

Shallow Coal Exploration Drill-Hole Data, Northeast Texas

By Rachel M. Gesserman, Matthew D. Merrill, and Peter D. Warwick

Chapter J of

**Shallow Coal Exploration Drill-Hole Data—Alabama, Georgia,
Kentucky, Louisiana, Mississippi, Missouri, North Carolina,
South Carolina, Tennessee, and Texas**

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Introduction

Coal exploration drill-hole data from 8,010 wells in northeast Texas drilled between 1977 and 1982 by Phillips Coal Company, a division of Phillips Petroleum Company (Phillips), are discussed in this chapter, and the data are provided in an accompanying spreadsheet. The data are part of a larger dataset donated to the U.S. Geological Survey (USGS) by the North American Coal Corporation, which purchased Phillips assets in 2001 (see chapter A, this volume). The data in 10 State reports have been digitized from field maps to create unified and spatially consistent coal exploration drill-hole datasets for each of the States in the donation (chapters B–K, this volume). Data for northeast Texas include a geologic map of the State with drill-hole coverage (fig. J1), a list of data attributes and explanations of the data format (table J1), a list of comments found in the data and descriptions of them (table J2), a list of counties and the number of drill holes for each county (table J3), and tabulated data in spreadsheet format (see appendix J1).

Methods

Hardcopy Phillips exploration maps, in Texas North Central 1927 State coordinate plane projection, were digitized into a geographic information system using ArcMap™ software from the Environmental Systems Research Institute, Inc. (ESRI). Roads and county boundaries served as reference points to georeference scanned maps. Shapefile attribute values were populated with data from drill-hole locations in 16 counties in northeast Texas (fig. J1, table J3). All raw data from the Phillips maps were entered into the shapefile attributes, as well as various comments, abbreviations, and symbols that were used to denote information about the drilled wells (table J1 and table J2). Some changes to the original data were made to maintain uniformity throughout the digitized maps. The dataset was projected into a North American Datum of 1983 geographic coordinate system to facilitate combining the dataset with similar Phillips datasets published by the USGS for other States. The shapefile was exported to a spreadsheet (see appendix J1).

Generalized Coal Geology of Northeast Texas

The undivided Paleocene to Eocene Wilcox Group crops out in northeast Texas and is overlain by the Eocene Claiborne Group in the East Texas Basin (Warwick and others, 2002). Correlations between these geologic units in other parts of Texas and Louisiana can be seen in figure J3. Structurally, the Mount Enterprise Fault Zone extends to southern Panola County (fig. J2) and divides the study area into westward dipping strata north of the fault zone and steeper, southward dipping strata south of the fault zone (Kaiser, 1990). To the east in the Sabine Uplift area (fig. J2), Wilcox sediment that was derived from the Ouachita Mountains of Oklahoma and Arkansas is represented in a progradational deltaic depositional system in the lower parts of the group, while the upper Wilcox sediments are characteristic of aggradational fluvial sedimentation (Kaiser, 1990). Lignite occurs throughout the Wilcox Group, but in Texas it is most commonly found in the upper two-thirds of the formation (Kaiser and others, 1980). In Louisiana, lignite is most commonly found in the lower Wilcox (Warwick and others, 2008).

The Claiborne Group represents a cycle of marine transgressions and regressions, marked by alternating marine clays and silts with nonmarine, nearshore blanket sands (Eagle, 1968). Surficial formations in the Claiborne Group include the Carrizo Sand, Reklaw Formation, Queen City Sand, Weches Formation, and Sparta Sand (Warwick and others, 2002) (fig. J2).

Data

The northeast Texas drill-hole dataset contains coal exploration information for 8,010 drill-hole locations in 16 counties in the Gulf Coast region (fig. J1, table J3). Geophysical instruments were used to log a total of 6,836 drill holes and had depths ranging from 54 to 1,000 feet with an average depth of 259 feet. The remaining 1,174 drill holes did not have any probe depth information and were assigned a value of 0 feet. For drill holes that had coal data, the average thickness range of beds, including partings, was 2.04 feet.

