9-2014

Field Trip Guidebook for the Nebraska Well Drillers Association

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FIELD TRIP GUIDE

(for the Nebraska Well Drillers Association)

SOUTH CENTRAL NEBRASKA AND NORTH CENTRAL KANSAS GEOLOGY

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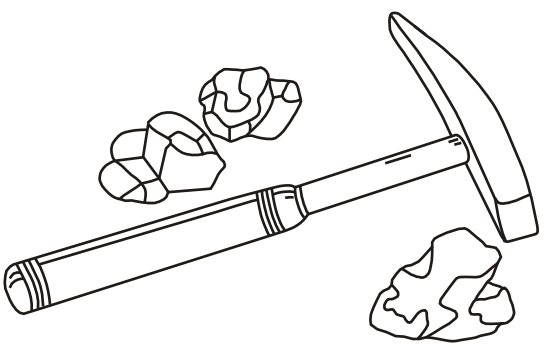
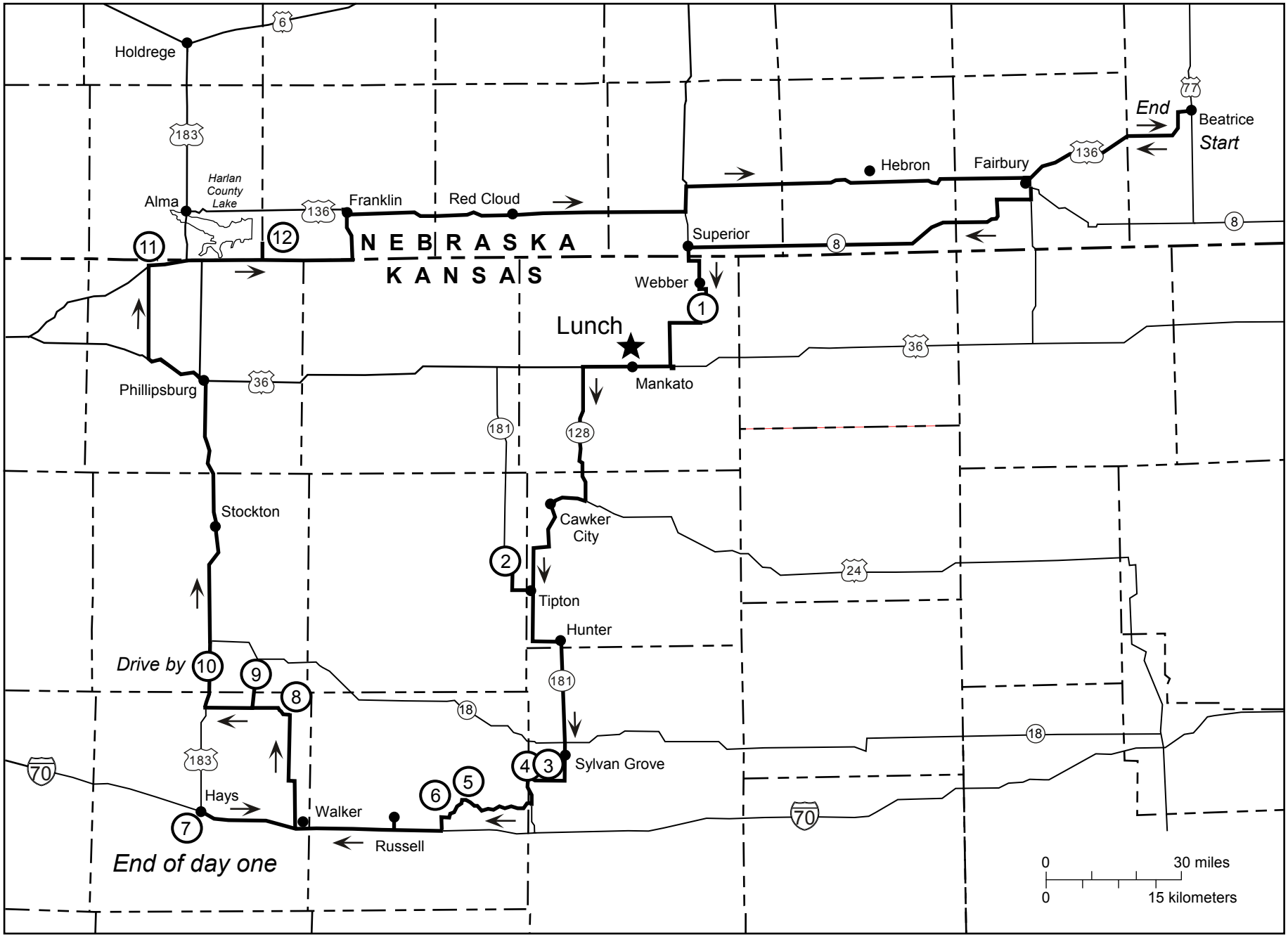


