

Stewardship of the Fitchburg-Waubesa Artesian System

Significance of the

*Buried Bedrock Valleys
& the Eau Claire Sea*

Further Research

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The Groundwater System

What do we believe so far?

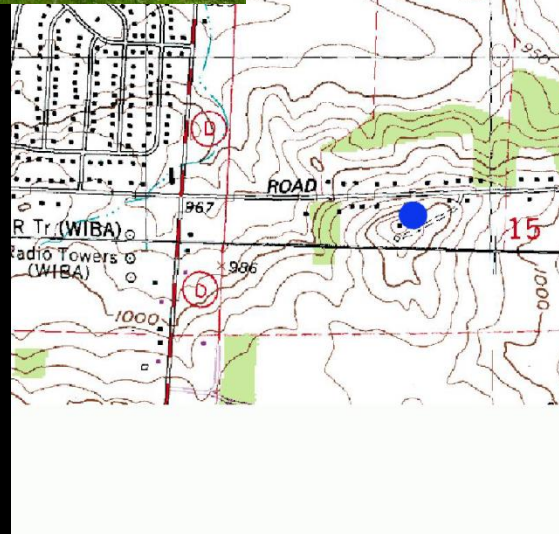
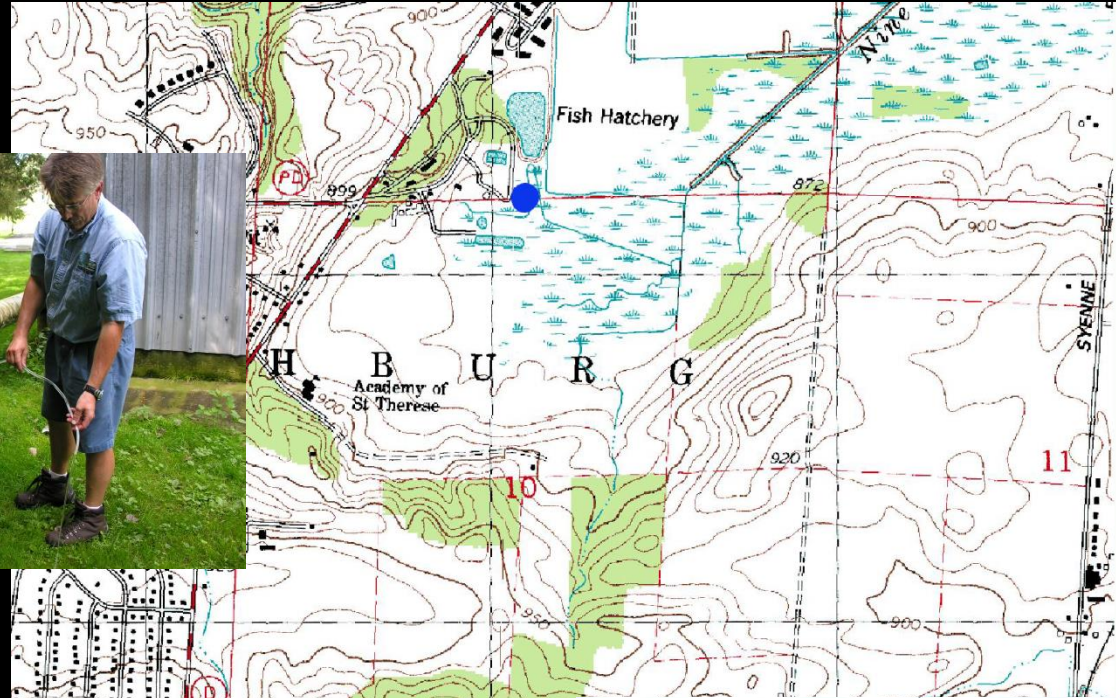
At this point we believe that:

- ◆ Two aquifers lie below us, with an aquitard between.
- ◆ This aquitard limits vertical water flow, except in cracks.
- ◆ Both aquifers ultimately get their water from above.
- ◆ Municipal wells pump at 800-1000 feet from the lower aquifer.
- ◆ Rural wells pump at 50 to 200 feet from the upper aquifer.

The aquitard is sedimentary rock---Eau Claire shale formed layer by layer in bedded sediments that settled under an ancient sea

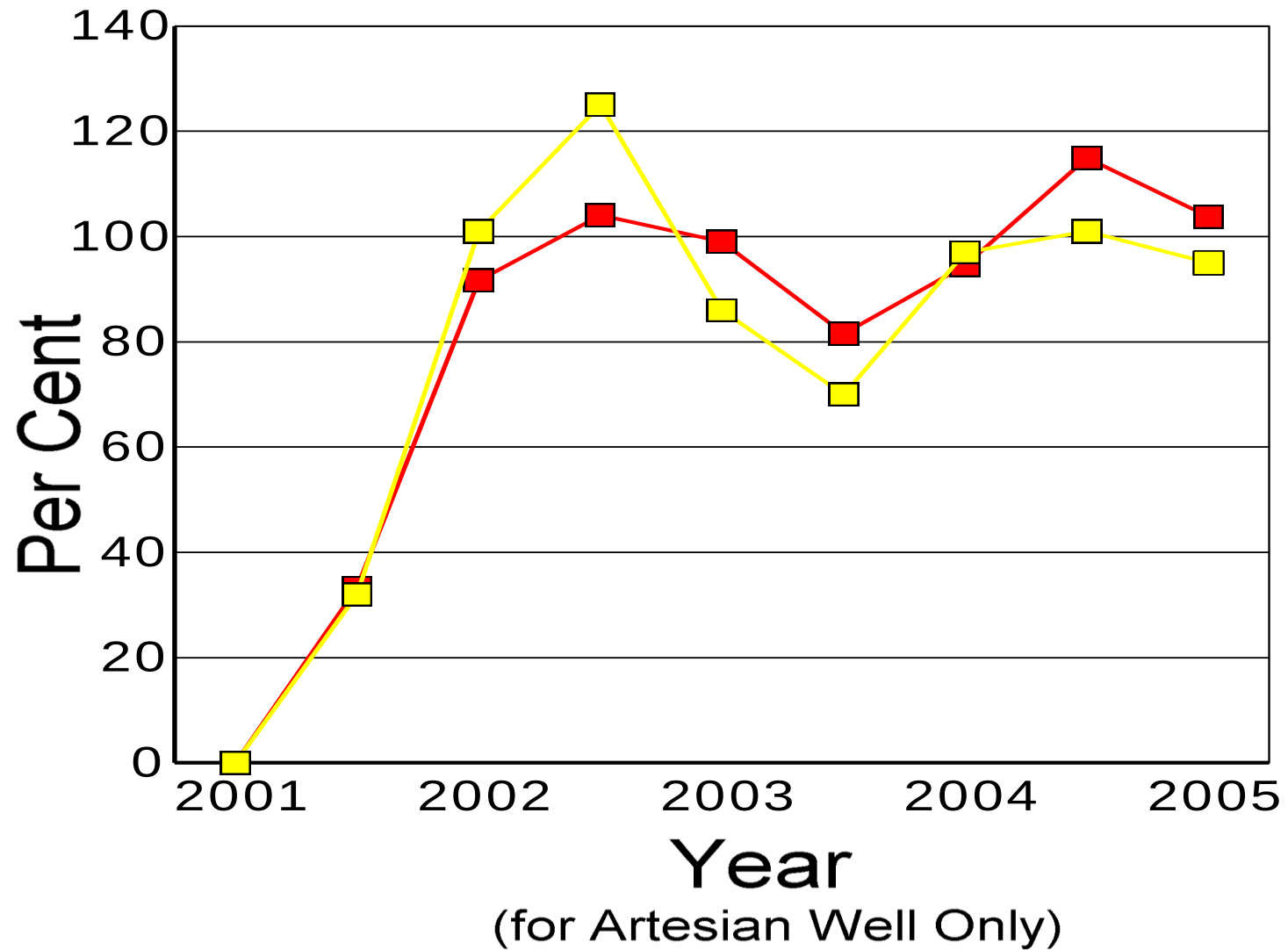
.....But we also have found that...

...there is a connection between DNR Artesian Well #8 ...and Fitchburg Pumping Well #10.



Relationship of Wells #8 & 10

- The outflow of DNR Well #8 corresponds with the pumpage of Fitchburg Well #10.
- At first this lag is about 18 months, then after half a year it is about 12 months, and after another half year about 6 months.
- When these lags of 18, 12, and 6 months are used, we get the following graph
- (#8 is in yellow, #10 in red):



We therefore have discovered:

- There is a connection between Municipal Well #10 and Nevin Artesian Well #8
- Since the Nevin Artesian Well is 180 feet deep, there is a connection between the upper and lower aquifers
- The lag of the effect of Well # 10 on Nevin # 8 was at first about 18 months and now is about 6 months;
- The distance between wells is about 5505 feet.
- This means that the flow rate between these two wells is approximately 5505 feet per 365 days or approximately 30 feet (9.1 meters) per day.

“...there is a connection between the upper and lower aquifers.”

- This is our conclusion from our seeing that Well #10 pumpage corresponds with Well # 8 flowage.
- Does this mean that the Eau Claire Aquitard might be missing?
- Has the Eau Claire Aquitard been cut through?
- Let's find out....







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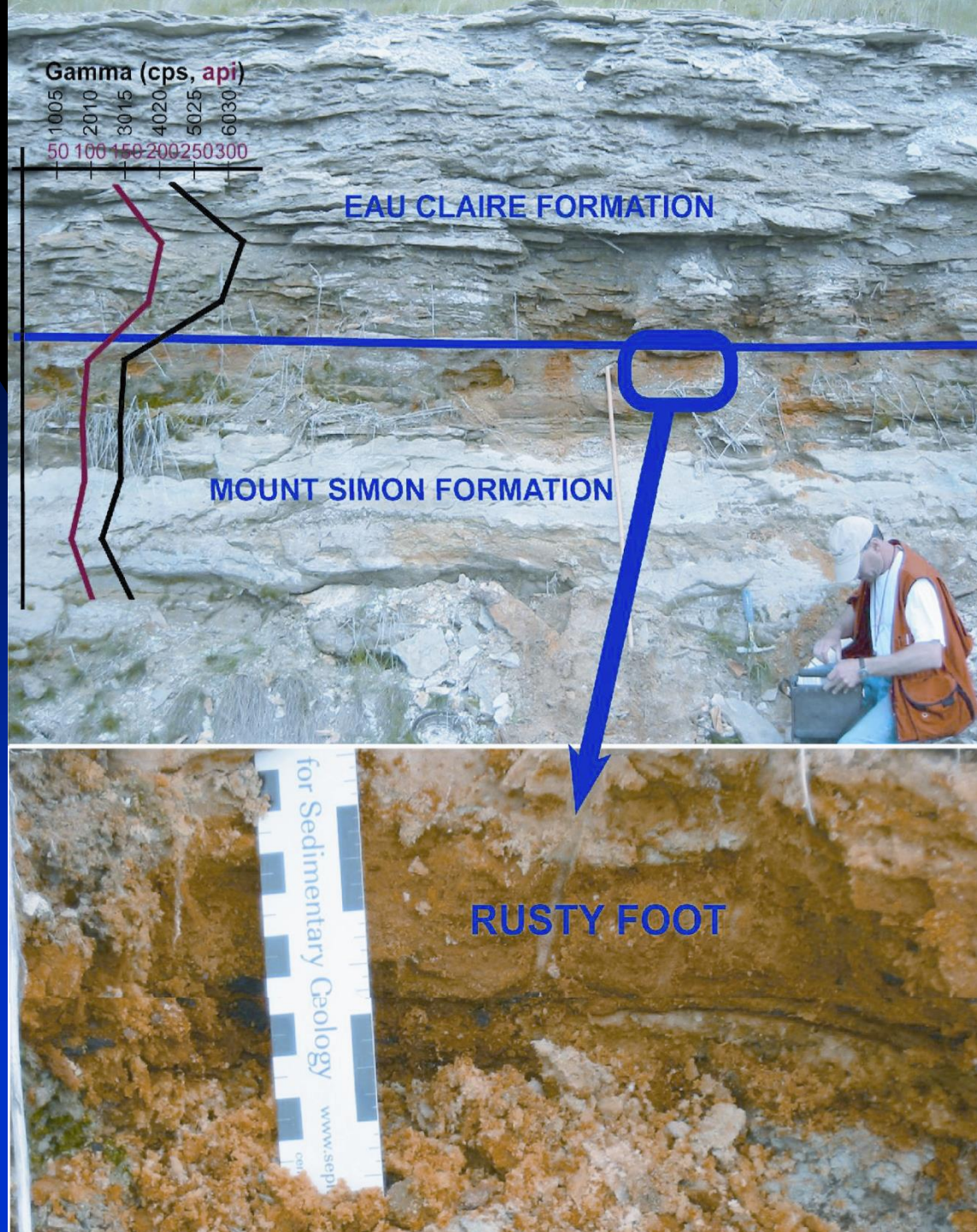
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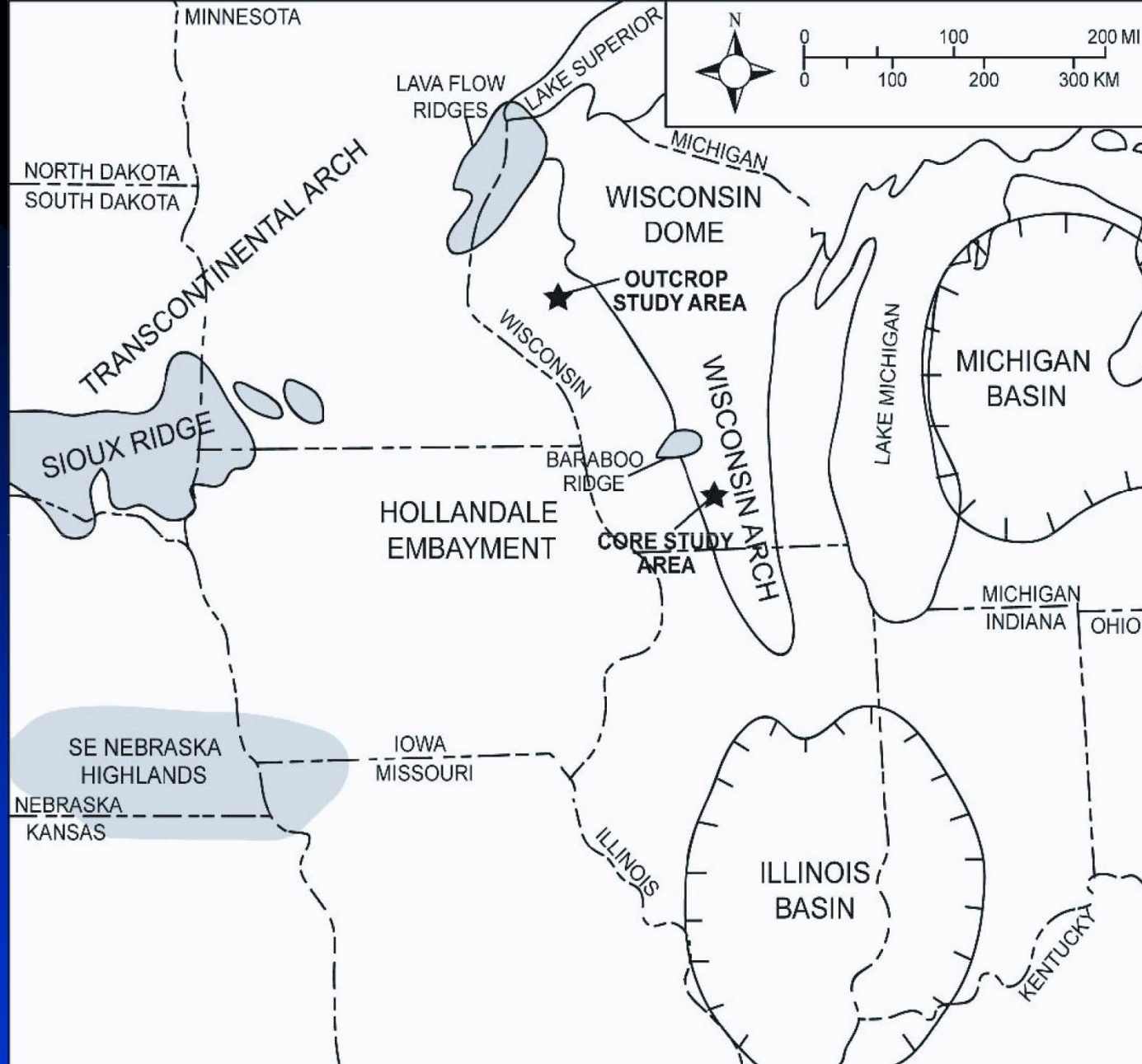
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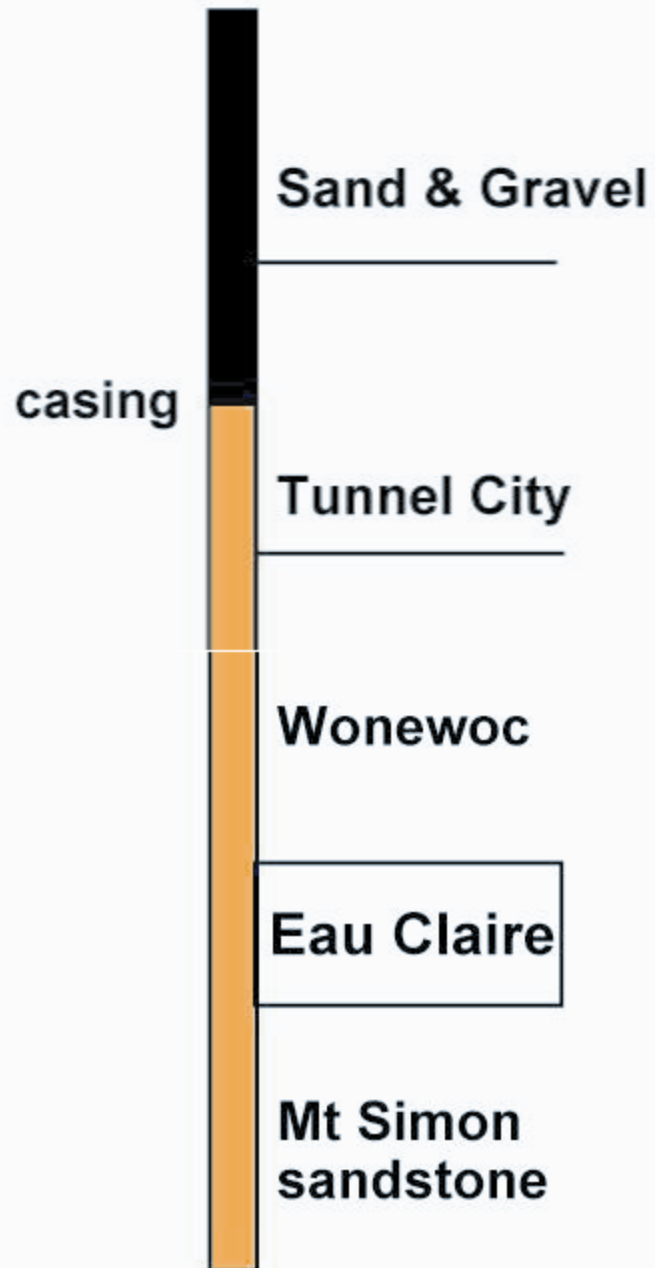
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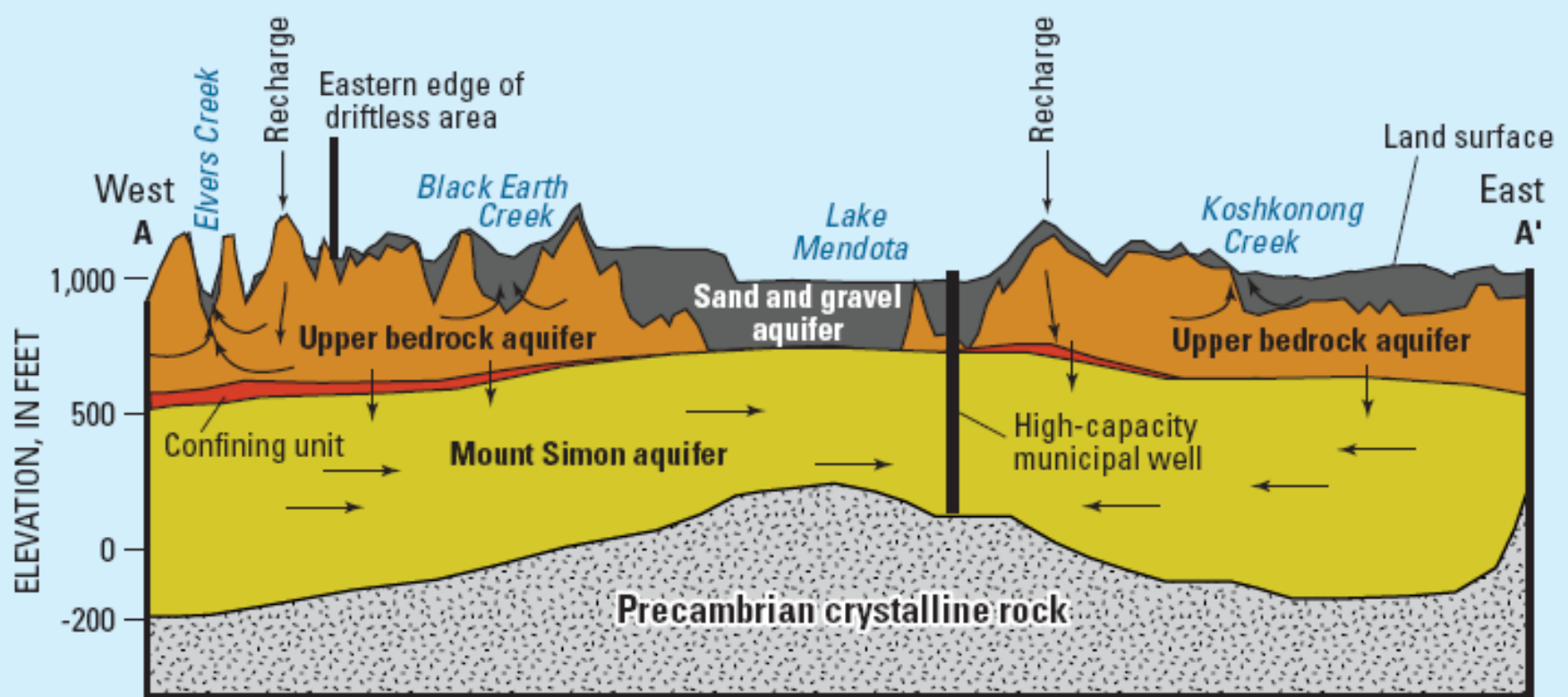
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Geology

