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A Standardized Digital Well-Record Database for the Glaciated U.S.

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U.S. Department of the Interior
U.S. Geological Survey

Background

- Arc Macro Language (AML) programs were developed by Les Arihood
- The AMLs were used to build several groundwater models

Arihood, L.D. 2008. Processing, analysis, and general evaluation of well-driller Logs for estimating hydrogeologic parameters of the glacial sediments in a ground-water flow model of the Lake Michigan basin: USGS SIR 2008-5184.

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Project Goals

- Create a sanitized and standardized database of digital well records for the glaciated U.S.
- Create Arc grid maps of
  - Total unconsolidated thickness
  - Total sand and gravel thickness
  - Horizontal hydraulic conductivity
  - Vertical hydraulic conductivity
  - Transmissivity
  - First Water

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Databases

State	Well-Drillers' Records GWSI Records	Well-Drillers' Records State Records
Alaska	26,620	36,203
Connecticut	2,865	
Idaho	355	229,944
Illinois	2,700	
Indiana	27,794	770,000
Iowa	3,275	142,626
Kansas	1,604	447,508
Massachusetts	5,941	1,115,237
Maine	387	0
Michigan	2,393	1,147,000
Minnesota	167,847	2,157,441
Missouri	1,931	802,216
Montana	4,160	499,519
Nebraska	1,923	115,980
New Hampshire	17,221	0
New Jersey	3,323	30,275
New York	21,192	
North Dakota	15,533	203,044
Ohio	5,512	2,246,000
Pennsylvania	3,957	479,626
Rhode Island	784	
South Dakota	21,879	
Vermont	351	0
Washington	2,380	
Wisconsin	8,404	458,875
TOTAL	**247,872**	**11,111,438**

Available for purchase

Available as pdf only

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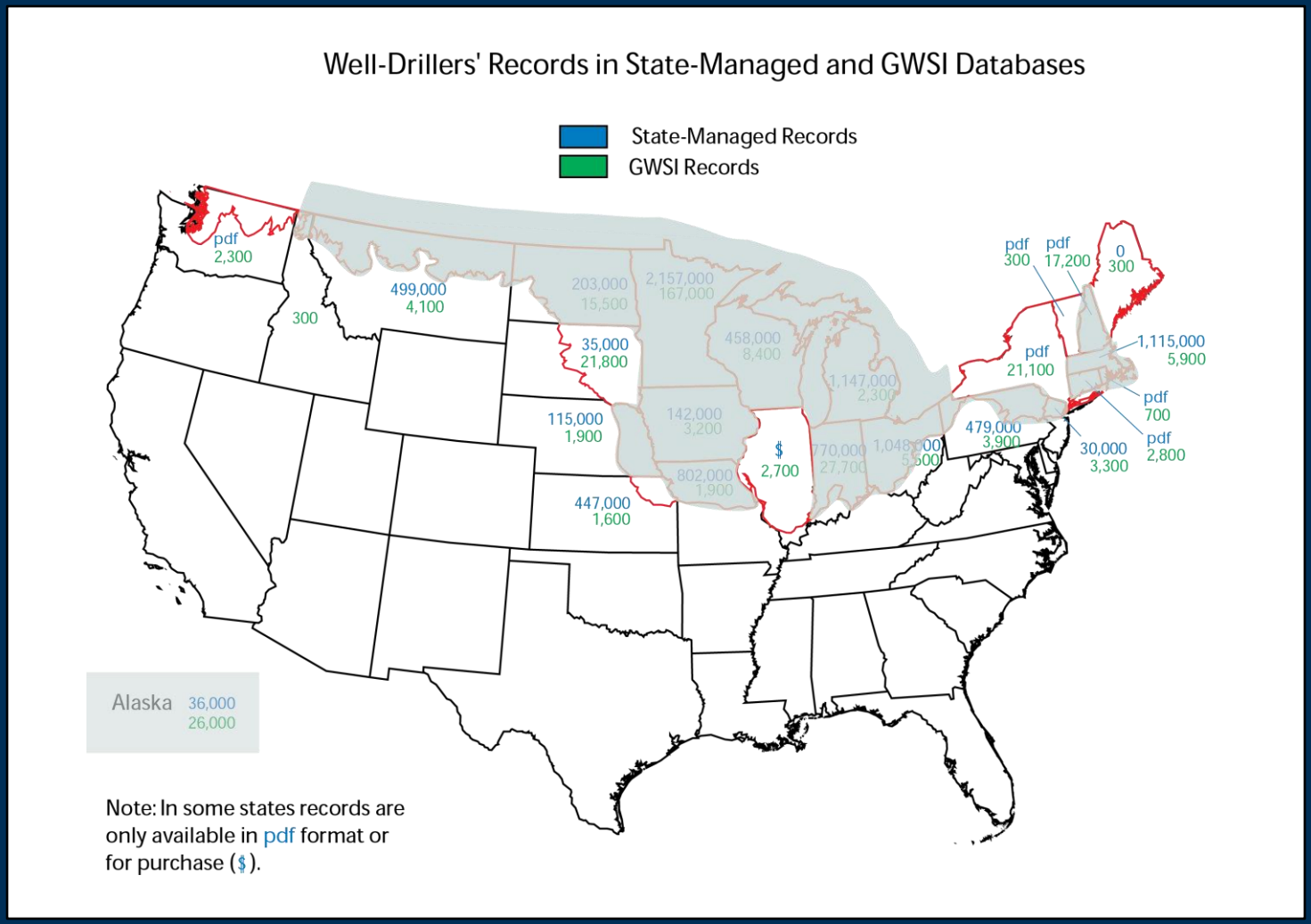
Anticipated Lithologic Coverage