NEBRASKA GEOLOGICAL SURVEY

Conservation and Survey Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln

September 9-10, 2014


Holdrege
6
183
Alma
Harlan County Lake
136
Franklin
Red Cloud
Hebron
Fairbury
77
End
Beatrice
Start
136
8
Superior
8
11
12
NEBRASKA
KANSAS
Webber
1
Lunch
36
Mankato
Phillipsburg
36
181
128
Stockton
Cawker City
2
24
Tipton
Hunter
Drive by
10
9
8
181
18
18
183
70
4
3
Sylvan Grove
Hays
6
5
7
Walker
Russell
70
End of day one
0
30 miles
0
15 kilometers

NEBRASKA WELL DRILLERS ASSOCIATION
SOUTHERN NEBRASKA-NORTHERN KANSAS GEOLOGY FIELD TRIP
SEPTEMBER 9-10, 2014

Day One – September 9:

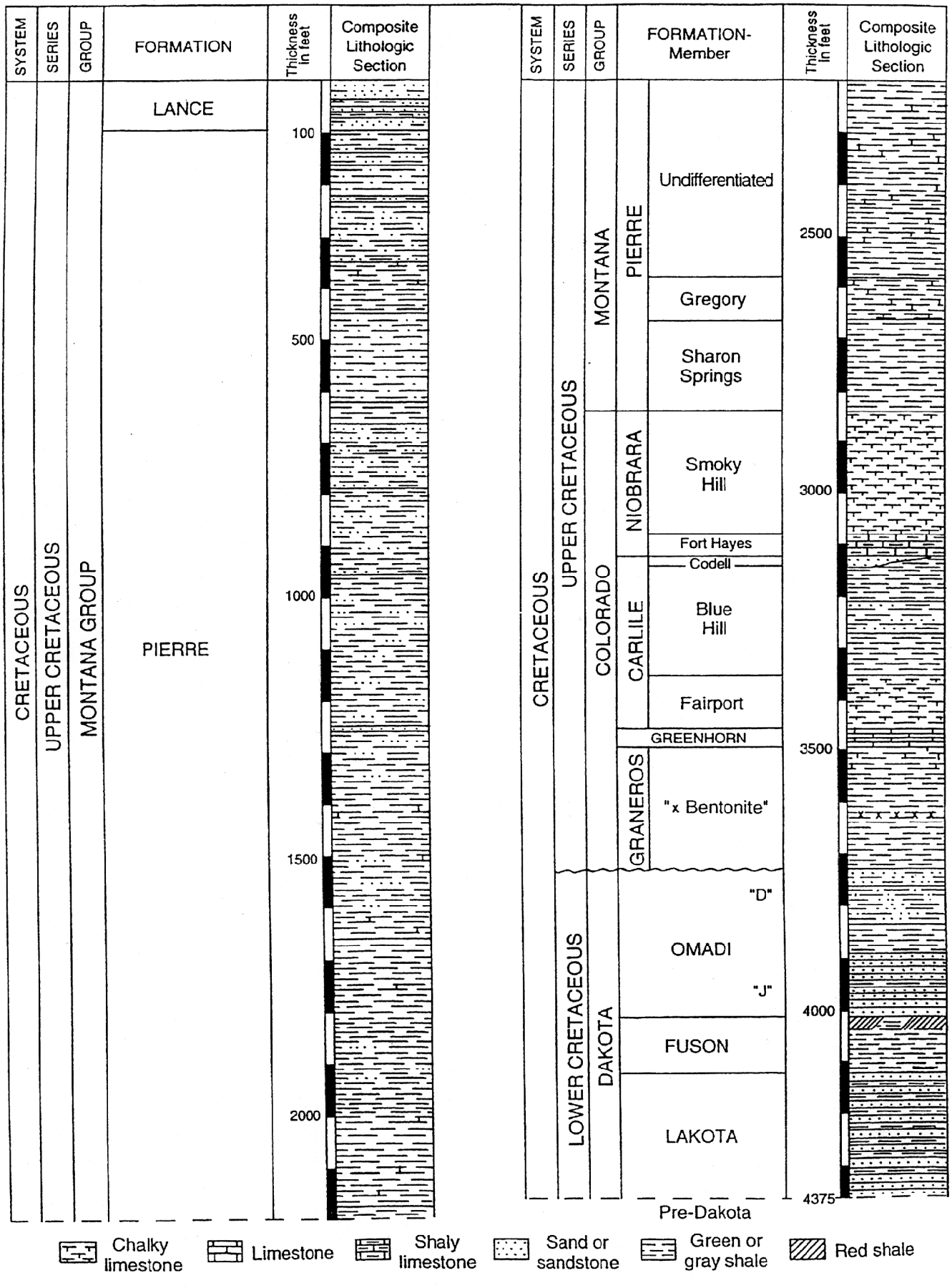
7:30 a.m. – 8:00 a.m. – Registration
8:00 a.m. – Leave Beatrice driving west on Highway #136 to Highway #103, then south to Highway #8, turn west and view occasional outcrops of Cretaceous Dakota sandstones and shale. Drive by Endicott, Nebraska where Endicott Brick Company resides. Dakota Shale is used to manufacture their bricks. Continue on Highway #8 driving by some Greenhorn & Graneros outcrops in the hills southwest of Fairbury. Continue on Highway #8 to Superior (bathroom stop), south to Kansas on County Road by Webber, Kansas to Lovewell Reservoir. Stop 1 at Lovewell Reservoir to view Cretaceous Carlile Shale and a presentation on the Bostwick Division. Leave driving south & west and join Highway #14 turning south to Highway #36 then west to Mankato, Kansas. Lunch at Mankato, Kansas at Buffalo Roam Café. Leave driving west on #36 to Highway #128 turn south and continue to Highway #24. Turn west thru Cawker City turning south on County Road by Waconda Lake to Tipton and join Highway #181. Turn north on #181 to Stop 2 a Ft. Hays Limestone outcrop and anticline. Leave outcrop returning south on #181 thru Sylvan Grove to Stop 3 and 4 at Wilson Lake to view Graneros and Dakota outcrops. Leave south and west on Shoreline Road to Stop 5 to view a Graneros "x" bentonite layer. Continue to County Road west to Stop 6 and view a Greenhorn limestone "Fence Post" deposit. Drive south thru Bunker Hill, Kansas to Interstate I-70, turn west & drive to Hayes, Kansas arriving at Sleep Inn motel, dinner at Gella's Brewing Co., Hayes,.