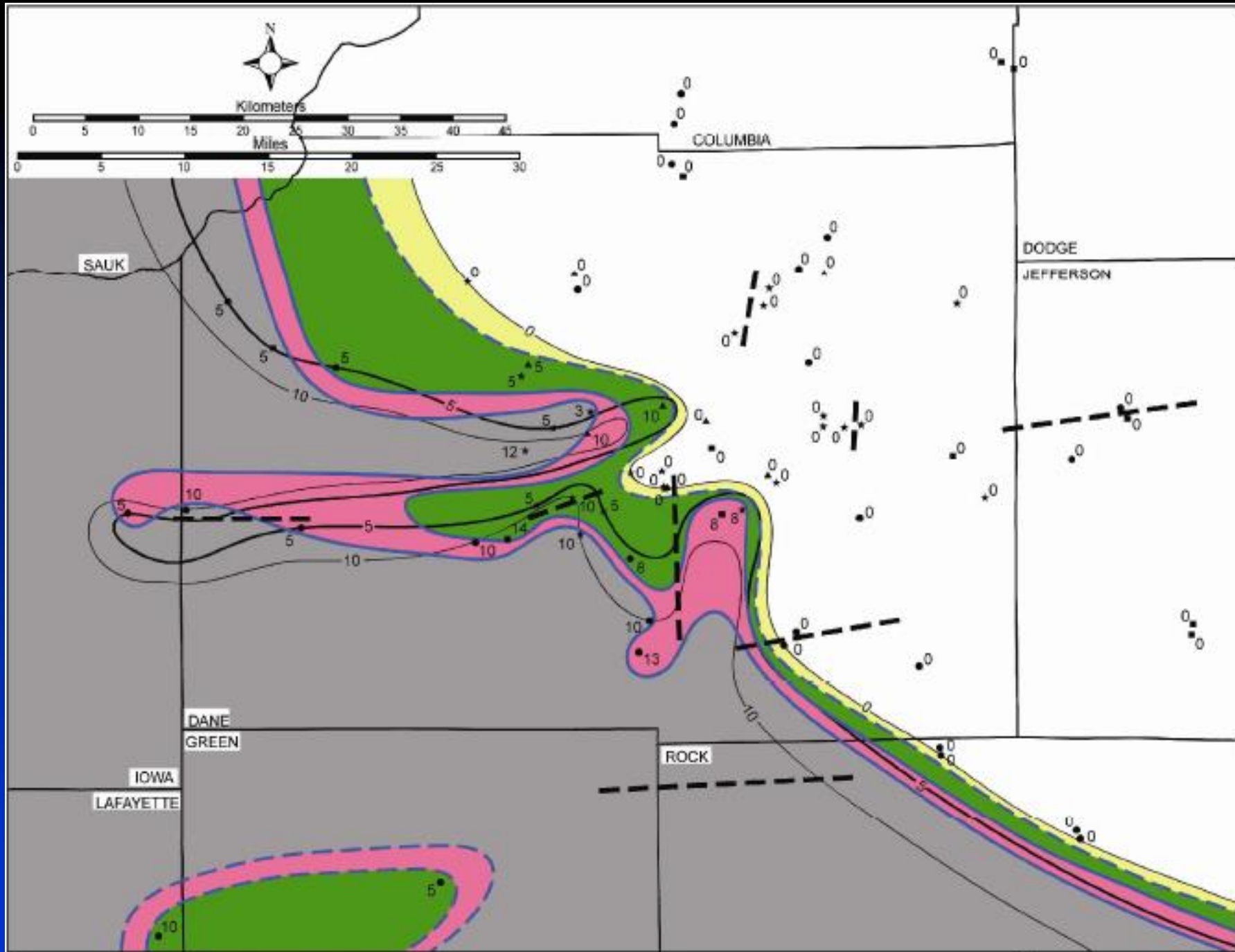


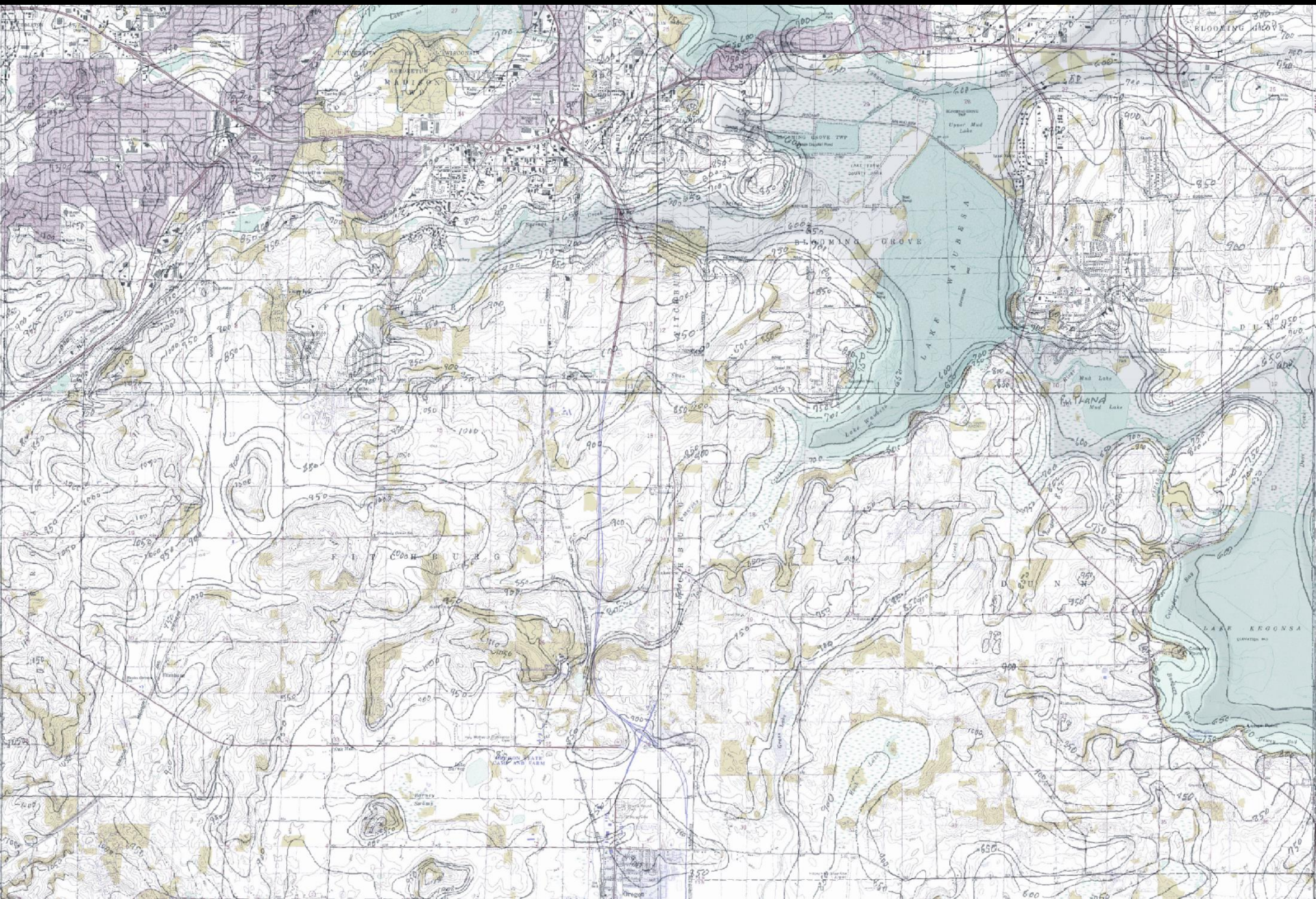


EXPLANATION

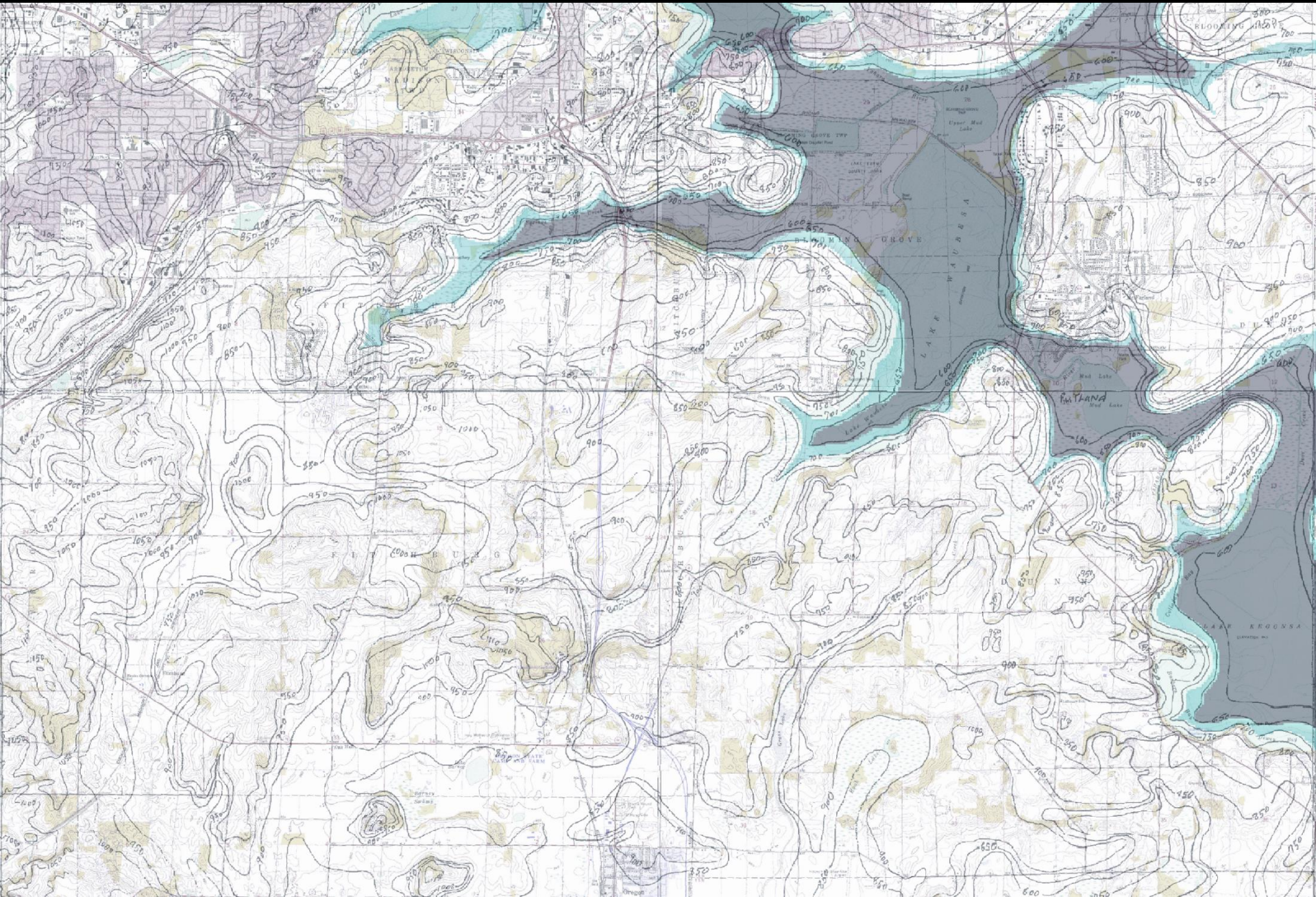
← General direction of ground-water flow

West-East cross section showing the upper aquifers and the lower (Mount Simon) aquifer. Schematic flow-lines also are included to illustrate the local and regional ground-water flow that occurs in the county.





ARTESIAN SYSTEM



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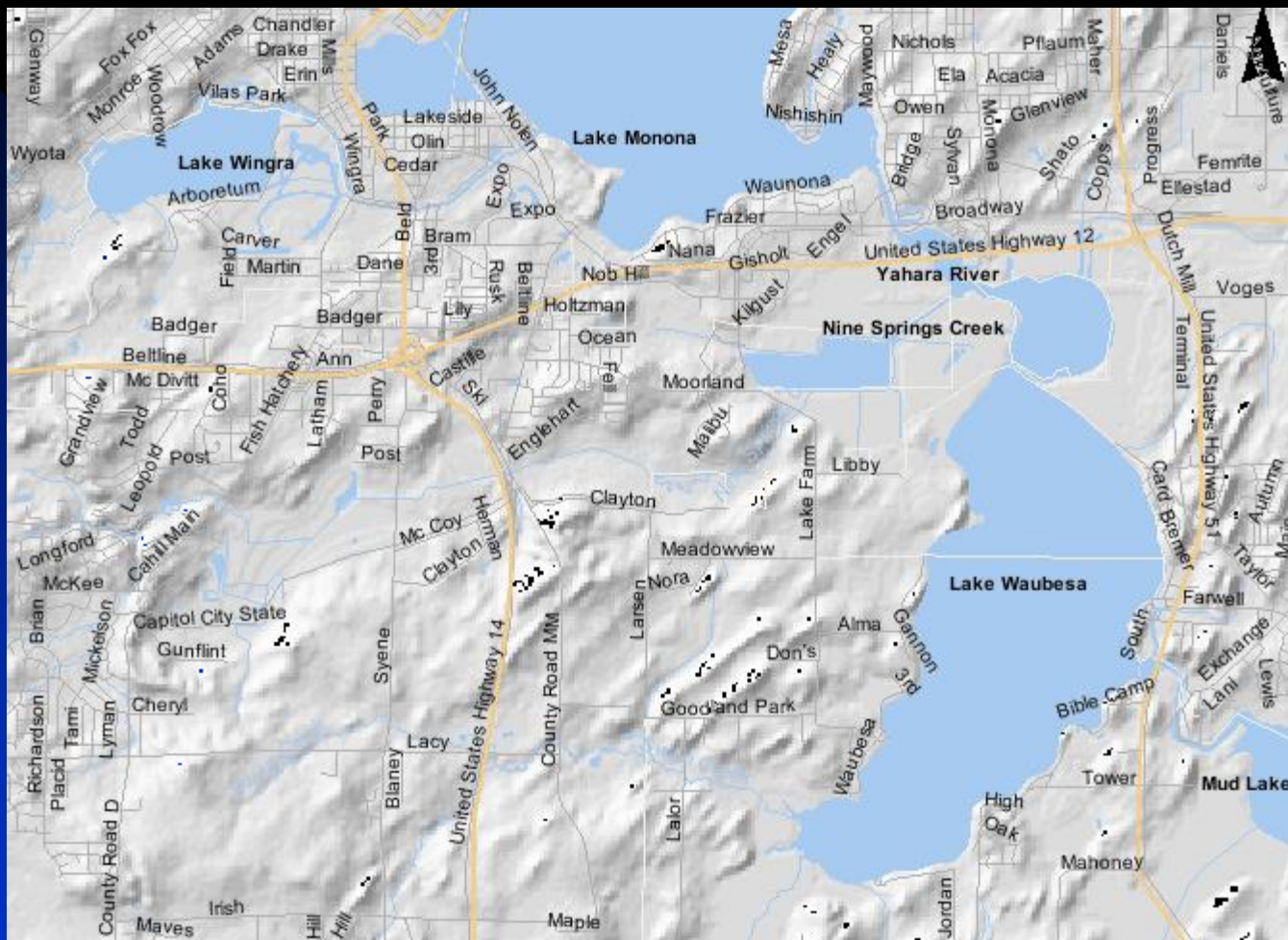


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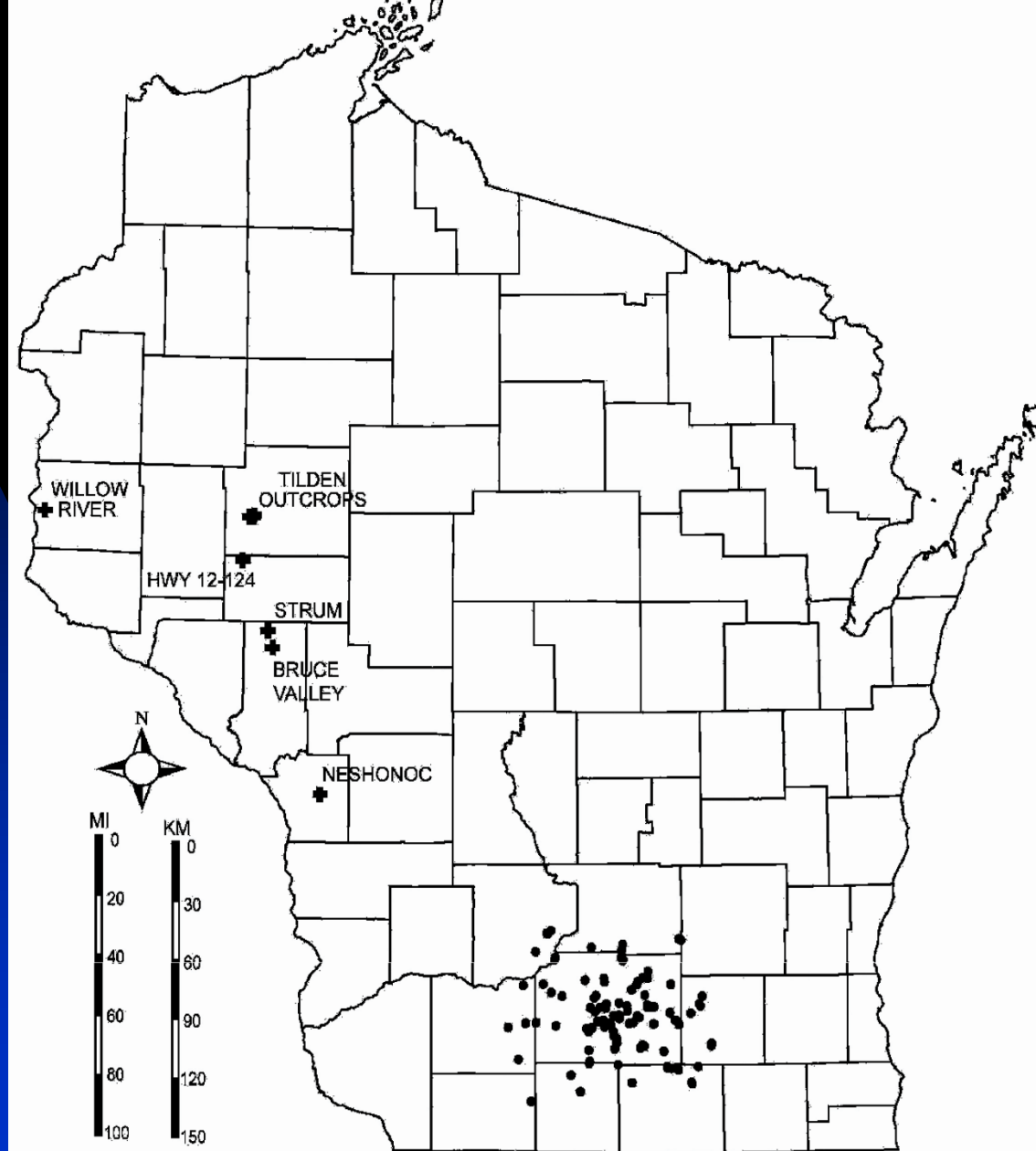