The densest drill-hole coverage is found in Hopkins, Rusk, and Harrison Counties, which contain 66 percent of the data plotted. Location error is expected to be ± 0.25 mile due to the generalized nature of the original maps and the process of georeferencing a new base layer.

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Appendix J1

The northeast Texas coal exploration drill-hole dataset in spreadsheet format is available at pubs.usgs.gov/of/2011/1261/Appendices/J1-TX.xls.

Table J1. Attribute titles and data descriptions and formats for the northeast Texas drill-hole dataset.

Attribute title	Data description and format
DRILL-HOLE NAME	County code followed by drill-hole number.
COUNTY	County where the drill hole is located.
ELEVATION	Elevation above sea level in feet.
DEPTH_TOTAL	Depth of drill hole in feet.
DEPTH_PROBED	Depth of geophysical probe measurement in feet.
LATITUDE	Decimal degree location values given to 4 decimal places.
LONGITUDE	Decimal degree location values given to 4 decimal places.
COMMENT	Additional information regarding the entire drill hole.
X_C	Thickness of coal for bed number X in decimal feet.
X_CP	Thickness of coal and partings combined for bed number X in decimal feet.
X_DEPTH	Top depth of bed number X in feet.
X_BED	A number or letter assigned to different coal beds of the same drill hole, which is not correlated throughout the dataset.
X_COMMENT	Additional information regarding coal bed X.

Table J2. Explanation of comments used to describe the northeast Texas drill-hole dataset (J.A. Luppens, U.S. Geological Survey, written commun., 2009).

Symbol/Comment	Description
-	Notation is on the original coal exploration maps and is listed under the drill-hole name and elevation, with no coal data recorded. No information about the definition of this notation is listed on any of the Phillips coal exploration maps or drilling logs. The meaning of the notation is unknown.
?	Questionable data/information.
+	More coal than the amount that was recorded could be expected.
<	Less than.
>	Greater than.
b	Found at the end of a drill-hole name if the name had already been used for another location in the dataset. This symbol was added after digitizing in order to give each drill hole a unique drill-hole name.
BAD LOG	Indicates a problem with the geophysical log instrument during exploration.
BED DEPTH NOT RECORDED	No coal-bed depth information was recorded for this coal bed.
BOTTOMED IN COAL	Terminated drilling in a coal bed. Coal extends deeper than the depth explored.
C	Found in the comment section of a coal bed, meaning carbonaceous. The coal bed was described to contain a high ash content.
C (after the drill-hole name)	Found at the end of the drill-hole name representing that the drill hole was cored.
CADY	This comment is written on the original coal exploration maps and the meaning is unknown. It could be a misspelling of “CARBY”, which describes carbonaceous material.
CARBY	Describing that the coal bed is “carbonaceous” and that it contains a high ash content.
CM	Abbreviation for “carbonaceous material.” The coal was described to contain a high ash content.
CORE SYMBOL	Triangle shaped drill-hole symbol meaning the drill hole was cored.
CORED	Indicating that the drill hole was cored.

Table J2. Explanation of comments used to describe the northeast Texas drill-hole dataset (J.A. Luppens, U.S. Geological Survey, written commun., 2009). —Continued