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General Info and Lithologic Files

General Well-Record Information

Site ID
Location
Land-Surface Elevation
Water-Table Elevation
Construction Date
Well Construction
Pump Test
Intended Use

Lithologic Information

Site ID
Interval Tops
Interval Bottoms
Lithologies

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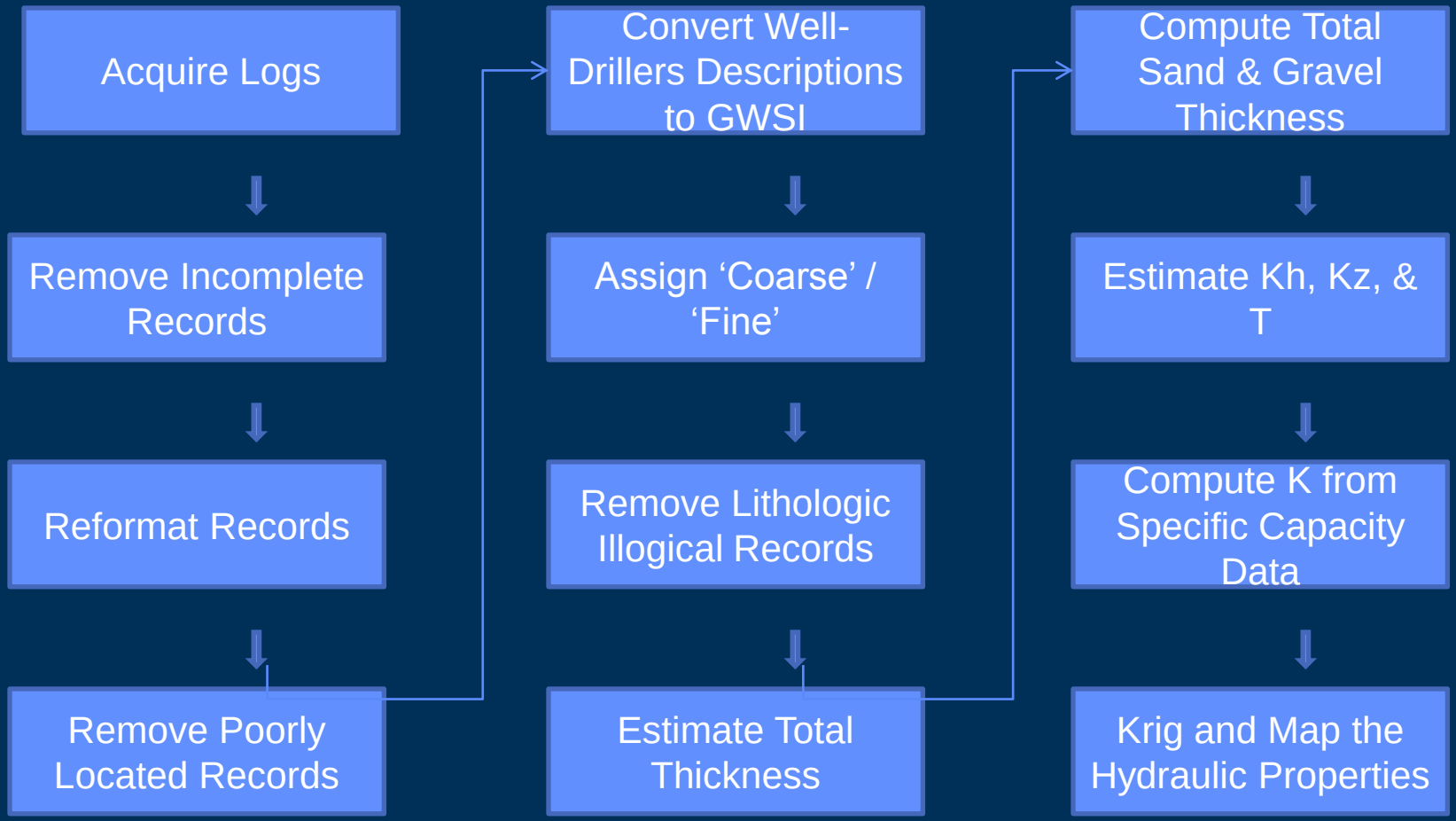
Generalized Procedure



