Status of Karst Mapping in Ohio: Sinking Spring

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Outline

- What is karst
- Methods
- Field verification
- Review of current karst area

What is Karst

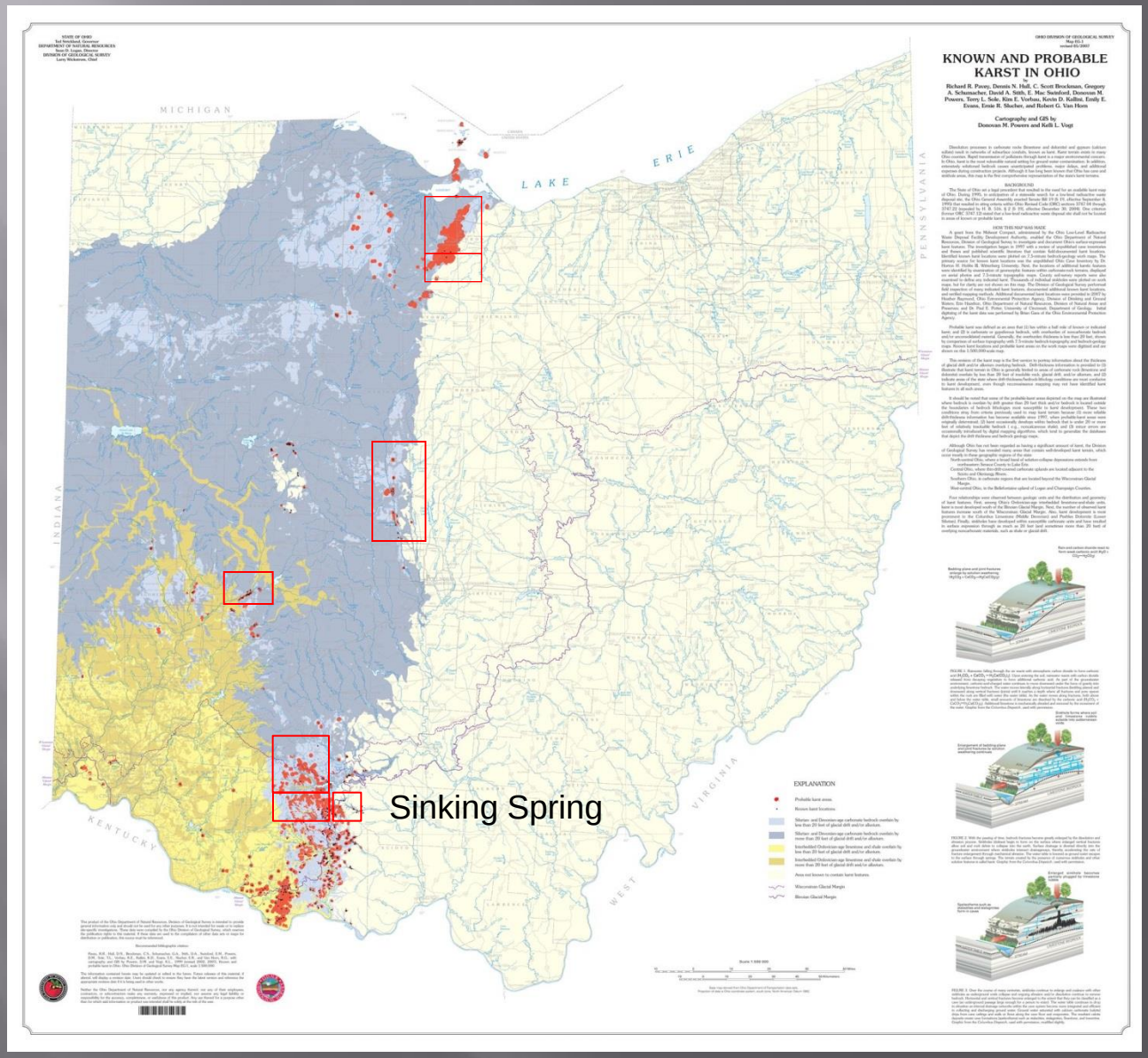
- Forms by dissolution of
  - Carbonates (limestone or dolomite)
  - Evaporites (gypsum or salt)
- Characterized by
  - Sinkholes
  - Disappearing streams
  - Caves
  - Springs

Locating Sinkholes

- Extract depressions from DEM (fill, minus)
- Automate removal of very small and very shallow depressions
- Manually check remaining depressions in Arc
- Field verify to find:
  - Points newer than the DEM
  - Points not revealed by DEM