Symbol/Comment	Description
DH	Abbreviation for “drill hole.”
DO	Abbreviation for “depth of oxidation.” The depth of the contact between weathered and unweathered material.
DUPLICATE DH	Information on the original maps show two drill holes in two separate locations with the same data. It is unclear which location is correct for the data listed.
DUPLICATE DH NAME	The drill-hole name was used for two different locations on the original coal exploration maps.
H.S.	Abbreviation for “hard streak.” Indicates beds of cemented limestone or sandstone that were used as marker beds.
HOLE BOTTOMED IN LIGNITE	Drilling was terminated in lignite. Coal extends deeper than the depth explored.
I	Abbreviation for “inferior.” Subjective term used to describe poor coal quality.
ILLEGIBLE DH NAME	The drill-hole name was not legible on the original coal exploration maps and may not be correct.
NC	Abbreviation for “no coal.” No coal was found during exploration for this drill hole.
NL	Abbreviation for “no lignite.” No lignite was found during exploration for this drill hole.
NO COAL	No coal was found during exploration for this drill hole.
NO DATA	No data were recorded on the original coal exploration maps for this drill hole.
NO E-LOG	No geophysical logging was completed for this drill hole.
NO LOG	No geophysical logging was completed for this drill hole.
NP	Abbreviation for “not probed.” Geophysical logging never occurred at this location.
NSL	Abbreviation for “no significant lignite.” Coal may have been found during exploration but because the coal beds were thin (usually less than 2 feet. thick) no coal data were recorded.
OX	Abbreviation for “oxidized” or “oxidation.”
P	Abbreviation for “poor.” A subjective term used to describe a low-quality coal.
P BOTTOM	The coal quality at the bottom of the coal bed was found to be poor. Coal quality in the bed decreased with depth.
PI	Abbreviation for “partially inferior.” Used to describe that a portion of the coal bed is of a low quality.
POOR	A subjective term used to describe coal of poor quality.
POOR LOG	Indicates an issue with the geophysical log instrument during exploration.
POOR TOP	Poor coal quality on the top section of the coal bed. Quality improved with depth in the coal bed.
PW	Abbreviation for “poor weathered.” A subjective term used to describe coal of a poor quality that has been altered by chemical or physical means.
RD (after the drill-hole name)	Abbreviation for “re-drill.” Was used when a location had to be re-explored either due to problems with the first drill hole at the location or in some cases the location was re-drilled to explore deeper strata.
SAND	A layer of sand was encountered during exploration.
TD IN COAL	Terminated drilling in a coal bed. Coal extends deeper than the depth explored.
TRI	Abbreviation for “triangle.” Signifies that the drill hole/coal bed was cored.
TRIANGLE	Signifies that the drill hole/coal bed was cored.
TWO DH NAMES	Drill-hole location had two names. The first name listed was used as the drill-hole name and the second name is listed in the comment section.
VD	Notation was written next to a coal bed on the original coal exploration maps. The meaning of the comment is unknown. Could be a misspelling of “VP.”
VERY POOR	Subjective term used to describe coal of a very low quality.
VP	Abbreviation for “very poor.” Subjective term used to describe coal of a very low quality.

Table J2. Explanation of comments used to describe the northeast Texas drill-hole dataset (J.A. Luppens, U.S. Geological Survey, written commun., 2009). —Continued

Symbol/Comment	Description
VPW	Abbreviation for “very poor, weathered.” A subjective term used to describe coal of a poor quality that has been altered by chemical or physical means.
W	Abbreviation for “weathered.” Used to describe coal that has been altered by chemical or physical means.
WEATHERED	Used to describe coal that has been altered by chemical or physical means.

Table J3. Northeast Texas counties and the number of drill holes by county.

County	Number of drill holes
Bowie	389
Camp	15
Franklin	205
Harrison	1,207
Hopkins	2,419
Marion	94
Morris	2
Panola	535
Rains	165
Red River	69
Rusk	1,676
Shelby	102
Titus	3
Upshur	165
Van Zandt	140
Wood	824
Total	8,010

