Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

Illinois County Geologic Map
ICGM Kane-CS

Geologic Cross Sections
Kane County, Illinois

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Intoduction

These geologic cross sections were produced as a part of *Kane County Water Resources Investigations: Final Report on Geologic Investigations* (Dey et al. 2007) as part of a contract report for the project entitiled *Water-Resources Investigation for Kane County, Illinois* (Meyer et al. 2002). The Illinois State Geological Survey and Illinois State Water Survey have examined the groundwater resources of Kane County through three-dimensional geologic mapping and groundwater flow modeling to estimate sustainable yields from major aquifers in Kane County and to aid groundwater resource management.

Geologic Cross Sections

Geologic cross sections are two-dimensional representations of geologic materials encountered in a vertical plane passing through a portion of the Earth's surface. Cross sections offer an image of the distribution and thickness of the geologic units present, generally along a straight line in the geographic area of interest. Presented here are eight cross sections in Kane County. Five are parallel east-to-west lines and three are south-to-north parallel lines (fig. 1). The locations of the cross sections were selected to highlight the geologic diversity across Kane County.

The cross sections were created by slicing through the three-dimensional geologic model of Kane County (Abert et al. 2007). The geologic model consists of 21 regionally significant lithostratigraphic units identified in Kane County, which include 15 Quaternary units and 6 bedrock units. Some simplification of the geology was necessary to prevent the model from becoming overly complex. Some lithostratigraphic units were combined into a single unit. The Equality Formation was combined with Grayslake Peat and fine-textured facies of the Cahokia Formation and is called the surficial fine-textured layer. The surficial Henry Formation includes the coarse-textured facies of the Cahokia Formation and surficial deposits of the Wasco facies of the Henry Formation. Subsurface occurrences of the Equality Formation were combined with adjacent fine-textured units. The Robein Member was combined with the uppermost fine-textured unit of the Glasford Formation. Although the Robein is younger than the Glasford, it is an important marker bed used to separate younger Wisconsin Episode units from underlying Illinois Episode units. Another simplification most units share is that they are assumed to have uniform lithology; e.g., lenticular sand bodies present within a generally fine-textured unit were not shown, because they were regarded as being insignificant to groundwater flow on a county scale. The Glasford Formation is an exception and was modeled as three fine-textured layers and two coarse-textured layers.

The model was produced from lithostratigraphic assignments made on records from 5,432 water wells, engineering and stratigraphic borings, and outcrops (fig. 2, sheet 2); 2,599 of the data points were in Kane County, and another 2,833 data points were used in a buffer area extending six miles out from the county boundary. The buffer zone was used to prevent distortion of interpretations near the county line. An attempt was made to verify the location of all data points used, either by confirming the location in the field or using plat books, tax records, or other sources in the office. Forty-nine percent of all data points had their location verified in the field, 50% had their locations verified by documentation in the office, and 1% of the data points had unverified locations. The elevations of the upper and lower occurrence of each unit were identified where possible from data sources. These elevations were used to create an upper and lower surface for each unit. The methods used to construct these surfaces and compile the model are described by Dey et al. (2005). Dey et al. (2007) summarize those methods and present the distribution of the data used to produce the model and individual layers.

The legend and figure 3 (sheet 2) offer an explanation of the lithostratigraphic units depicted in the cross sections.

Application

The cross sections are a complement to the three-dimensional geologic model (Abert et al. 2007). The cross sections provide a visual representation of the geology of the county along parallel lines passing through the county. The cross sections allow visualization of the individual stratigraphic layers and their relationship with one another.

References

Abert, C.C., W.S. Dey, A.M. Davis, and B.B. Curry, 2007, Three-dimensional geologic model, Kane County, Illinois: Illinois County Geologic Map, ICGM Kane-3D.

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Dey, W.S., A.M. Davis, C.C. Abert, B.B. Curry, and J.C. Sieving, 2005, Kane County water resources investigations: Interim report on three-dimensional geologic modeling: Illinois State Geological Survey, Open File Series 2005-6, 50 p.

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Meyer S.C., D.D. Walker, S.M. McConkey, W.S. Dey, B.B. Curry, C.C. Abert, and E. Mehnert, 2002, Water-resources investigations for Kane County, Illinois: Illinois State Water Survey and Illinois State Geological Survey, A proposal to Kane County Development Department, 55 p.

