

# Mapping the Mahomet Aquifer

by  
**Helicopter-borne Transient  
Electro-Magnetic Survey**

“HTEM”

**Steven E. Brown, Chief Scientist**  
**September 9, 2021**

**I ILLINOIS**

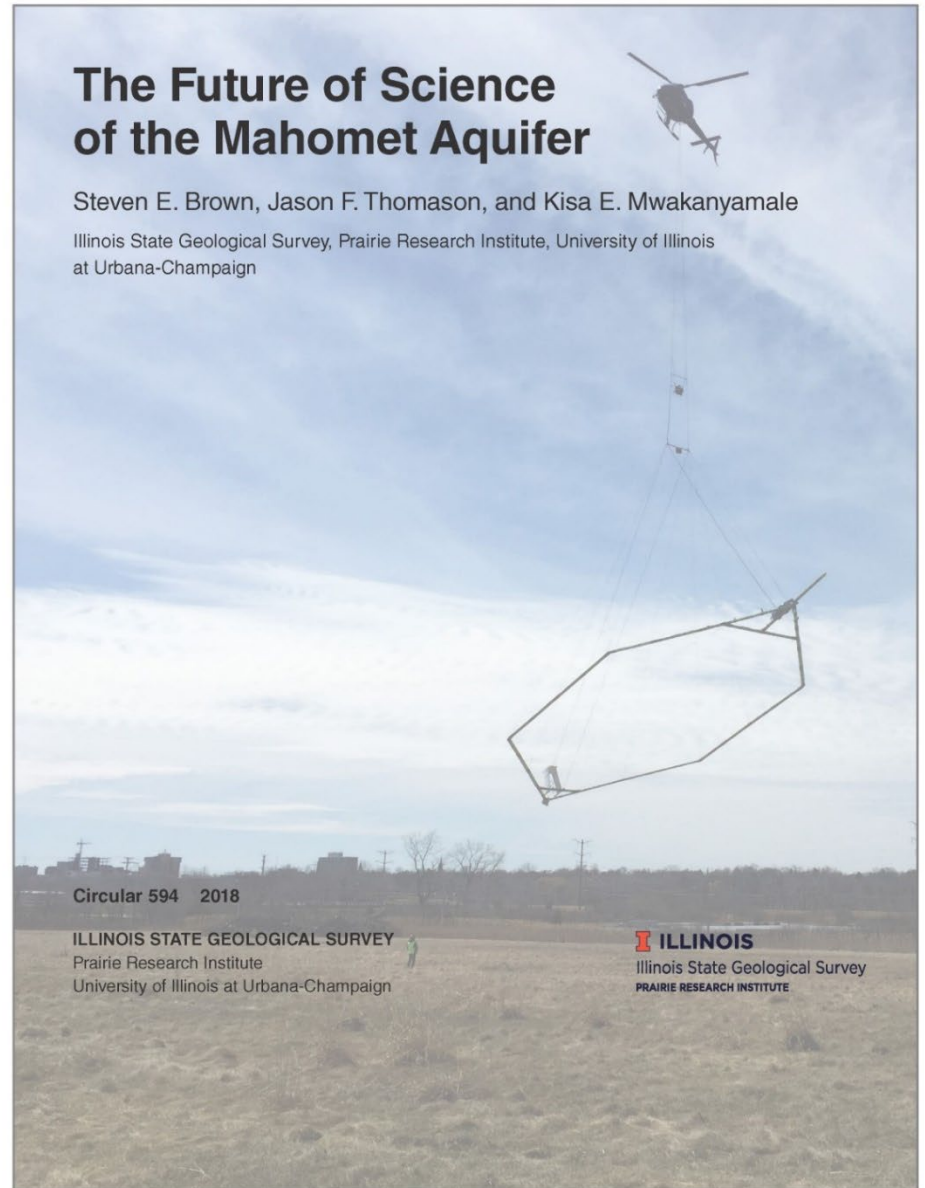
Illinois State Geological Survey

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## The Future of Science of the Mahomet Aquifer