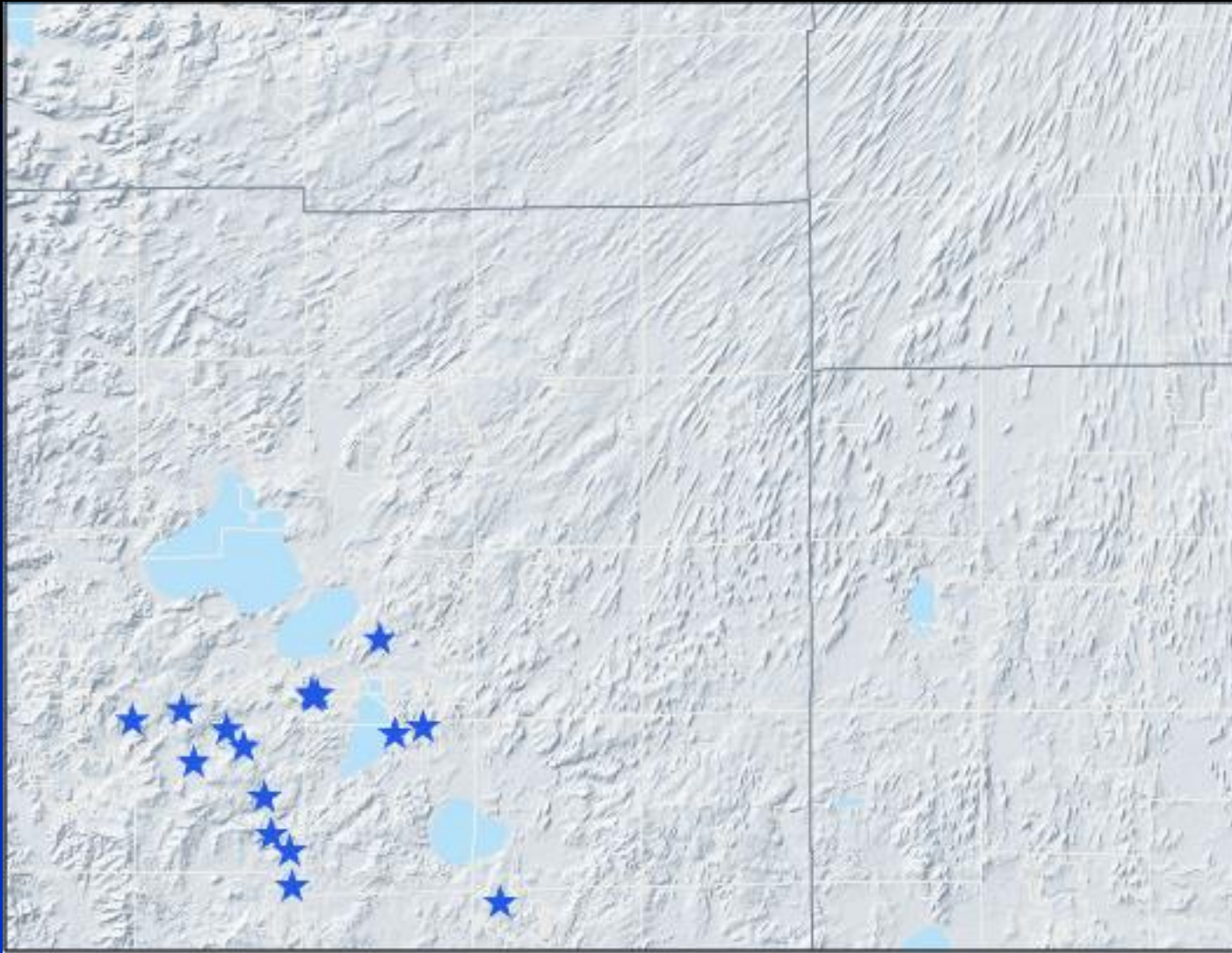
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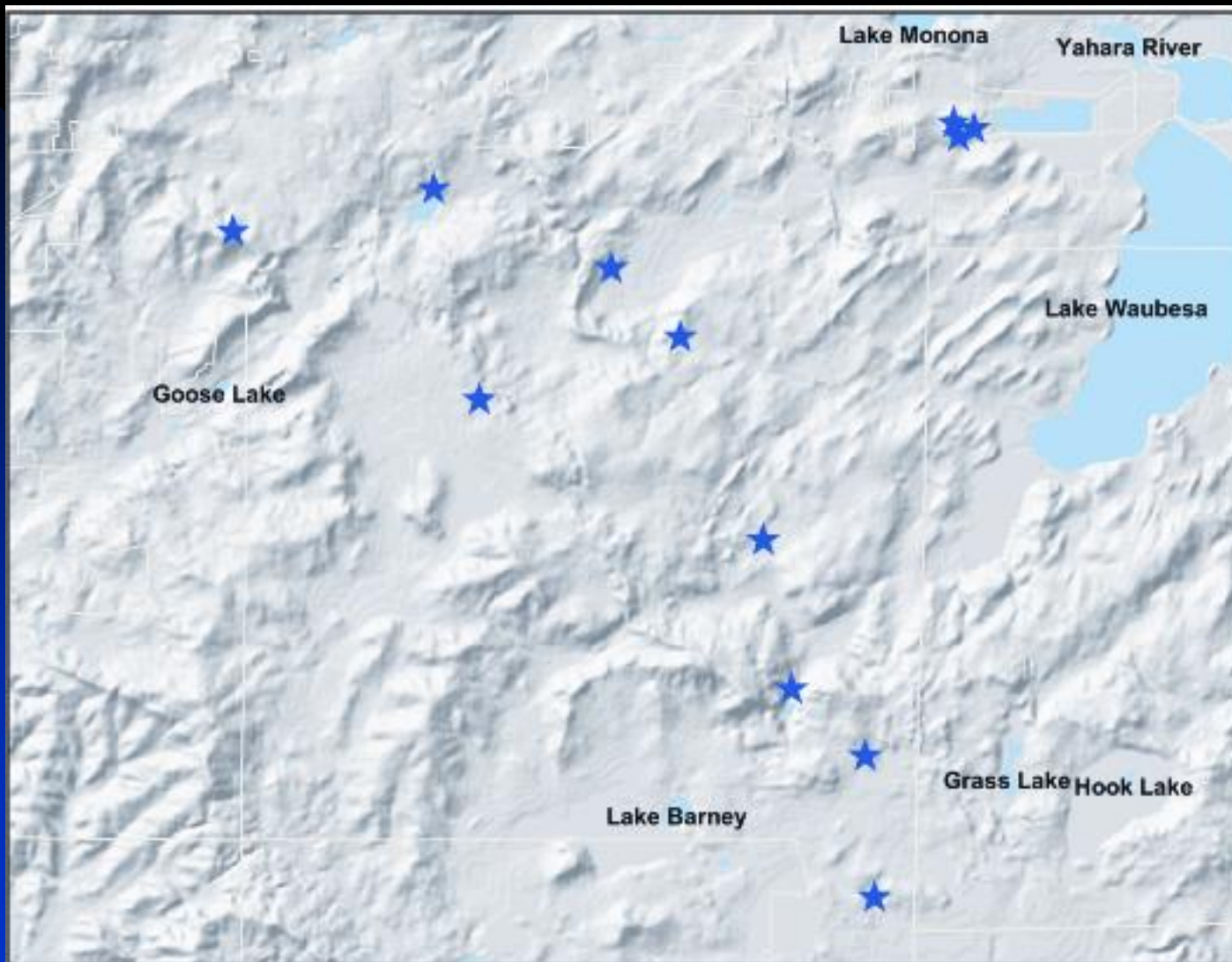














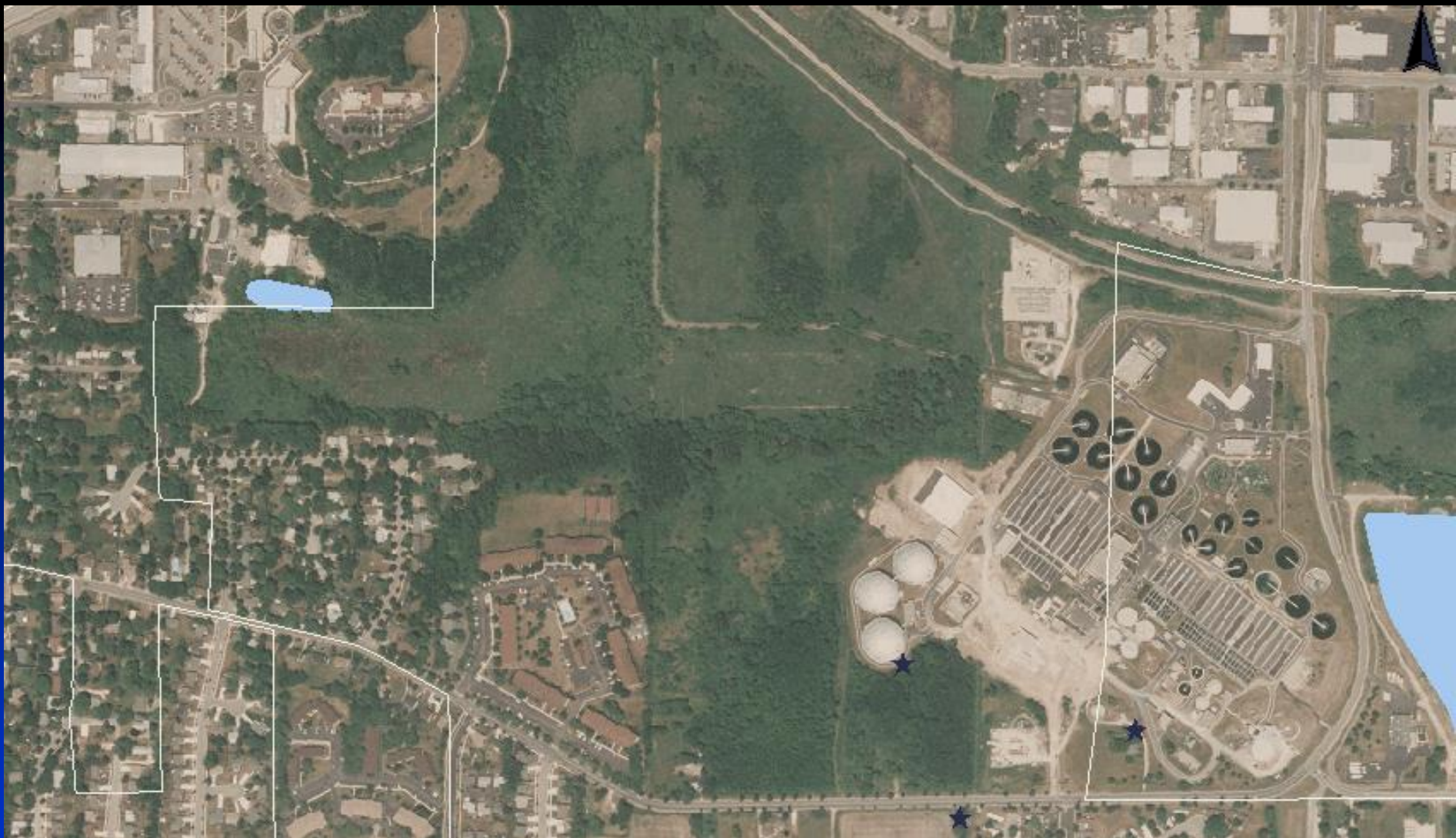
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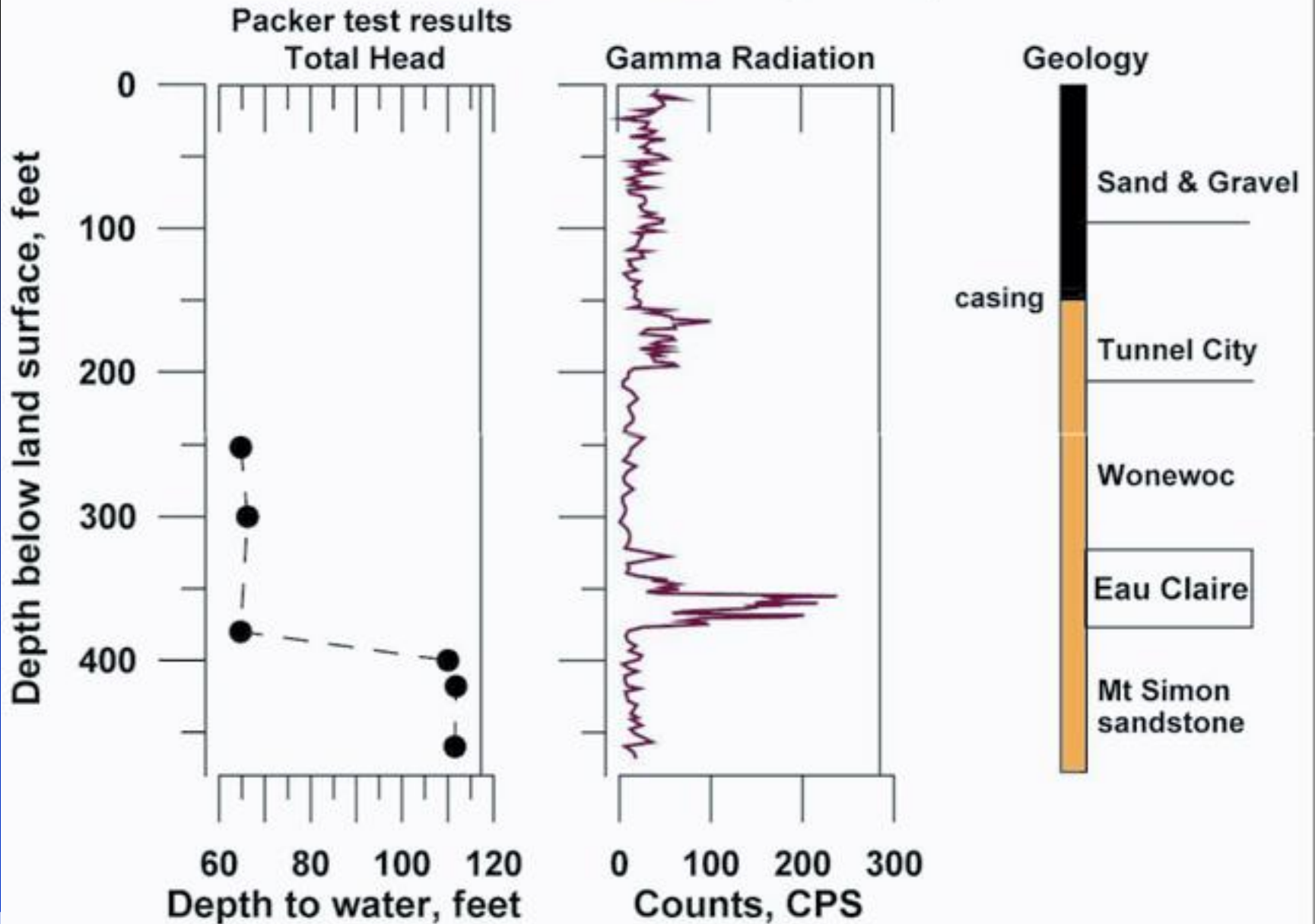
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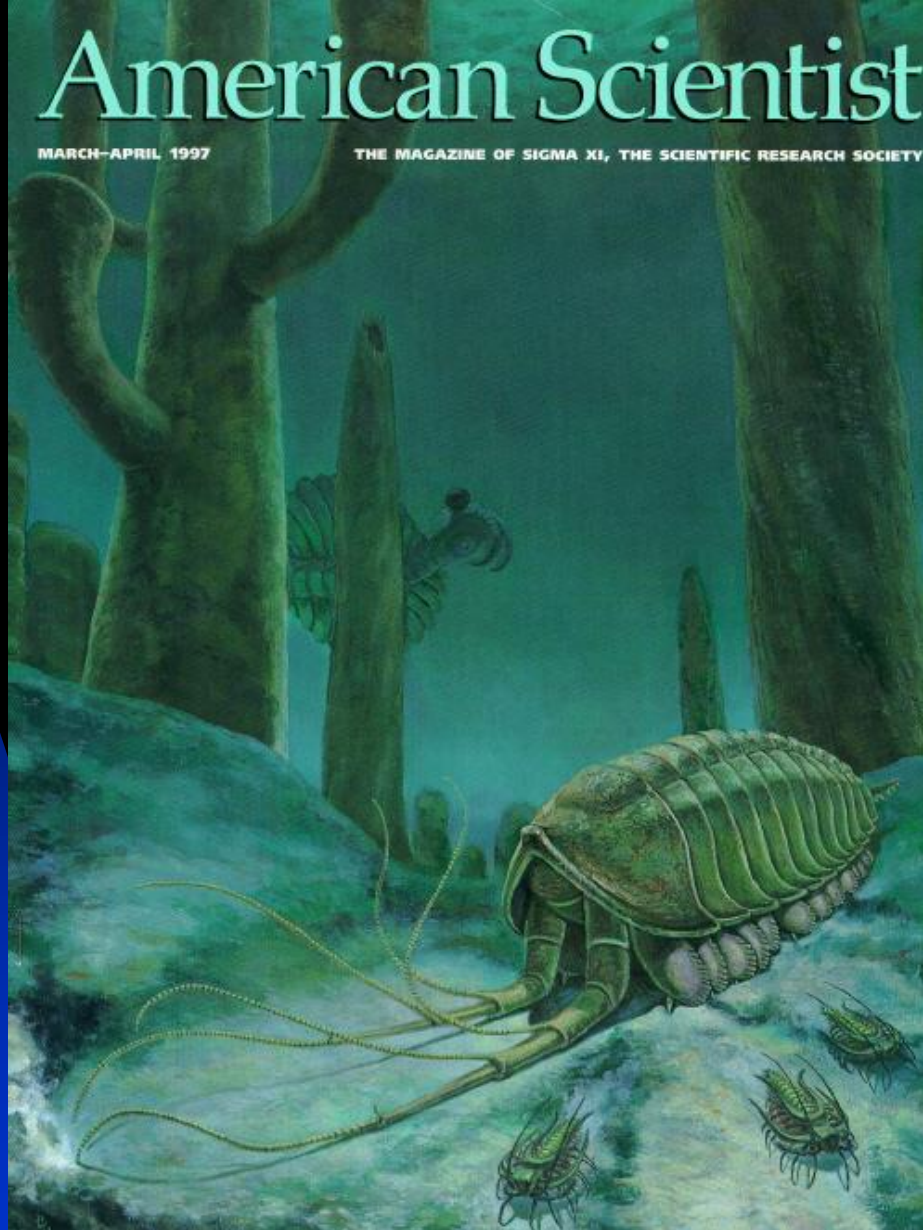
Springfield Corners test well (131371)



American Scientist

MARCH-APRIL 1997

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The U.S. National Atlas - can help us find the answer.

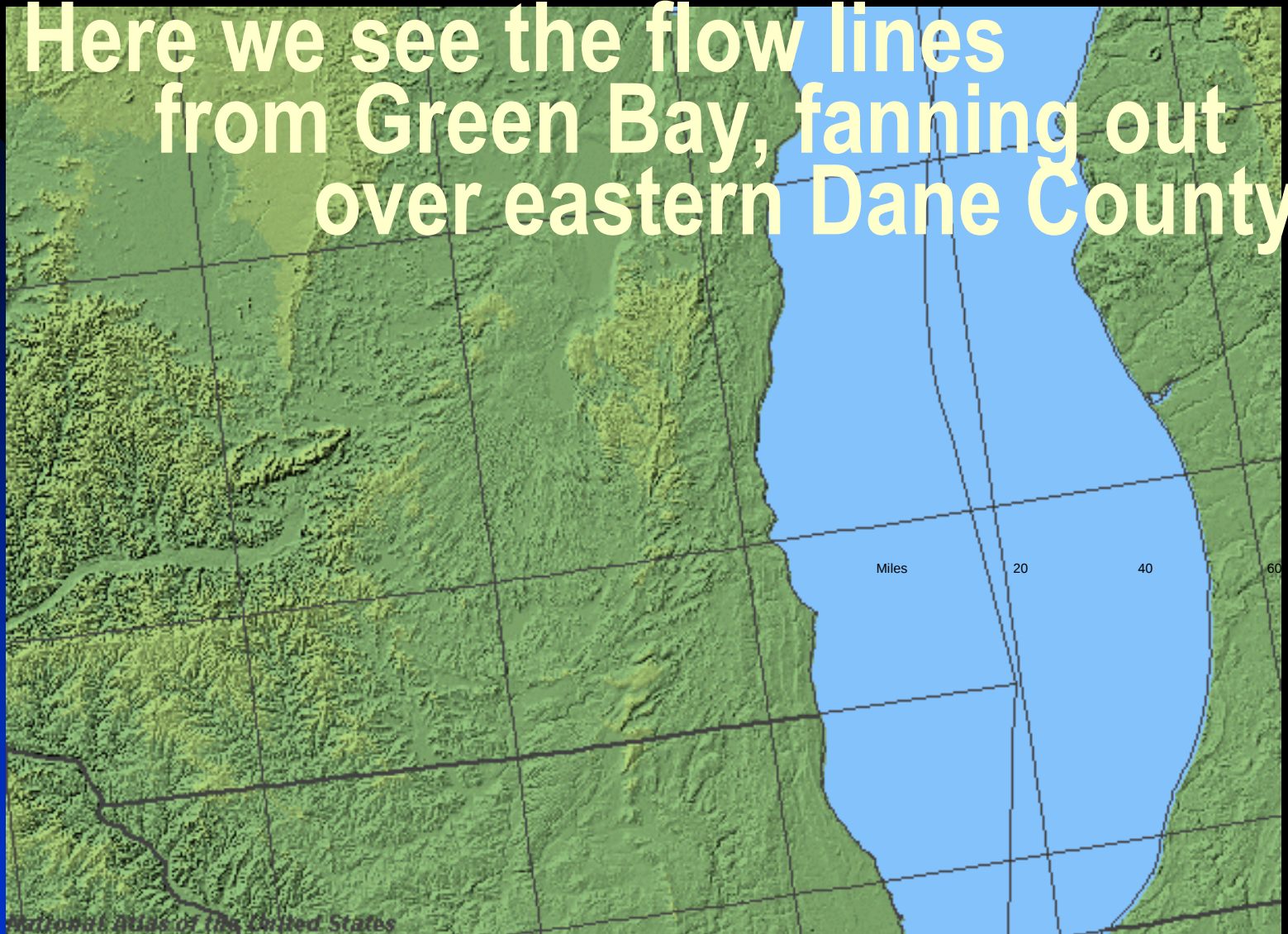
This a LIDAR image....

