

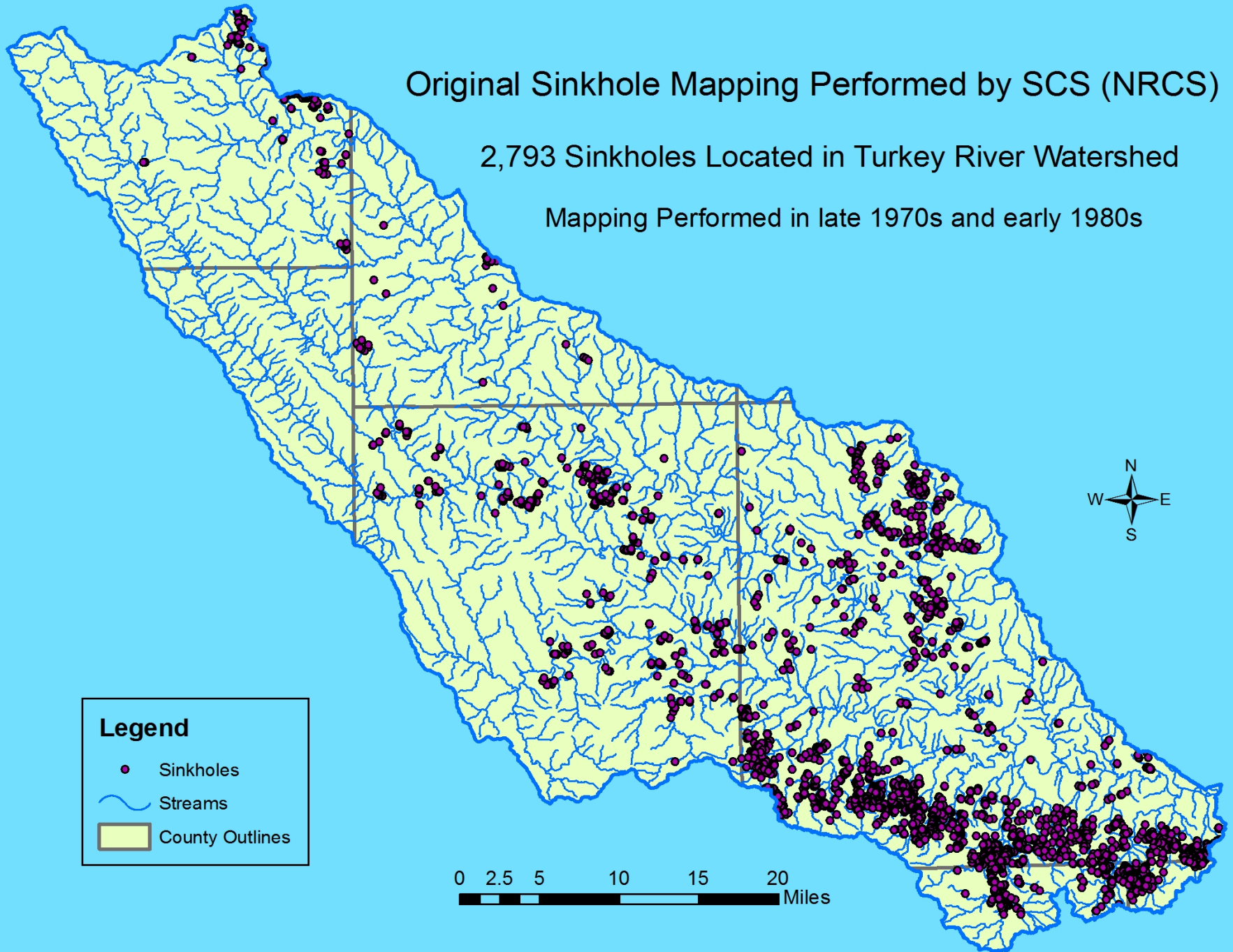
Sinkhole Mapping with LiDAR Derivatives and Historical Photography

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Iowa DNR/Geological Survey
June 19, 2012

Original Sinkhole Mapping Performed by SCS (NRCS)