Day Two – September 10:

Breakfast at Sleep Inn, Depart at:
7:45 a.m. – To tour Sternberg Museum at Stop 7. Leave going east on I-70 to Walker, Kansas. Turn north on County Road (380th) then turn west and north on County Road continue northwest to Stop 8 to view Greenhorn, Carlile and Niobrara outcrops along the Saline River. Continue and turn north on County Road (320th) to Stop 9 to examine Ft. Hayes Limestone, Codell Sandstone and Blue Hill Shale outcrops. Leave outcrop continue back on County Road south and west to Highway #183 then turning north to Stop 10 (drive by only) to view Ft. Hayes Limestone outcrops. Continue north on #183 crossing the Solomon Rivers thru Phillipsburg turning west on Highway #383 to County Road west of Woodruff, Kansas (approximately 4 miles). Stop 11 at an active Ogallala Quartzite (opaline sandstone) quarry where we will have a box lunch and the owners and quarry operator may visit with us about the quarry's history. Leave quarry on Highway #383 east to Highway #183 turn north into Nebraska across the Republican River Valley where the Niobrara and the Pierre outcrops along the south shores. At Alma turn east on Highway #136 to Harlan County Dam at Stop 12 for a drive by talk on Harlan County Reservoir. Leave Dam site and continue east on Highway #136 along the Republican River where outcrops of both Niobrara and Pierre Shale can be seen particularly along the south side of the valley. Quarries of Ogallala Quartzite also occur south of the valley southwest of Franklin, Nebraska. These quarries were the source of some of the rip-rap on the major dams in southwestern Nebraska. Continue on Highway #136 east back to Beatrice arriving around 5:00 p.m.