Known and Probable Karst in Ohio

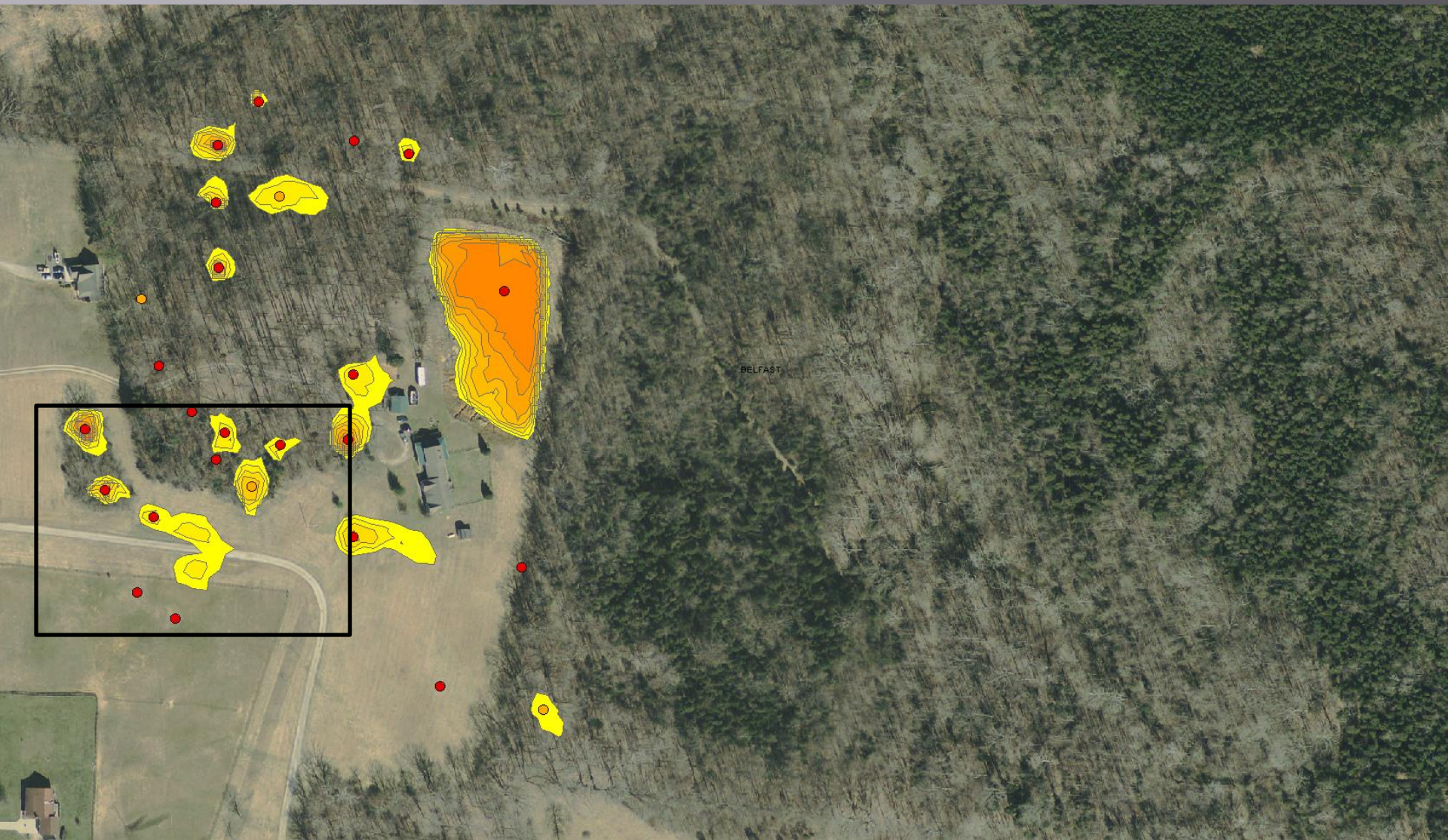
Map EG-1, revised 05/2007



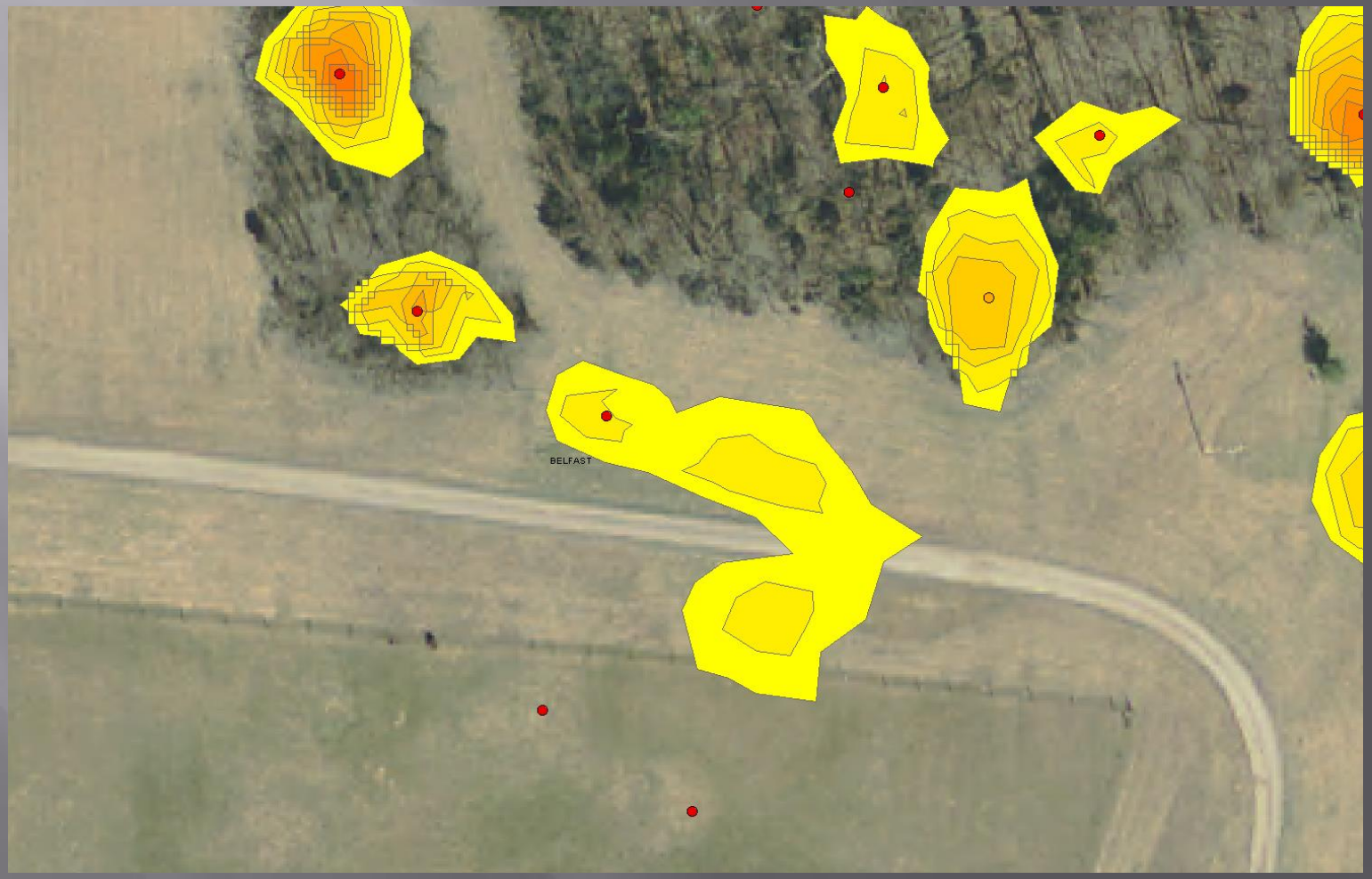
Results of Initial Processing

Results of Automatic Model

Final Results Including Field Verification



Benefit of Including >0-1ft.