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Translating and Standardizing

Driller's Description	Interpreted GWSI Lithology
sand and gravel	SDGL
S&G	SDGL
sand and grvl	SDGL
grey sand gravel	SDGL
grey sand gravel clay	SGVC
grey sand gravel clay and silt	SGVC
clay with silt sand and gravel	CLSD

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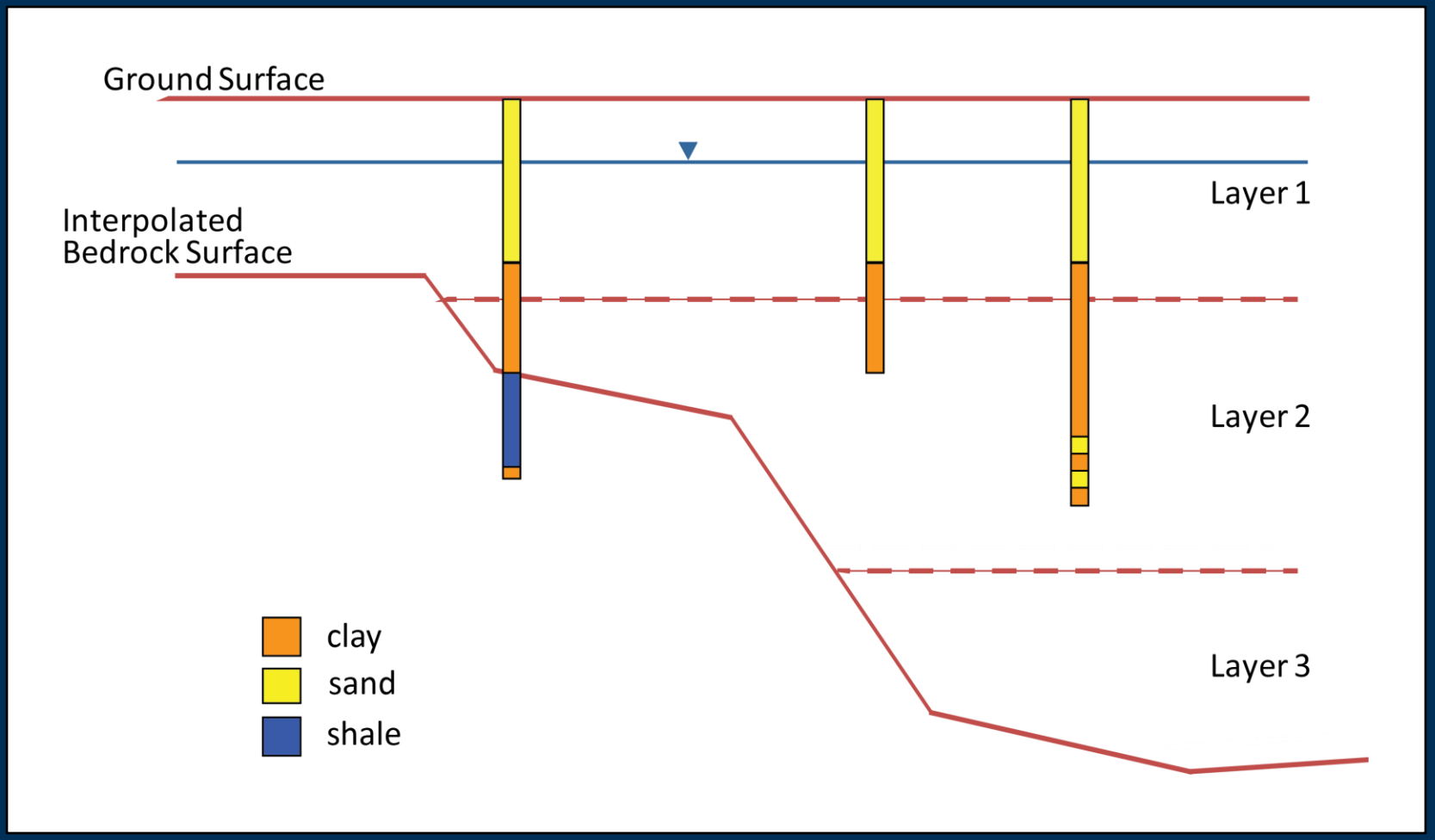
Common Situations