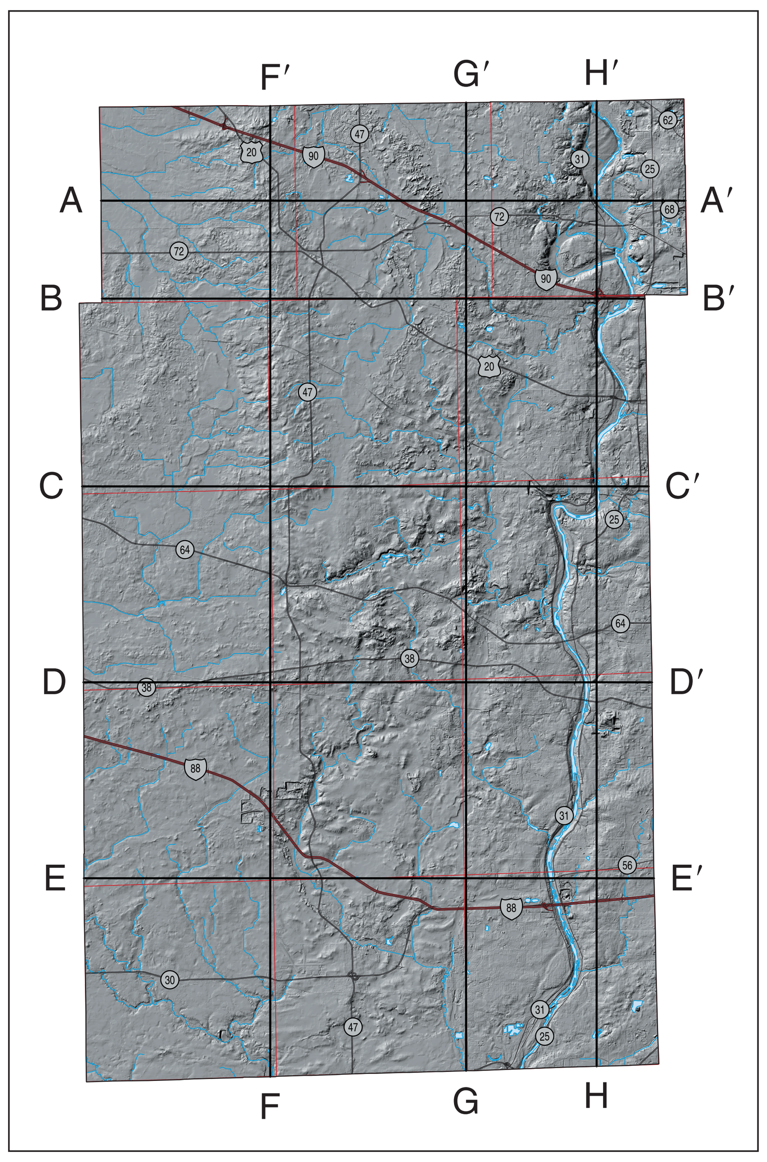


Figure 1 Location of cross section lines in Kane County.

QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON AND WISCONSIN EPISODES (~ 75,000 years before present (B.P.) to today)		
Silt, clay, and fine sand; layered to massive; gray to brown; and/or marl, peat, and sand; and/or silt, clay, and diamicton	Surfical fine-textured unit Equality Formation, Grayslake Peat, and fine-textured facies of Cahokia Formation f	**Lake deposits** in kettles and some valleys tributary to the Fox River, decomposed wetland vegetation and sediments in depression, and alluvium along streams
WISCONSIN EPISODE (~75,000–12,000 years B.P.)		
Sand and gravel, or sand; contains lenses of silt and clay or diamicton; up to 90 feet thick	Henry Formation h	**Proglacial outwash** deposited in terraces and as outwash plains downslope of glacial margins or nearshore sand and gravel deposited in beaches, spits, bars, and deltas in glacial lakes; or ice-contact deposits forming kames and eskers; or sand and gravel deposited along modern streams and rivers
Diamicton; sandy loam to loam; dolomite-rich; yellowish brown; with lenses and beds of sand and gravel; up to 80 feet thick	Haeger Member, Lemont Formation l-h	**Till and debris flow deposits** associated with the Woodstock Moraine
Sand and gravel, or sand; with lenses of silt and clay, or of diamicton; up to 90 feet thick	Beverly Tongue, Henry Formation h-b	**Proglacial outwash** underlies deposits of the Haeger Member
Diamicton; silty clay, silty clay loam, and clay; gray, oxidizing to yellowish brown; includes layers of sand and gravel, silt, and silty clay; up to 100 feet thick	Yorkville Member, Lemont Formation l-y	**Till and debris flow deposits** associated with the St. Charles and Minooka Moraines
Sand and gravel, or sand; contains lenses of silt and clay, or diamicton; up to 50 feet thick	Unnamed tongue, Henry Formation h(l-y)	**Proglacial outwash** deposited in deltas and alluvial fans as outwash plains downslope of glacial margins; underlies deposits of the Yorkville Member of the Lemont Formation
Diamicton; sandy loam, loam, and silt loam; gray to grayish brown, oxidizing to yellowish brown to brown up to 90 feet thick; includes common layers of sand and gravel or silt	Batestown Member, Lemont Formation l-b	**Till and debris flow deposits** associated with the Elburn Complex, Farm Ridge, and Arlington Moraines
Sand and gravel, or sand; contains lenses of silt and clay, or diamicton; greater than 70 feet thick	Unnamed tongue, Henry Formation h(l-b)	**Proglacial outwash** underlies deposits of the Batestown Member of the Lemont Formation deposited in deltas and alluvial fans as outwash plains downslope of glacial margins or kames
Diamicton; clay loam to loam with lenses of sand and gravel, sand, silt or clay; reddish brown, oxidizing to brown; as much as 270 feet thick	Tiskilwa Formation t	**Till and debris flow deposits** forming the Marengo Moraine and Bloomington Morainic System and occuring under most of the county
Sand and gravel, or sand; contains lenses of silt and clay, or diamicton; more than 80 feet thick	Ashmore Tongue, Henry Formation h-a	**Proglacial outwash** underlies deposits of the Tiskilwa Formation
ILLINOIS EPISODE (~ 200,000–130,000 years B.P.)		
Diamicton; sandy loam to loam, reddish brown, pinkish brown, and brown; bouldery in places, with lenses of silt and clay and abundant lenses and layers of sand and gravel; up to 185 feet thick	Glasford Formation g	**Till, debris flow deposits, outwash, and lake sediment**