It shows surface features beautifully...

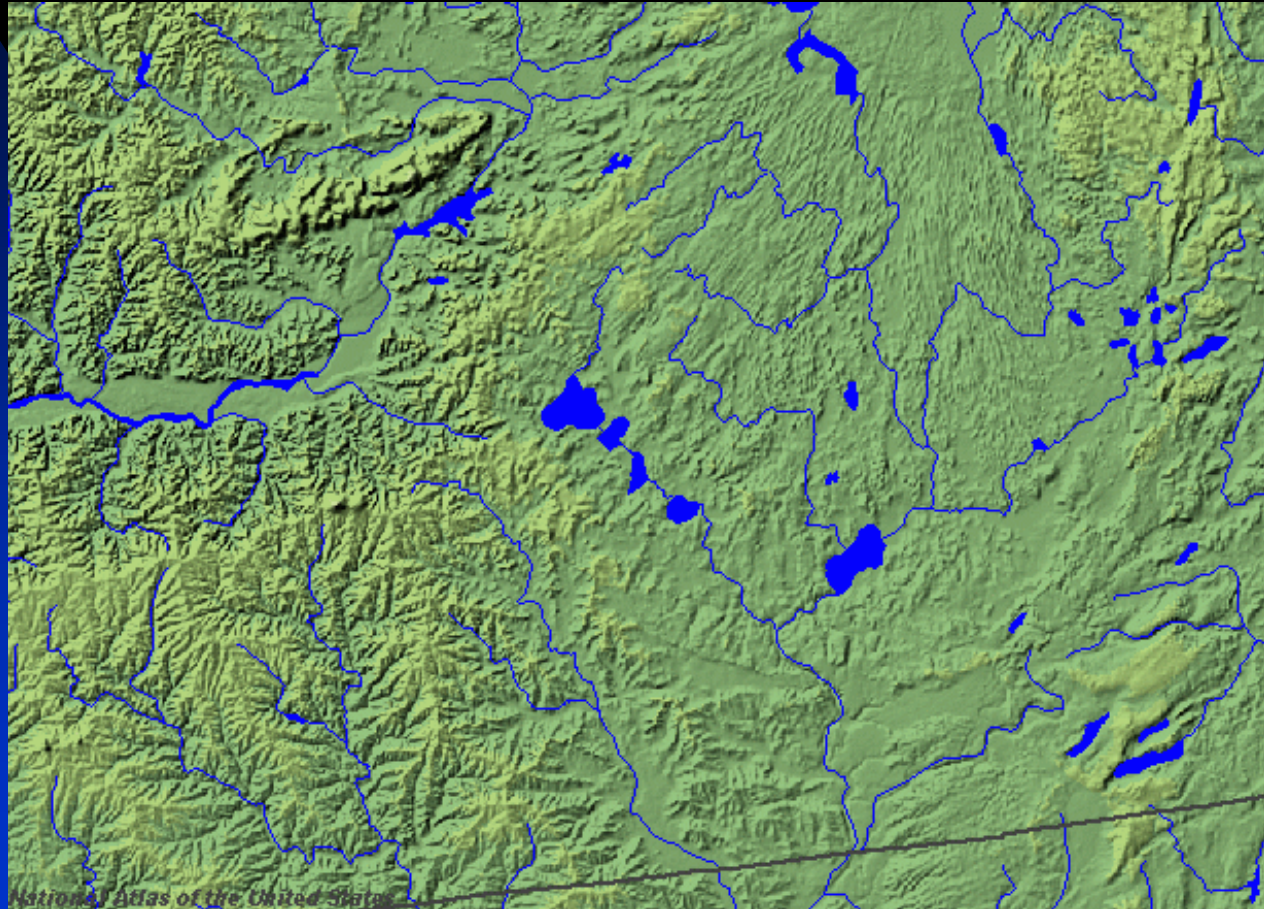
**TAKE SPECIAL NOTE OF THE
UNGLACIATED DRIFTLESS AREA**

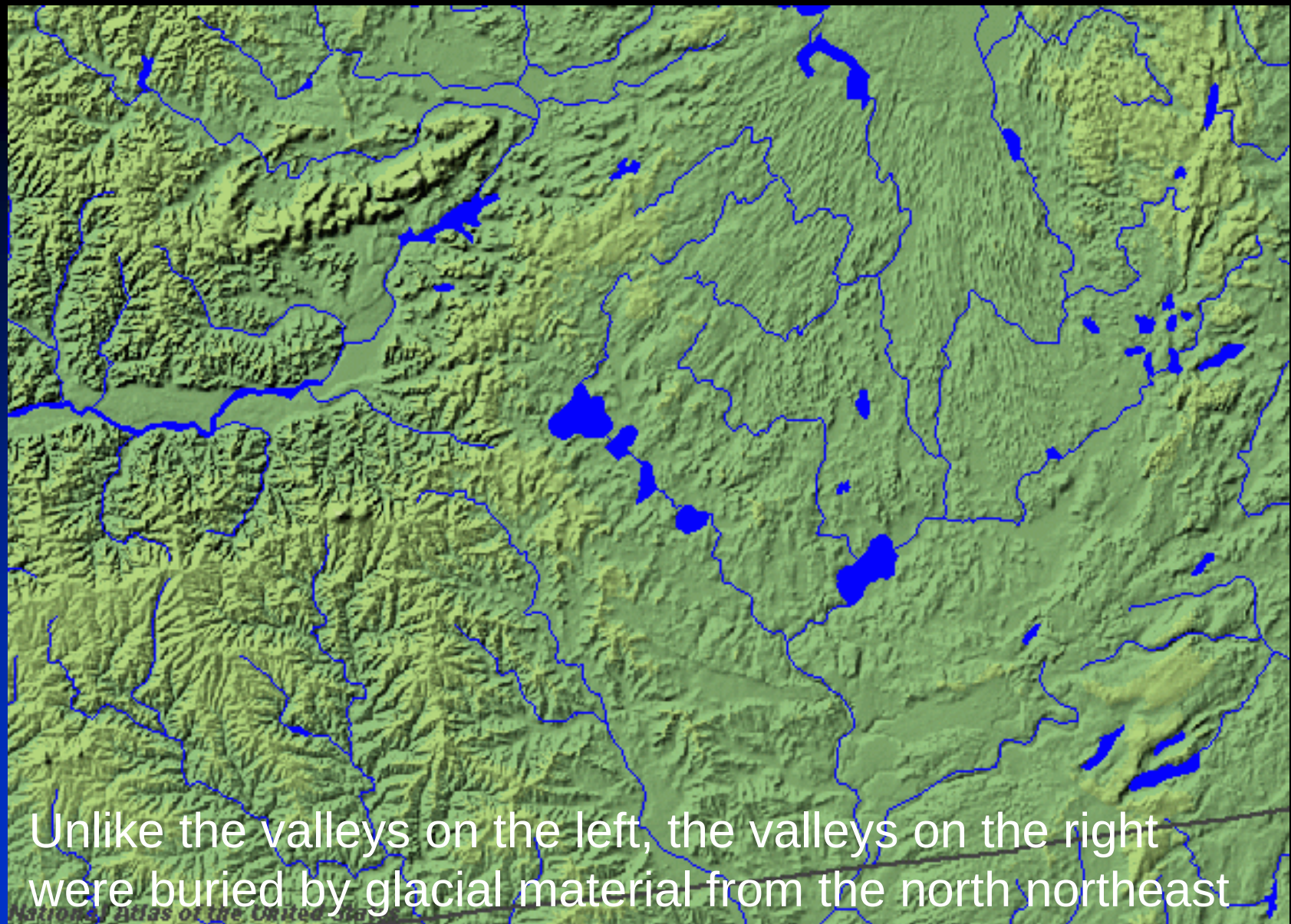
National Atlas of the United States

Here we see the flow lines
from Green Bay, fanning out
over eastern Dane County.



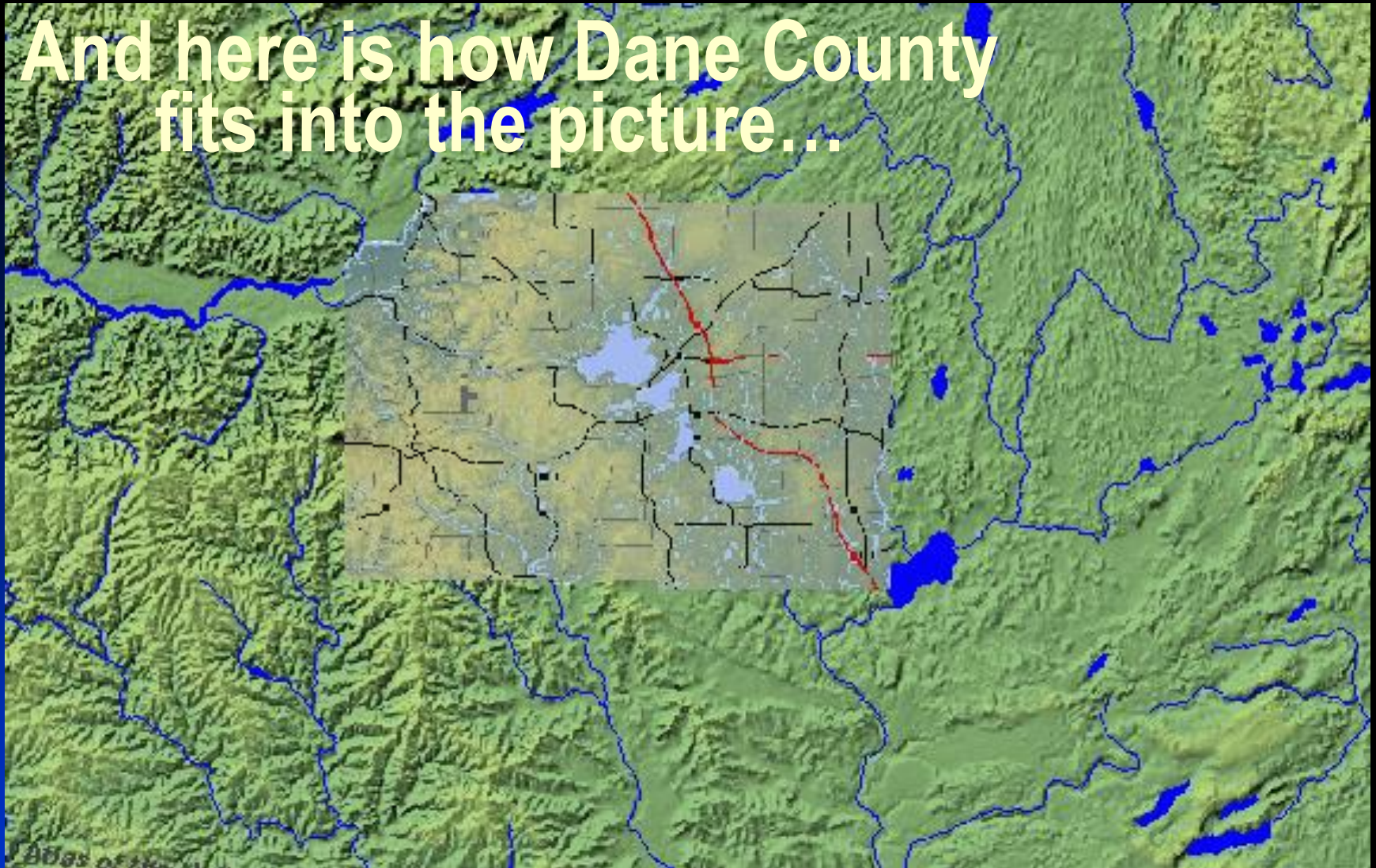
- And this flow of glacial material buries the eastern bedrock Valleys including the Yahara Valley.
- But it stops before it otherwise would have filled the valleys further west.

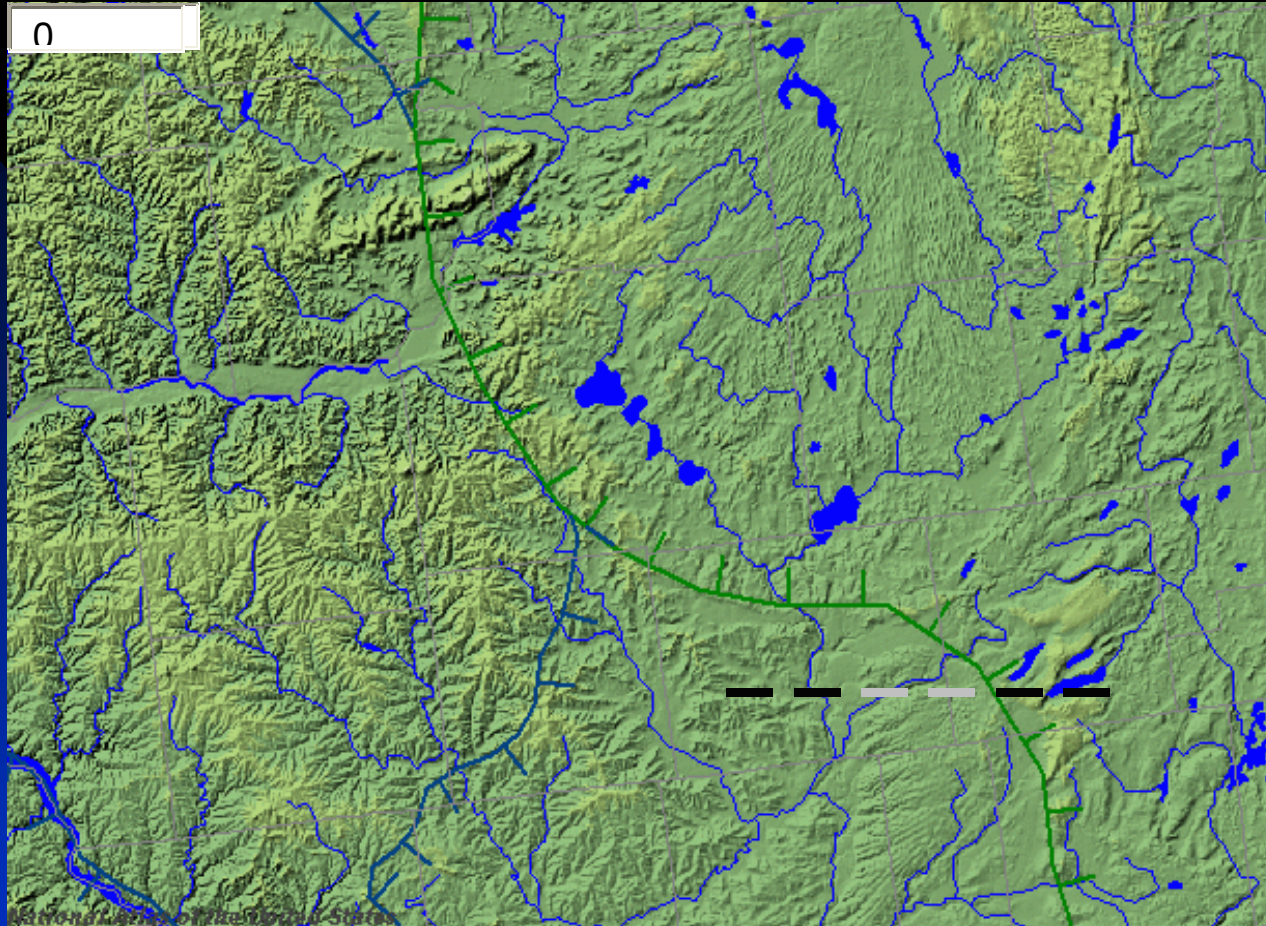


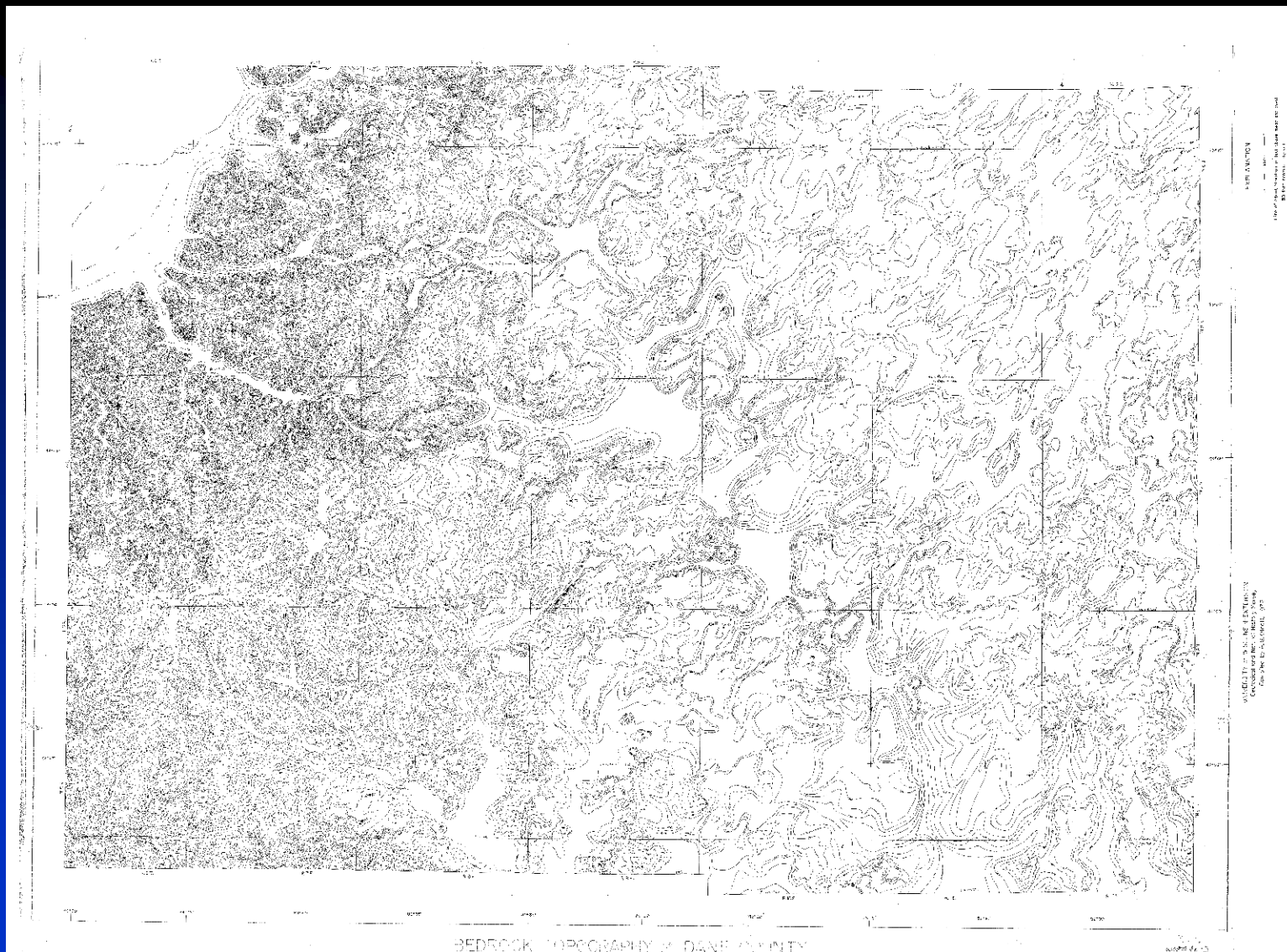


- Unlike the valleys on the left, the valleys on the right
- were buried by glacial material from the north northeast

And here is how Dane County
fits into the picture...