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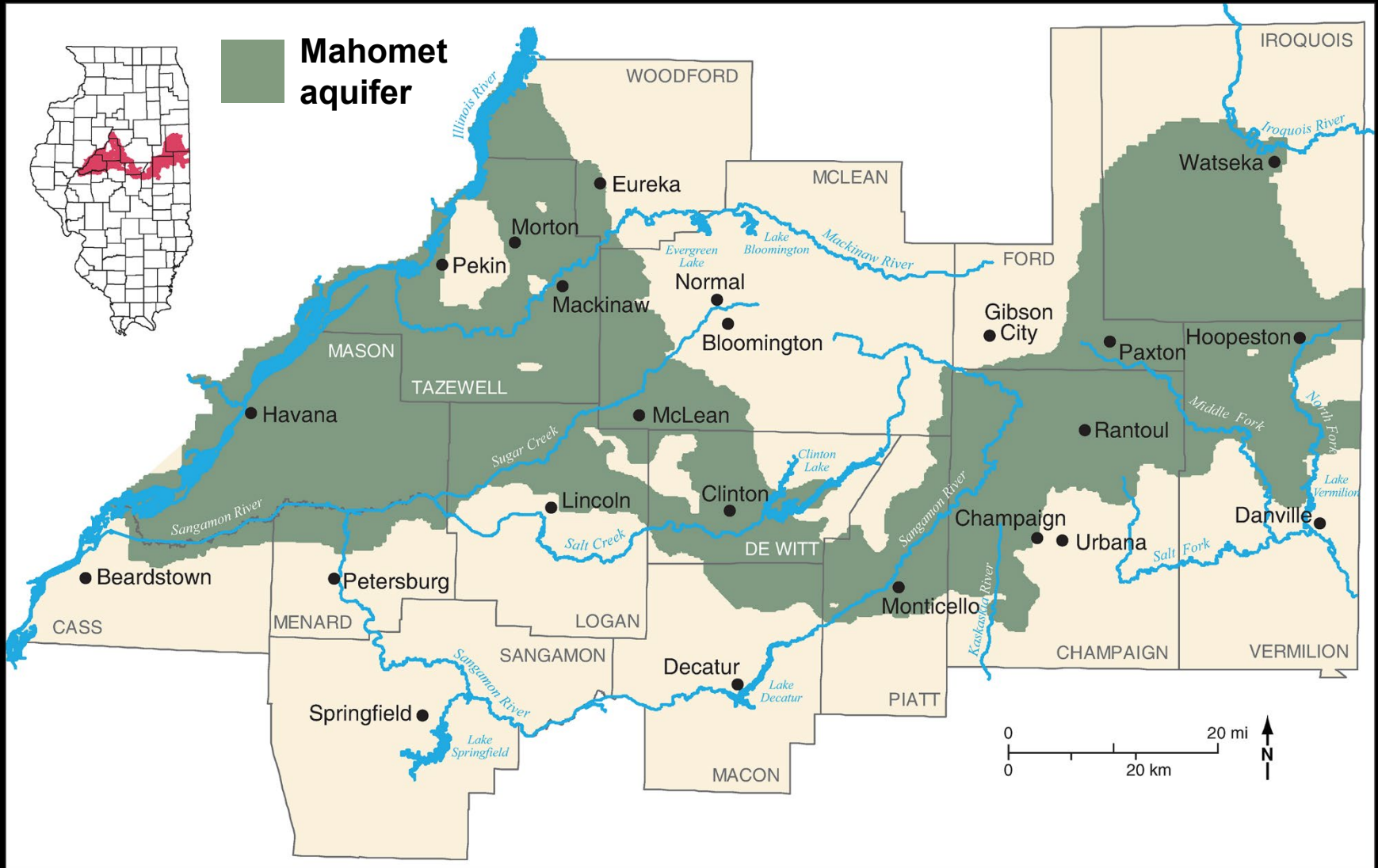