PRE-QUATERNARY DEPOSITS

Description	Unit	Interpretation
SILURIAN SYSTEM (~ 443–417 million years B.P.)		
Dolostone; microcrystalline; cherty in places; up to 150 feet thick	Silurian (undifferentiated) S	**Dolostone** reef and inter-reef carbonates deposited in shallow marine environment
ORDOVICIAN SYSTEM (~ 490–443 million years B.P.)		
Shale; fossiliferous, dolomitic, and thin beds of vuggy dolostone (Maquoketa Group); up to about 250 feet thick	Maquoketa Group Om	**Shales** deposited in subtidal to intertidal environment with interbedded carbonate bank deposits
Dolostone; nearly pure medium- to fine-grained dolostone; also contains chert nodules and shaley zones; averaging greater than 300 feet thick	Galena and Platteville Groups Ogp	**Dolostone** shelf deposits formed in shallow marine environment

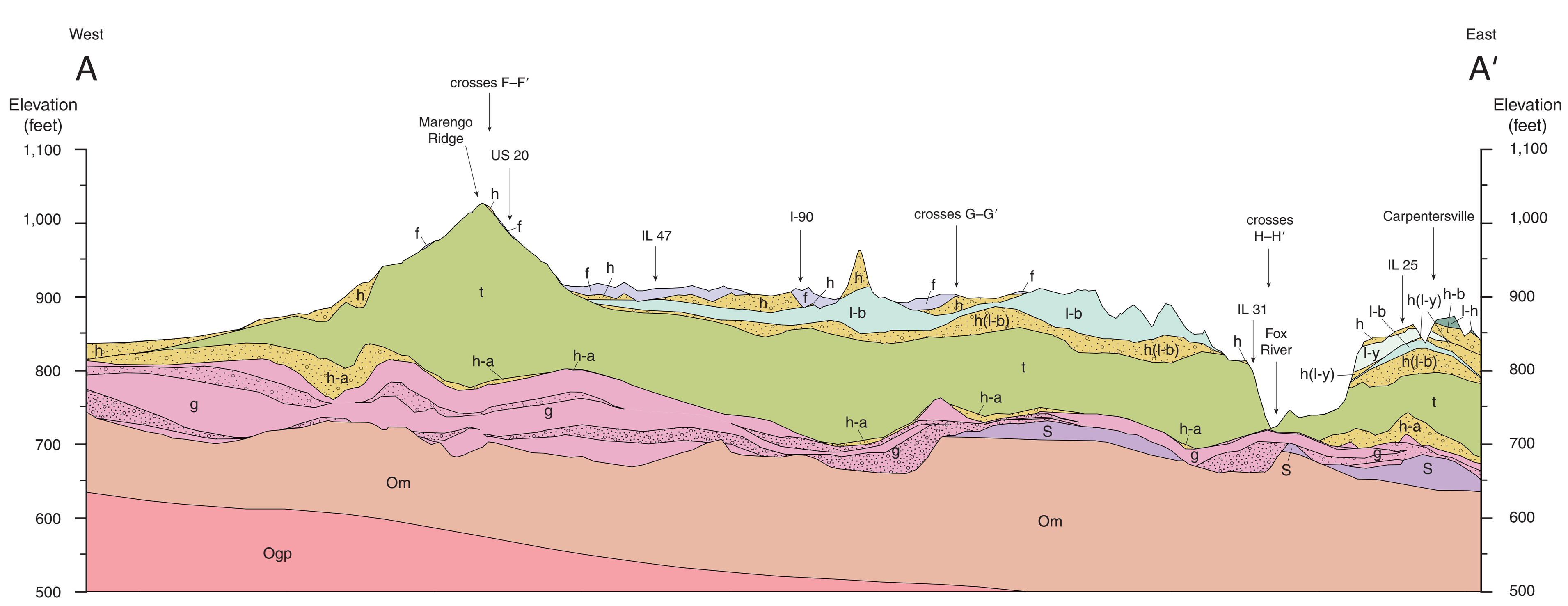
Medium to fine sand with gravel

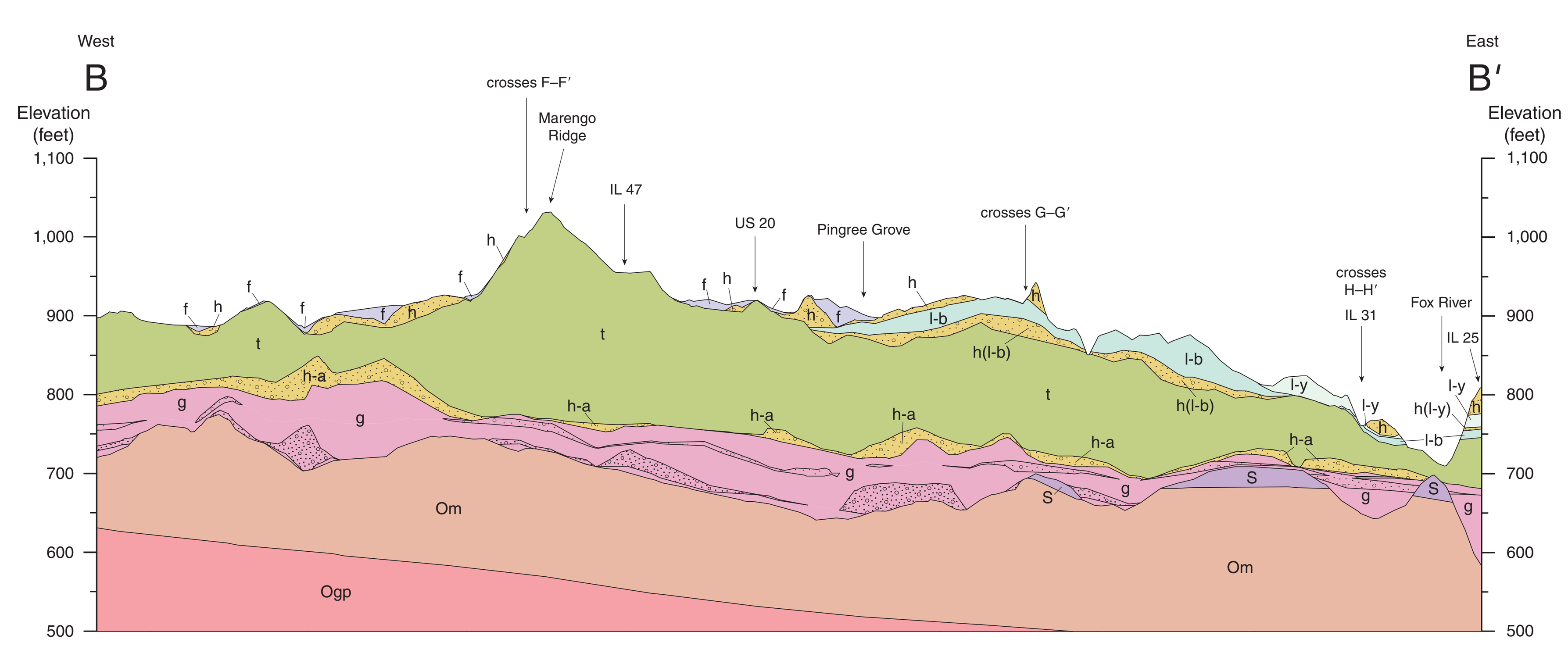
Medium to coarse sand and gravel

Diamicton, massive silt, or other fine-grained sediment

Contact

Horizontal scale: 1:100,000 (1 inch = 1.58 miles)
Vertical scale: 1 inch = 166 feet
Vertical exaggeration: 50×