2,793 Sinkholes Located in Turkey River Watershed

Mapping Performed in late 1970s and early 1980s



Legend

- Sinkholes
- ~ Streams
- County Outlines

0 2.5 5 10 15 20 Miles

Process to Update Sinkhole Coverage

- LiDAR DEM
- LiDAR Filled DEM
- LiDAR Difference Grid
- LiDAR Hillshade Grid
- LiDAR Slope Grid
- Orthorectified Historical Images

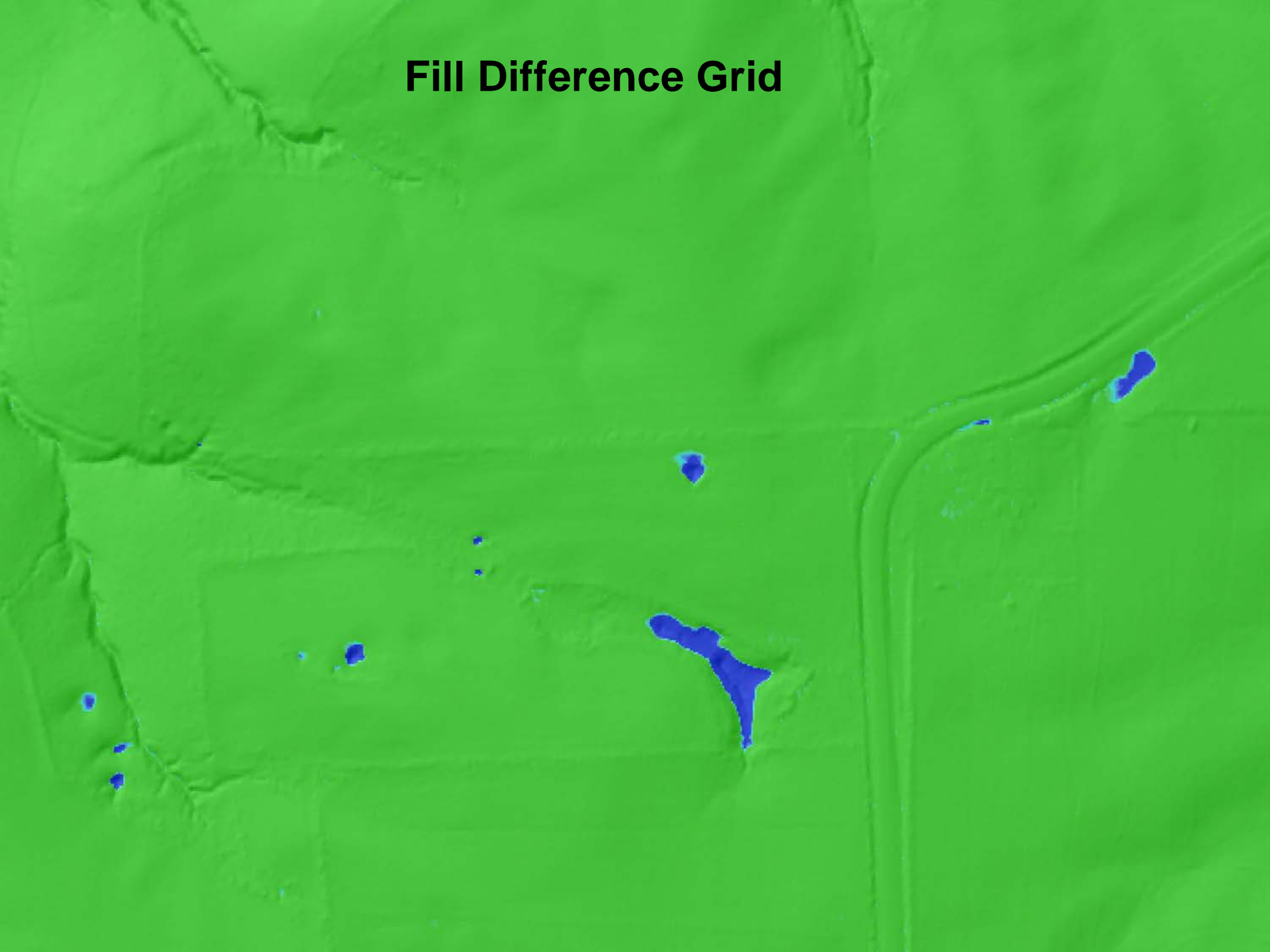
2010 photo with original sinkholes



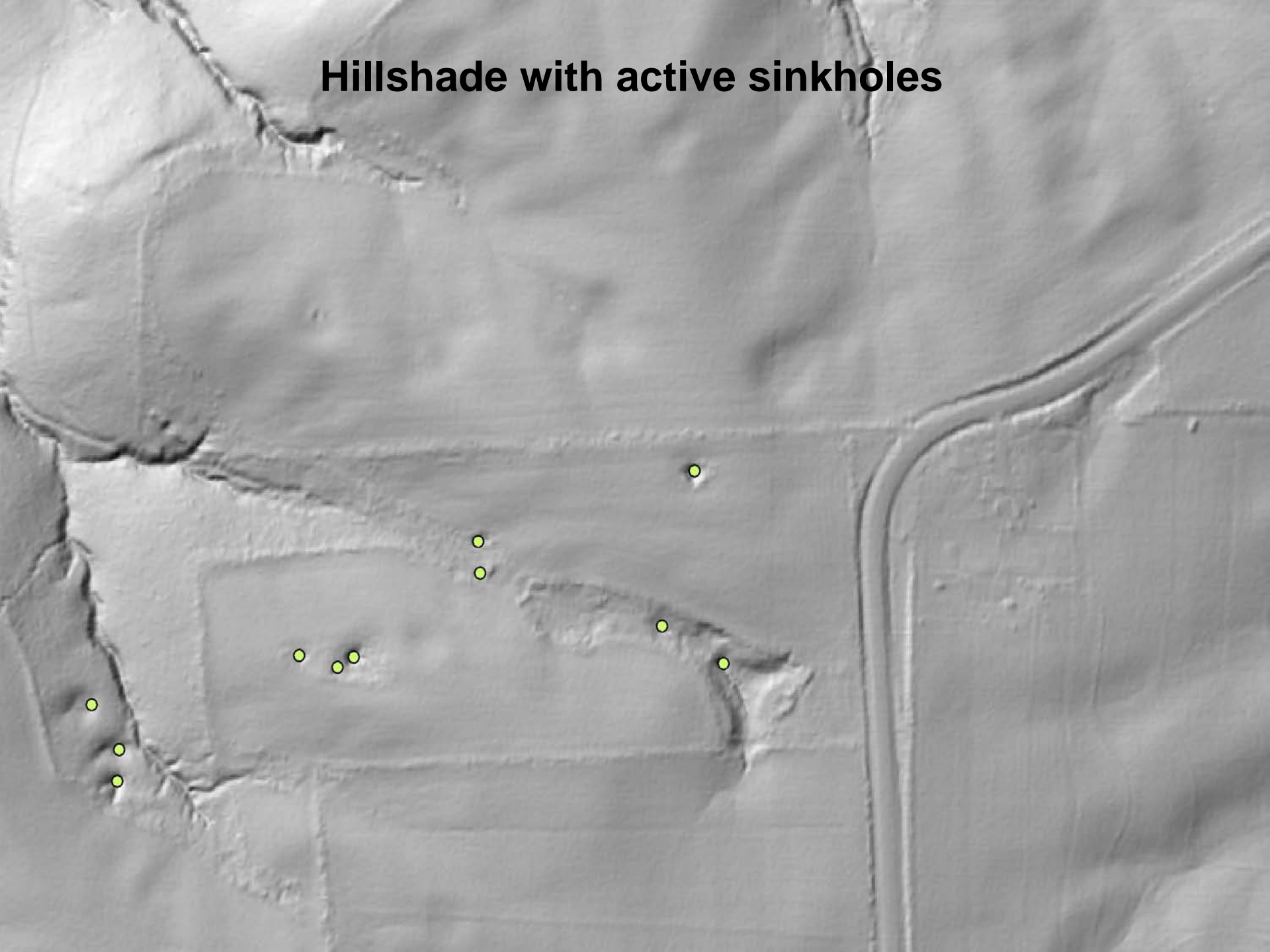
Hillshade