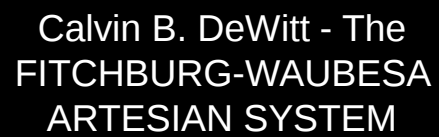


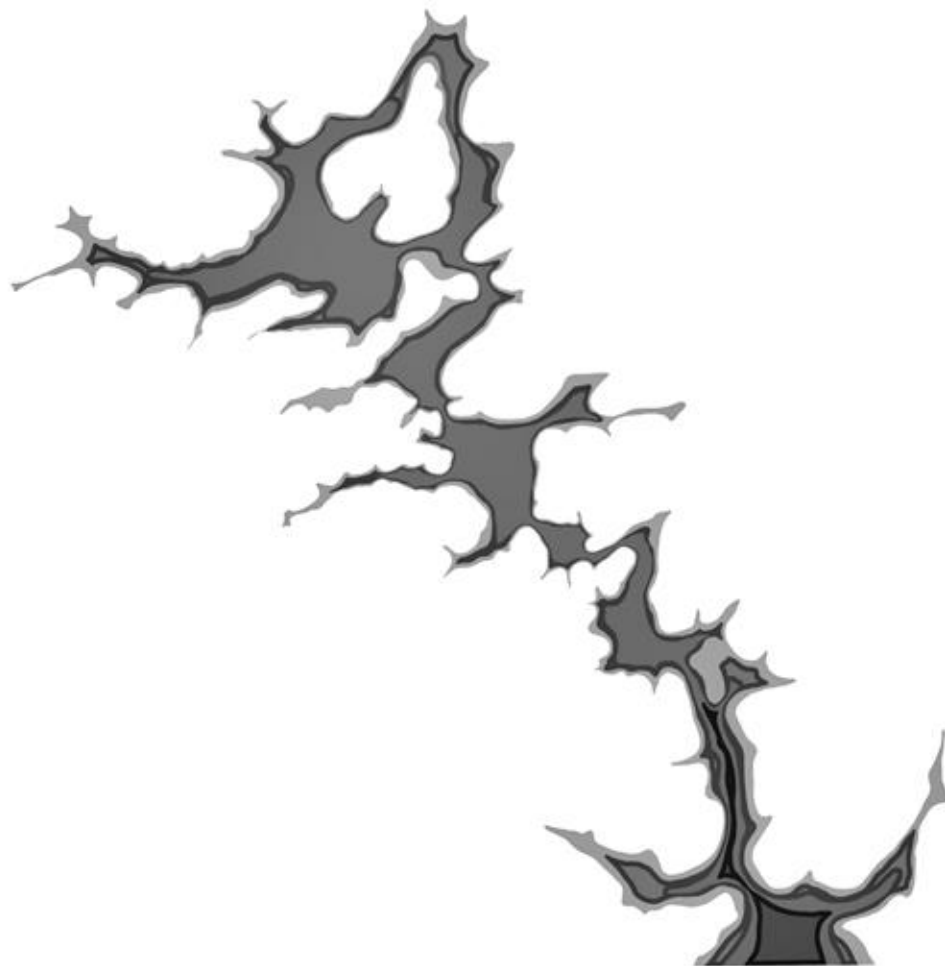


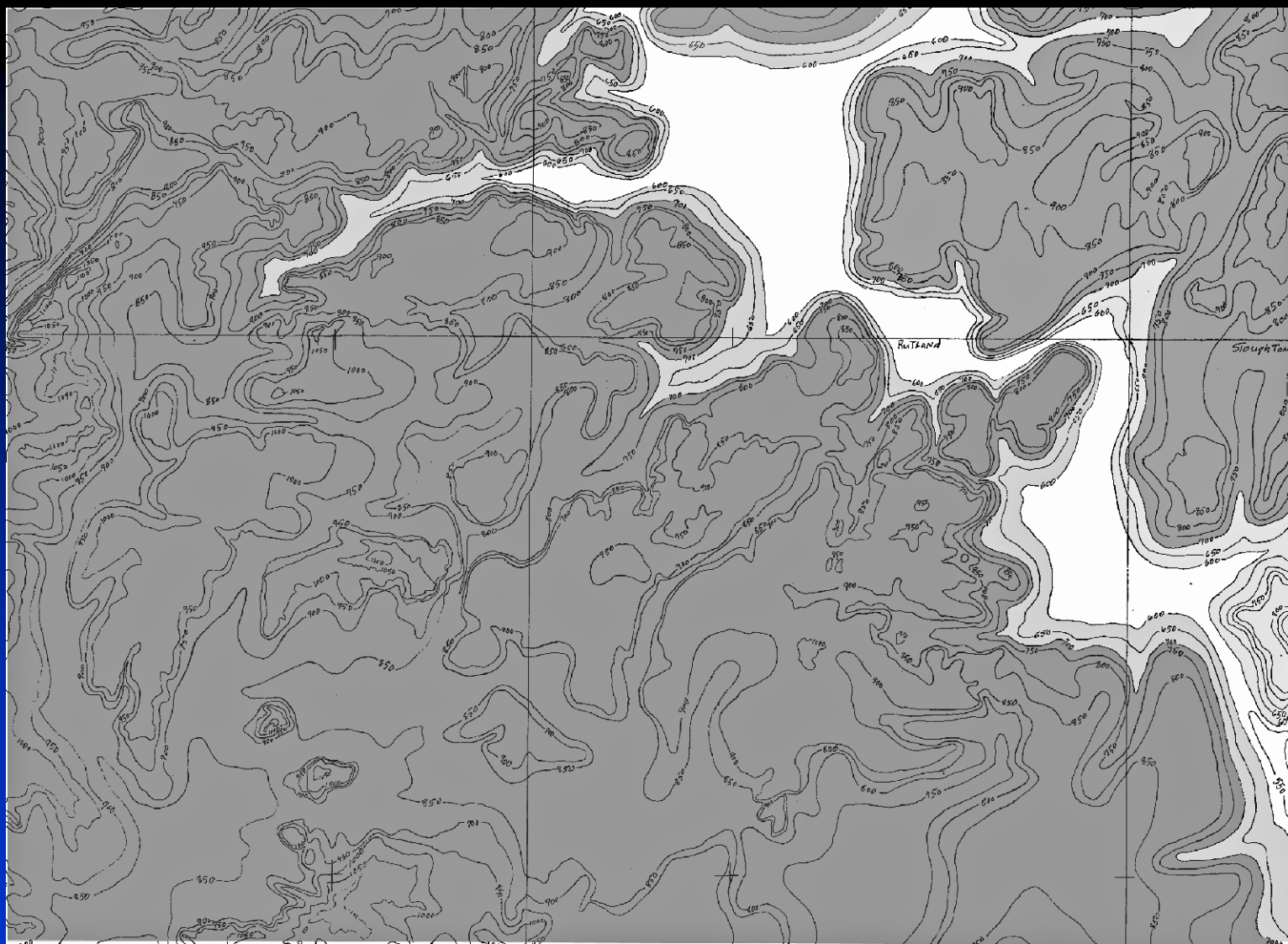


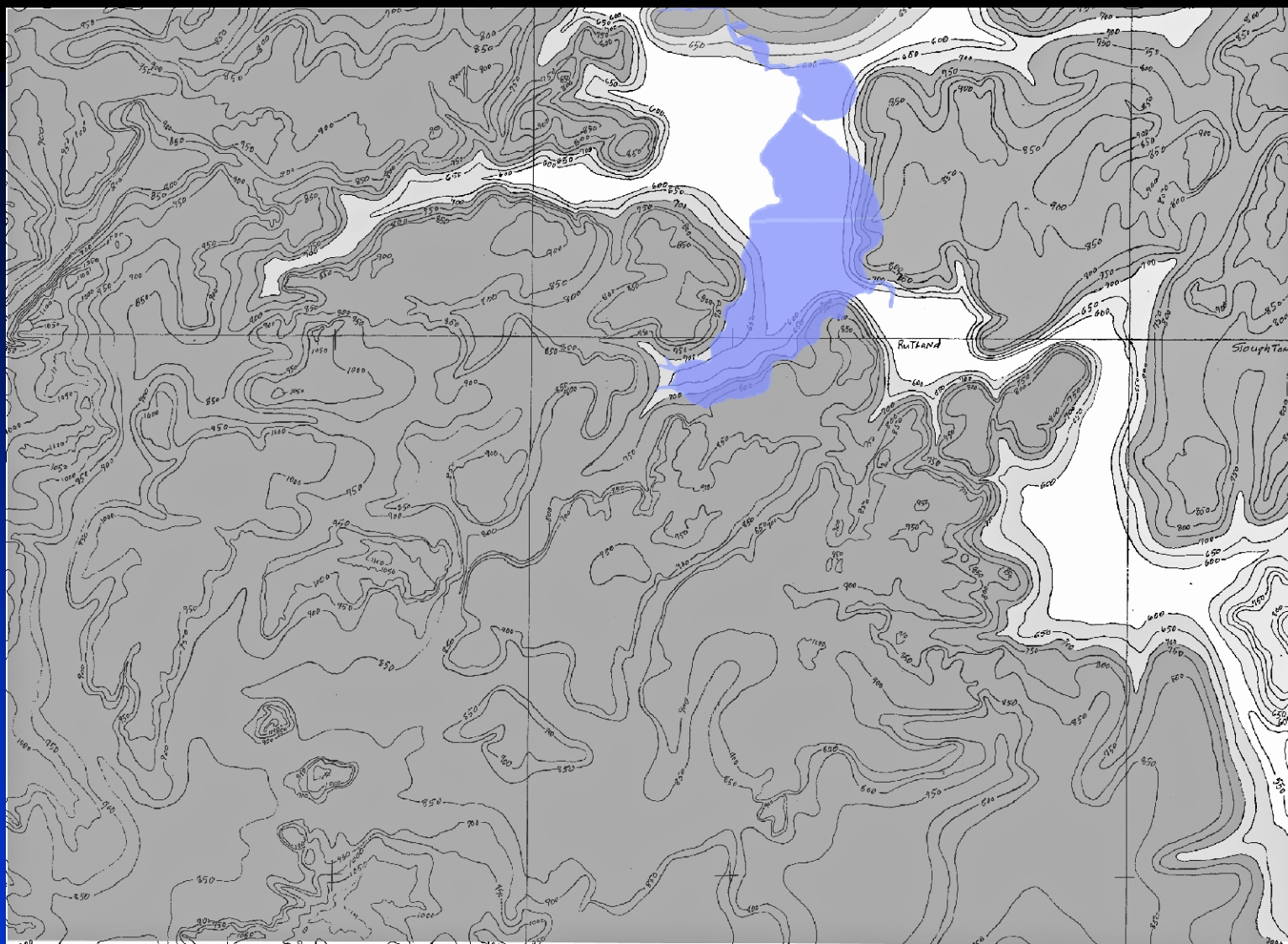
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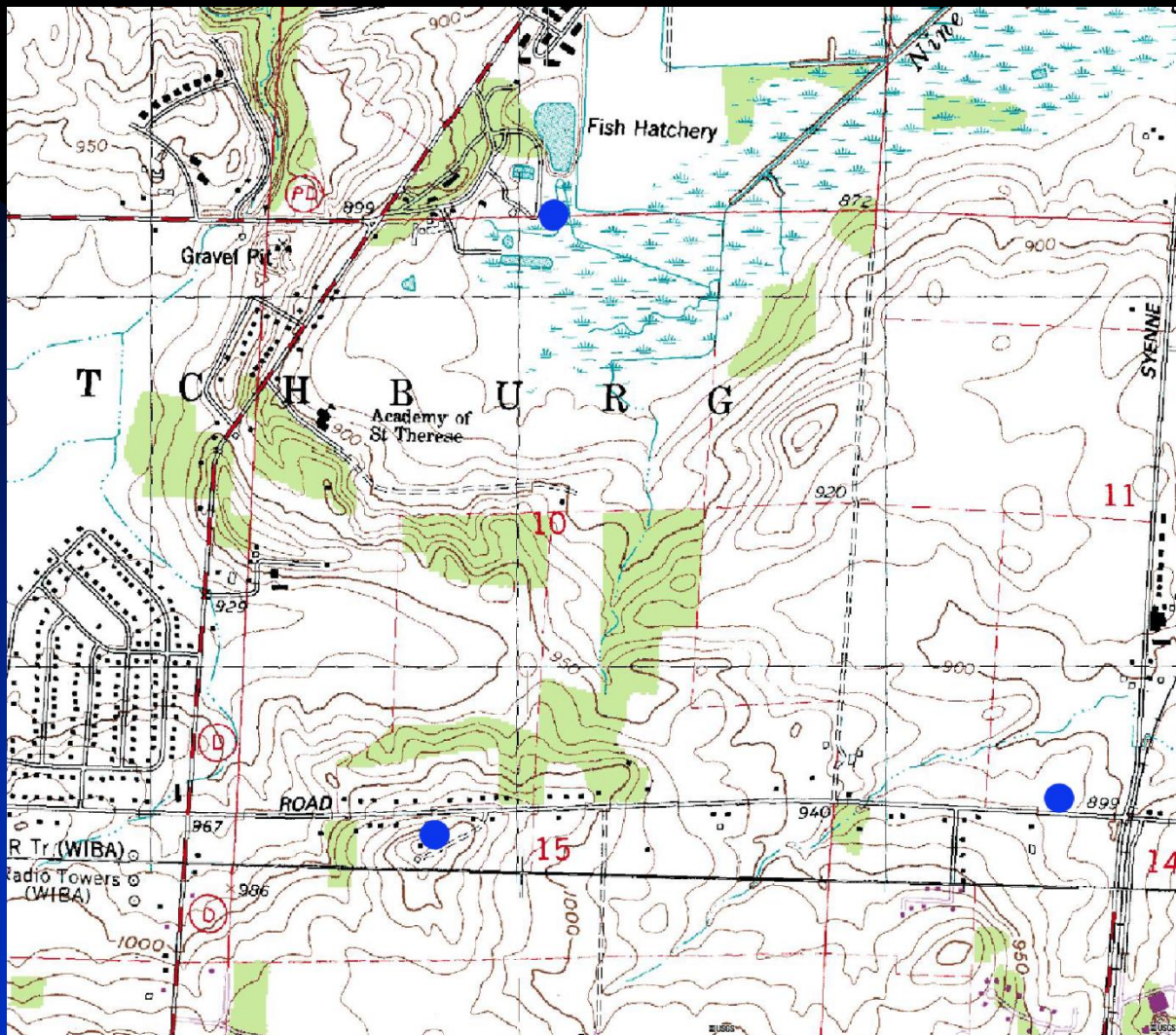
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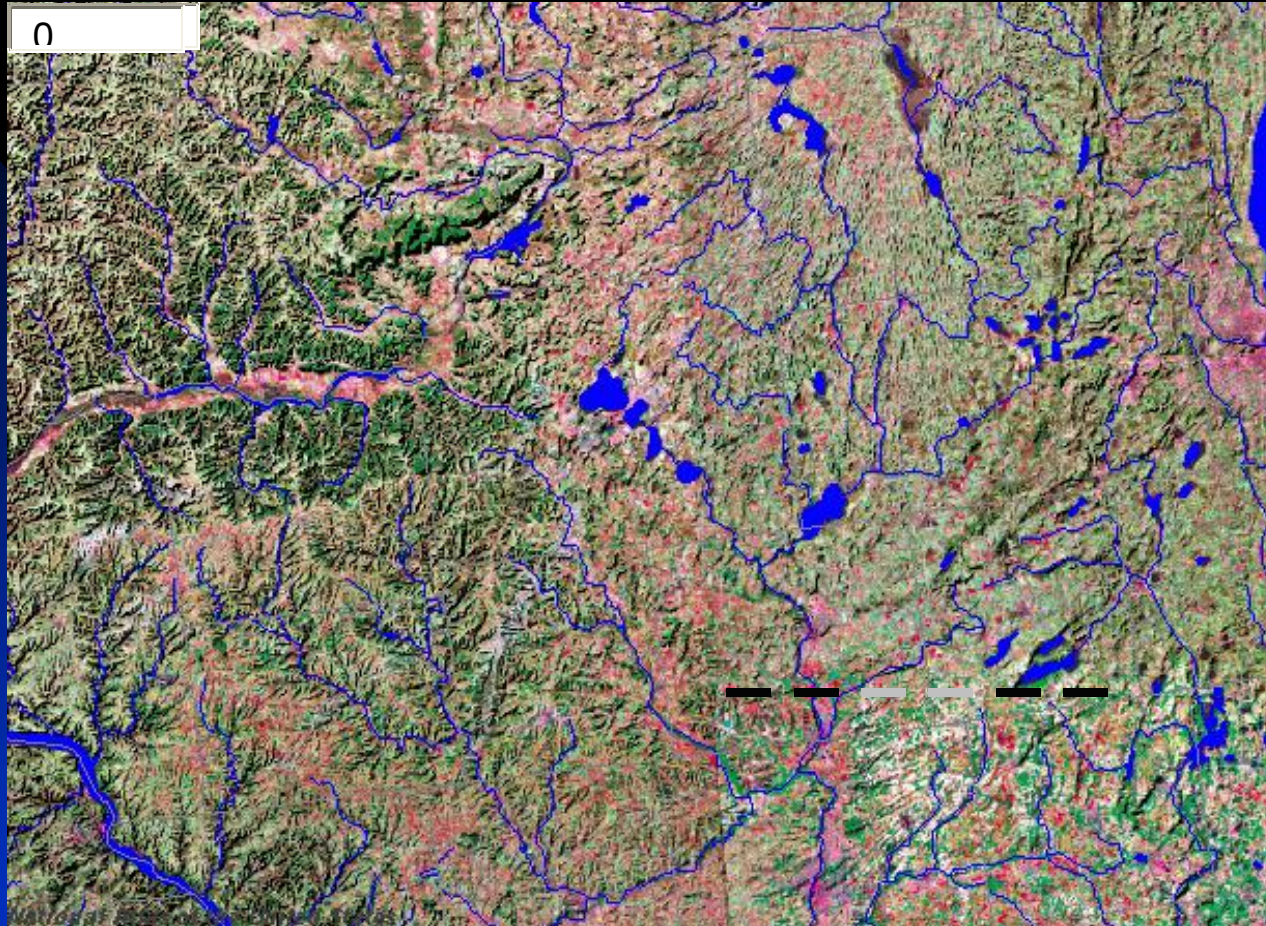