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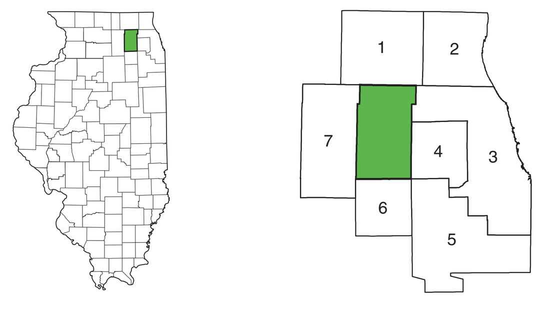

ADJACENT COUNTIES
1 McHenry
2 Lake
3 Cook
4 DuPage
5 Will
6 Kendall
7 DeKalb

Geology based on field work by W.S. Dey, A.M. Davis, and B.B. Curry, 2002–2007.

Digital cartography by A.M. Davis, Illinois State Geological Survey.

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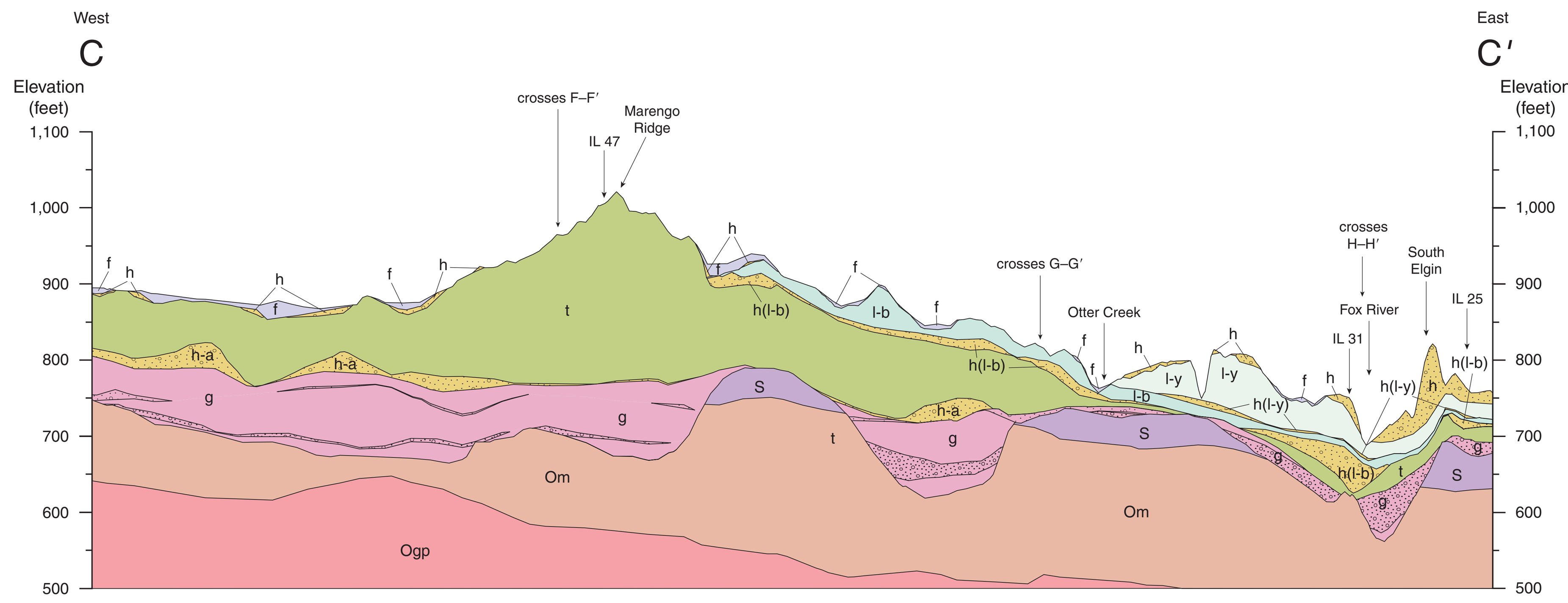
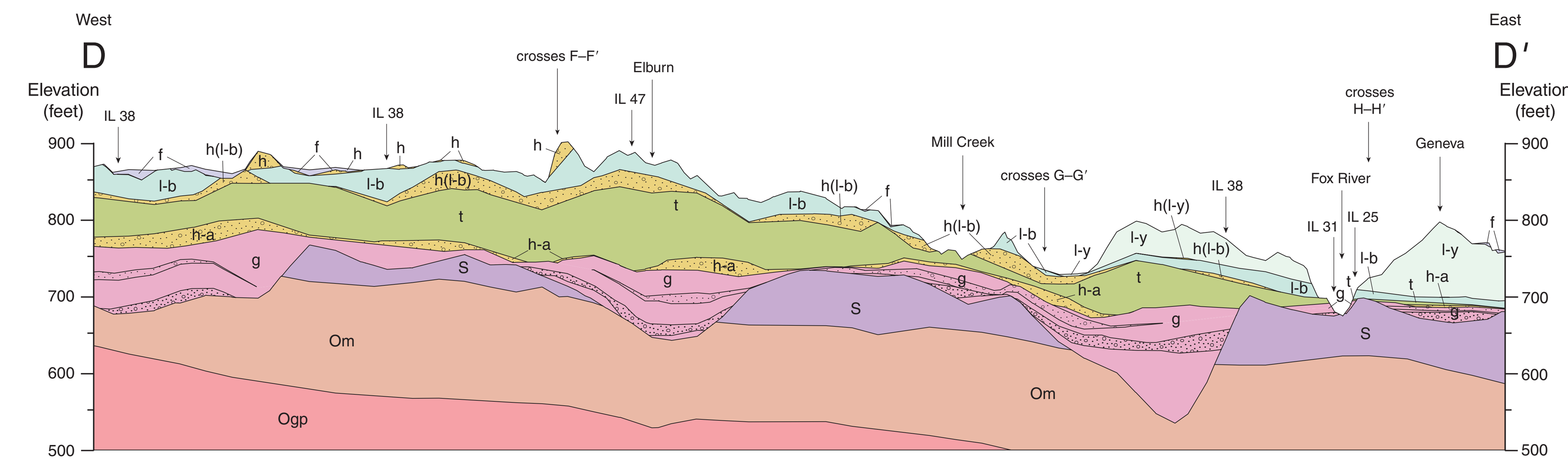
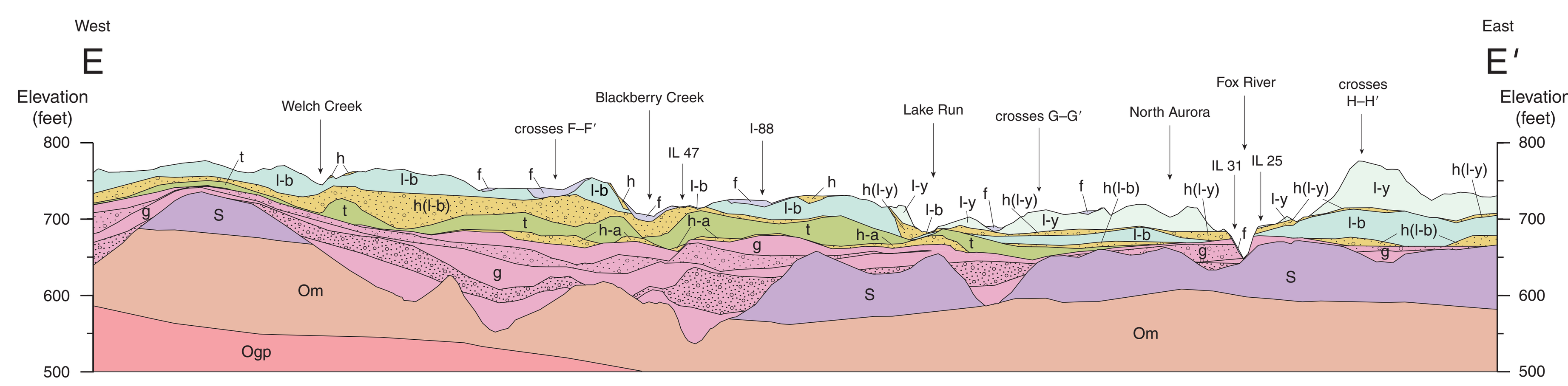