Fill Difference Grid



Hillshade with active sinkholes



1930s photo with active sinkholes



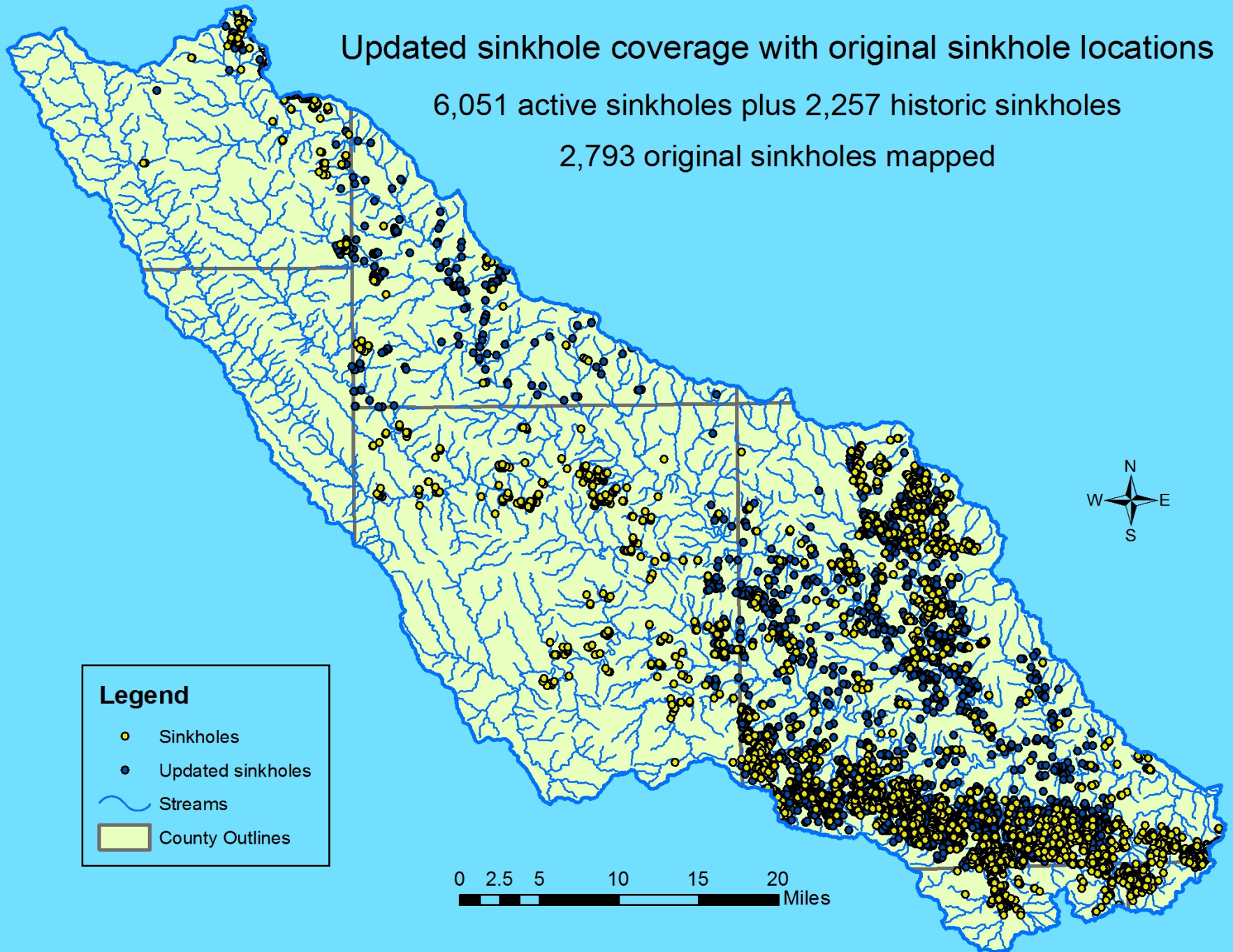
1930s photo with all sinkholes



Updated sinkhole coverage with original sinkhole locations