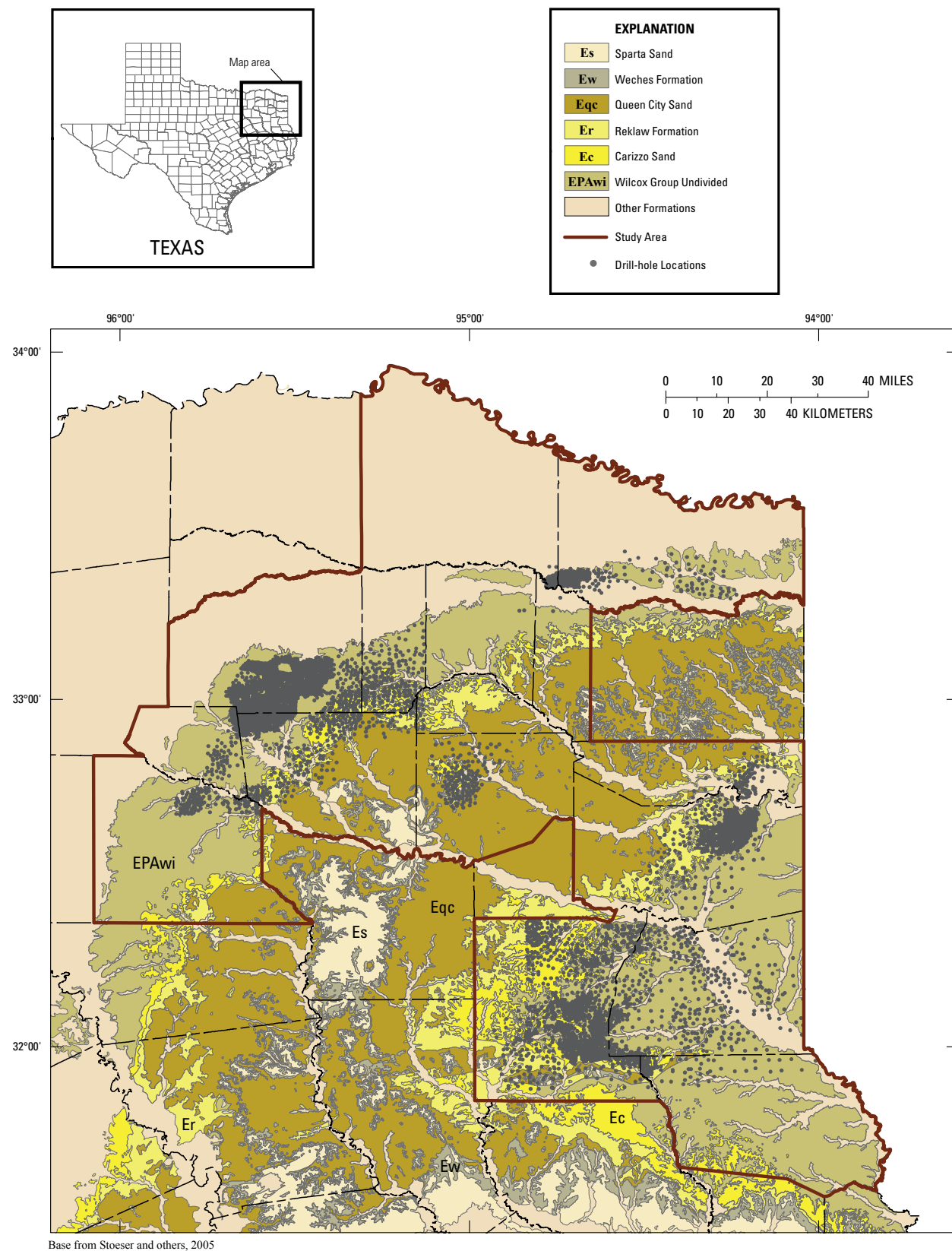


Figure J1. Geology of northeast Texas with drill-hole locations (Stoeser and others, 2005).

