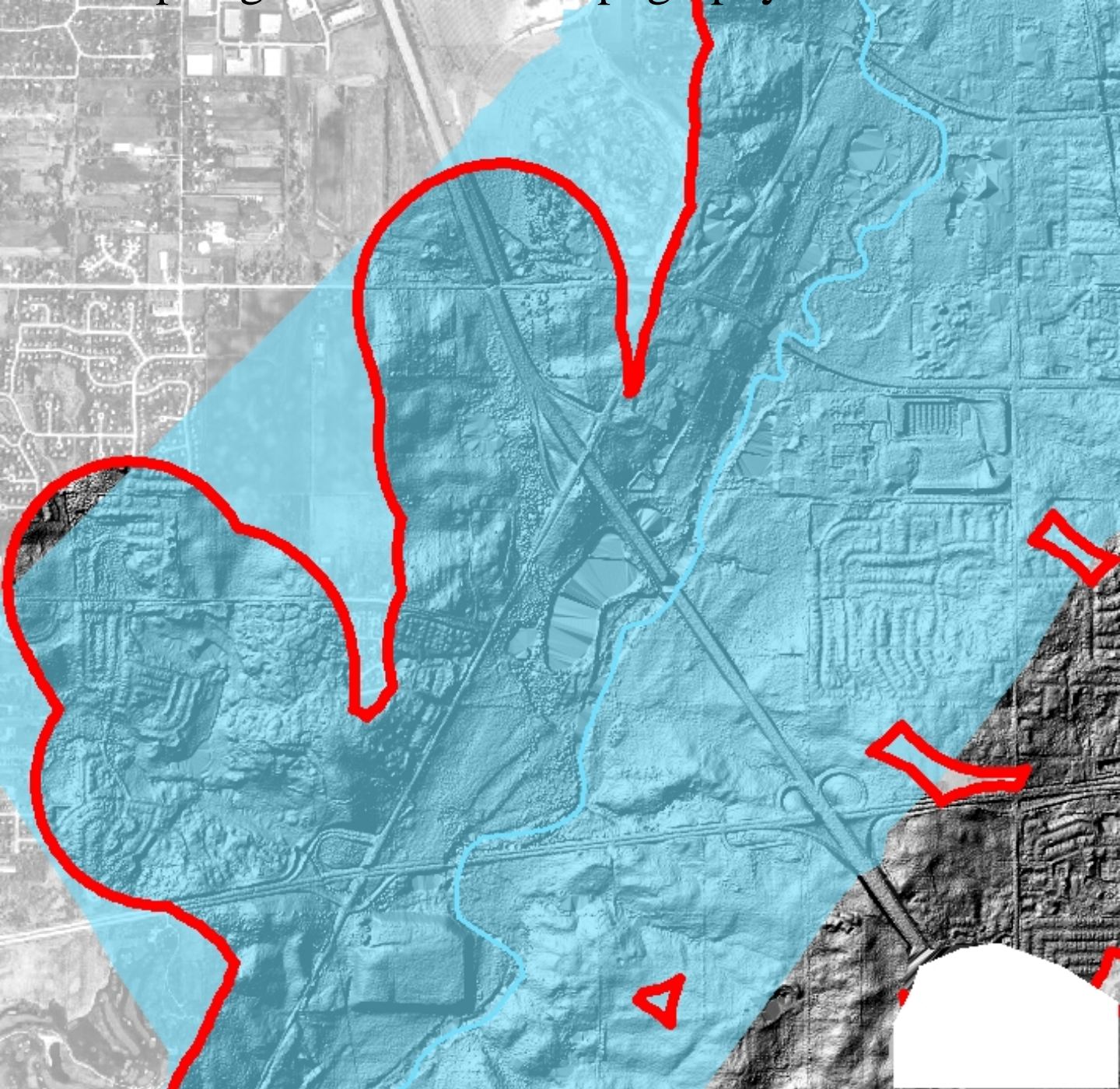


Step 7: Map Floodplain



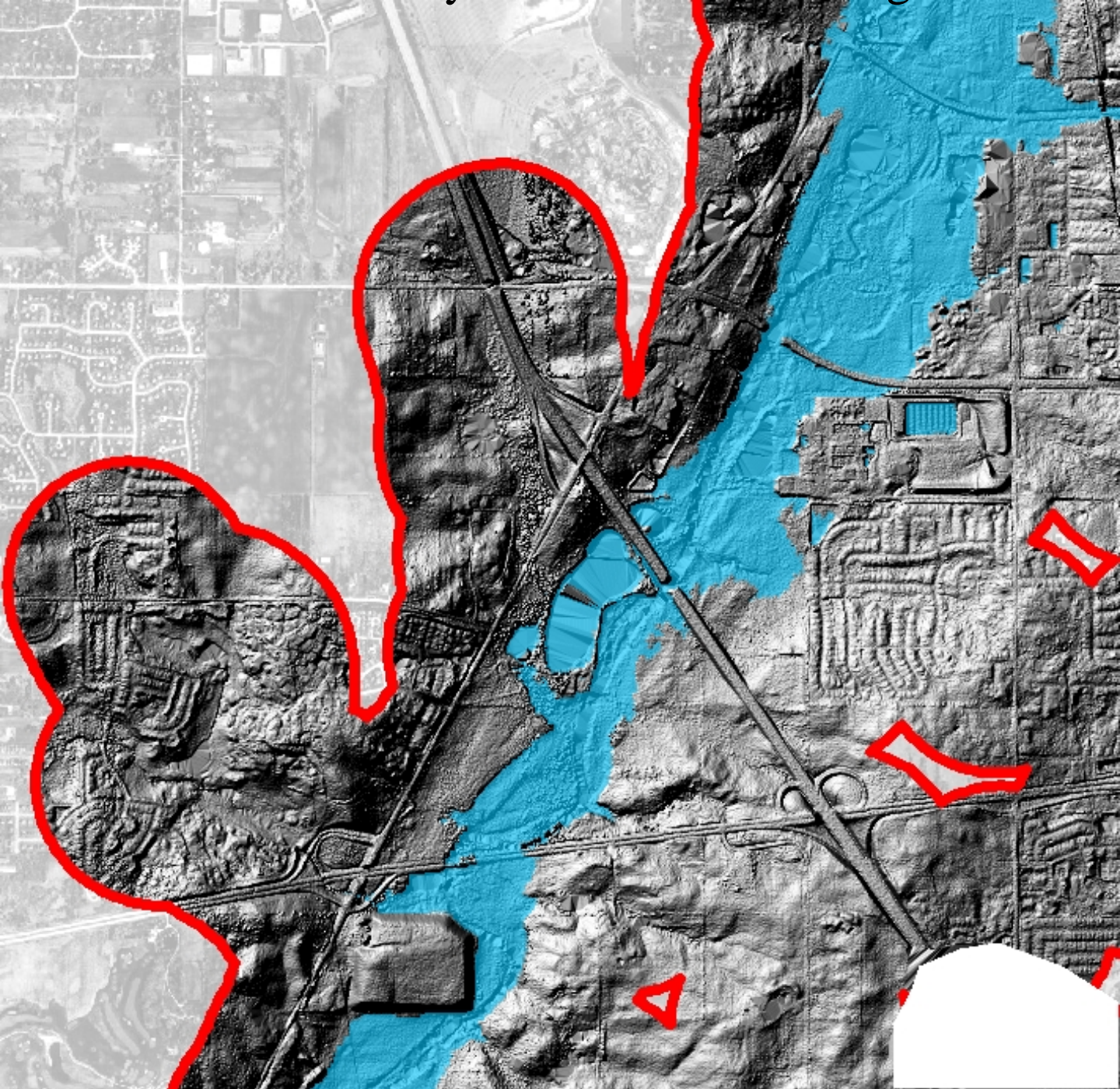