Circular 594 2018

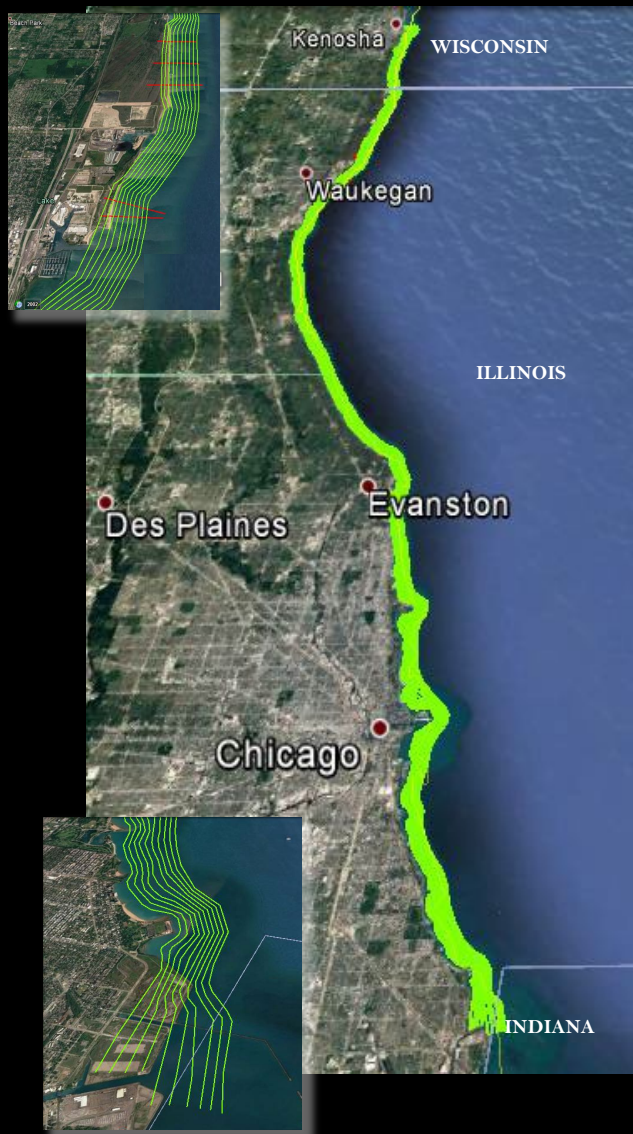
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# Area of the Mahomet aquifer



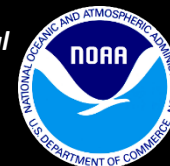
# Use of HTEM: Example 1 — Lake Michigan coast