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SINKING
SPRING
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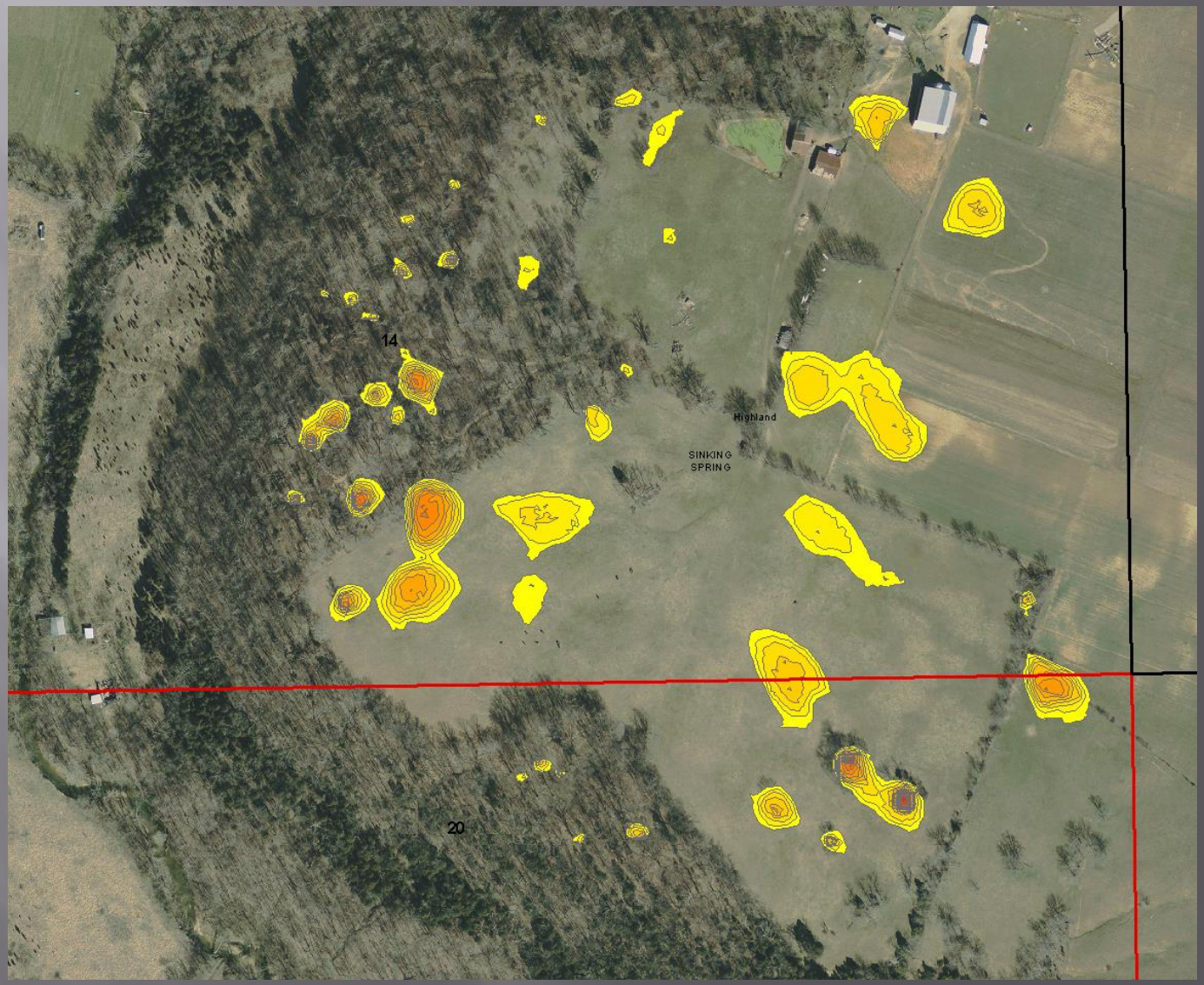
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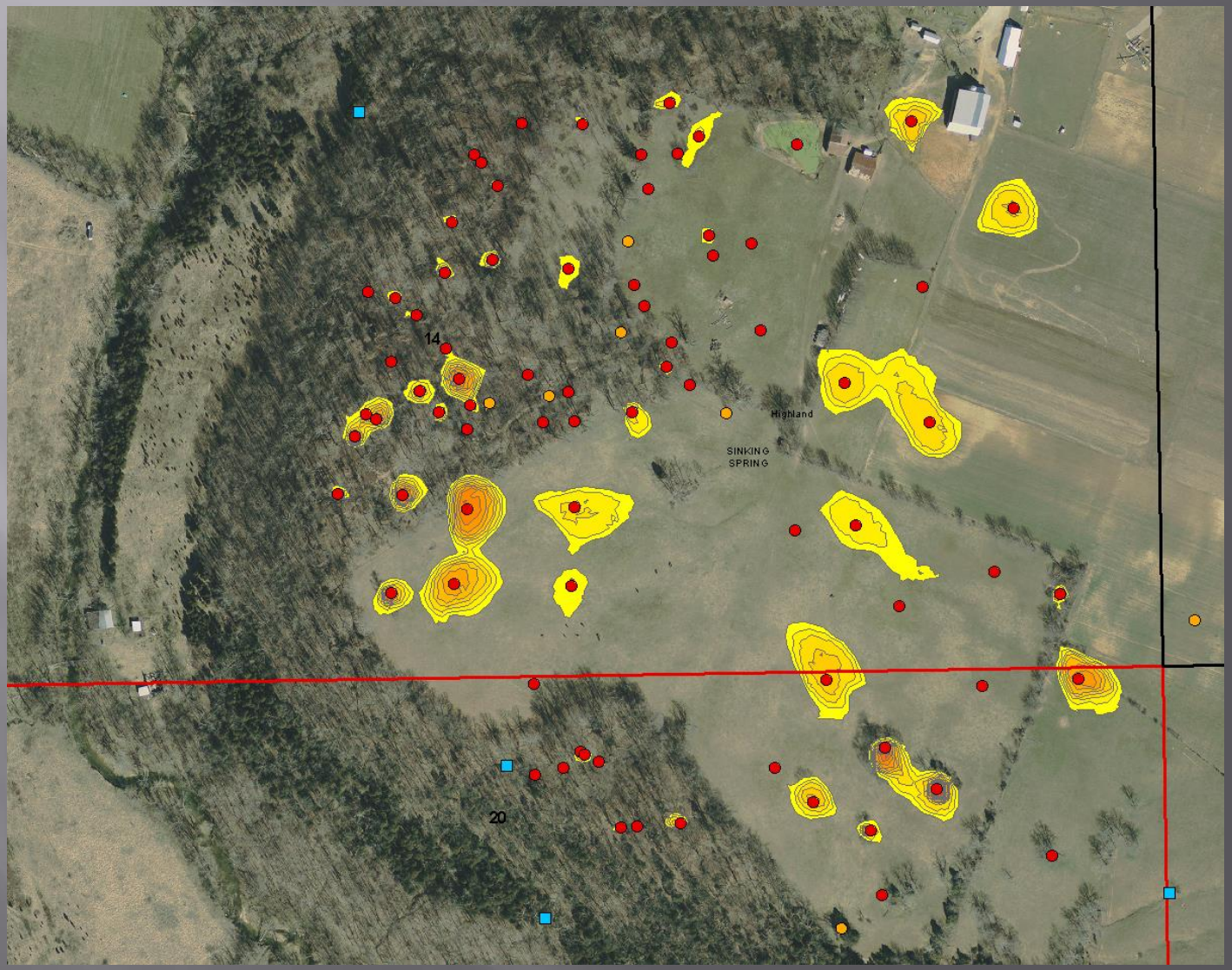
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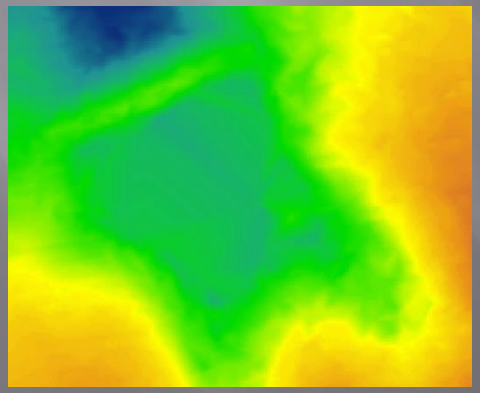
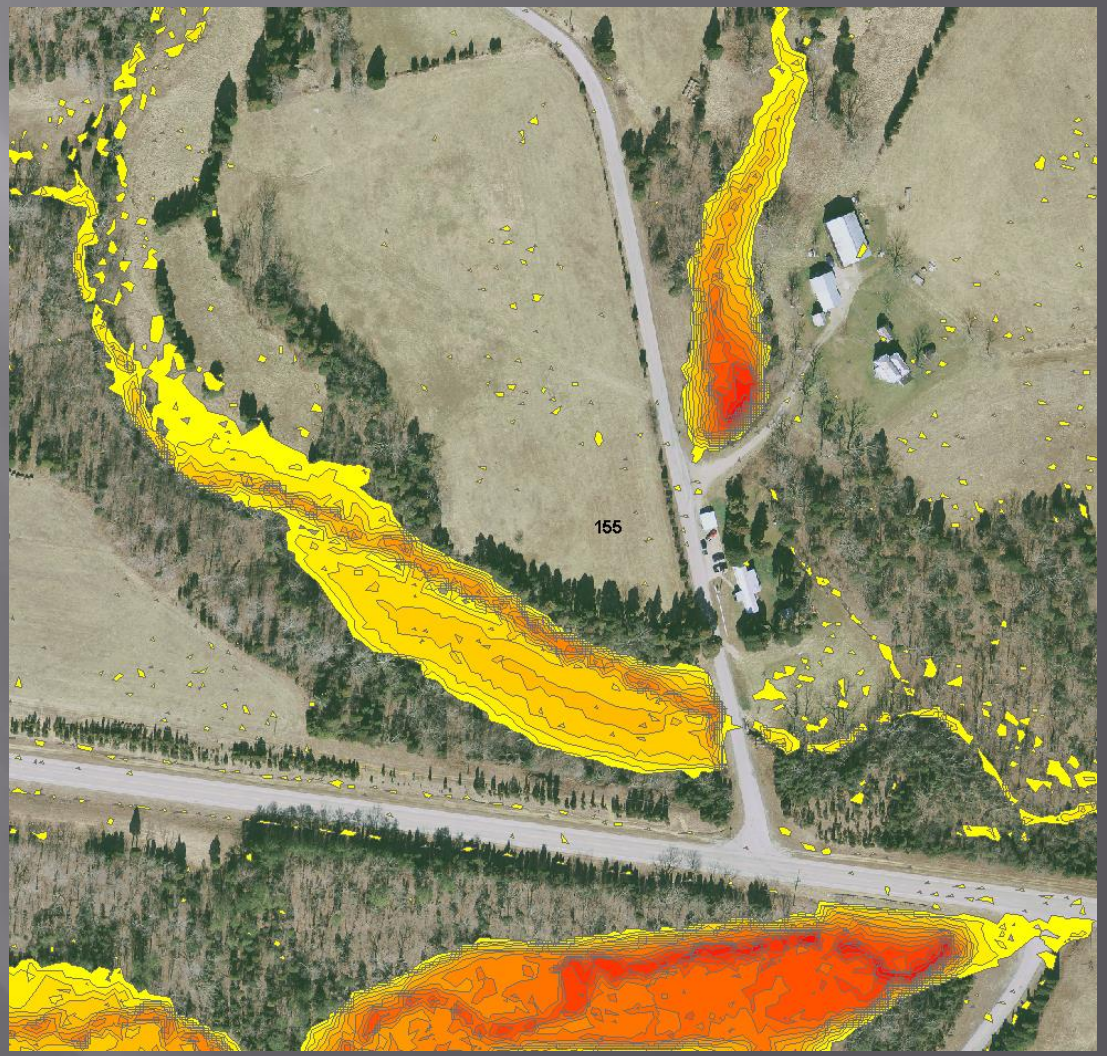
Field Verification

- Stream bank/water reflections
- Culverts/ bridges
- Storm drains
- Foundations
- Ponds