Step 7: Map Floodplain

Map Algebra: subtract topography from water



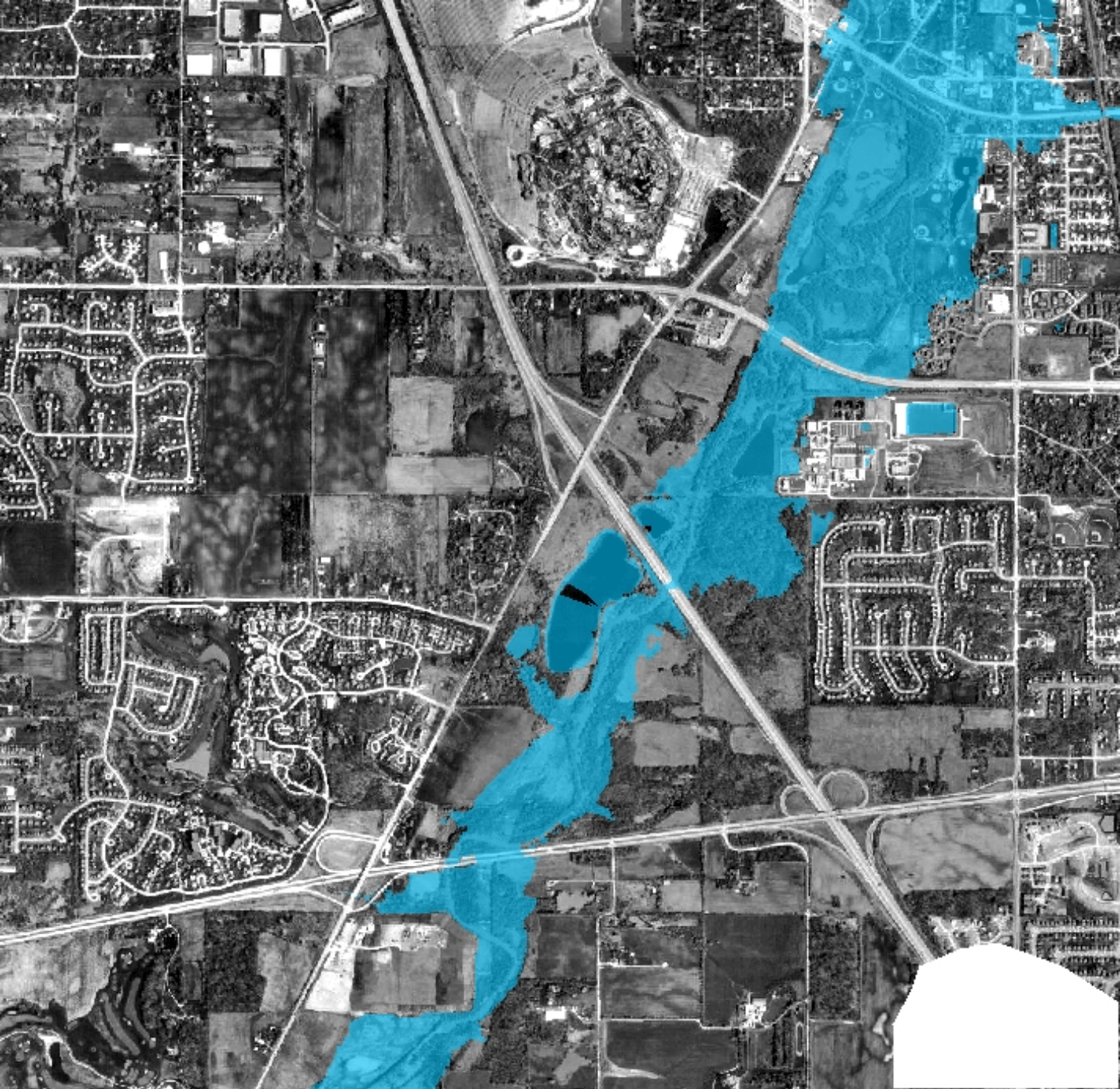
Step 7: Map Floodplain

Area inundated by Pseudo-Forecast Stage