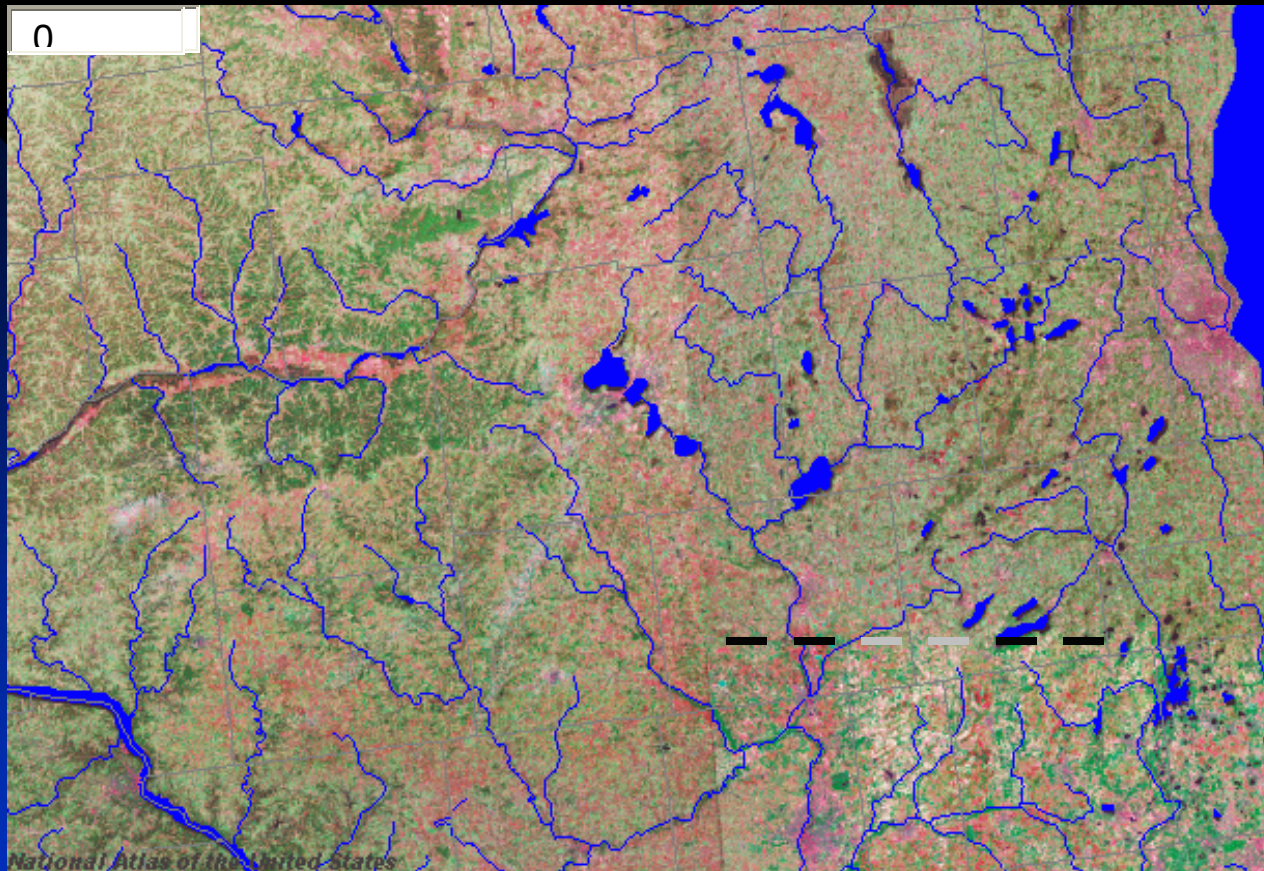






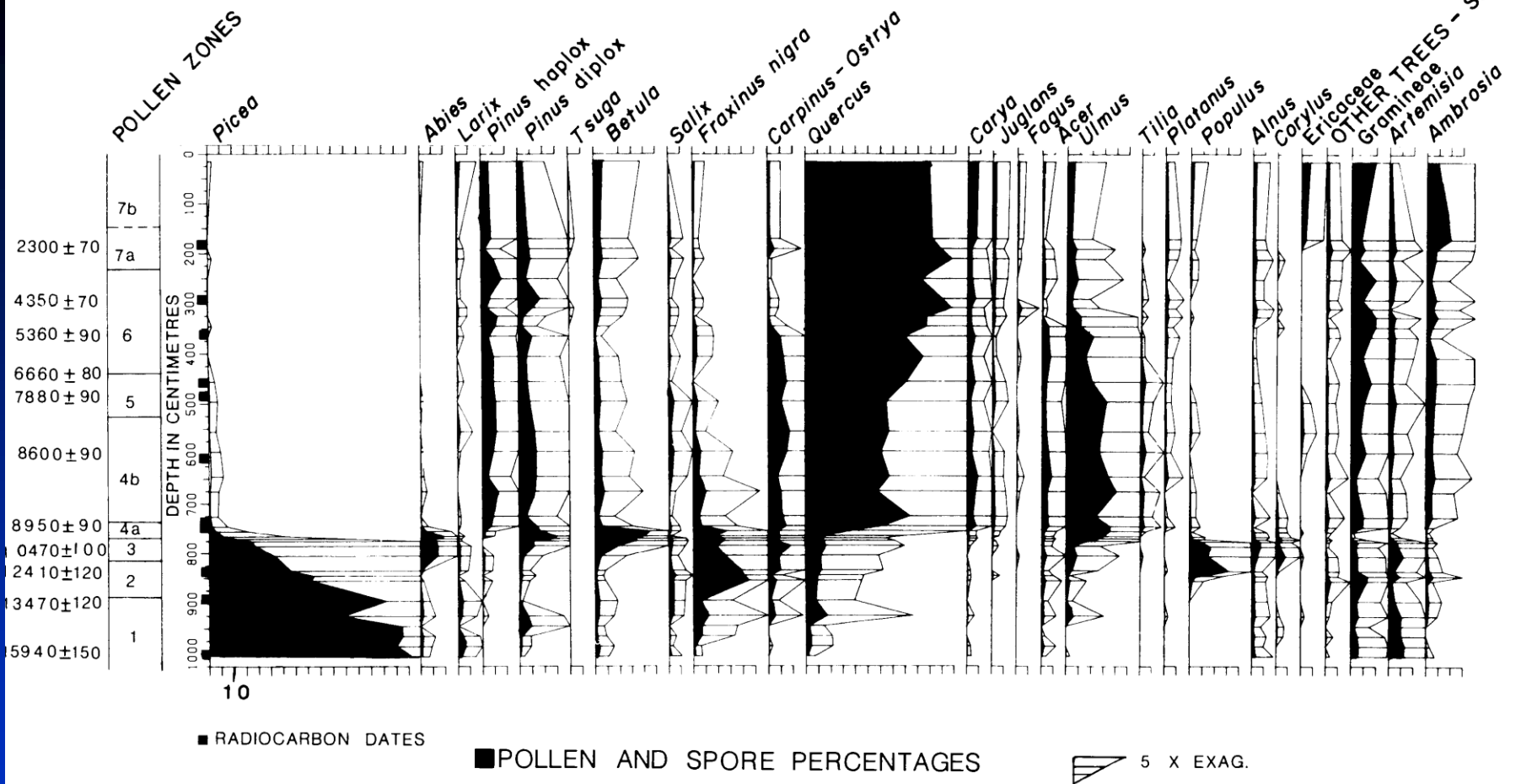




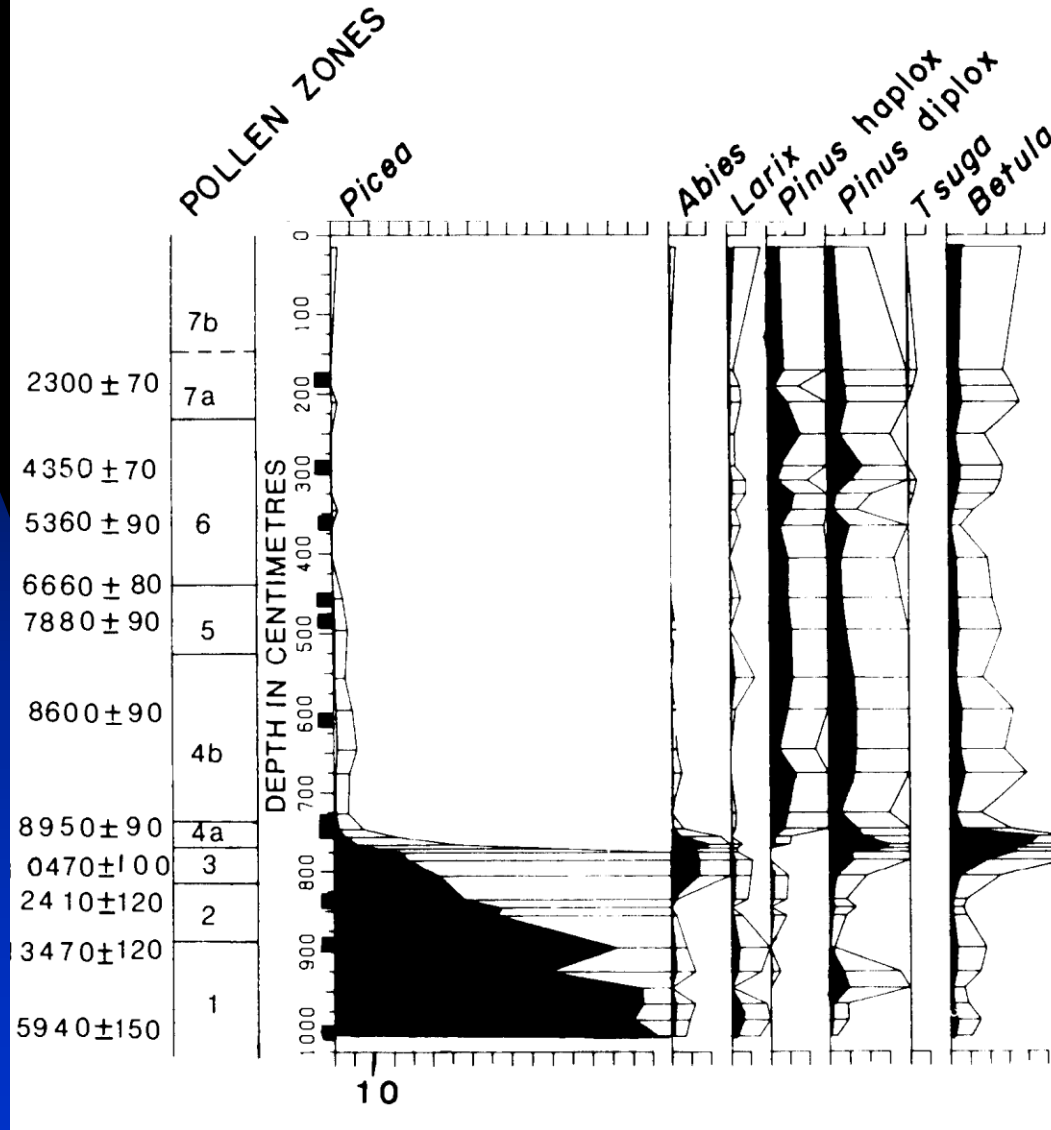


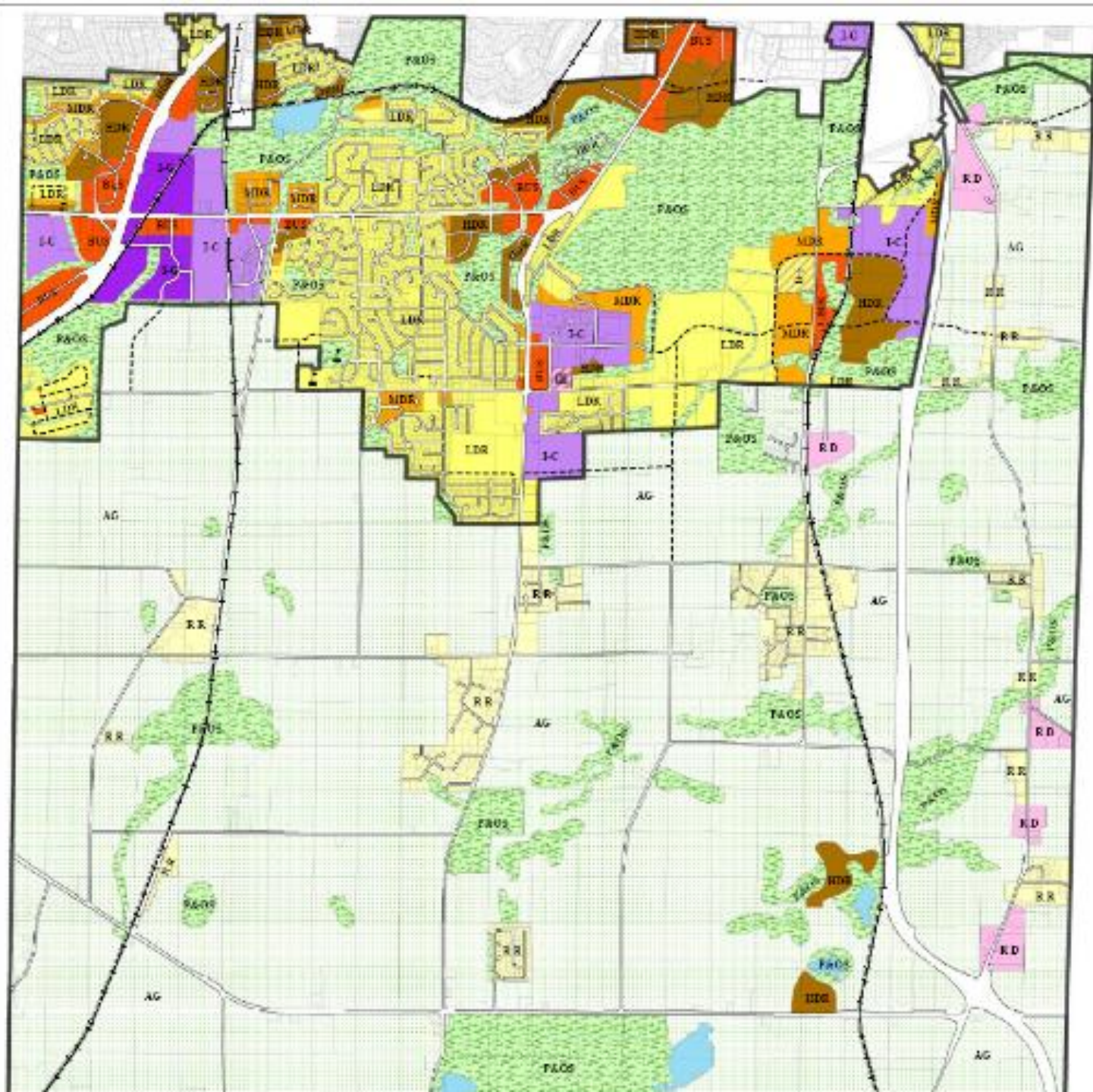
HOOK LAKE BOG DANE CO. WISCONSIN

M. WINKLER - 1983



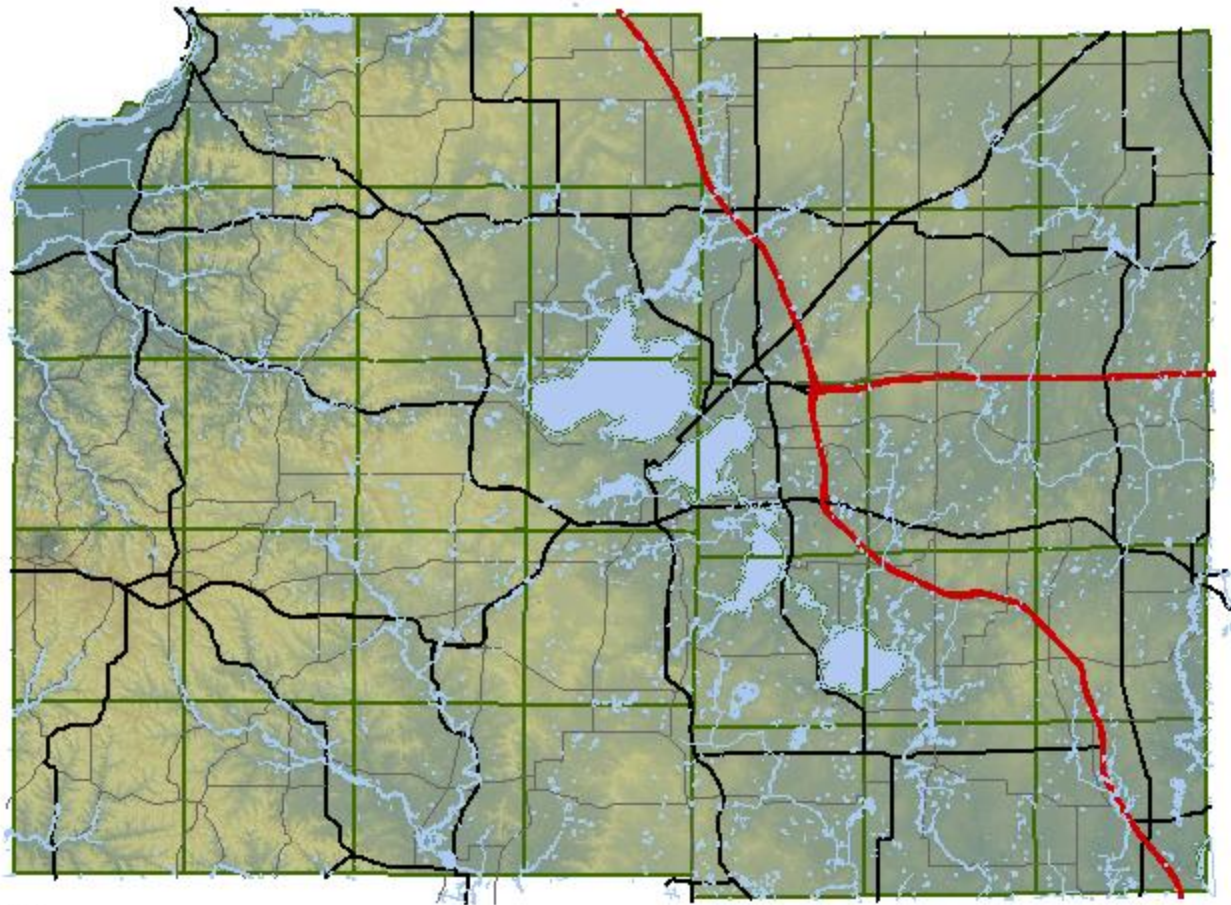
M. WINKLER -1983





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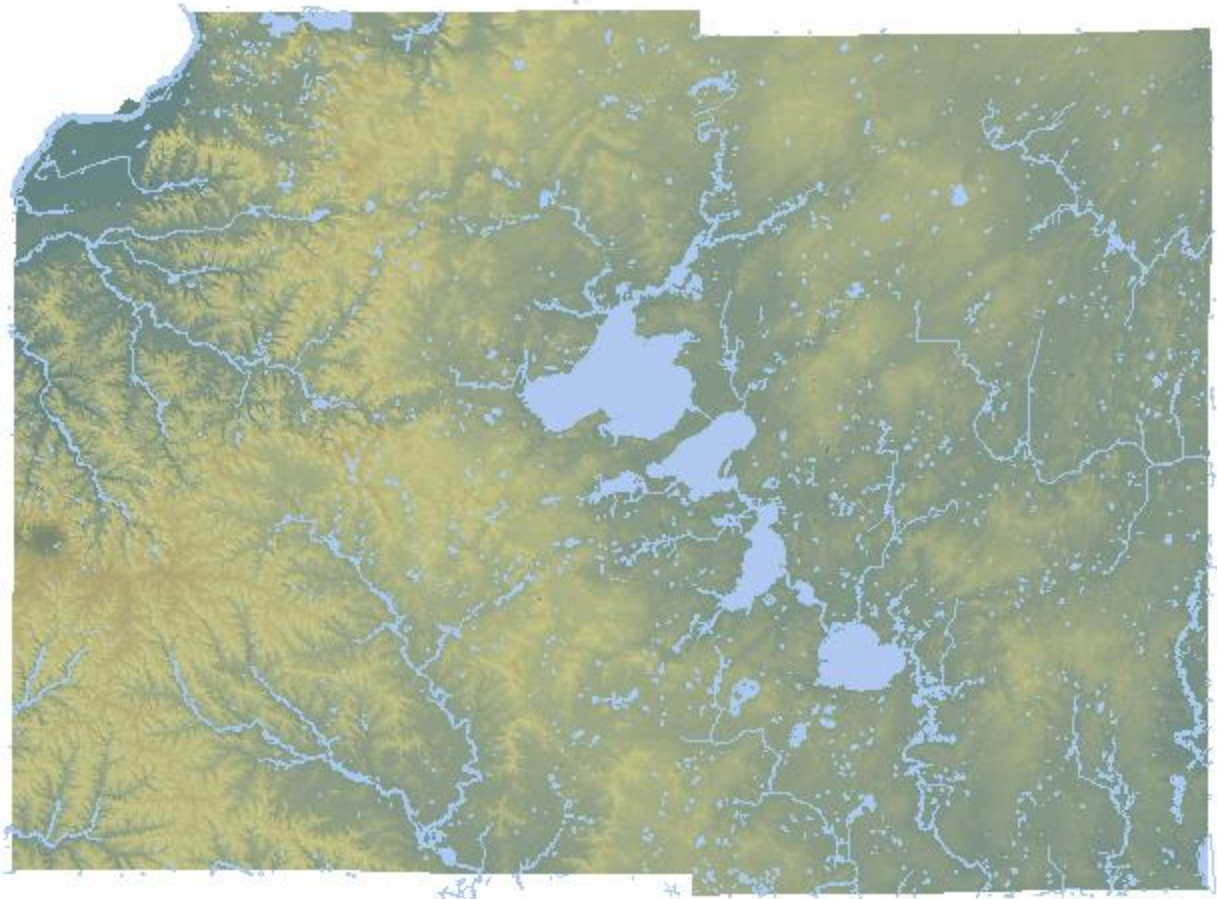
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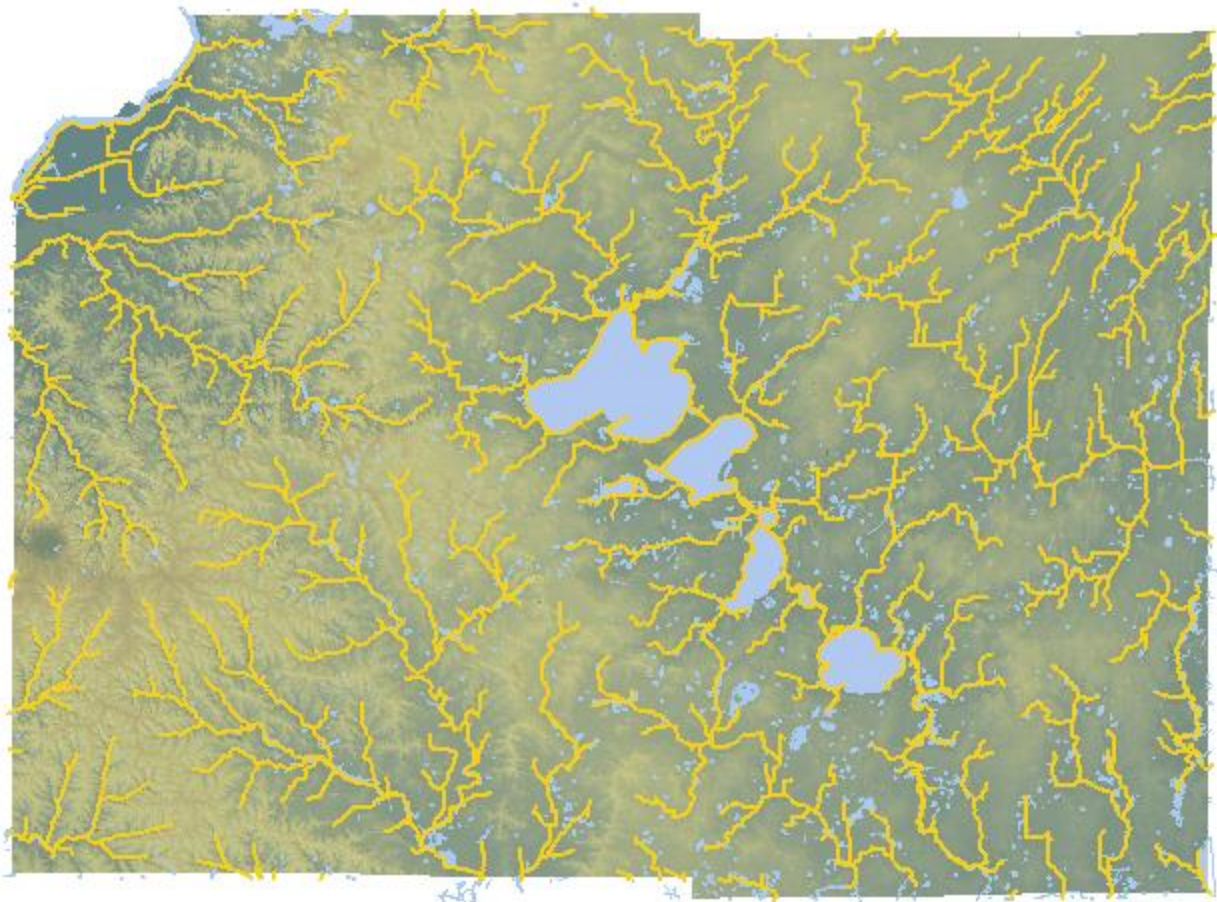