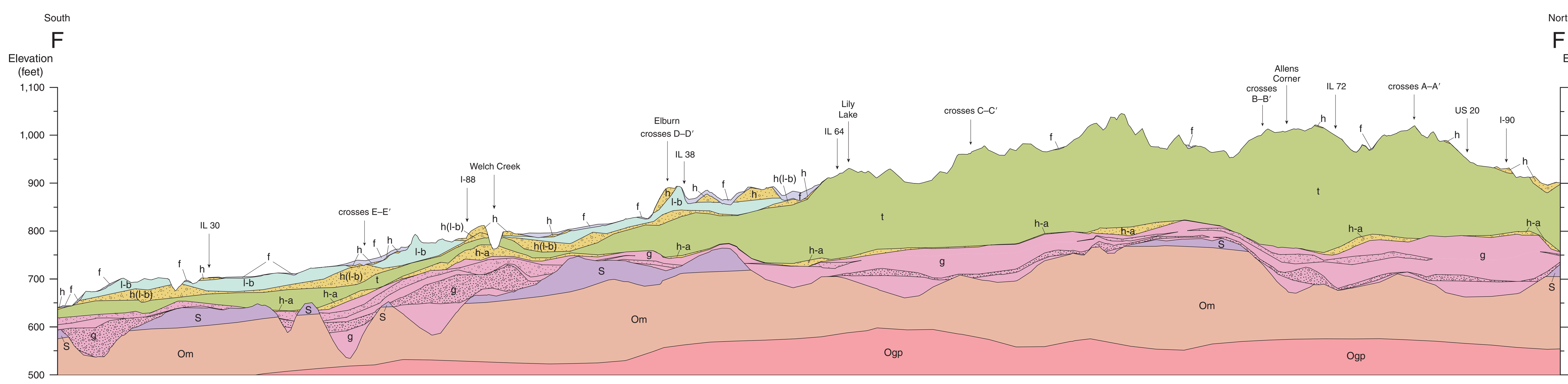
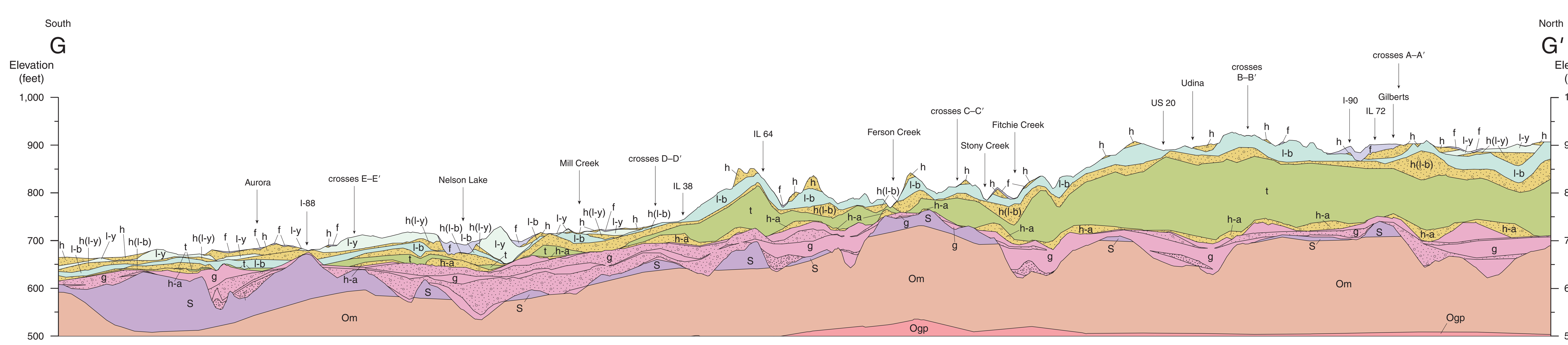
Base map compiled from the United States Geological Survey 1:100,000-scale Digital Line Graph data. North American Datum 1983. Transverse Mercator projection.