This field trip is intended to view the Cretaceous and Tertiary rocks in Nebraska and Kansas (Tertiary: Ogallala, and Cretaceous: Pierre, Niobrara, Carlile, Greenhorn – Graneros and Dakota). It will mainly be concentrated in Kansas due to the fact that more of a complete "geologic section" (an exposed surface or cut that may be vertical or horizontal) is present in Kansas. These rocks are present in Nebraska, but mostly in the sub-surface. They are primary and secondary aquifers for water particularly in some areas of eastern, southcentral and northeastern Nebraska. By visiting outcrops of these formations we can better understand their materials, properties and changes within each formation(s) as they relate in the sub-surface to Nebraska water and water well issues.

COMPOSITE SECTION OF CRETACEOUS ROCKS IN NEBRASKA



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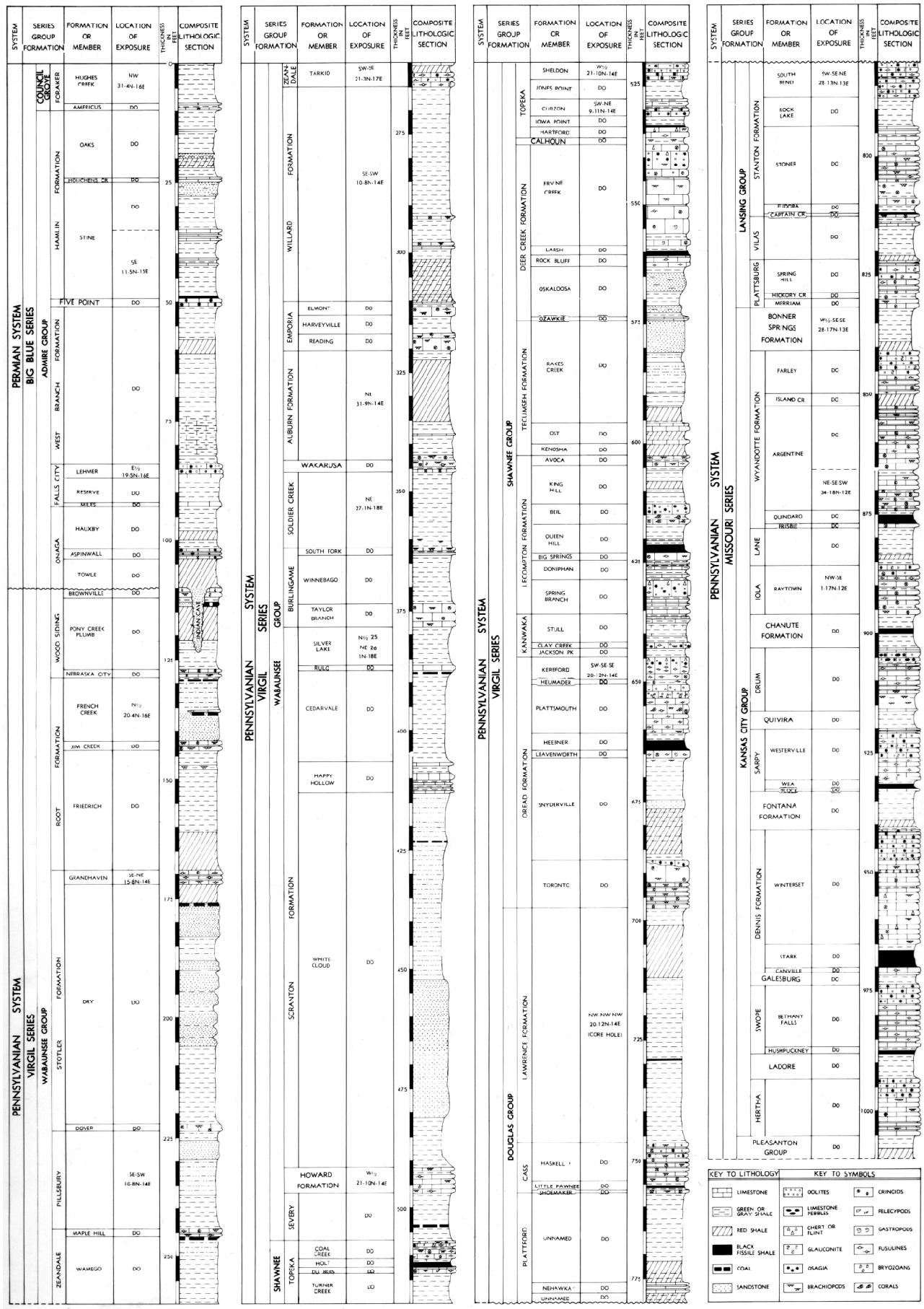
COMPOSITE SECTION OF OUTCROPPING LOWER PERMIAN AND UPPER PENNSYLVANIAN ROCKS IN SOUTHEASTERN NEBRASKA