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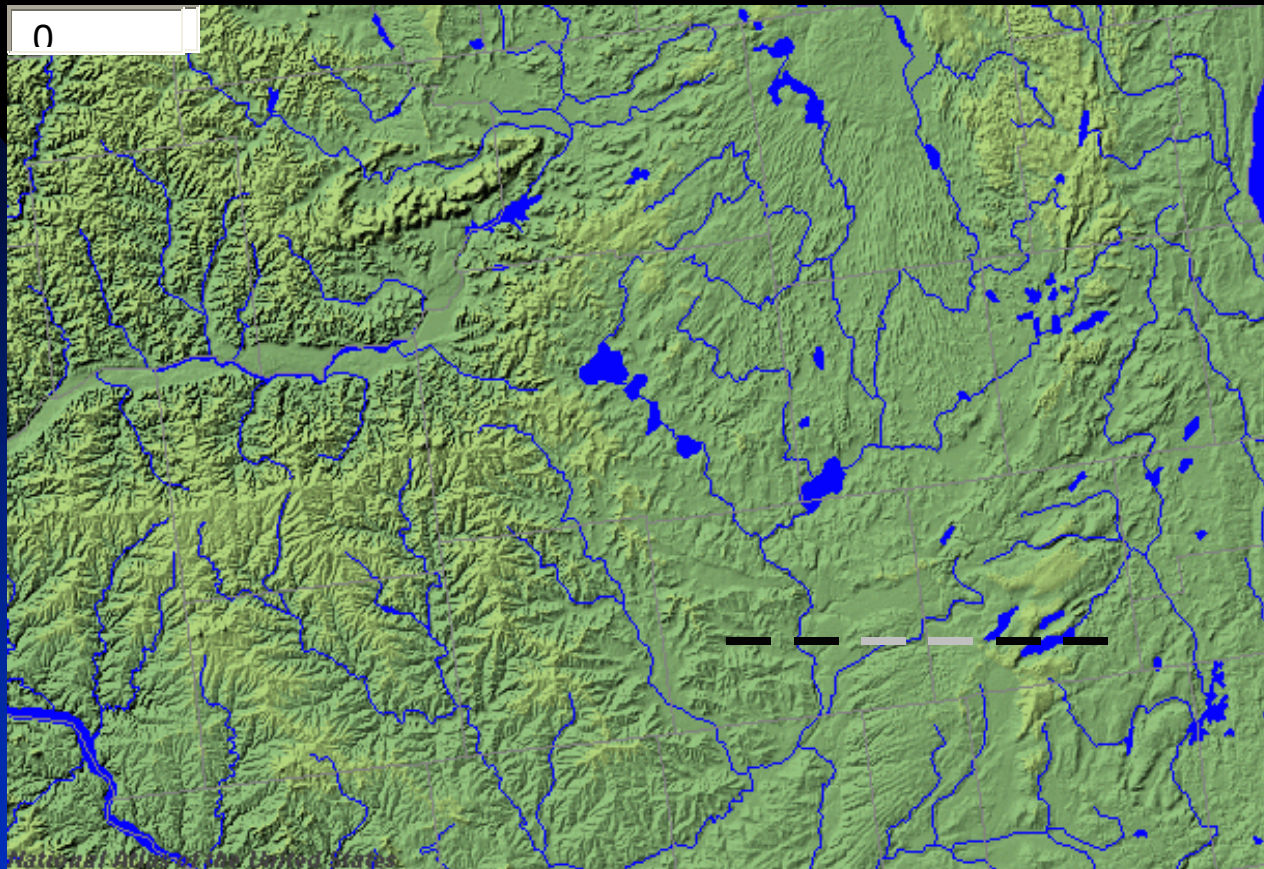
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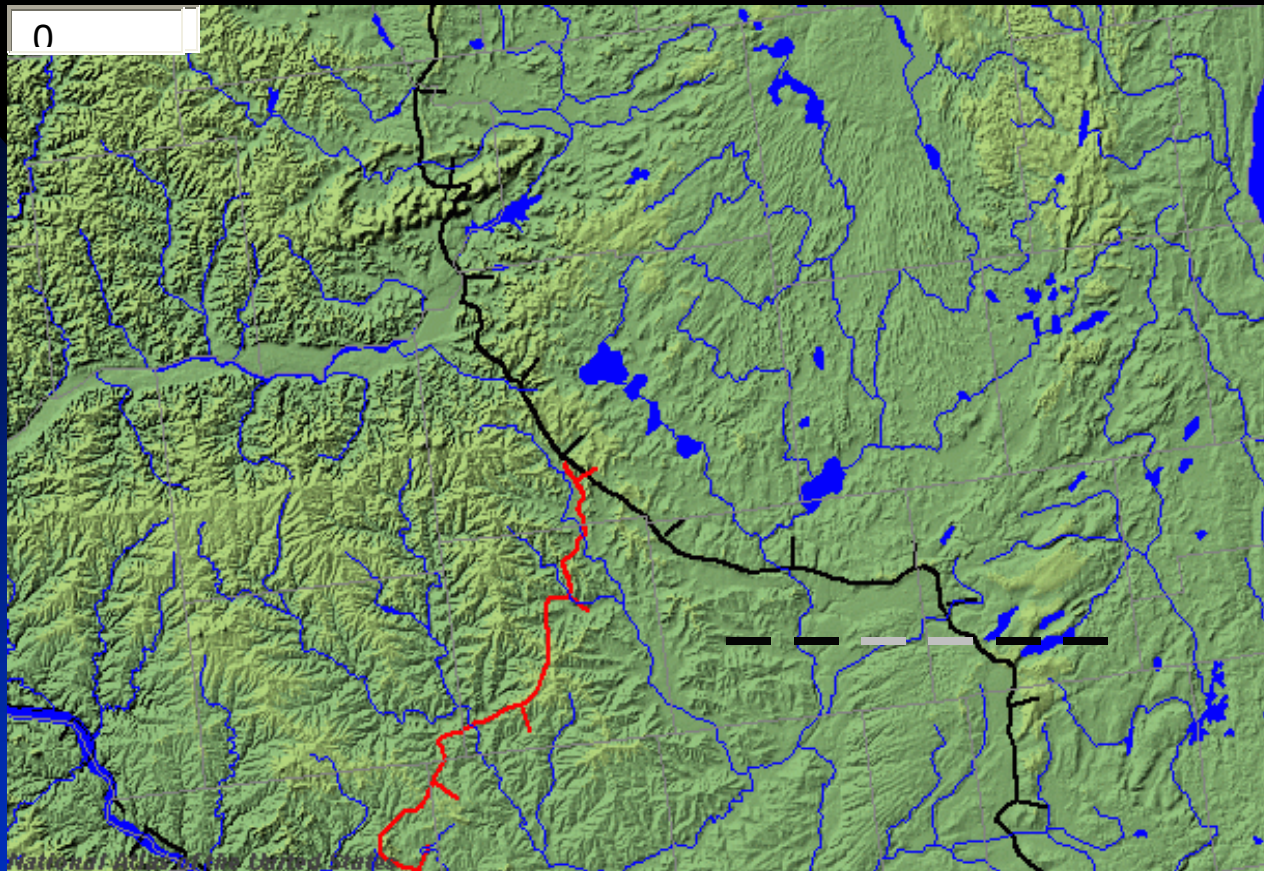
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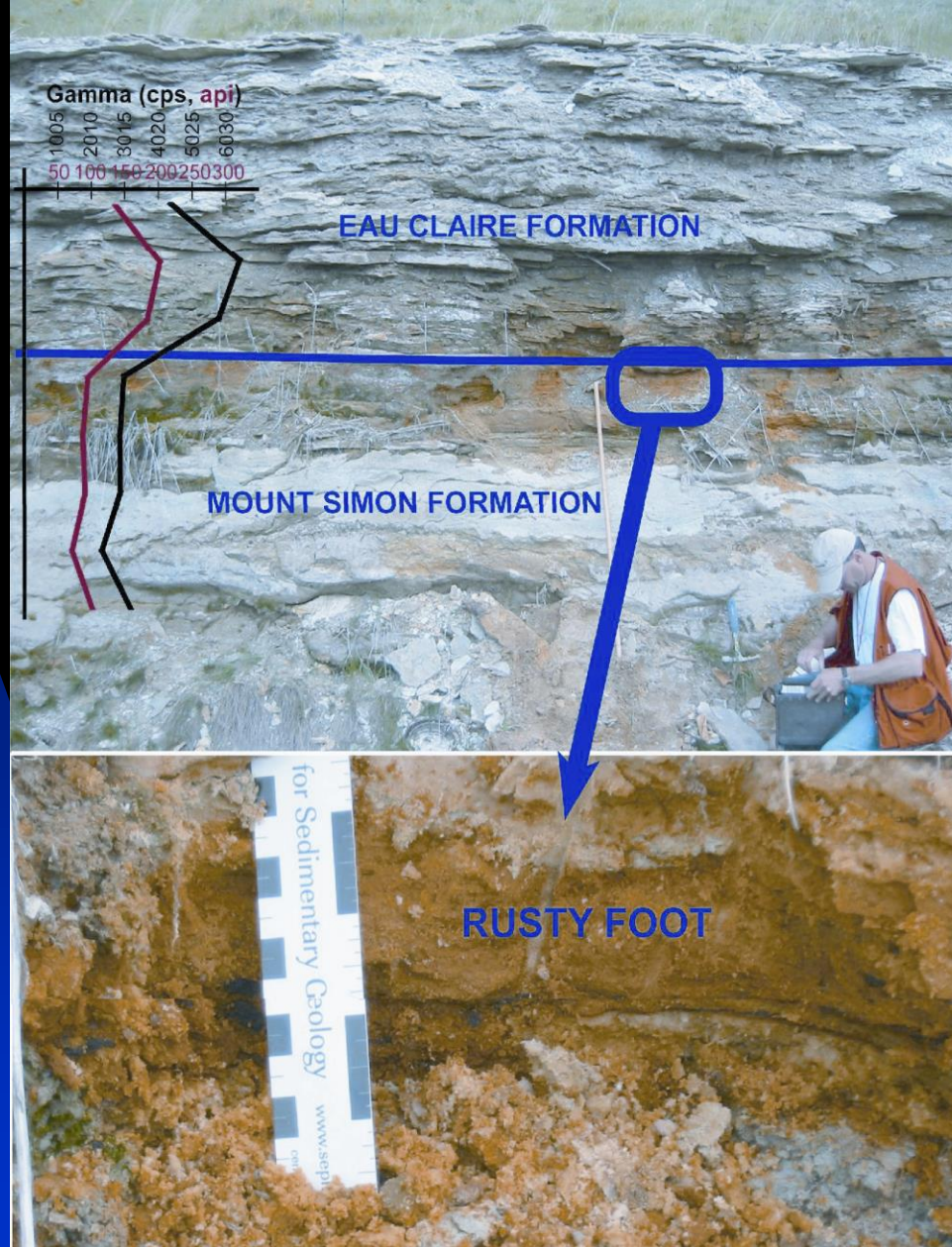


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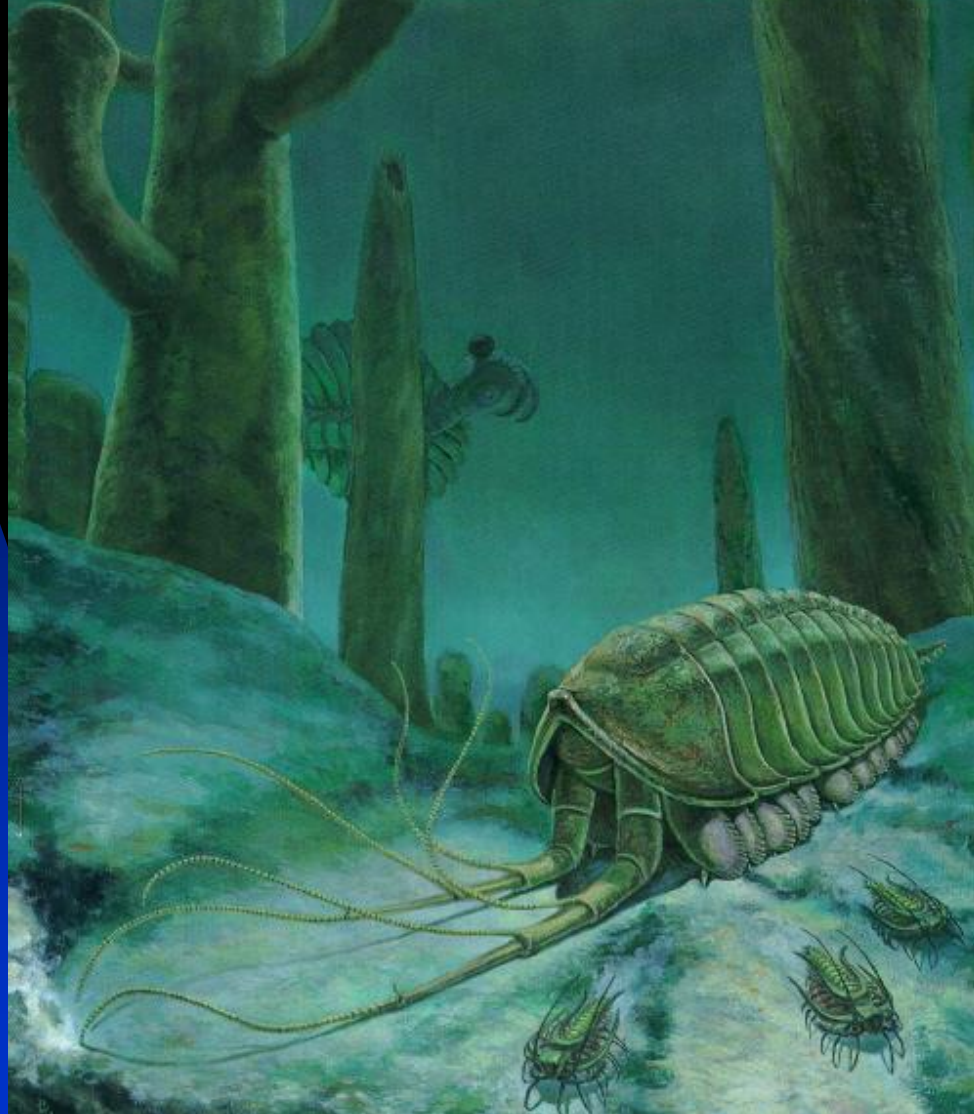




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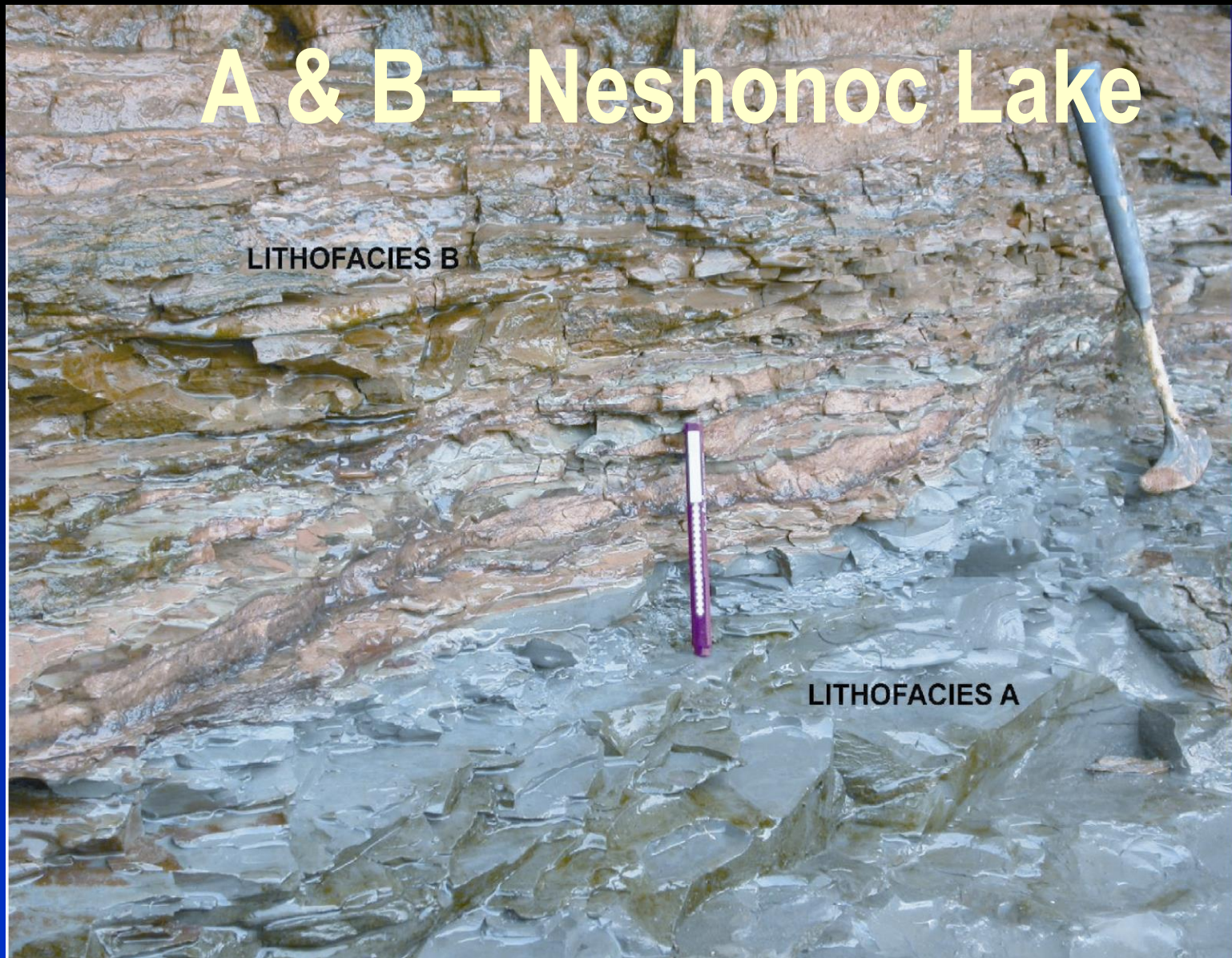