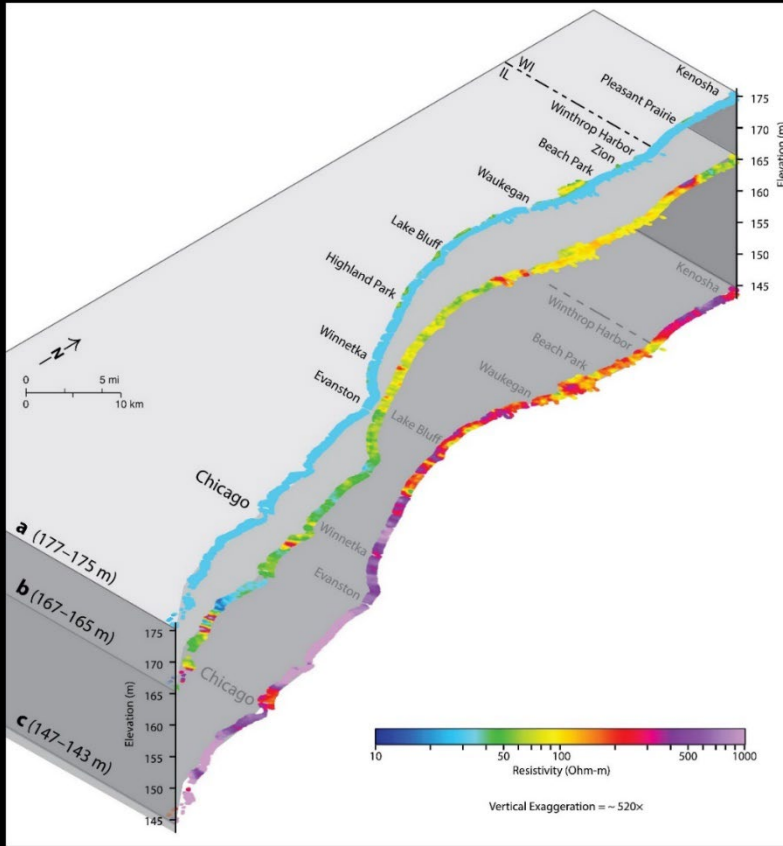
NOAA  
Office for Coastal Management

Projects of Special  
Merit

2016 Award



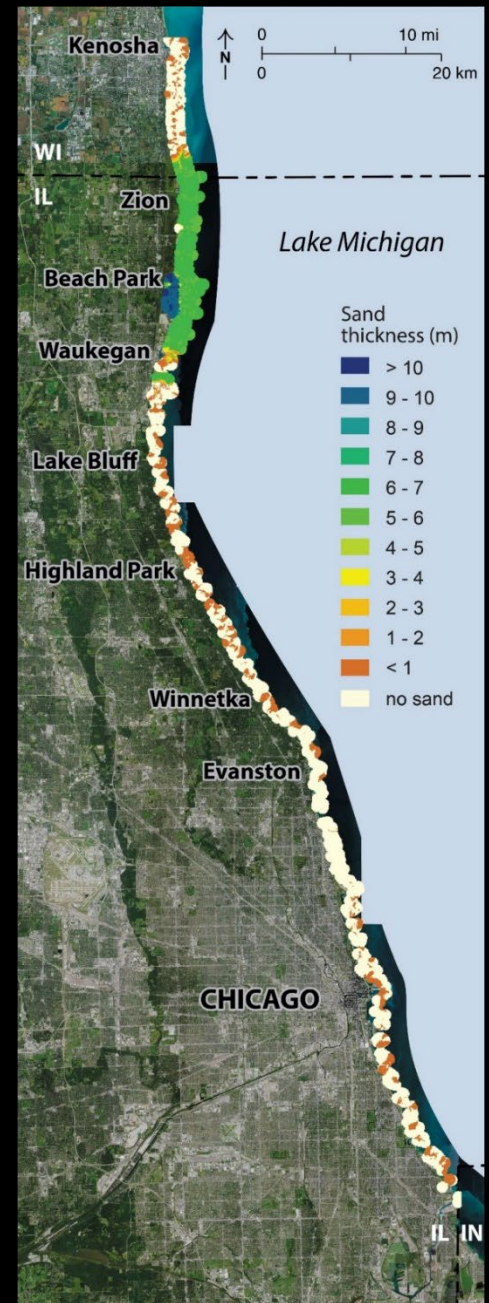
# Use of HTEM: Example 1 — Lake Michigan coast



Geology at depth



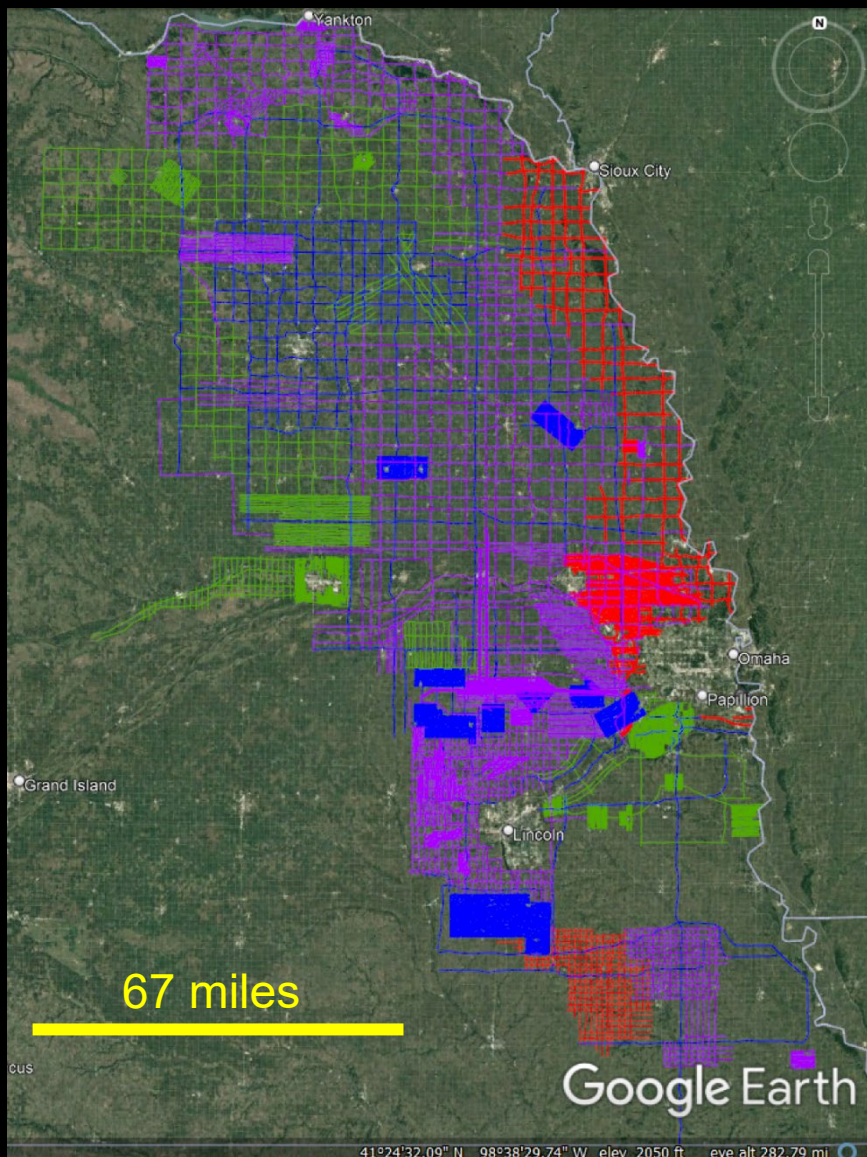
Sand distribution and thickness on lake bottom



