Complex Lithofacies Relationships between the Ste. Genevieve and Paoli Limestones: Clarifying Reservoir Relationships in the Indiana Subsurface



and Indiana. Droste and Carpenter (1990) addressed this problem by revising Blue River Group nomen

To gauge the effort necessary to comprehensively correct and revise the pay zone assignments for Blue

East field area of Gibson County. The criteria for selecting this particular field was simply that a relatively

large number of "Renault," "Aux Vases," and "Ste. Genevieve" pay zone assignments had been made to

River units in Indiana, we applied the stratigraphic framework of Droste and Carpenter to the Patoka

clature in Indiana. They constructed cross sections that formed an "ideal" skeletal correlation network.

They also recognized that practical correlation of well logs remained a challenging endeavor.

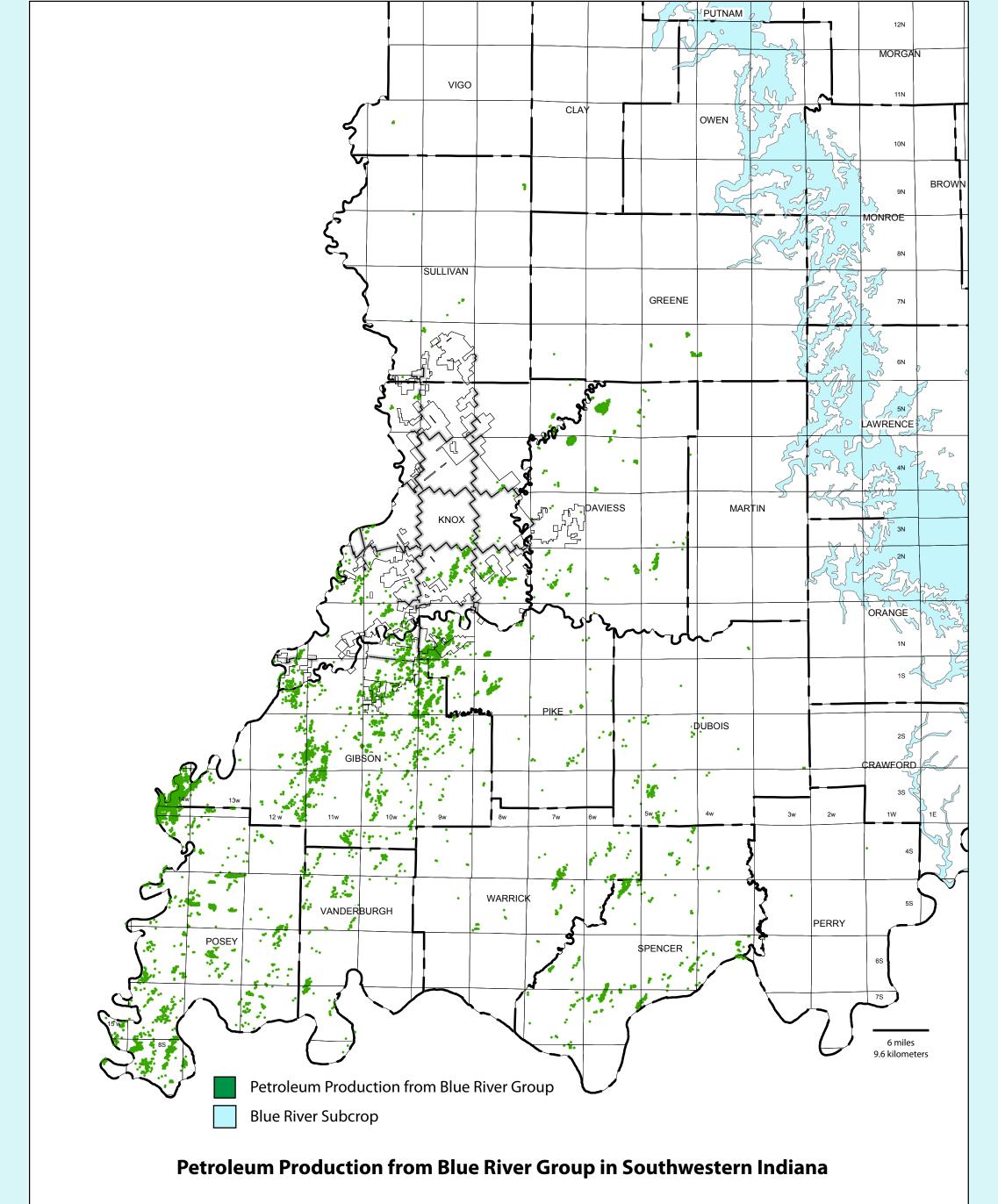
wells in the area. Many other areas could equally have served.