6,051 active sinkholes plus 2,257 historic sinkholes

2,793 original sinkholes mapped

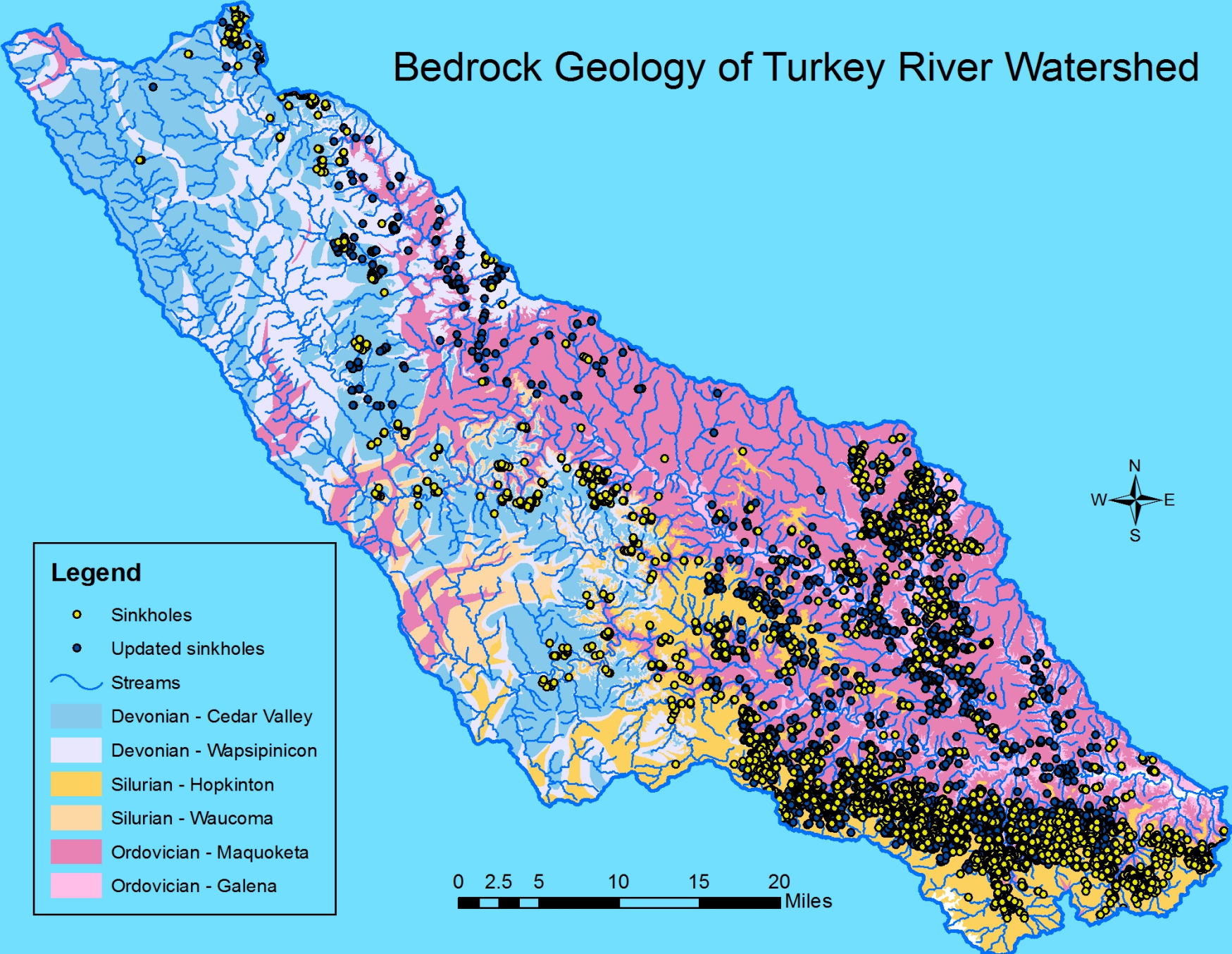


Legend

- Sinkholes
- Updated sinkholes
- ~ Streams
- County Outlines

0 2.5 5 10 15 20 Miles

Bedrock Geology of Turkey River Watershed