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Quality Evaluations

- **Groundwater Atlas of the U.S.**
  - [*http://pubs.usgs.gov/ha/ha730/*]
- **Widely Recognized Maps**
- **Bedrock surface by D. Soller**
- **Bedrock surface by Williston Study Group**
- **Ohio county study of aquifer transmissivity distribution based on county geology maps.**

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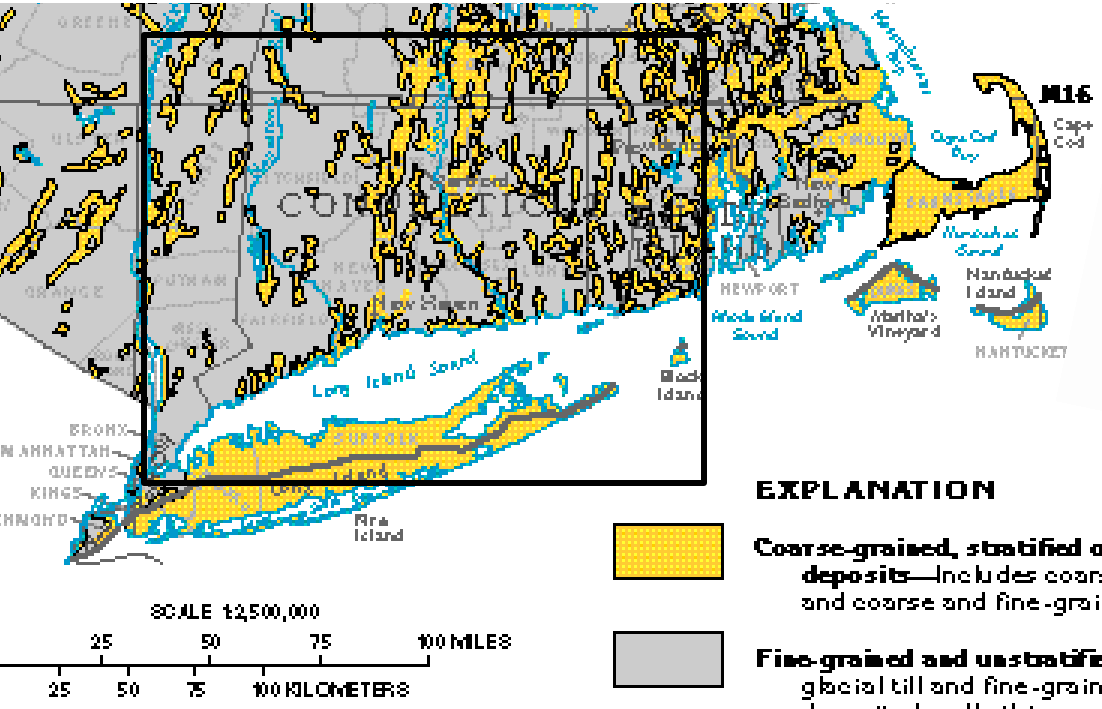
Comparing Maps