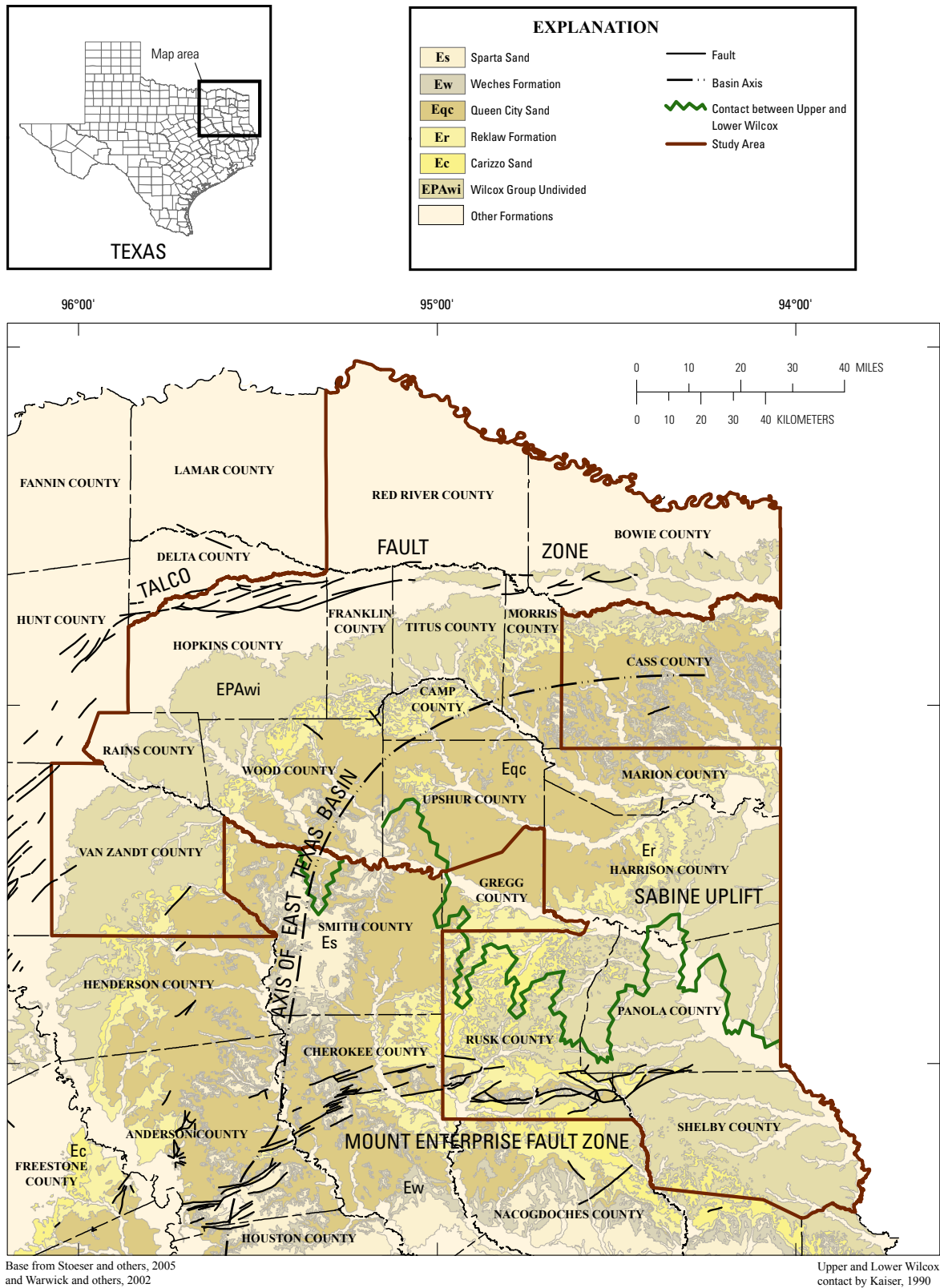


Figure J2. Geology and structure of northeast Texas (Kaiser, 1990; Stoesser and others, 2005; Warwick and others, 2002).