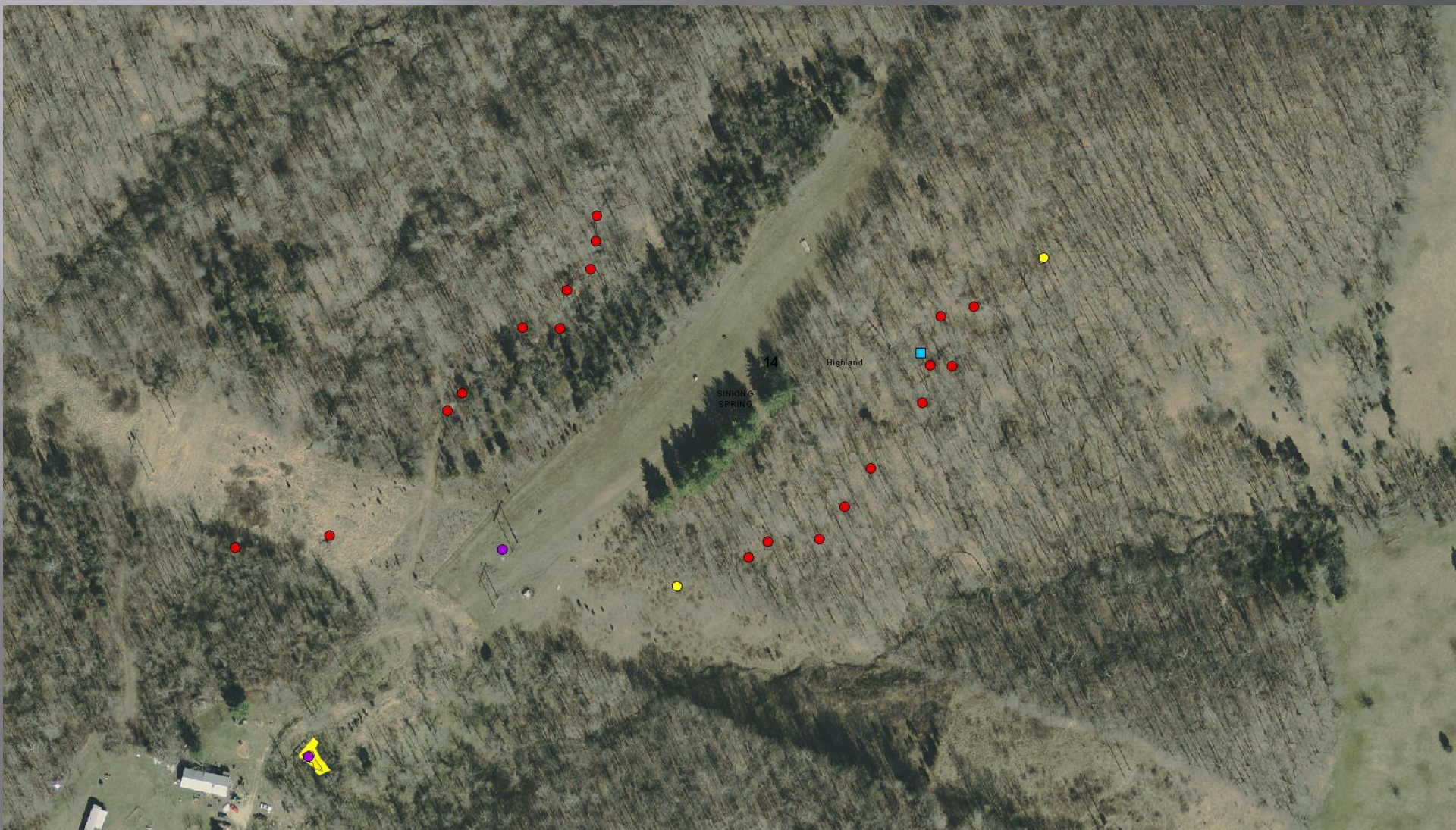




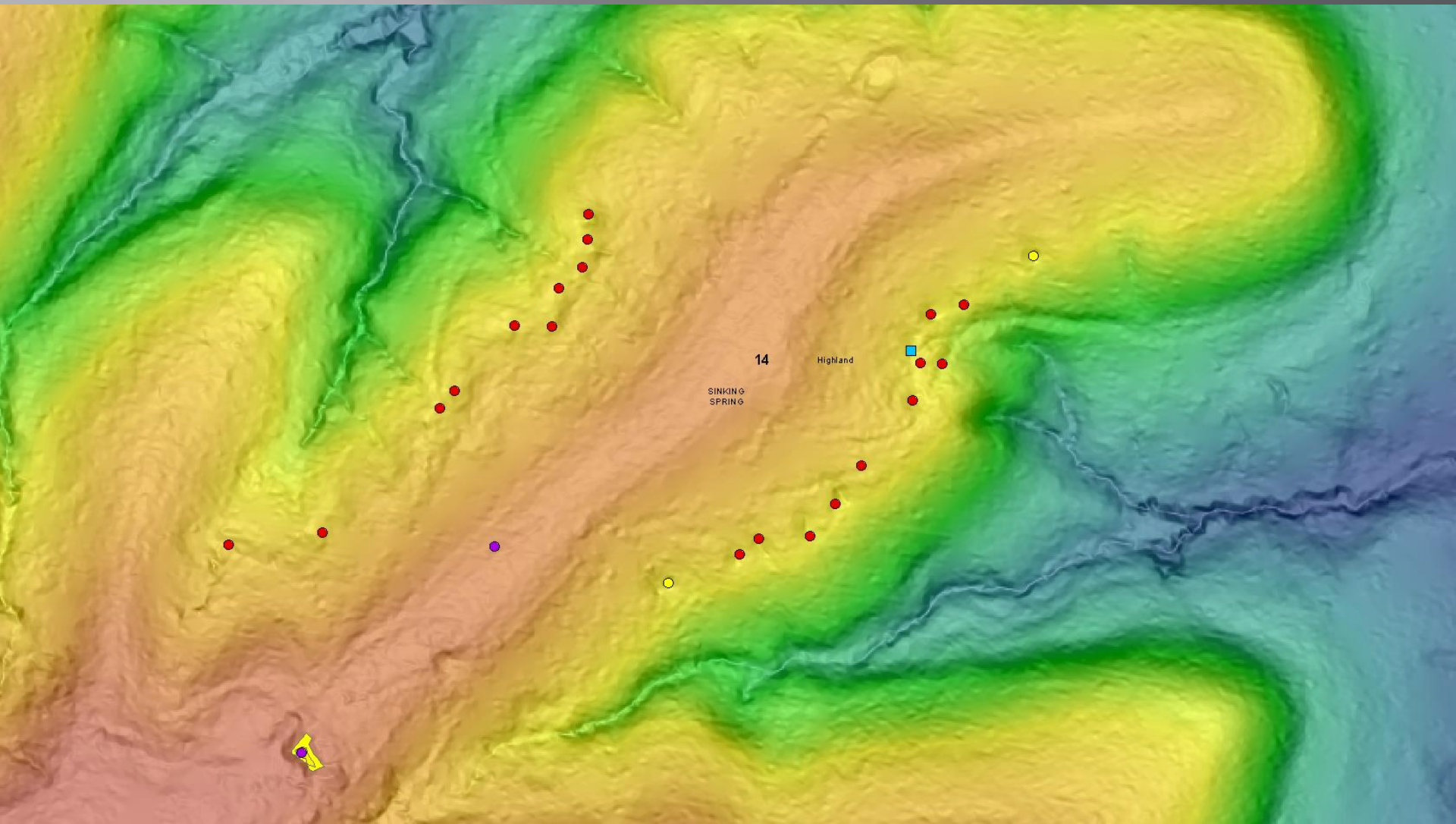
Failing drain tile

Benefits of Field Work

Features provided by Owner



DEM view