Fig. 9 Major Aquifers
USGS HA 730-M



Well sites in the Standardized
Well-Record Database

Comparing Maps

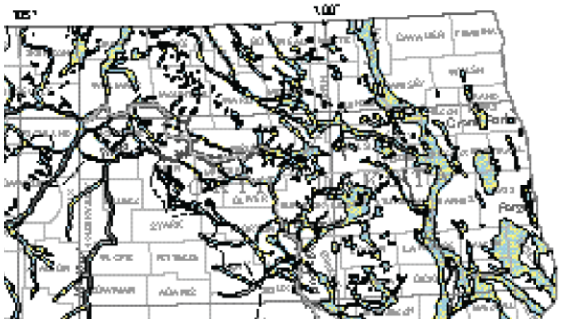
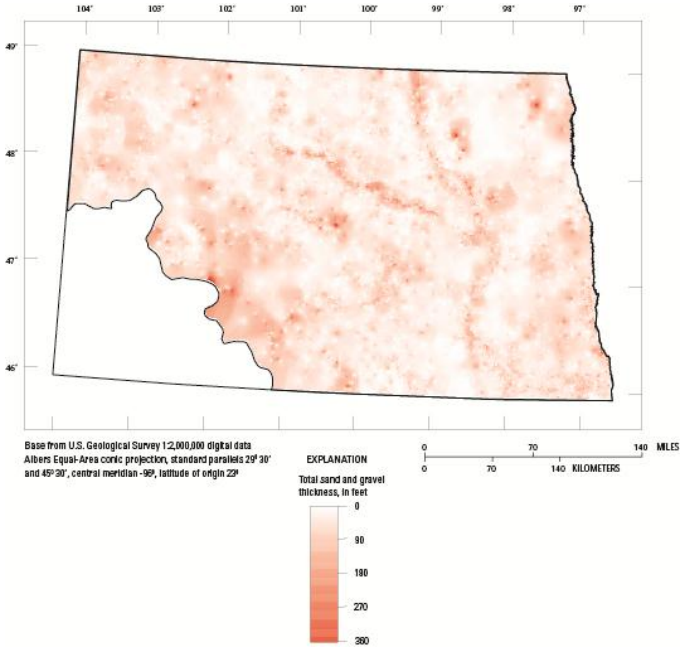


Fig. 25 Unconsolidated Aquifers
USGS HA 730-I



Sand and Gravel Thickness
Well-Record Database

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Comparing Maps

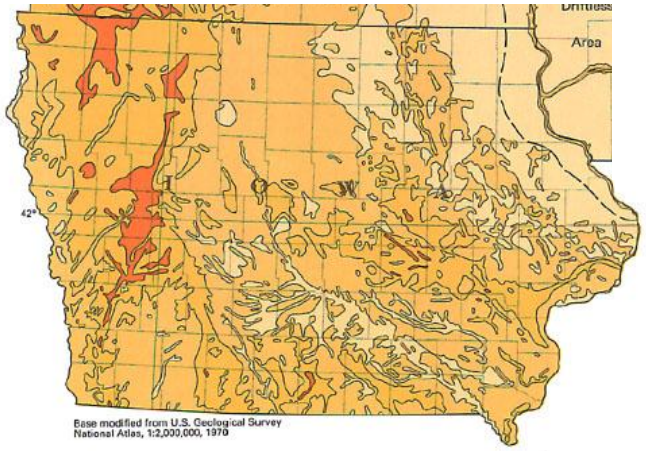
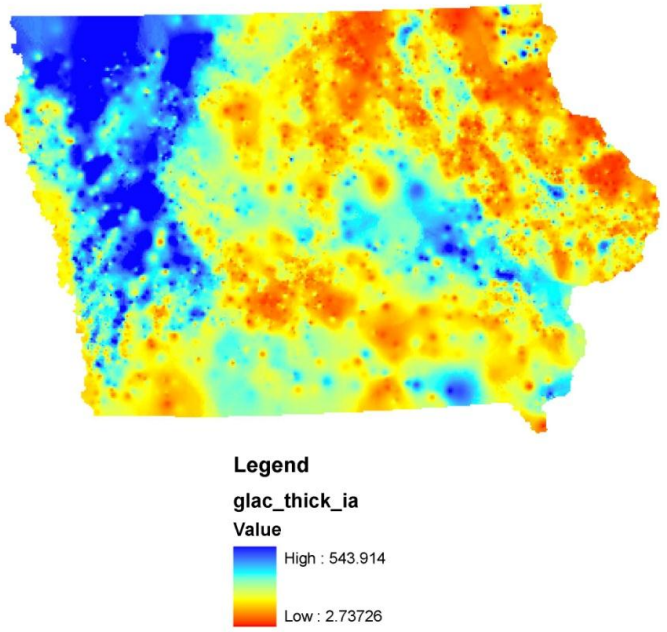