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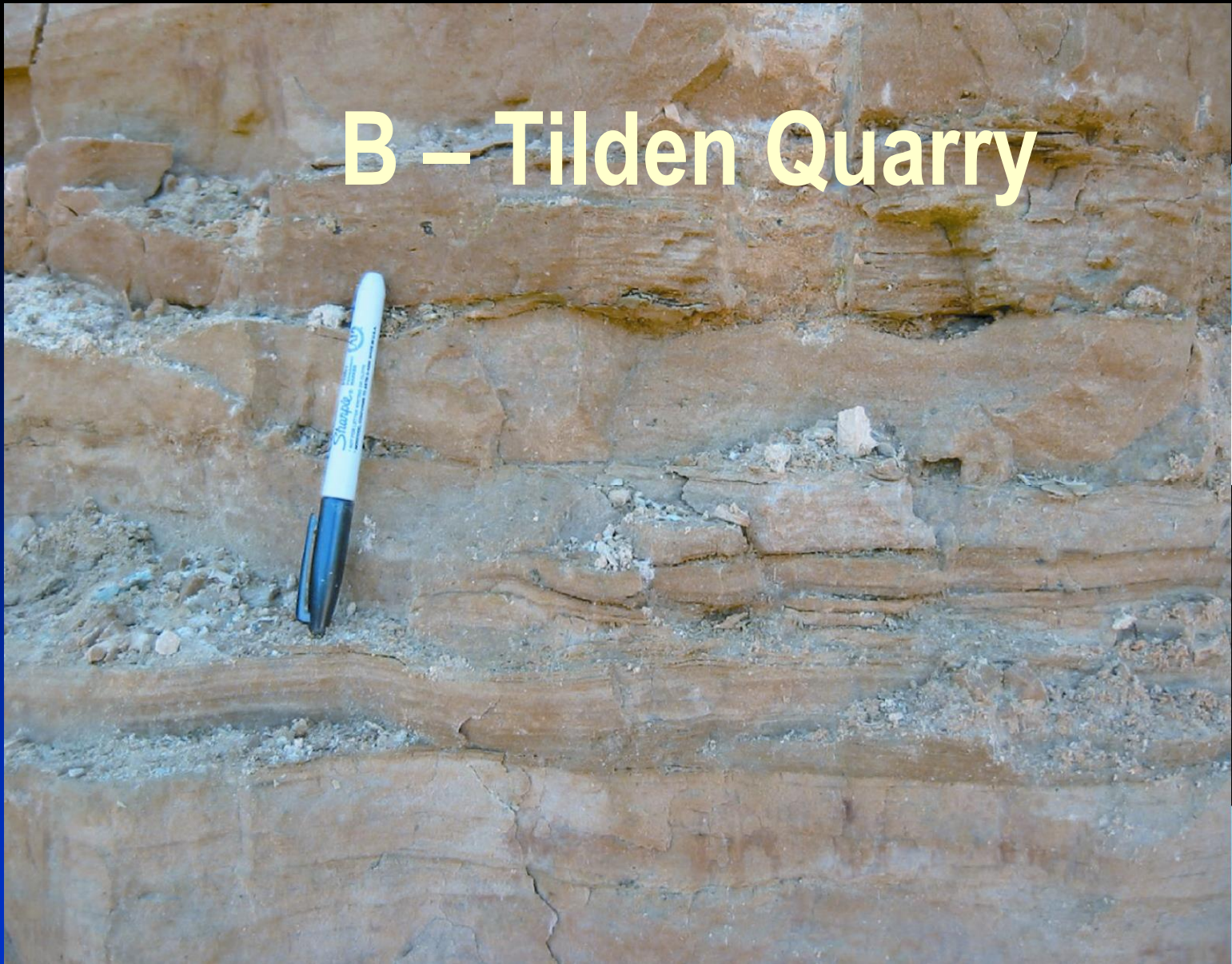
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A & B – Neshonoc Lake



B – Tilden Quarry



C – Tilden Quarry

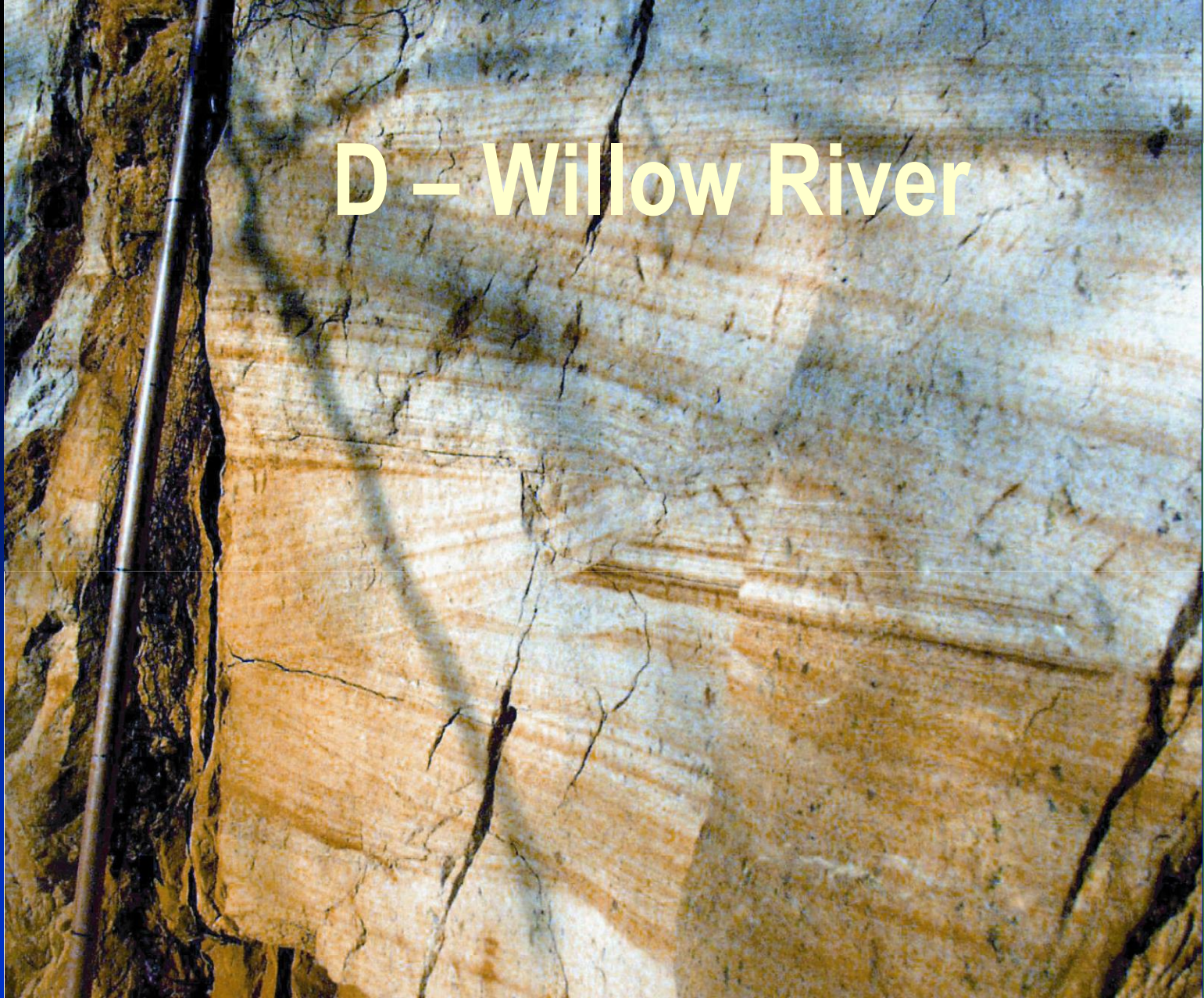


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D – Willow River



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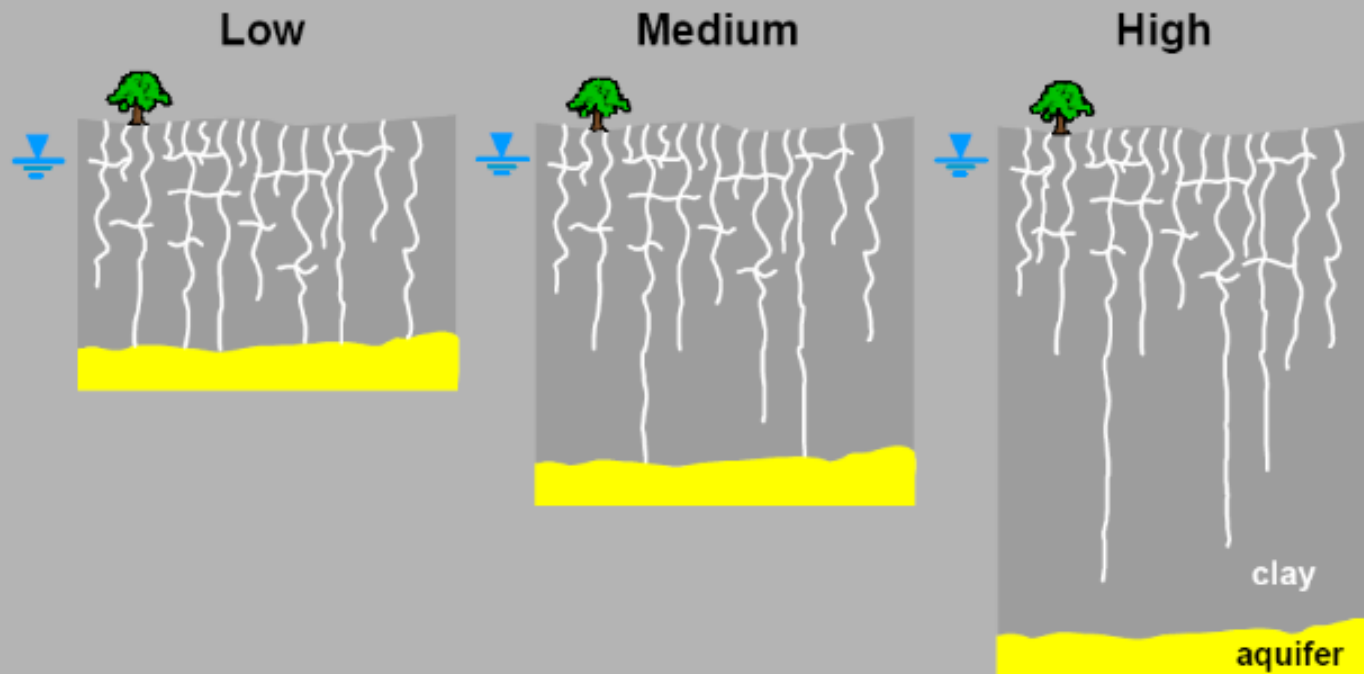
E – Willow River



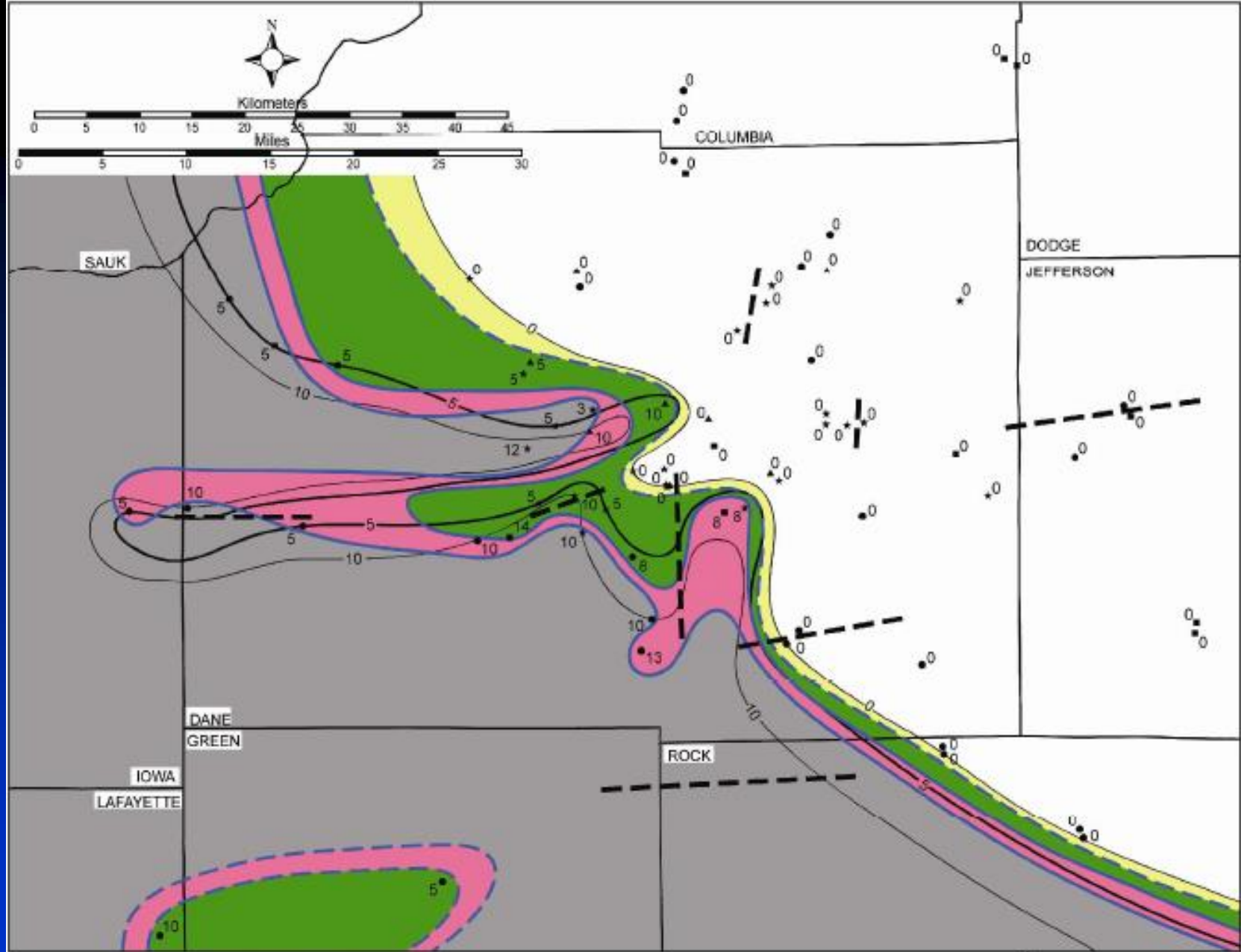
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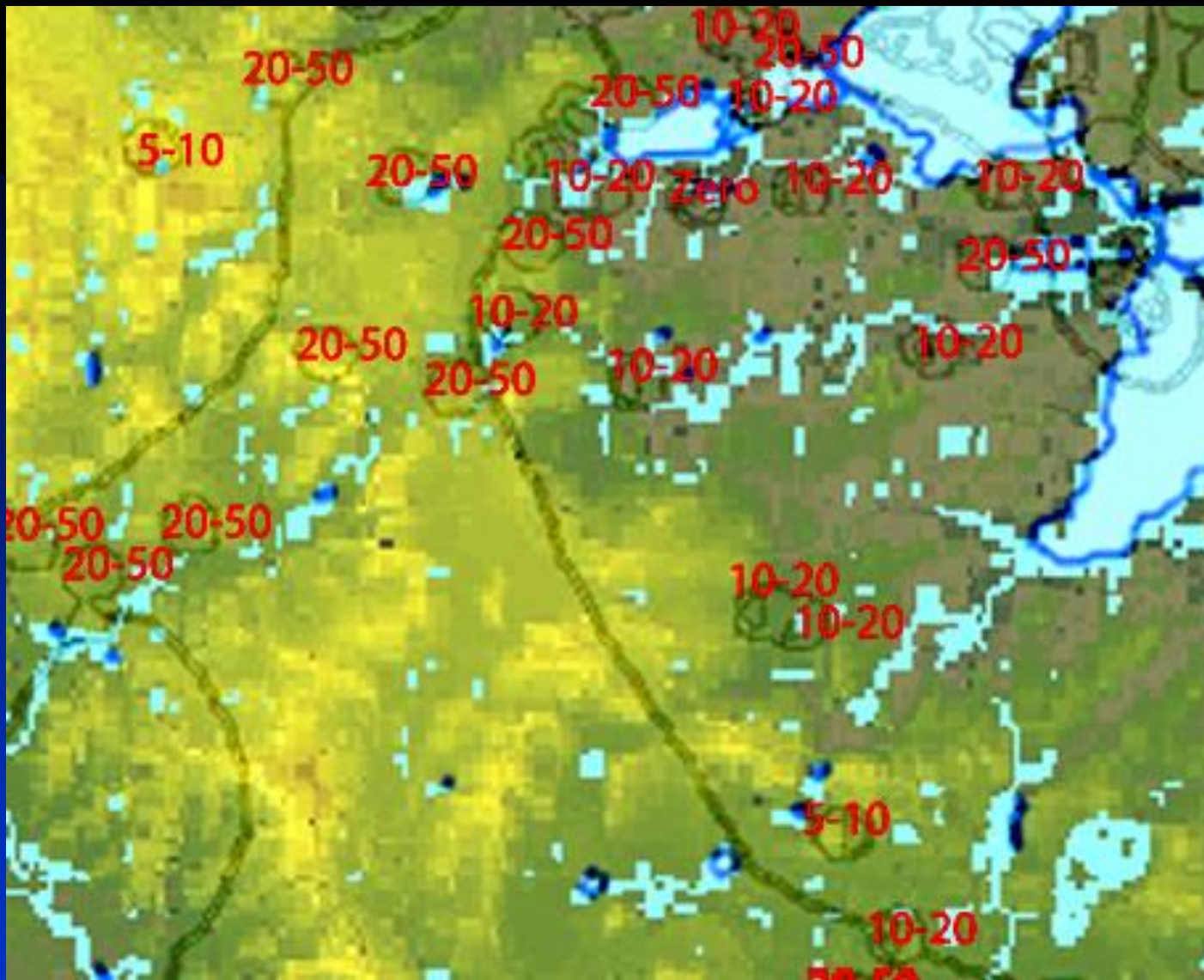
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DIFFERENT INTEGRITY DUE TO DIFFERENT THICKNESS

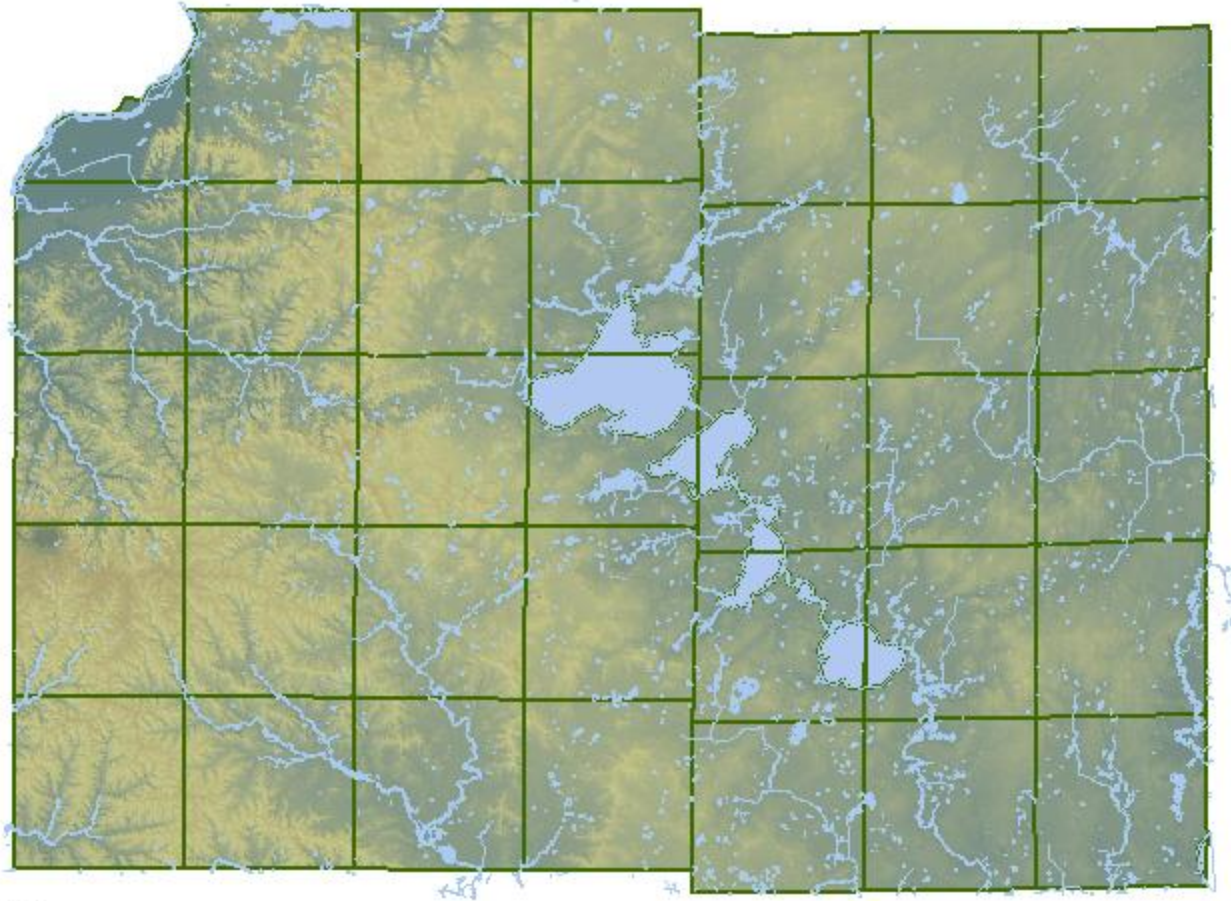


From: Bradbury, K., J. Cherry, B. Parker, T. Eaton, D. Hart, M. Gotkowitz, and M. Borchardt, 2003. Measures of aquitard integrity. Geological Society of America.





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