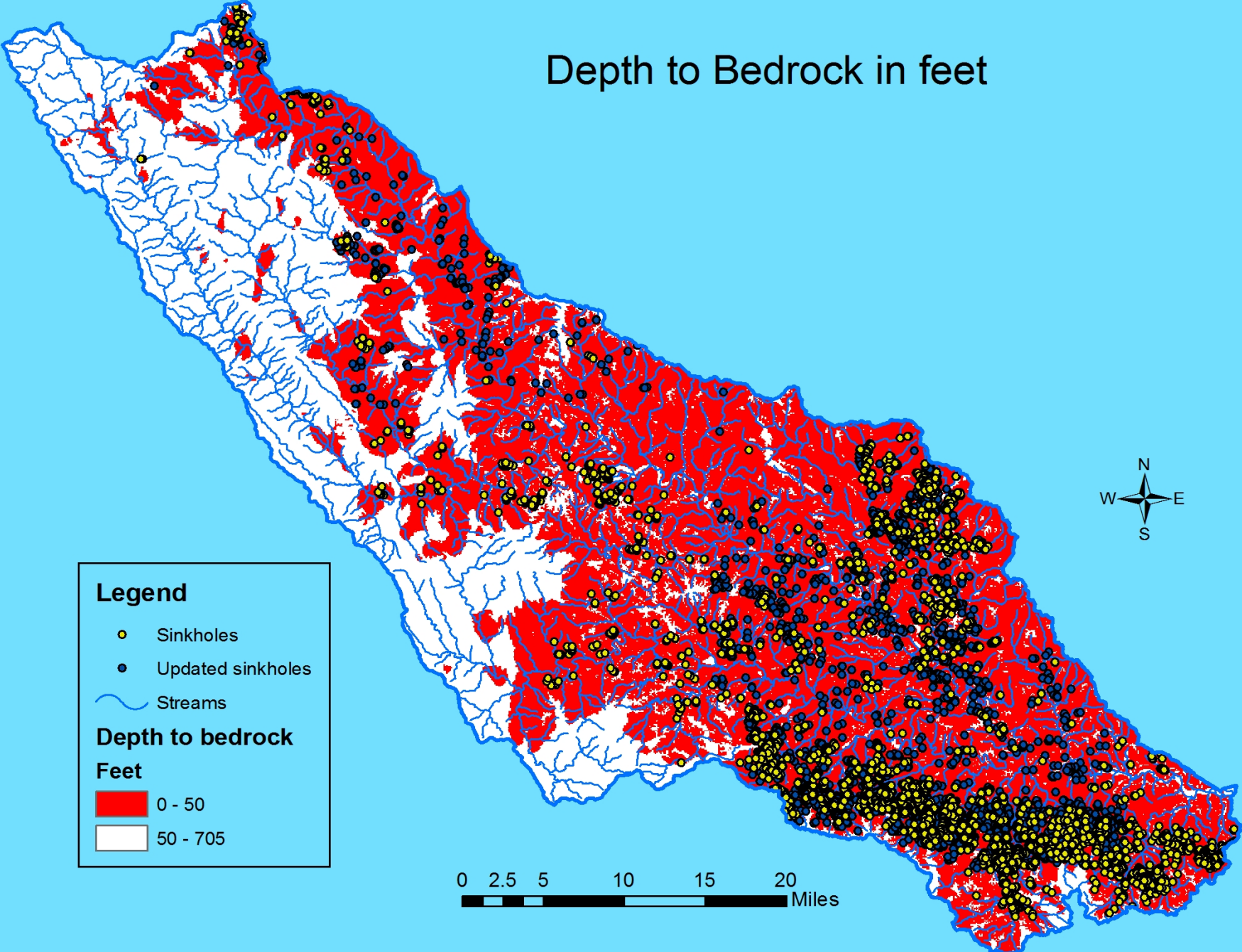
Legend

- Sinkholes
- Updated sinkholes
- ~ Streams
- Devonian - Cedar Valley
- Devonian - Wapsipinicon
- Silurian - Hopkinton
- Silurian - Waucoma
- Ordovician - Maquoketa
- Ordovician - Galena