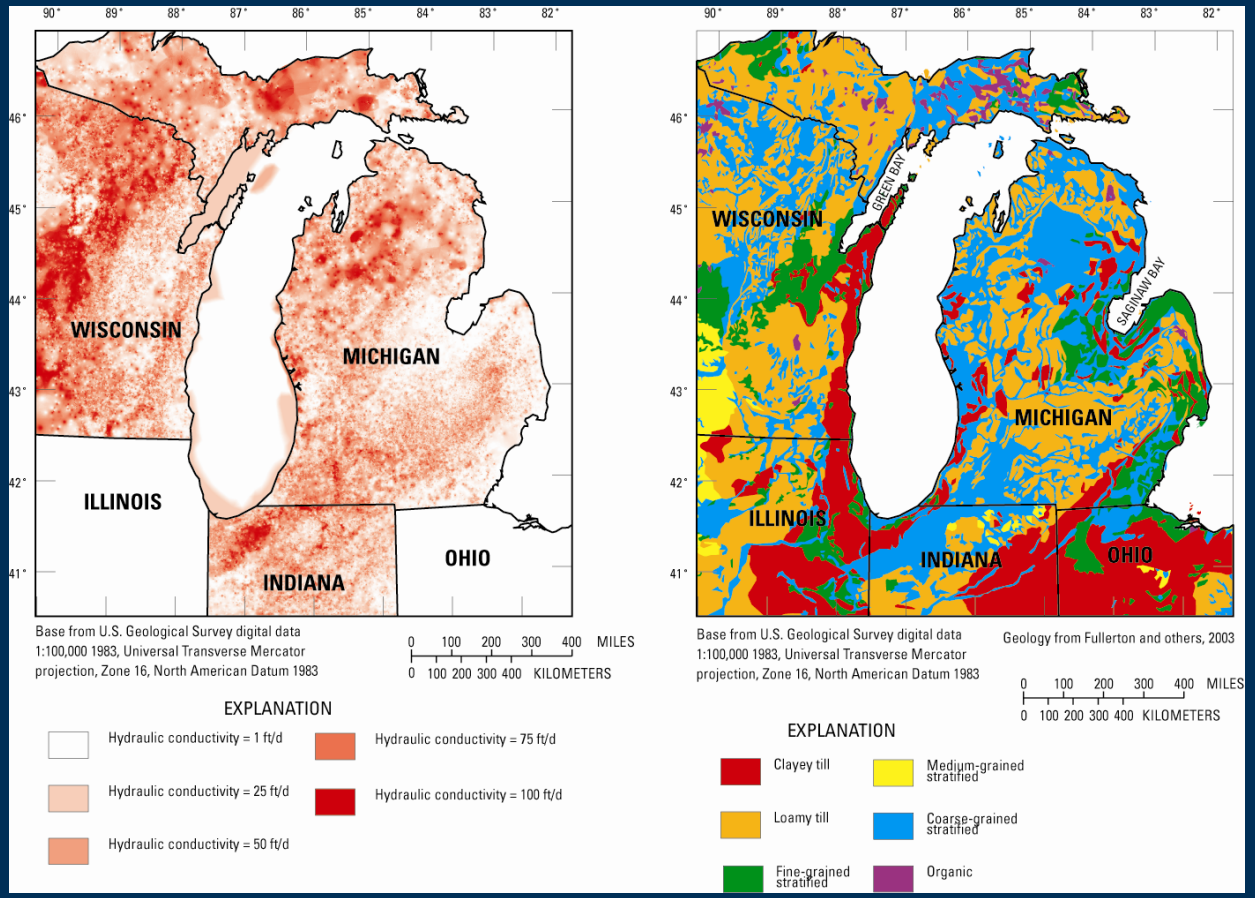
Fig. 30 Unconsolidated Thickness
USGS HA 730-K