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Abstract

vertical and lateral distribution of lithofacies within the Ste. Genevieve and Paoli Genevieve lithologies (Joppa Member) with Paoli units of similar composition and (Aux Vases and Renault Members). The Joppa Member of the Ste. Genevieve thins ward the Illinois Basin margin, losing the distinctive log signature that characterizes rapid changes in composition and bed distribution. As a consequence, many Ste. Genevieve and Paoli Limestone pay zones have been assigned to the wrong reservoir pool, sometimes within the

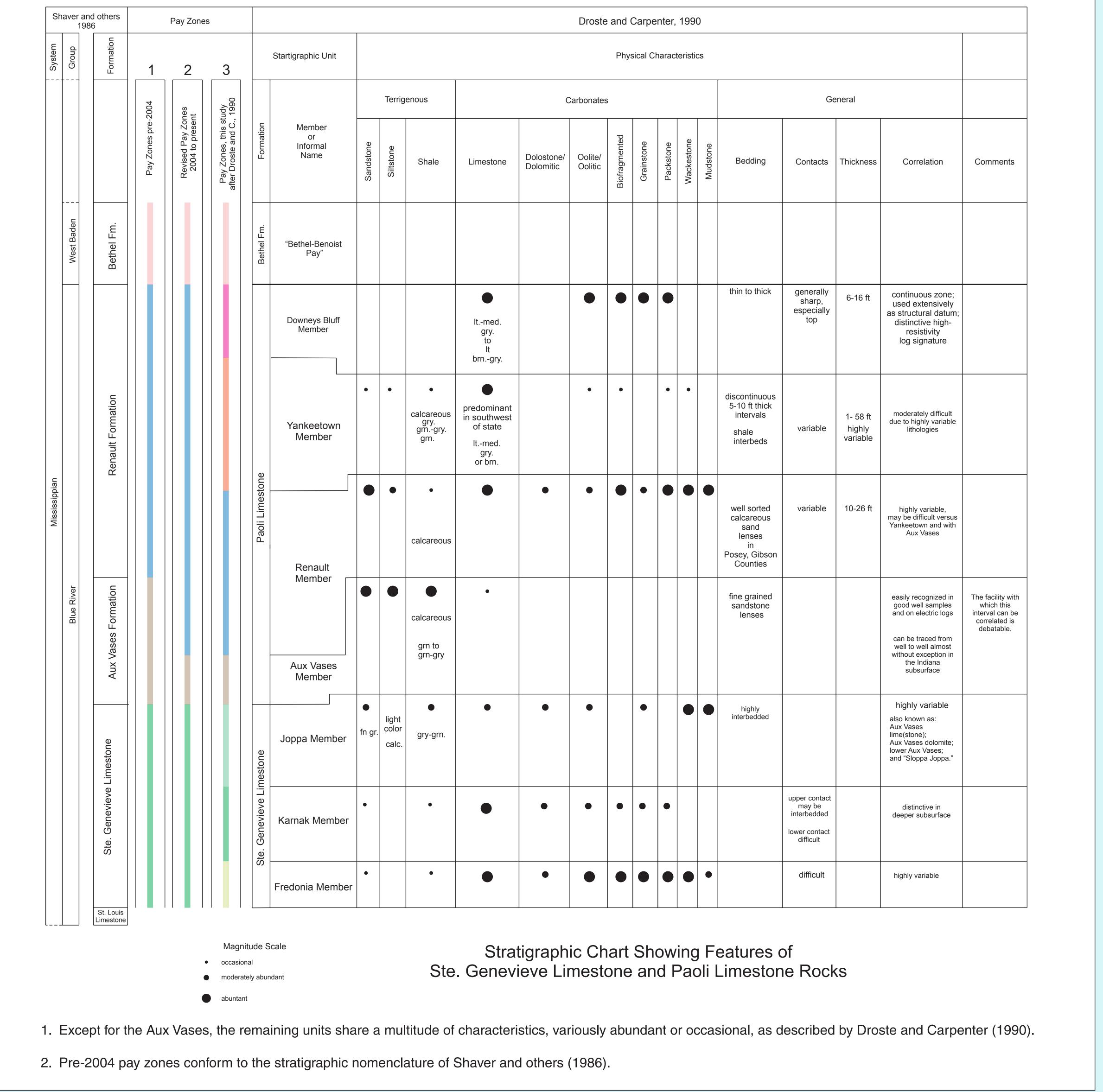
Pay zones from Ste. Genevieve and Paoli Limestone reservoirs were reassigned according to current stratigraphic divisions. These new correlations more accurately reflect spatial relationships within and between hydrocarbon pools, and could contribute to more effective reservoir management. Improved correlations should also provide a useful tool for future hydrocarbon exploration and development activities in Indiana. Our investigation also suggests that revisions to formal Ste. Genevieve-Paoli stratigraphic nomenclature should be considered.