0 2.5 5 10 15 20 Miles



Depth to Bedrock in feet



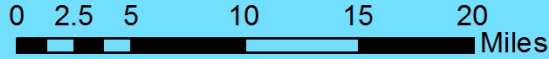
Legend

- Sinkholes
- Updated sinkholes
- ~ Streams

Depth to bedrock

Feet

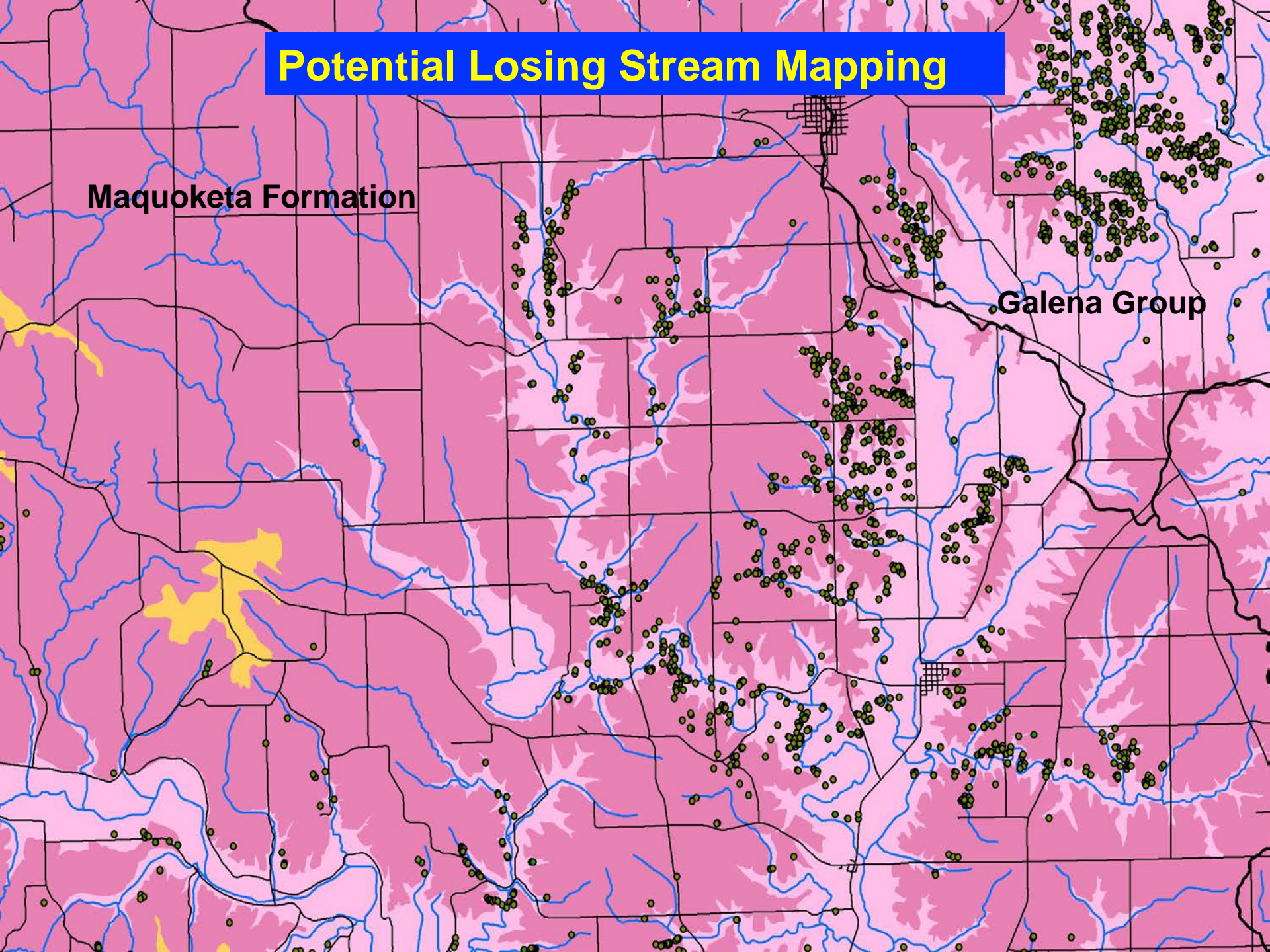
- 0 - 50