Earth Material	Resistivity Ranges (Ohm-m)		
	Telford et al. 1976	Culley et al. 1975	TEM, this study
Sand and Gravel	100-180	100-8000	80-150
Clays	1-100	1-100	30-75
Dolomite	350-5000	—	200-1000
Shale	20-2000	—	10-35
Limestone	50-10 <sup>7</sup>	—	100-300

measures electrical properties (conductivity/resistivity) of sediment and rock

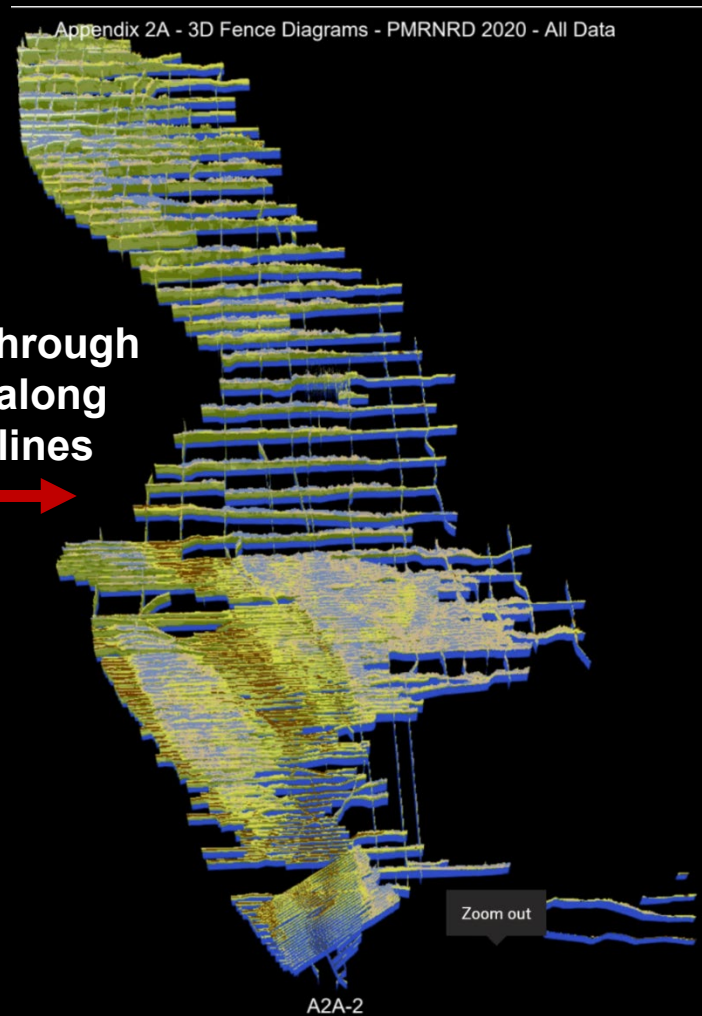
# Use of HTEM: Example 2 — eastern Nebraska