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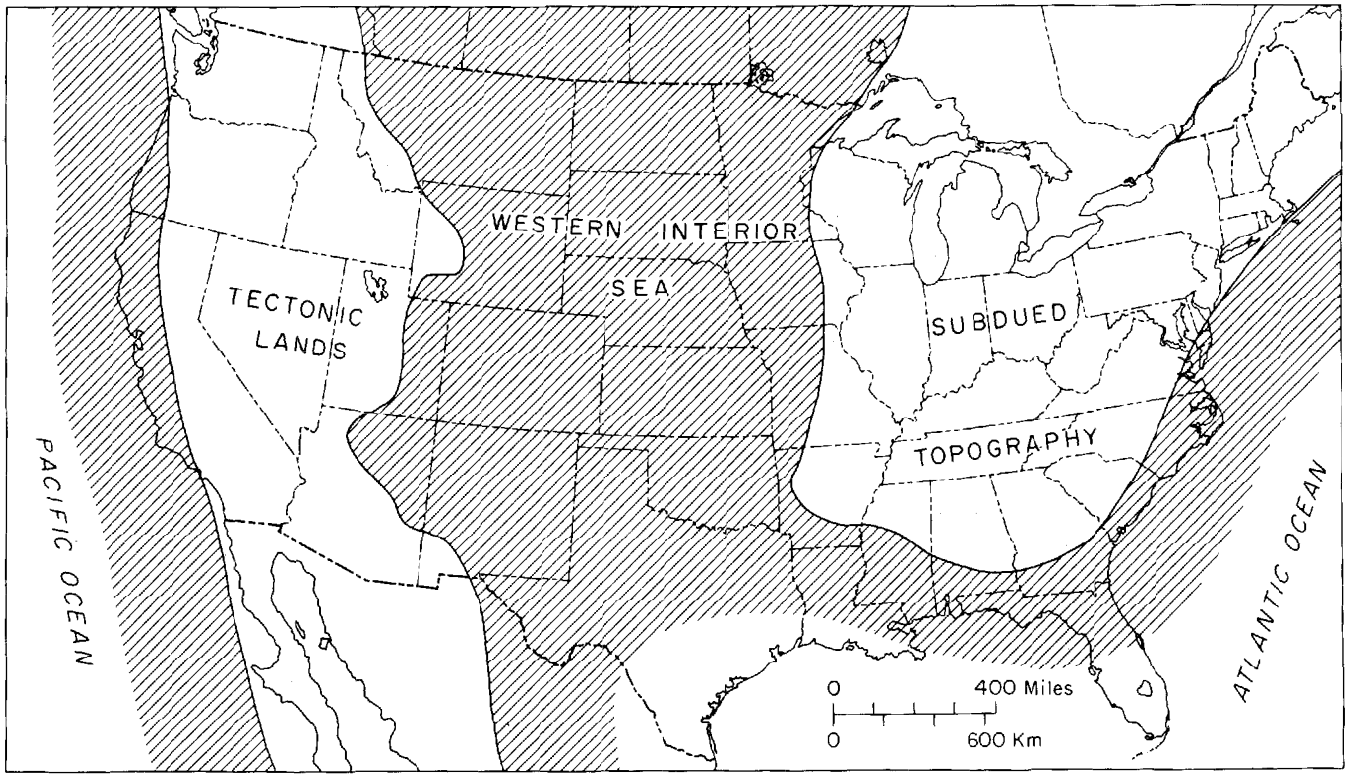