- 50 - 705



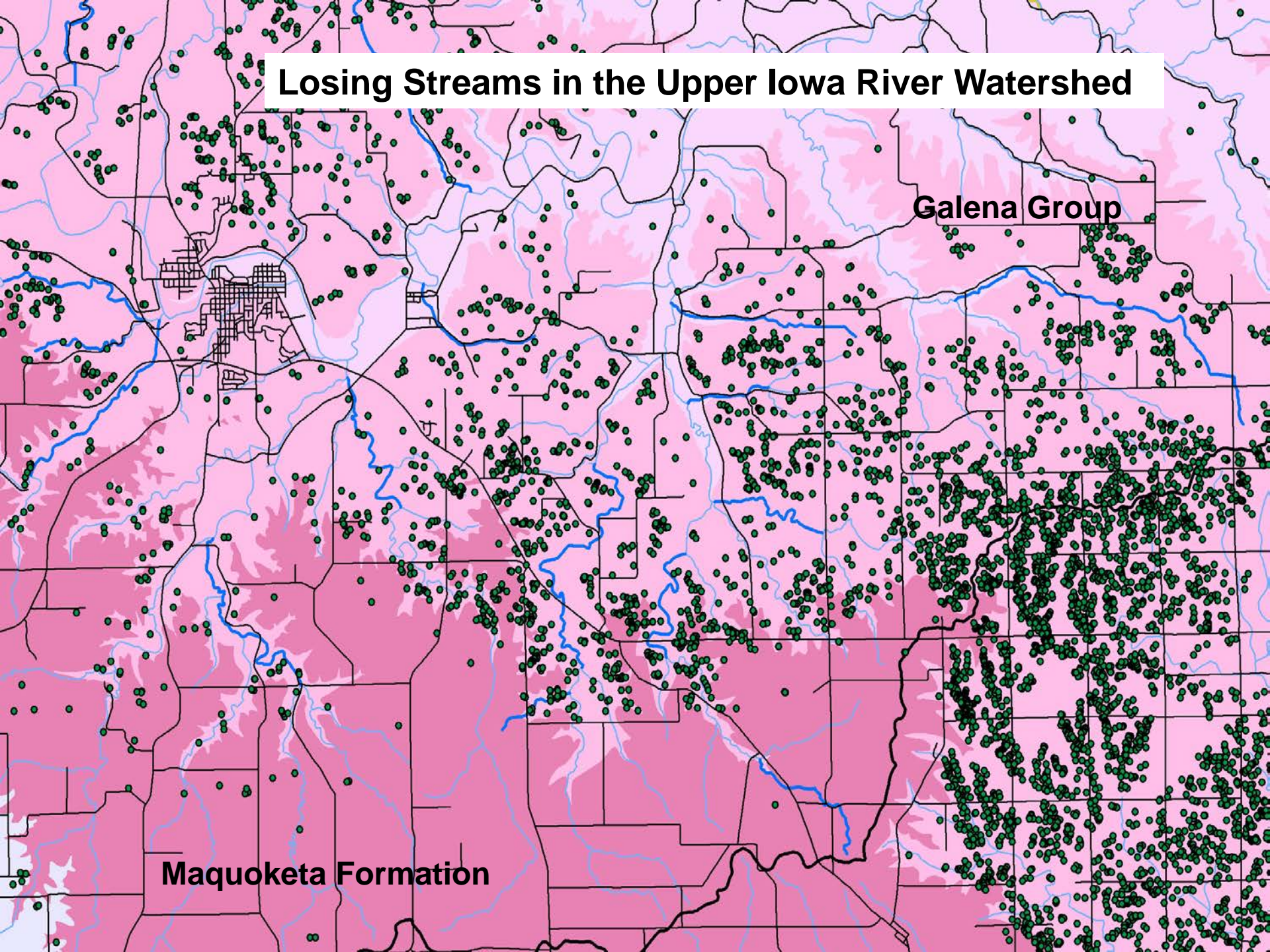
Potential Losing Stream Mapping

Maquoketa Formation

Galena Group



Losing Streams in the Upper Iowa River Watershed



Galena Group

Maquoketa Formation

Questions ????