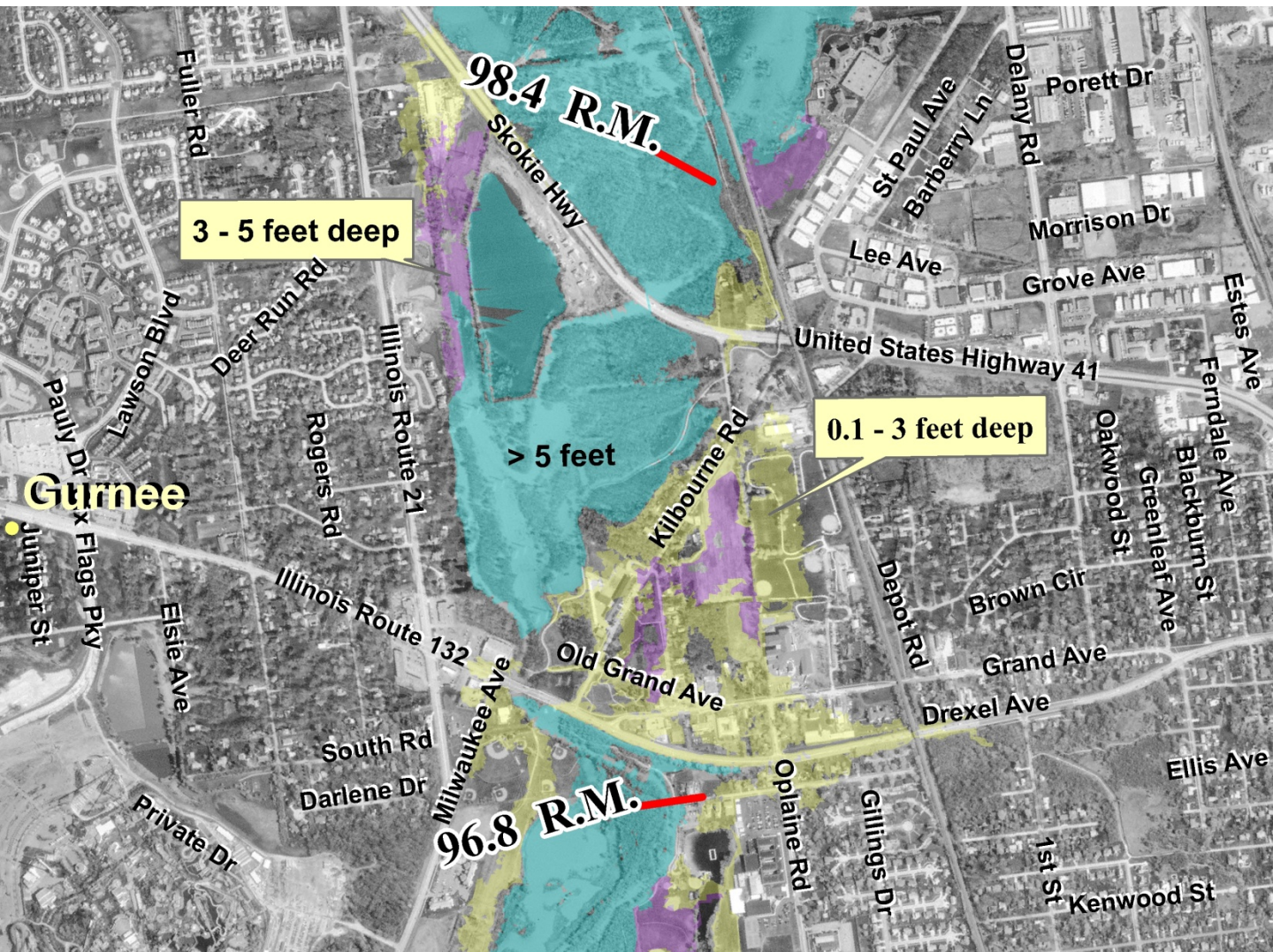
Step 7: Map Floodplain

GIS overlay – identifies structures impacted