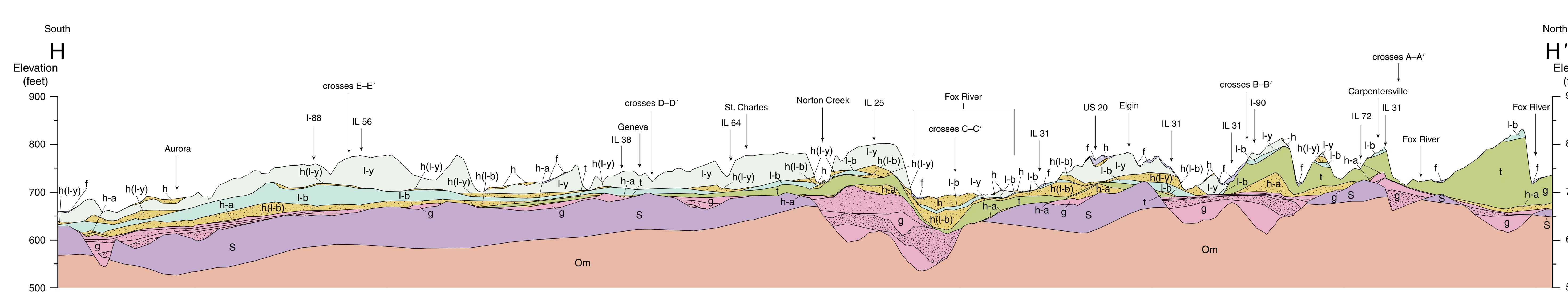












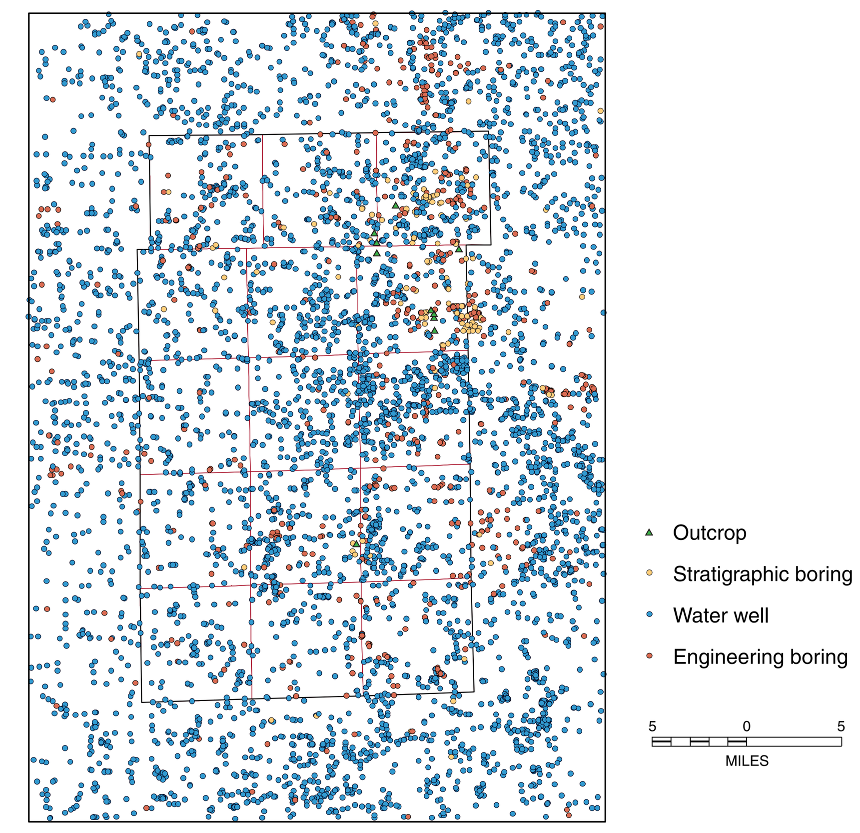


Figure 2 Distribution of wells, borings, and outcrops used to generate lithostratigraphic surfaces.

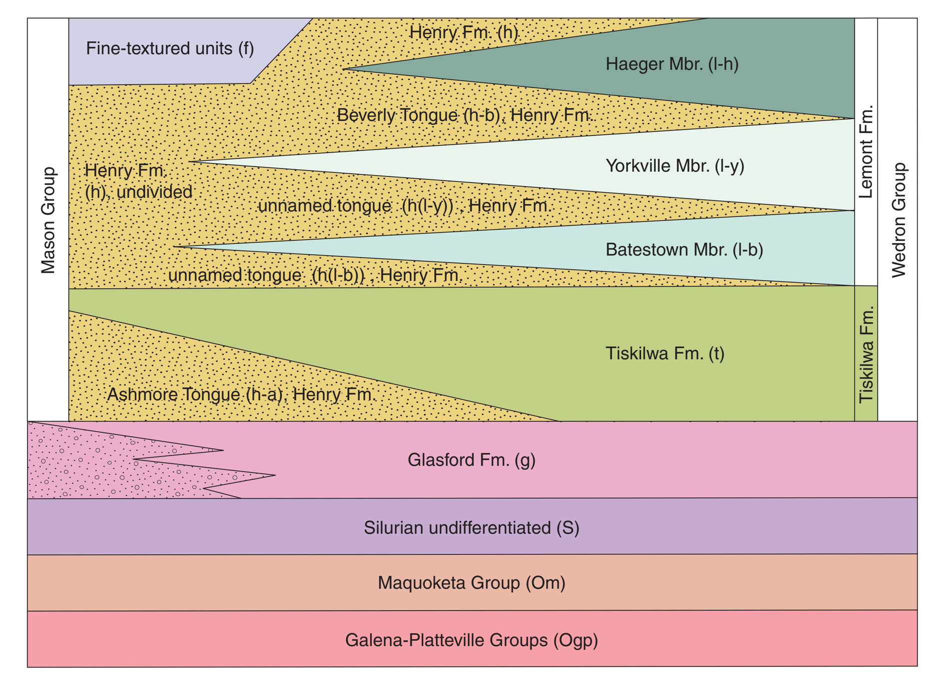


Figure 3 Schematic representation of the spatial relationships among the major lithostratigraphic units and associated tongues. (Modified from Curry et al. 1999.)