Unconsolidated Thickness
Well-Record Database

USGS

Comparing Maps



Concurrent Applications

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Statist **uting to high**

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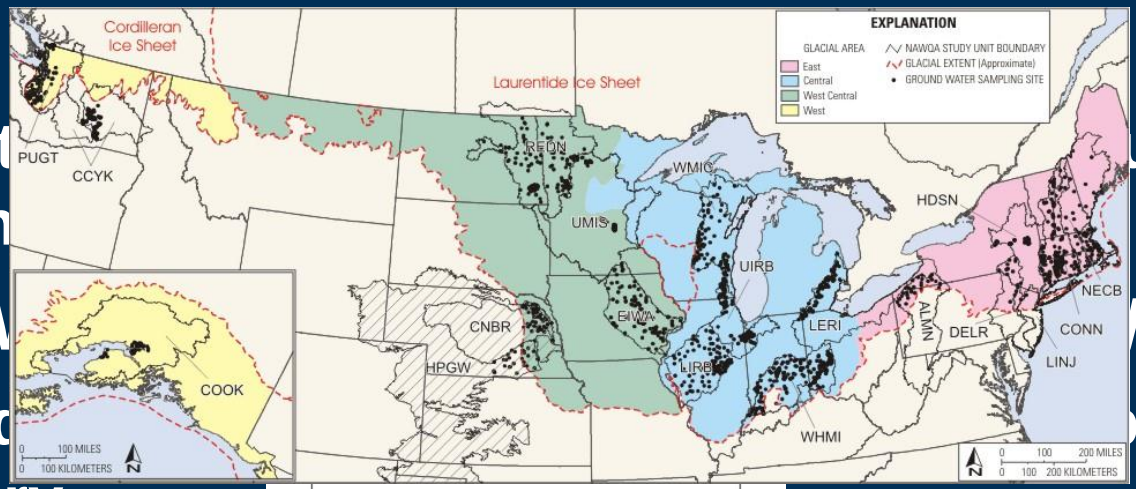
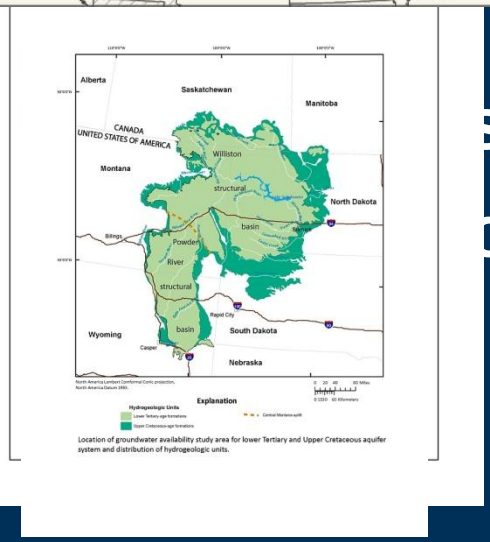
Ground **etroleum recovery.**