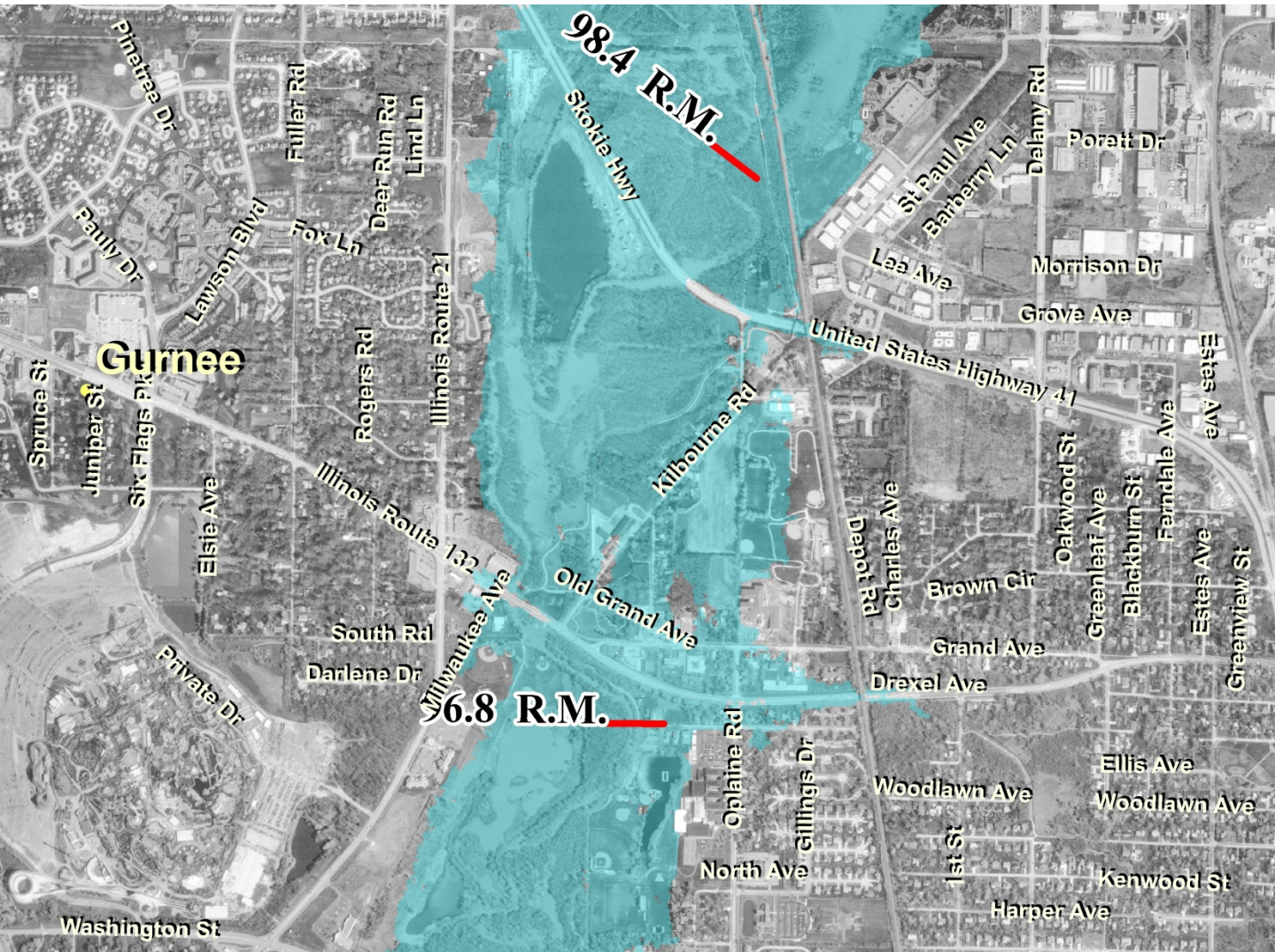
Step 8: Digital Products

Categorize water depth