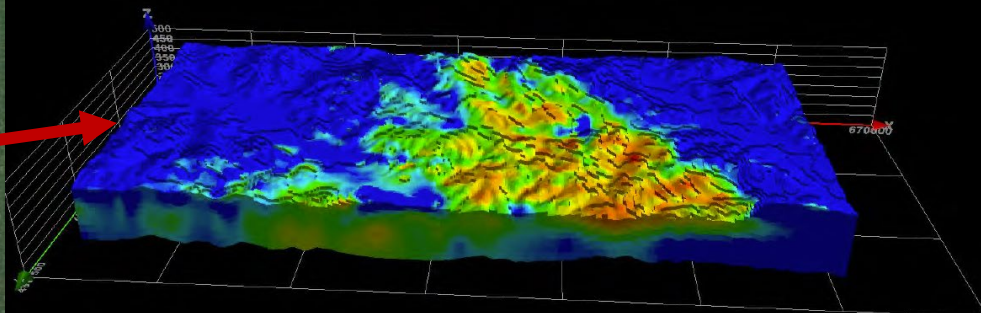
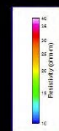
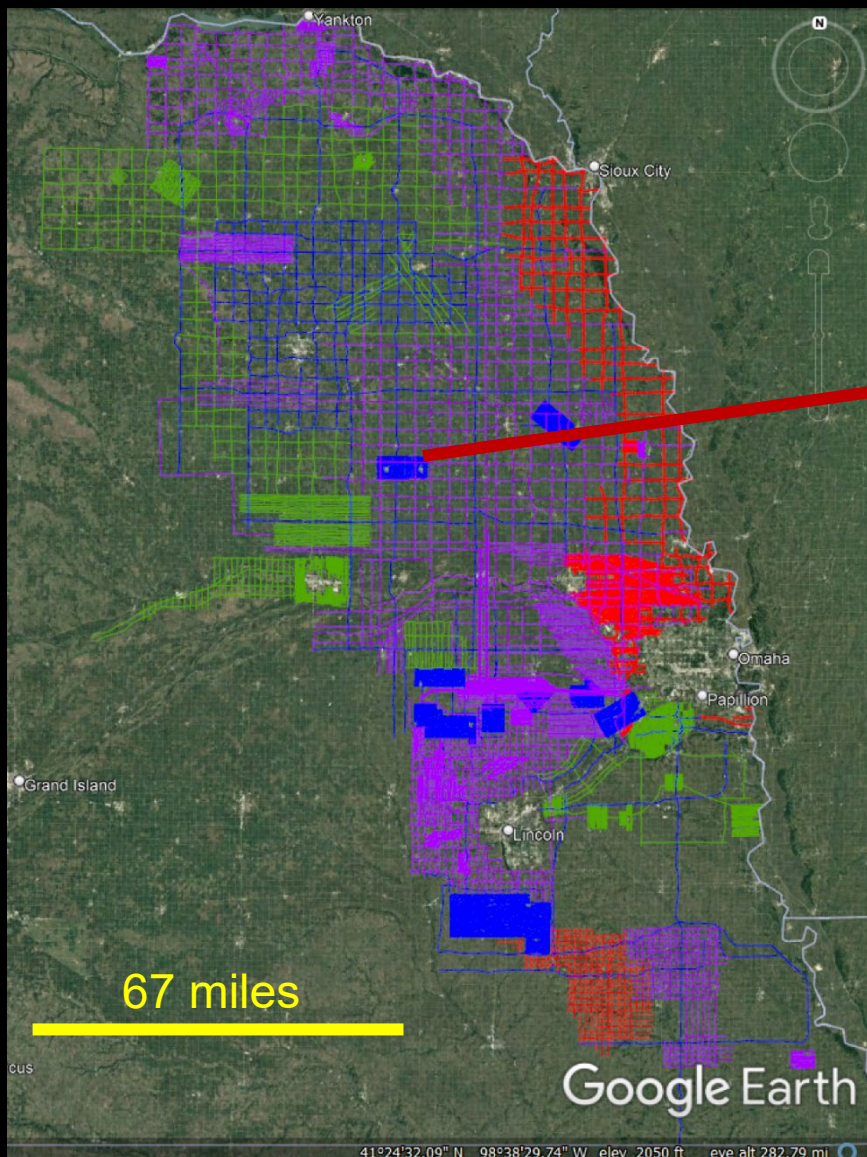
Helicopter  
flight lines