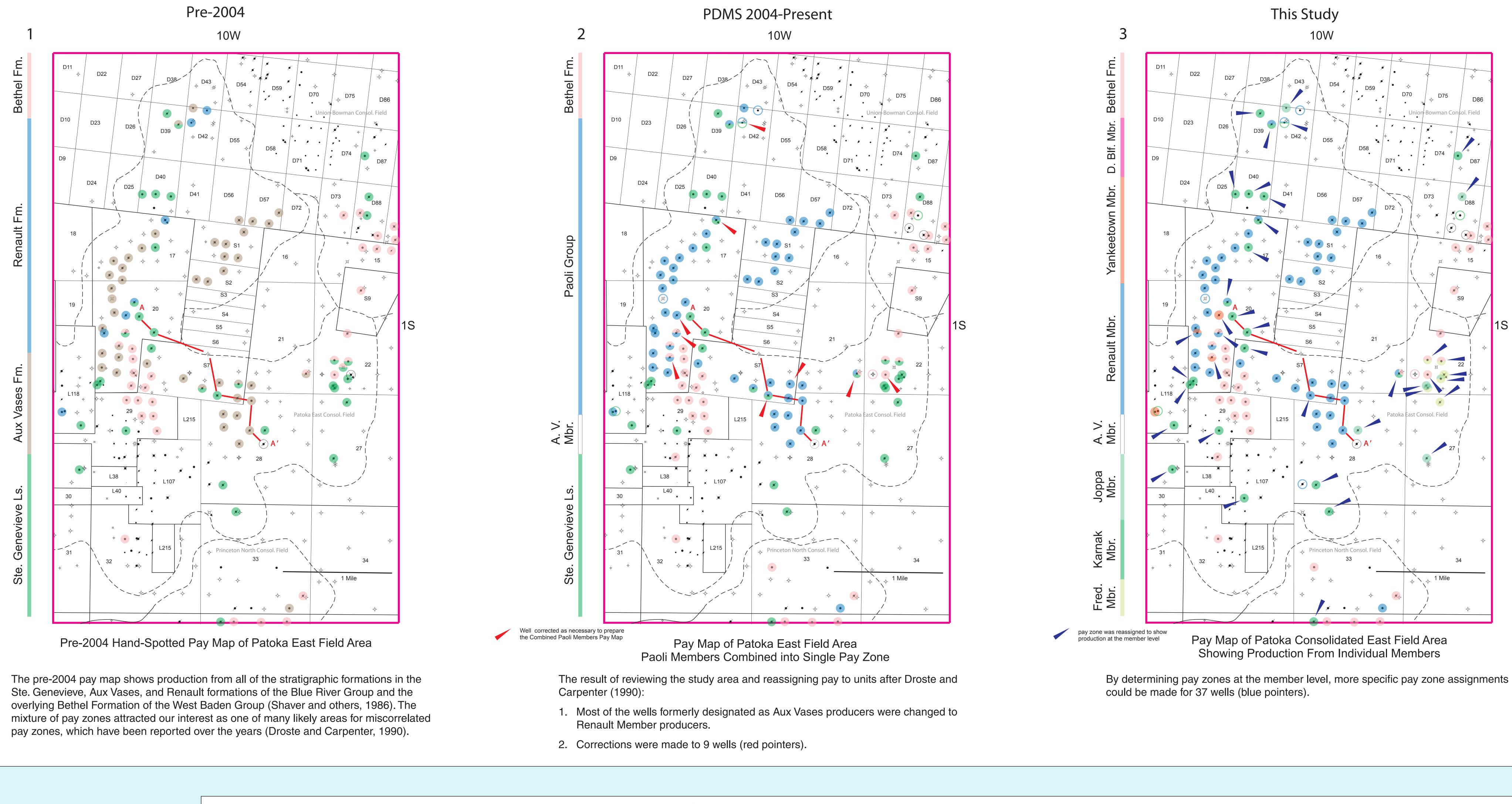
2. Pre-2004 pay zones conform to the stratigraphic nomenclature of Shaver and others (1986). **Discussion** The stratigraphic reservoir (pay zone) designations were assigned over the years by many geologists and assistants at the IGS. It was commonly known among them that "problems" (miscorrelations) existed in the names that had been used in certain areas, especially in heavily drilled areas of older petroleum The Ste. Genevieve Limestone and overlying Paoli Limestone formations of the Blue River Group contain significant petroleum reservoirs in Indiana and throughout the Illinois Basin. Stratigraphic correlation was further complicated by conflicting formal stratigraphic names used in Illinoi

For more than 50 years, the Indiana Geological Survey (IGS) has maintained color-coded pay maps showing the distribution of wells that have produced petroleum from different stratigraphic horizons. These maps were traditionally hand-colored, but beginning in 2004, the pay zones were plotted using linked data from the IGS's online Petroleum Database Management System (PDMS).

Although the Blue River Group is dominated by carbonate rocks, the stratigraphic interval marks the change from predominately Early Mississippian carbonate deposition to more terrigenous deposition tha followed during Late Mississippian and Pennsylvanian time. During Blue River deposition, environments shifted frequently, resulting in variably thick and thin deposits of variable lithologic composition that are notoriously difficult to correlate in the Indiana subsurface.







Discussion of Patoka East Consolidated Field

The difficult task of unraveling pay zone correlations in the field area led to the realization that our original goal of updating Blue River Group pay maps over large areas would not be feasible during this study. It became clear that associating pay zones in the study area with the key regional wells used by Droste and Carpenter (1990) to illustrate regional correlations might be difficult. It was also evident that a much larger cross section grid would be necessary to make pay assignments of Ste. Genevieve and Paoli production.

Our emphasis shifted to this new objective: creating a closely spaced cross section grid to better characterize variations in the Blue River Group stratigraphic interval.