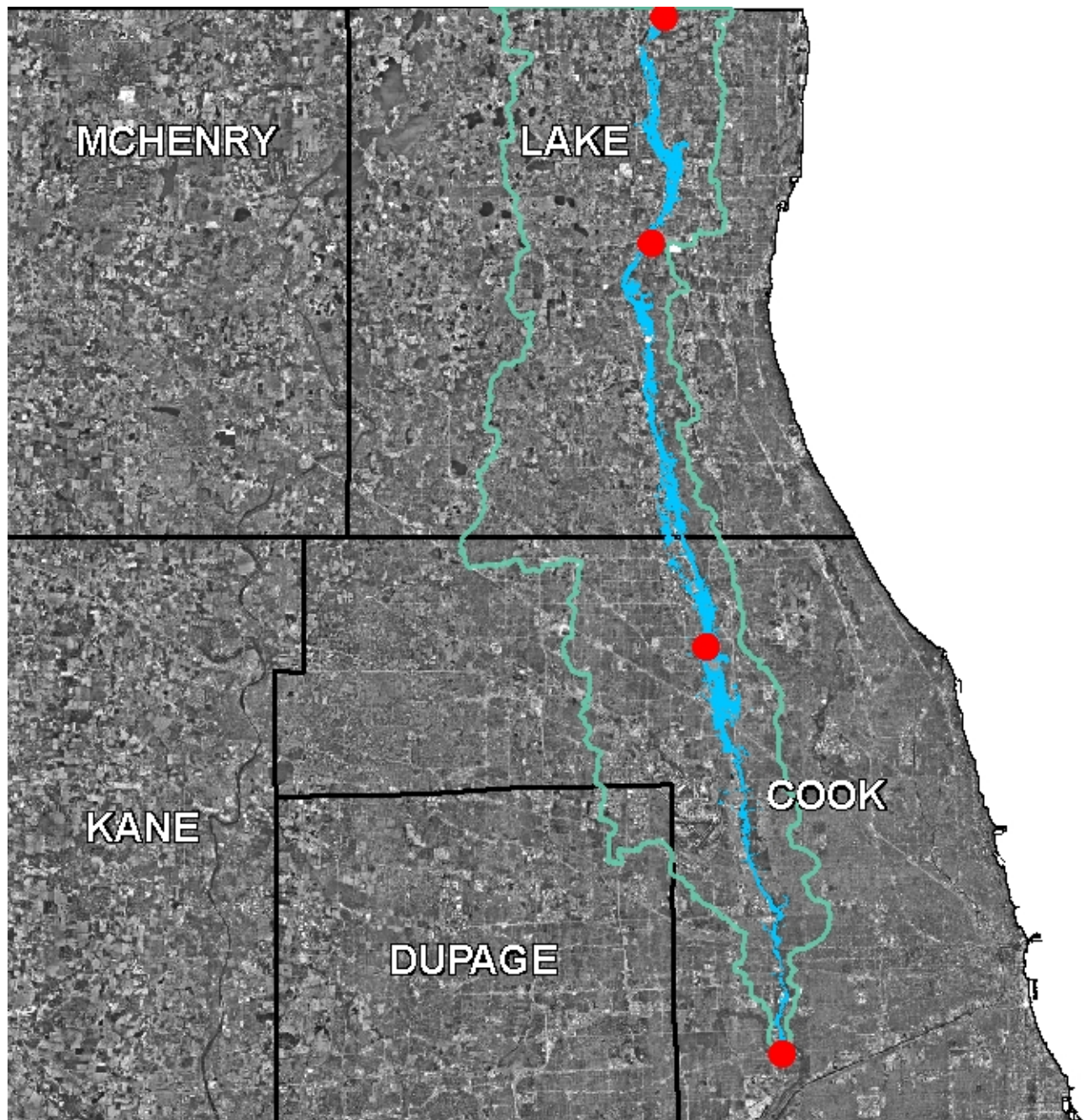


Step 8: Digital Products

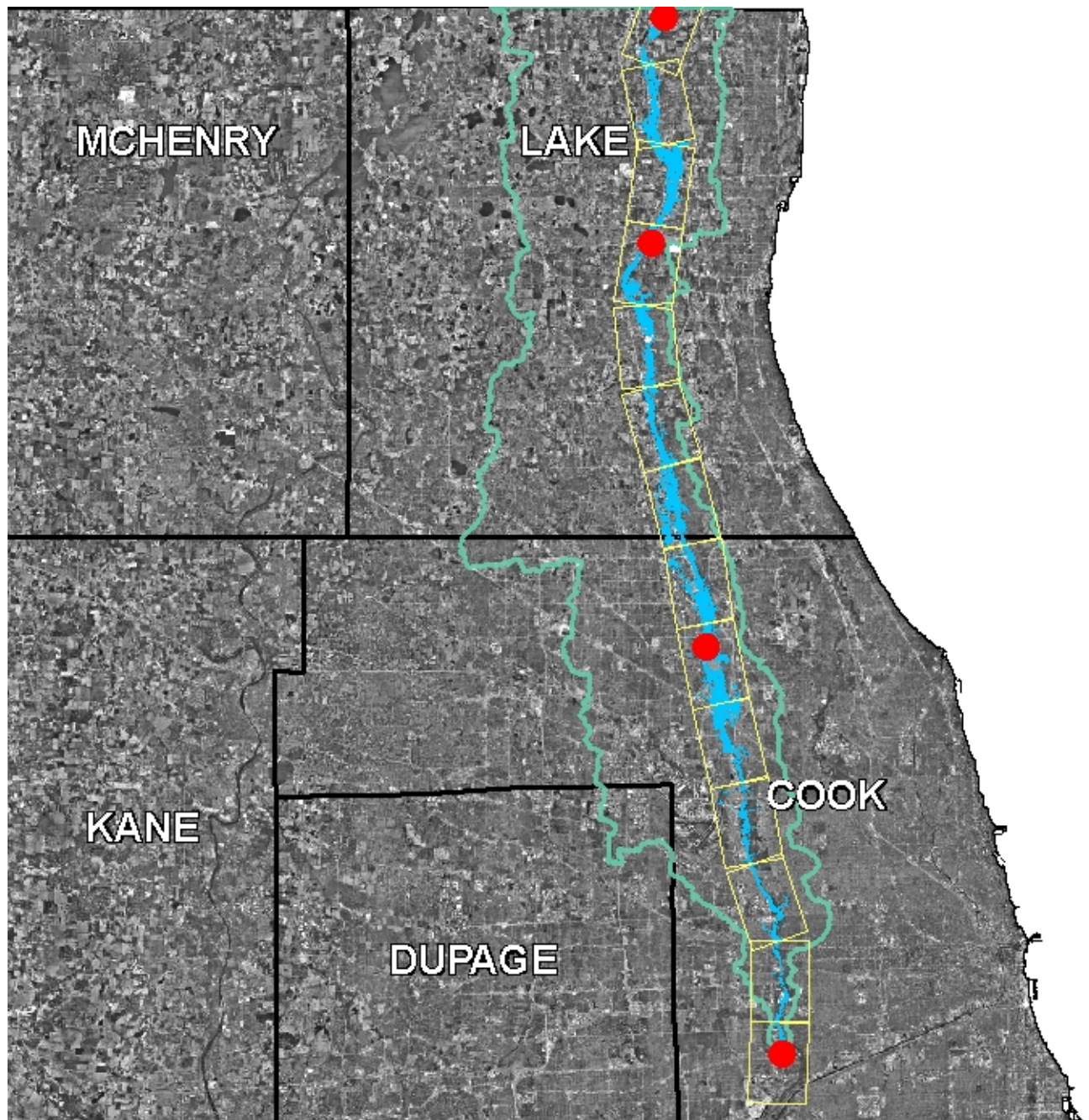