National Water- **sment:**

Water quality **on of the glaciated U.S**





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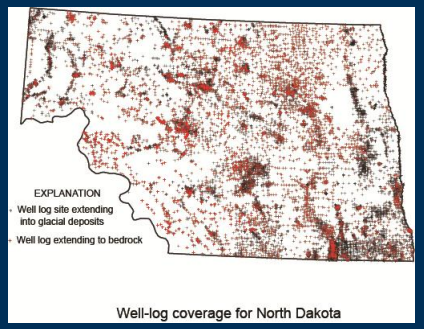
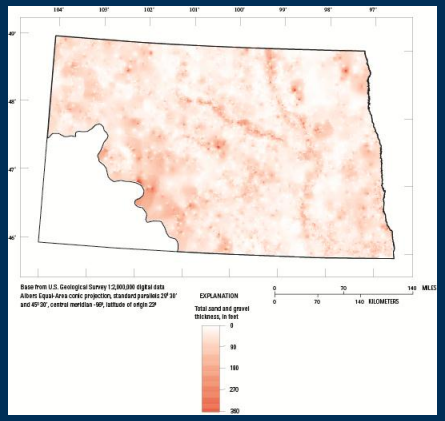
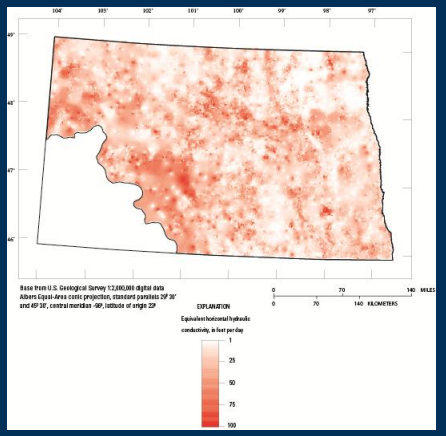
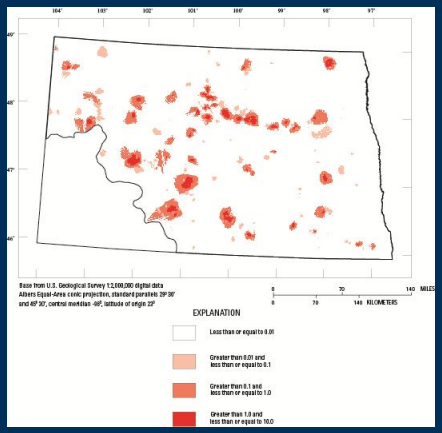
Anticipated Products

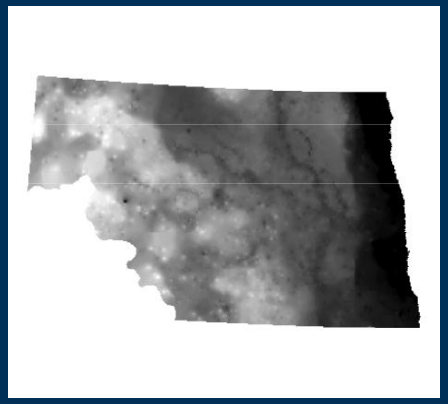


Well-log coverage for North Dakota









Total unconsolidated thickness
Total sand and gravel thickness
Relative horizontal K
Relative vertical K
Specific capacity horizontal K
Aquifer transmissivity
First Water
Bedrock Surface

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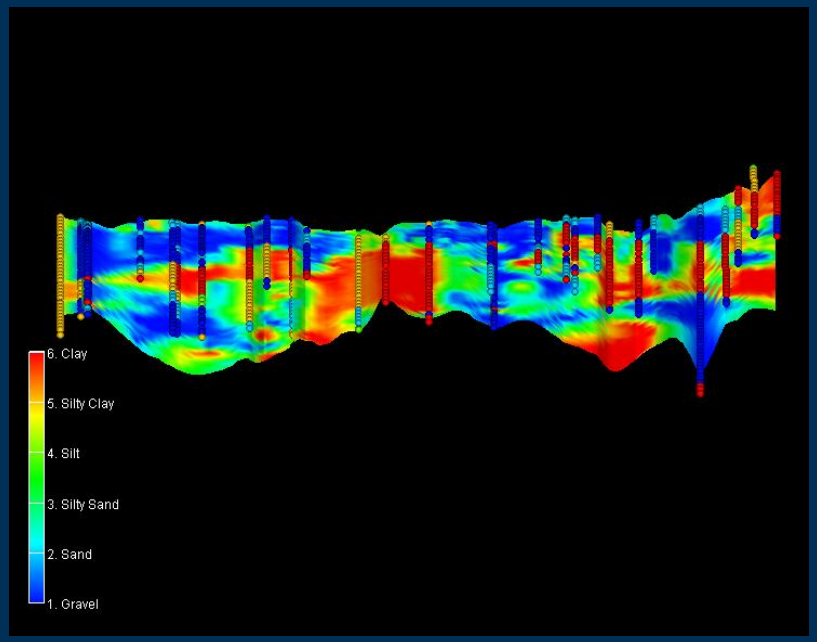
Anticipated Products

Web served:

- Report
- Database
- Maps
- Interactive
- Storage
- Water-use



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Final Remarks

- Map products are for large scale projects
- Database will be useful for small scale efforts
- Comments welcome!

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