“Slices” through  
the earth along  
red flight lines



# Use of HTEM: Example 2 — eastern Nebraska

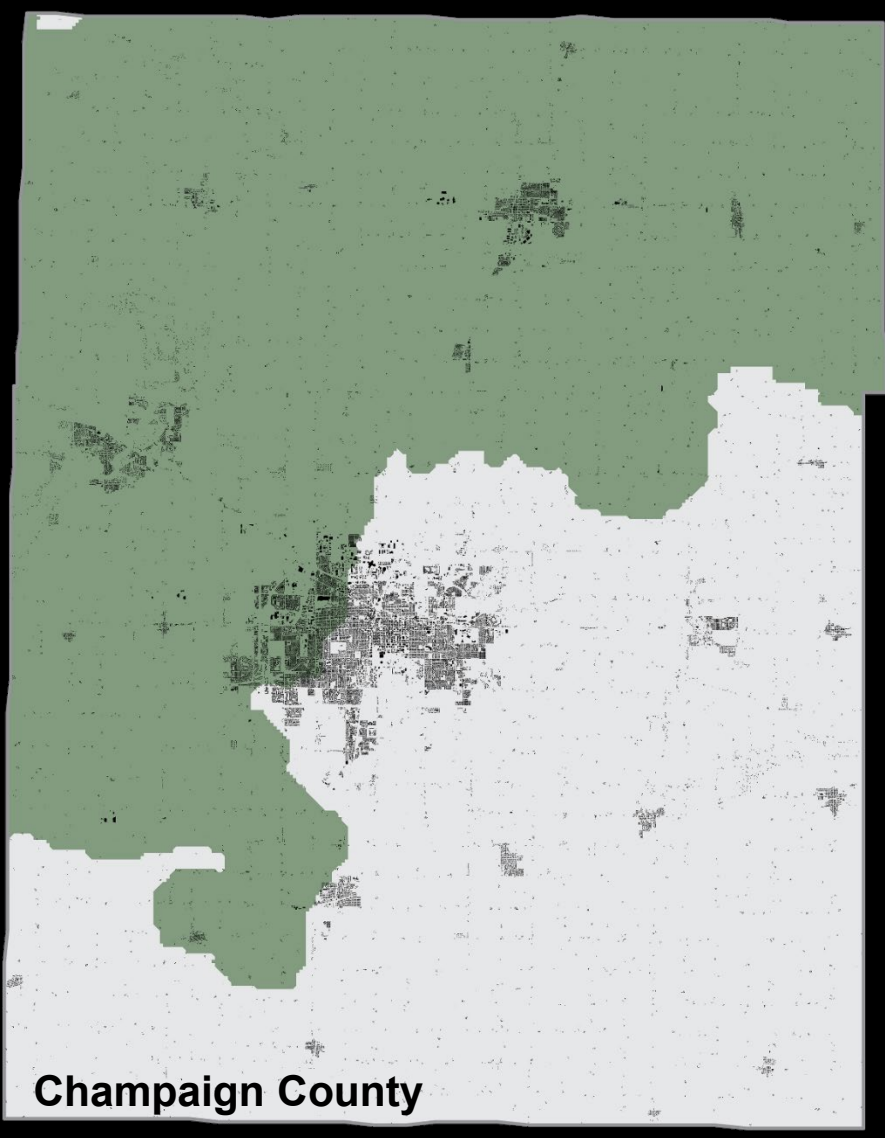


## Water volume in aquifer

Resistivity Threshold (ohm-m)	Aquifer Volume (m <sup>3</sup> )	Specific Yield	Extractable Water Volume (millions m <sup>3</sup> )
15-20	7.3 x 10 <sup>8</sup>	0.1	73.4
20-25	3.4 x 10 <sup>8</sup>	0.12	40.3
25 and above	12 x 10 <sup>8</sup>	0.15	17.8
<b>TOTAL</b>	<b>1.2 x 10<sup>9</sup></b>		<b>131.5</b>

Abraham, 2014

# Cost for Mapping the Mahomet aquifer in Champaign County



**\$1.7 million**

**550 to 600 square miles**

**~4500 to 5000 flight miles**

 **Mahomet aquifer**



# Contacts and Sources of Information

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