Flood Extent



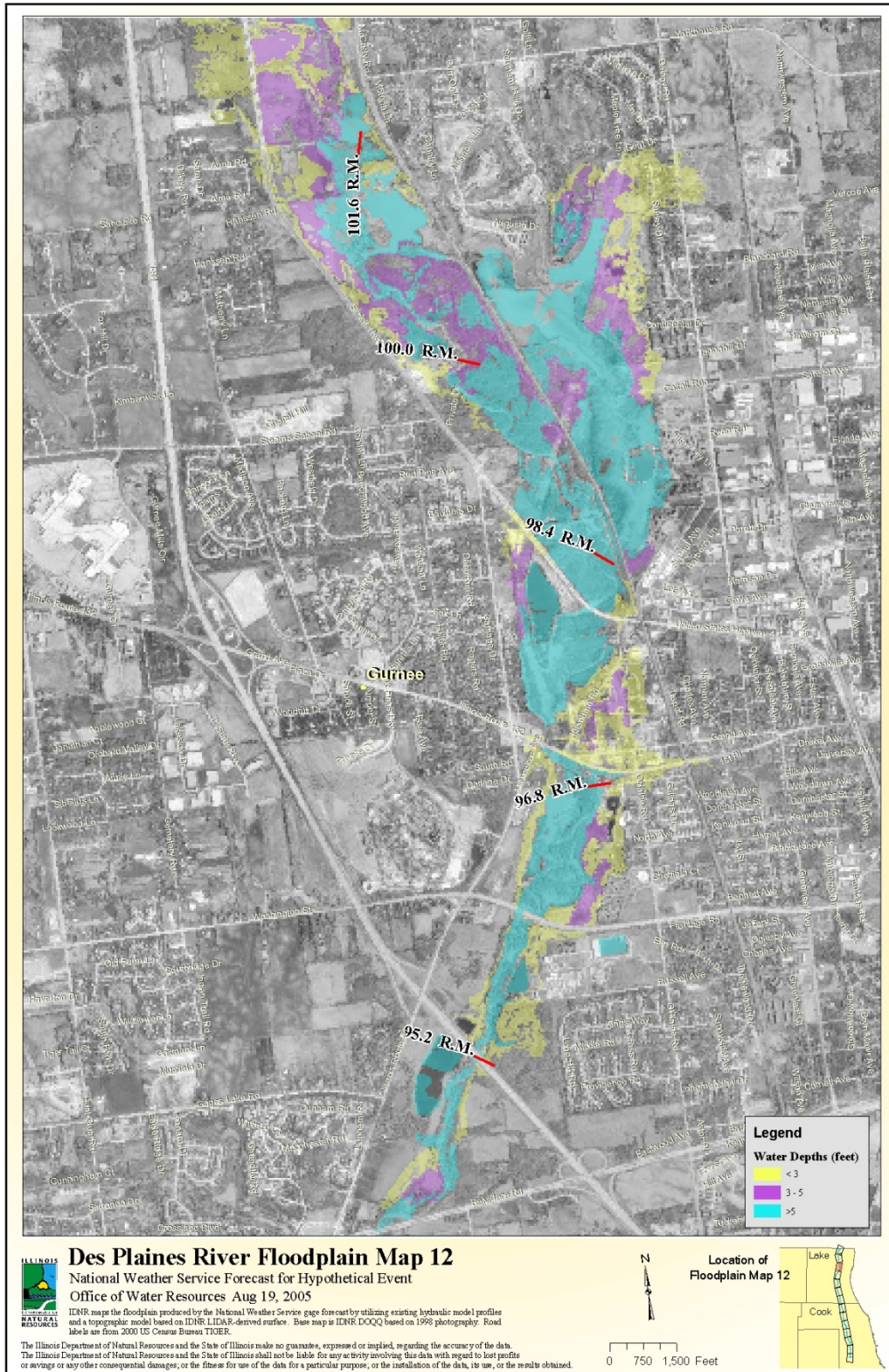
Step 9: Map Distribution



Step 9: Map Distribution



Step 9: Map Distribution



River Forecast Inundation Mapping Efforts