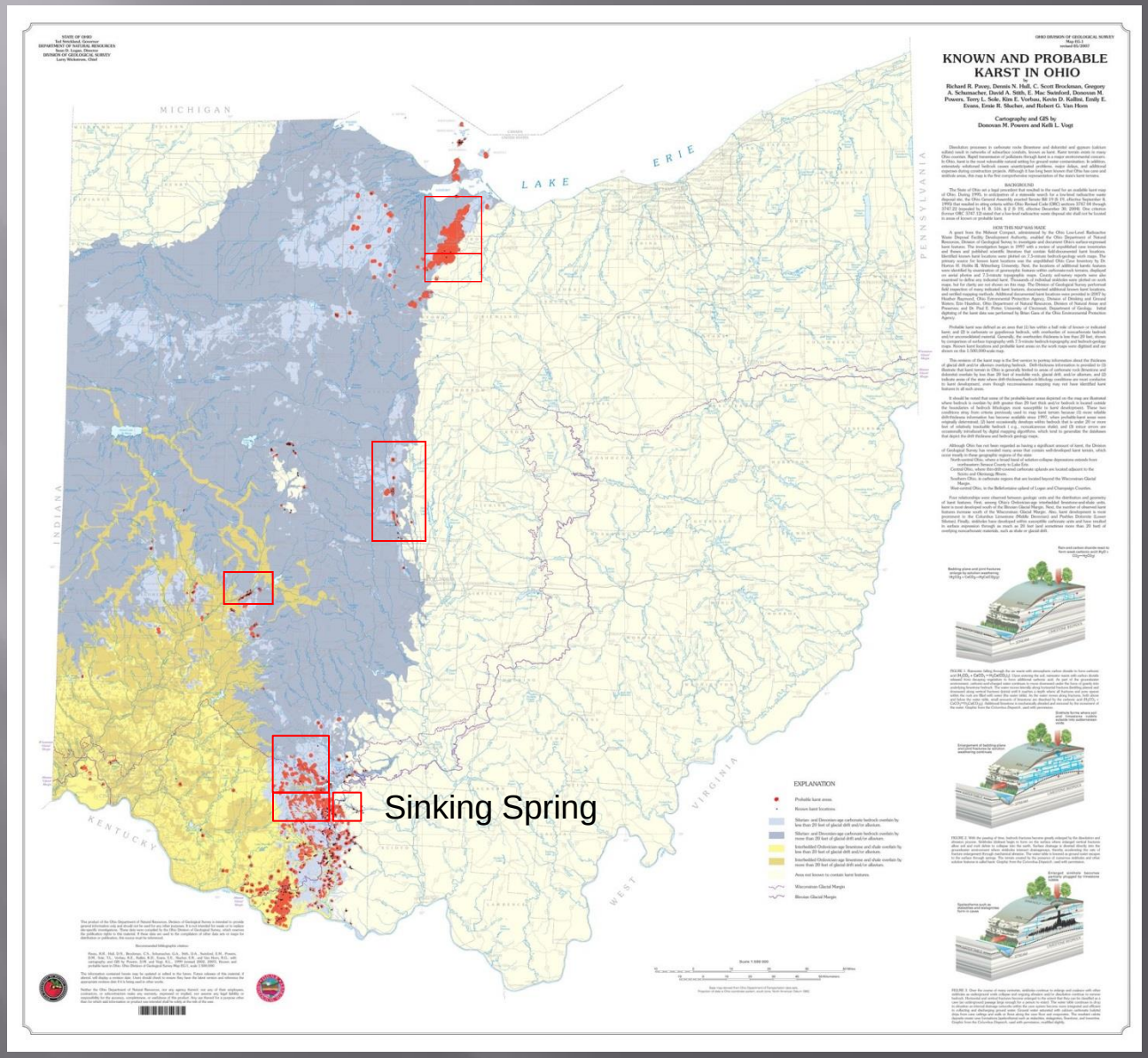


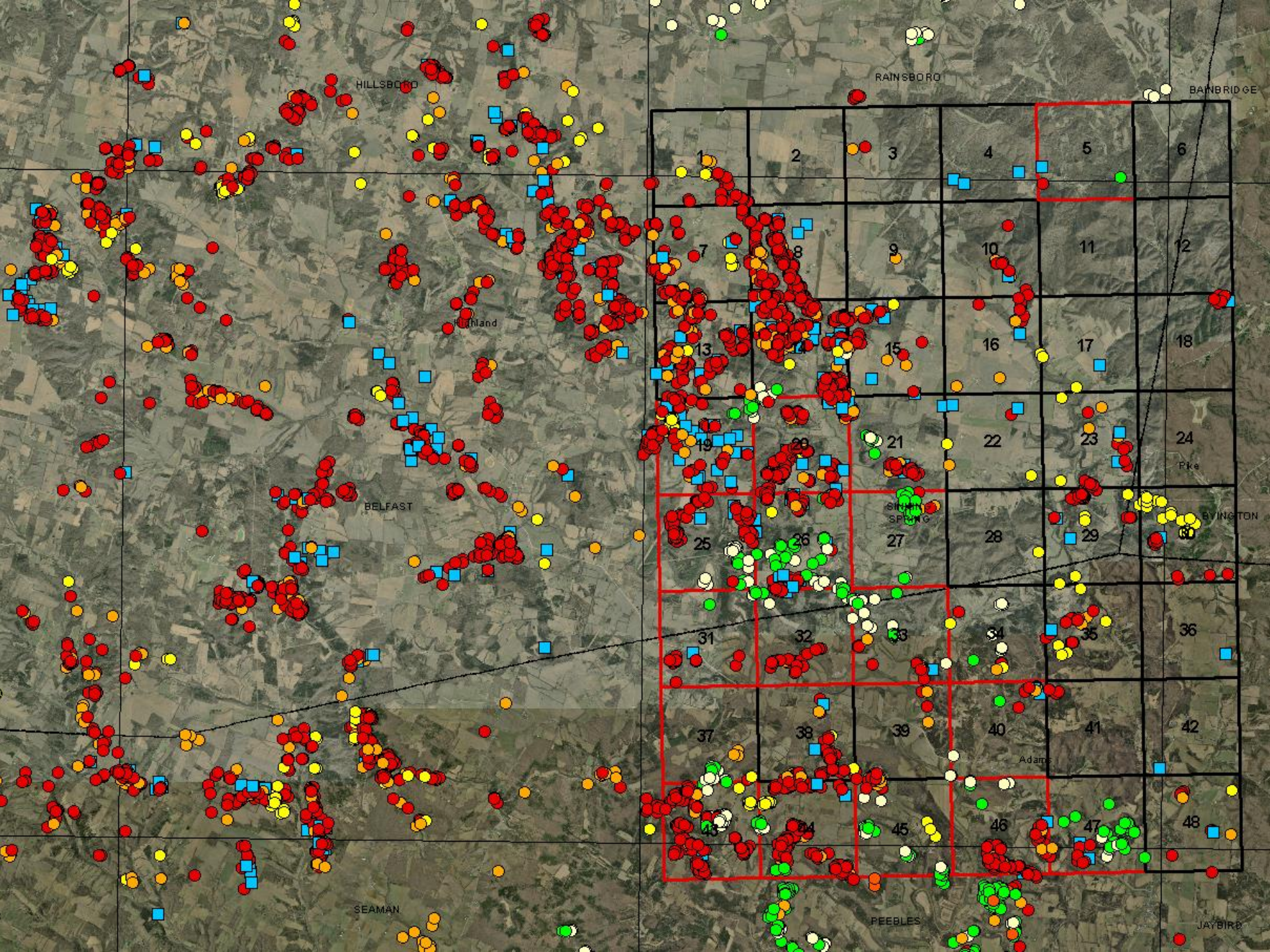
Deep active sink.

- Not on DEM
- Location mentioned by owner
- Sent the younger brother down 40ft on a rope