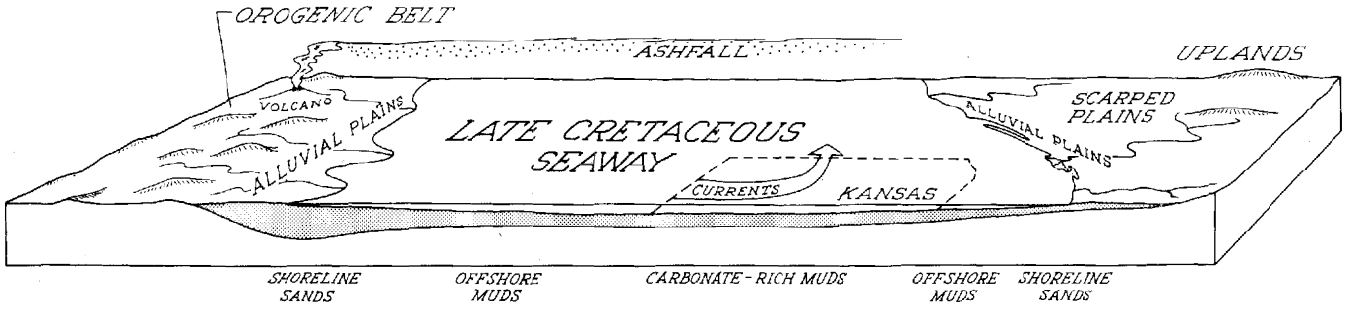
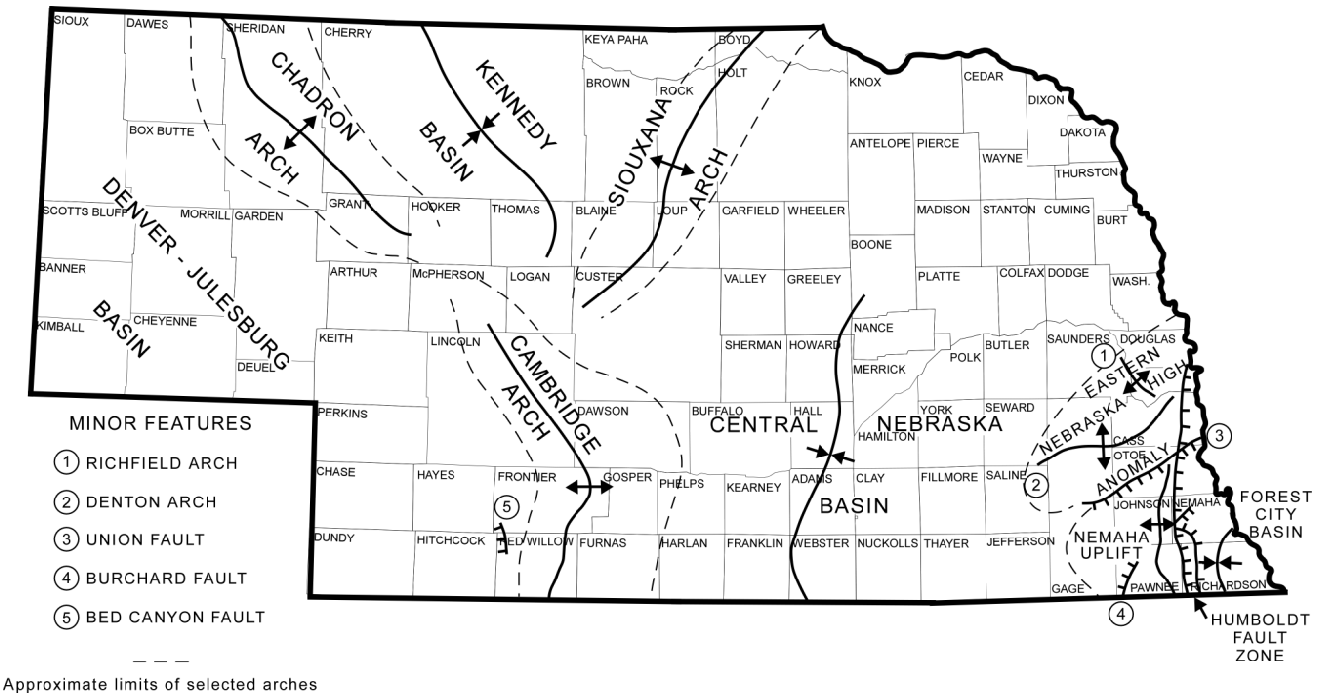