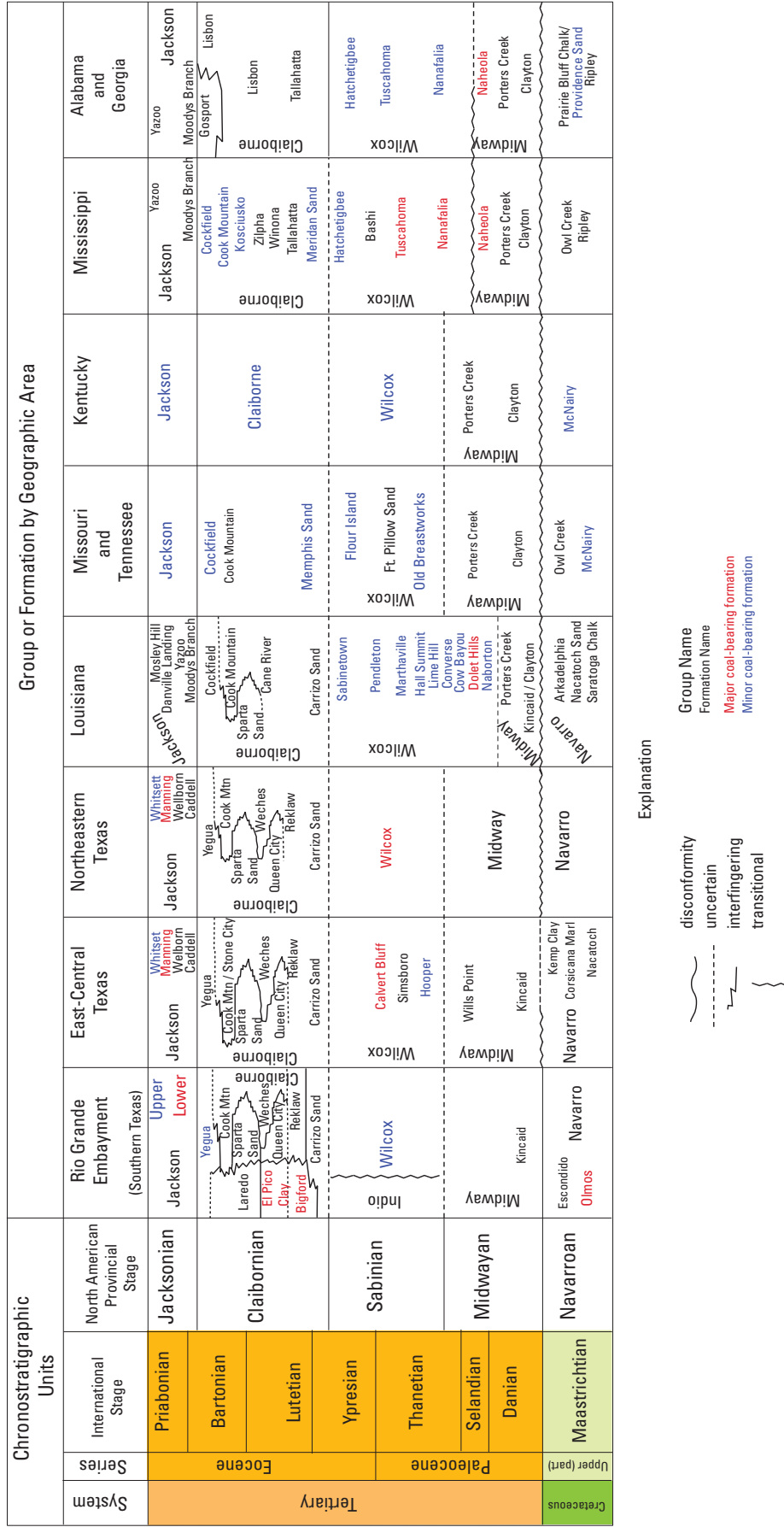


Figure J3. Generalized stratigraphic chart showing major and minor coal-bearing formations in the Mississippi Embayment and Gulf Coastal Plain (modified from Warwick and others, 1997; Ogg and others, 2008).