Known and Probable Karst in Ohio

Map EG-1, revised 05/2007

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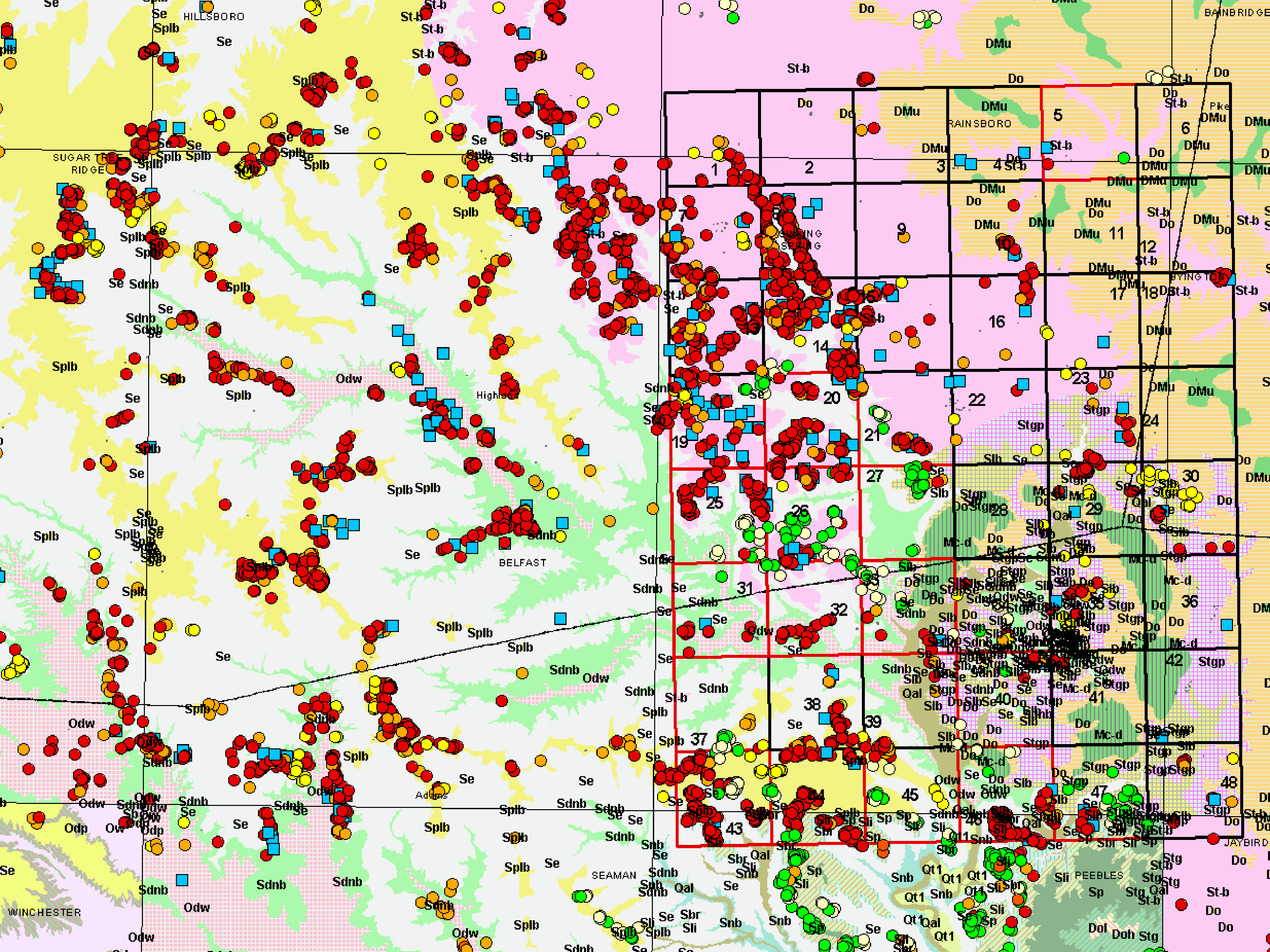
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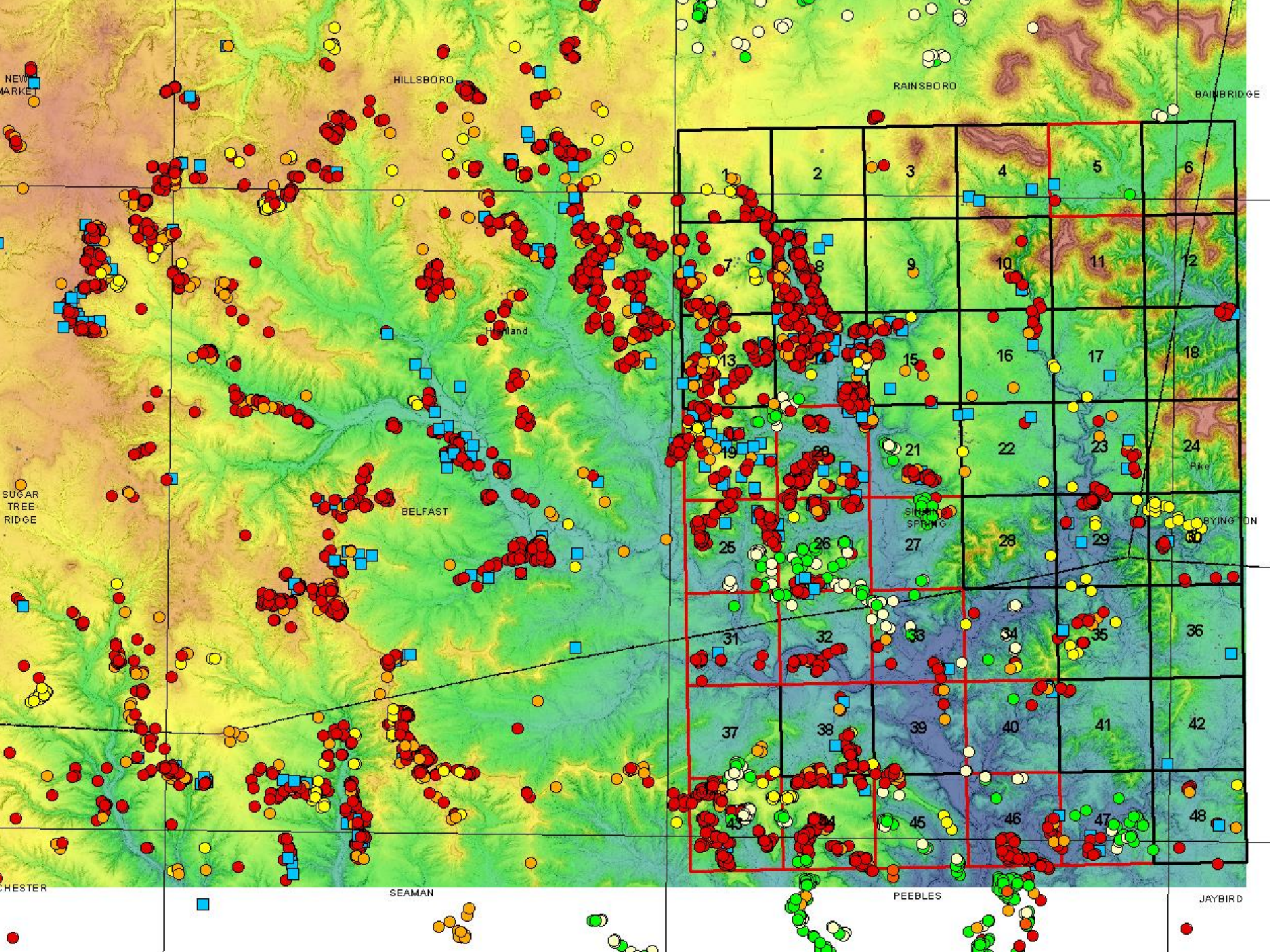
PEEBLES
WINCHESTER