Paleographic map of United States during Greenhorn transgressional maximum (early Turonian). Map modified from Williams and Stelck (1975).

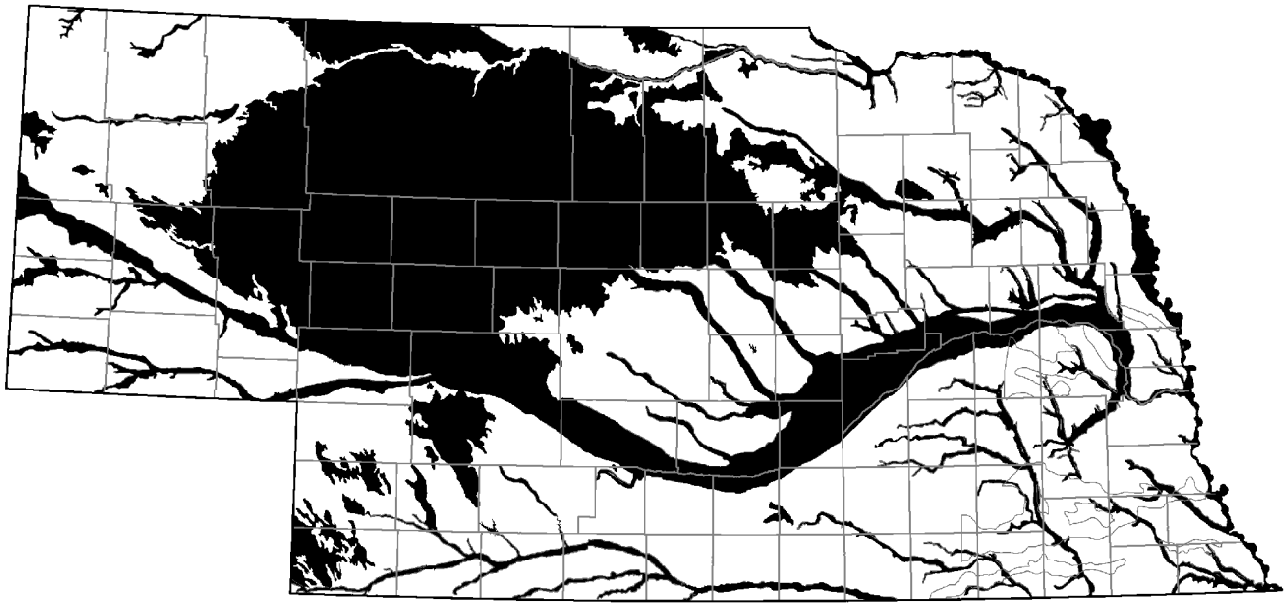


Block diagram depicting schematically a portion of Western Interior Sea during deposition of Greenhorn Limestone and nature bordering land areas. Shaded portion indicates Upper Cretaceous sediments (modified from Hattin, 1975a).

Figures from Guidebook Series 3, "Upper Cretaceous Stratigraphy and Depositional Environments of Western Kansas," AAPG/SEPM Annual Meeting, Oklahoma City, April 12-14, 1978.



Principal structural features in Nebraska



Locations of sand and gravel deposits at or near the surface in Nebraska