JAYBIRD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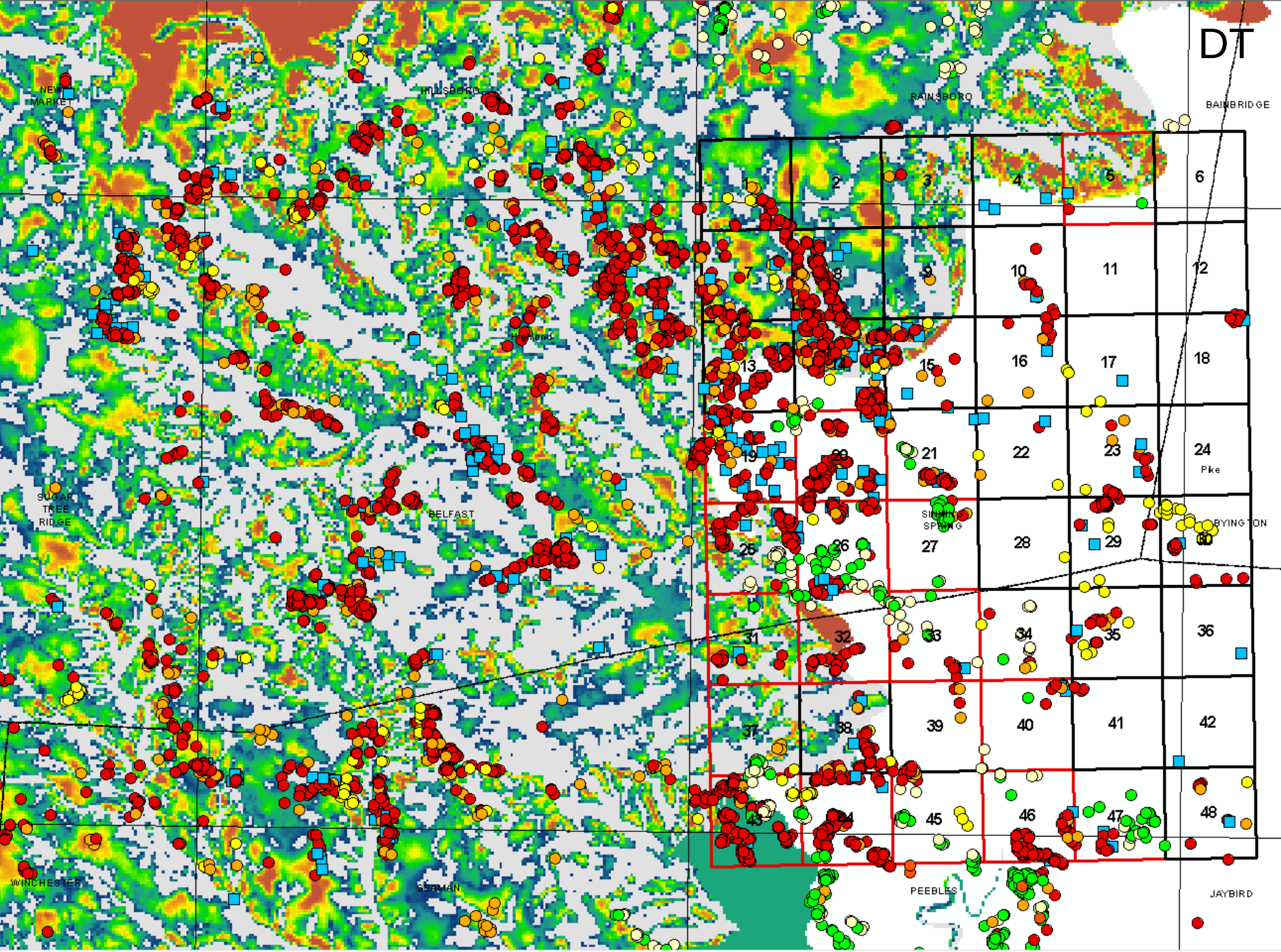
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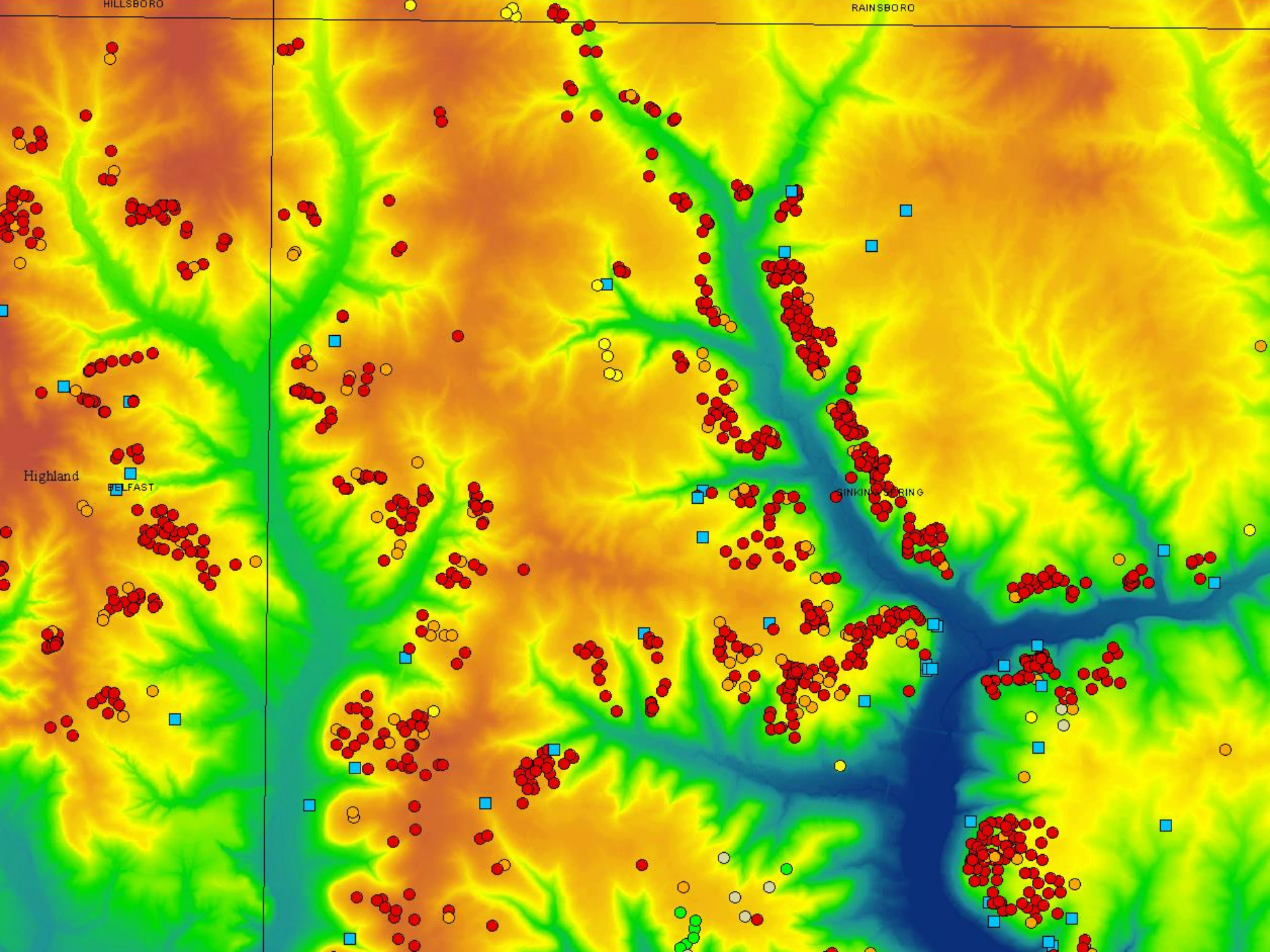
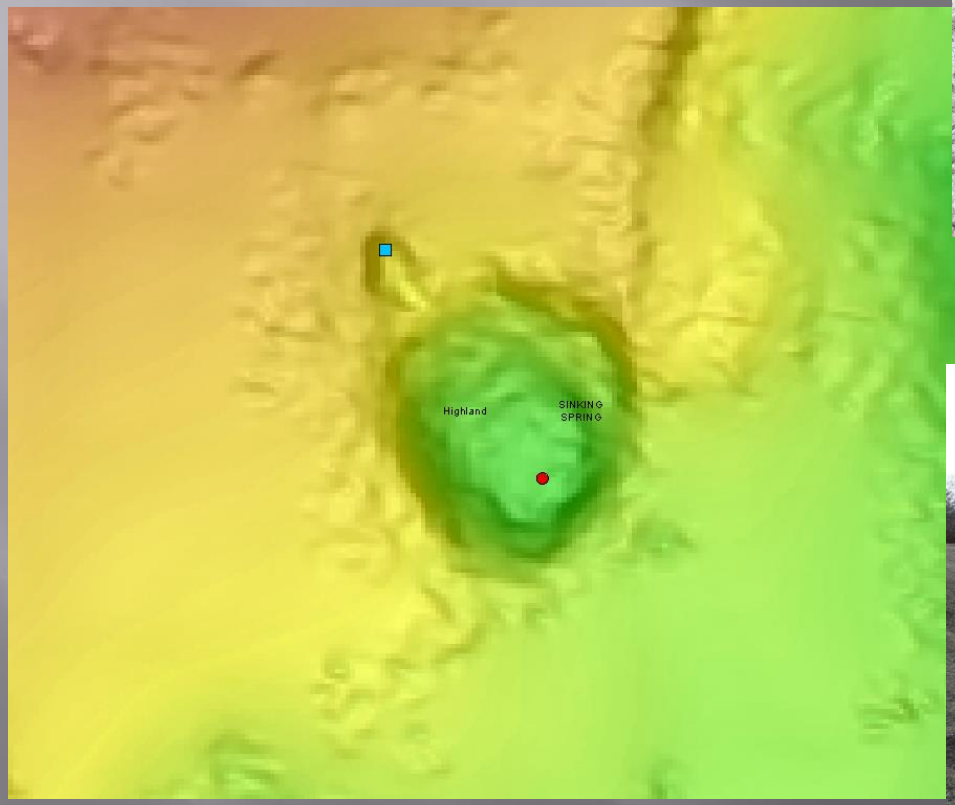
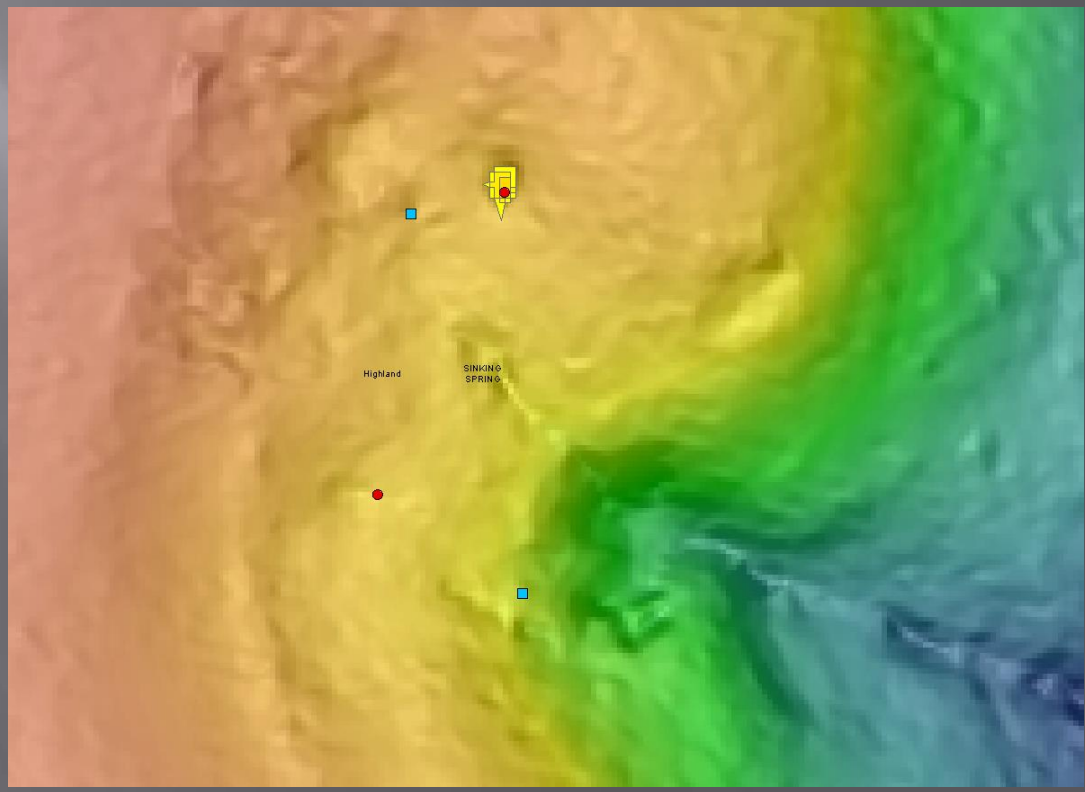

HILLSBORO
RAINSBORO
Highland
BELFAST

Sinks Along Valley Rims

Sinking Spring



Spring Above Sink



Groundwater Contamination

Trash Filled

Trash Filled

Burned Trash

Trash Filled

Flooded Sink

Sink Nearing Road

All Roads Lead to Sinkholes

Collector

Plumbing the depths

Reactivated sink with cave

Power lines

10-15year old sinkhole 18x25ft, 9ft deep.

Solution Enlarged Fracture

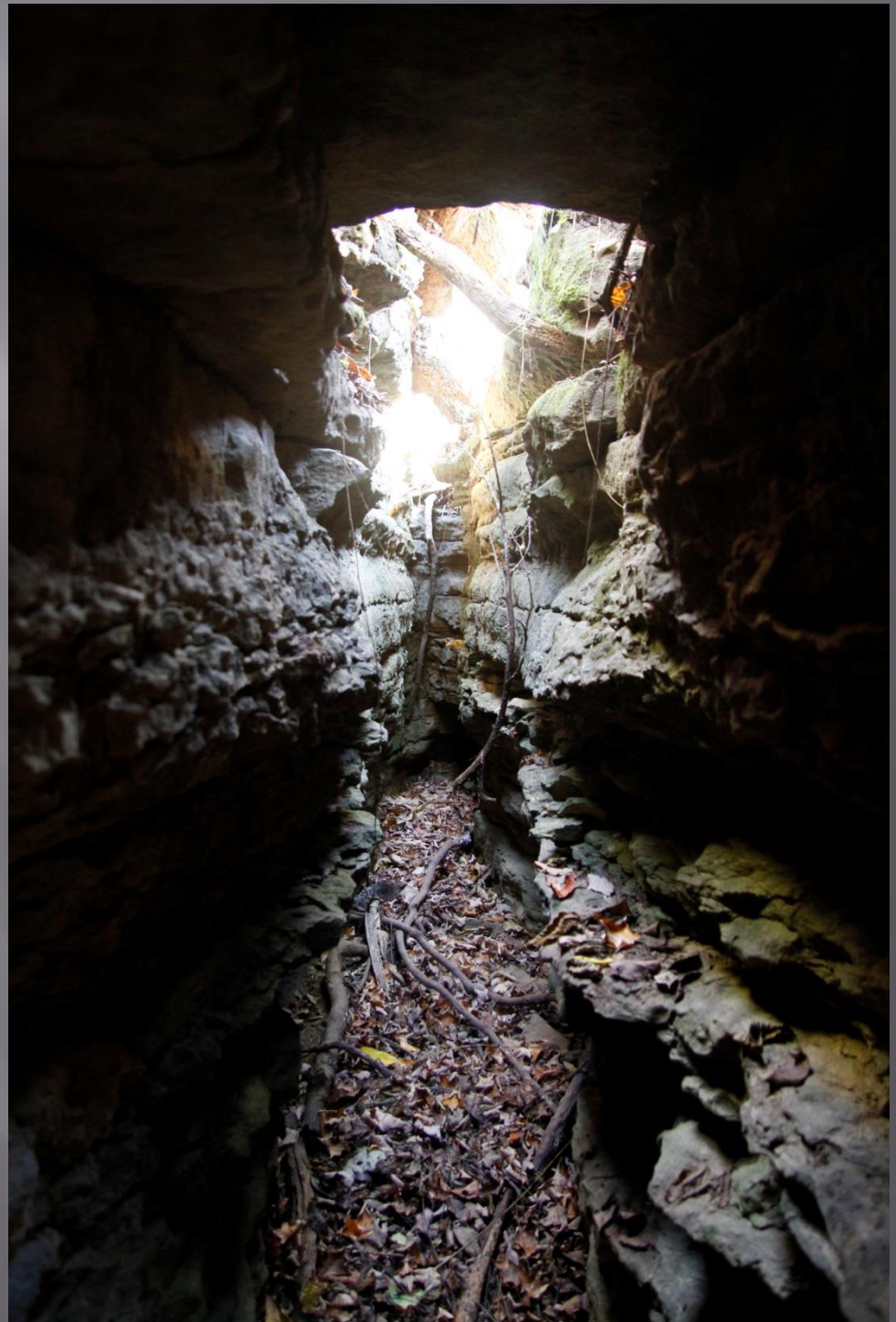
Solutional Weathering

Suspended Tree and Soil

Sequence

- Fracture enlarged via karst processes
- Enlarged fracture infilled with sediment, possibly glacial
- Trees grow on top
- Deeper karst reactivates from below

Similar Solution Enlarged Fracture



Deepest sink in Ohio?

Key Hole Arch

Key Hole Arch

Key Hole Arch

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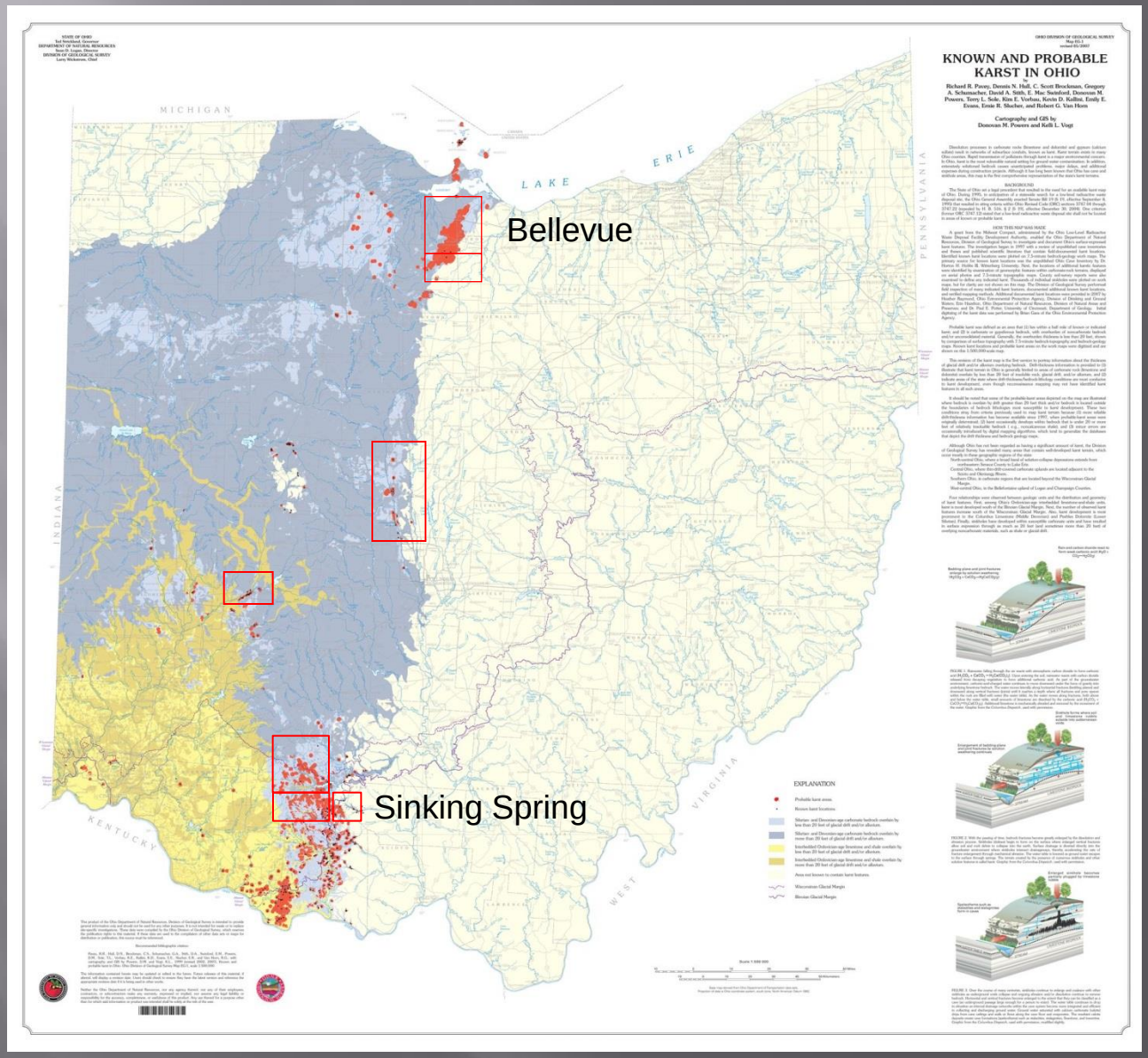

Summary

- Sinking Spring
  - 1741 field verified points
  - 125 springs
  - 326 suspect points
  - 140 points left to field check
- Sinkholes clustered along valley rims
- Springs above and below sinkholes
- Fracture solutional timing based on soil and trees