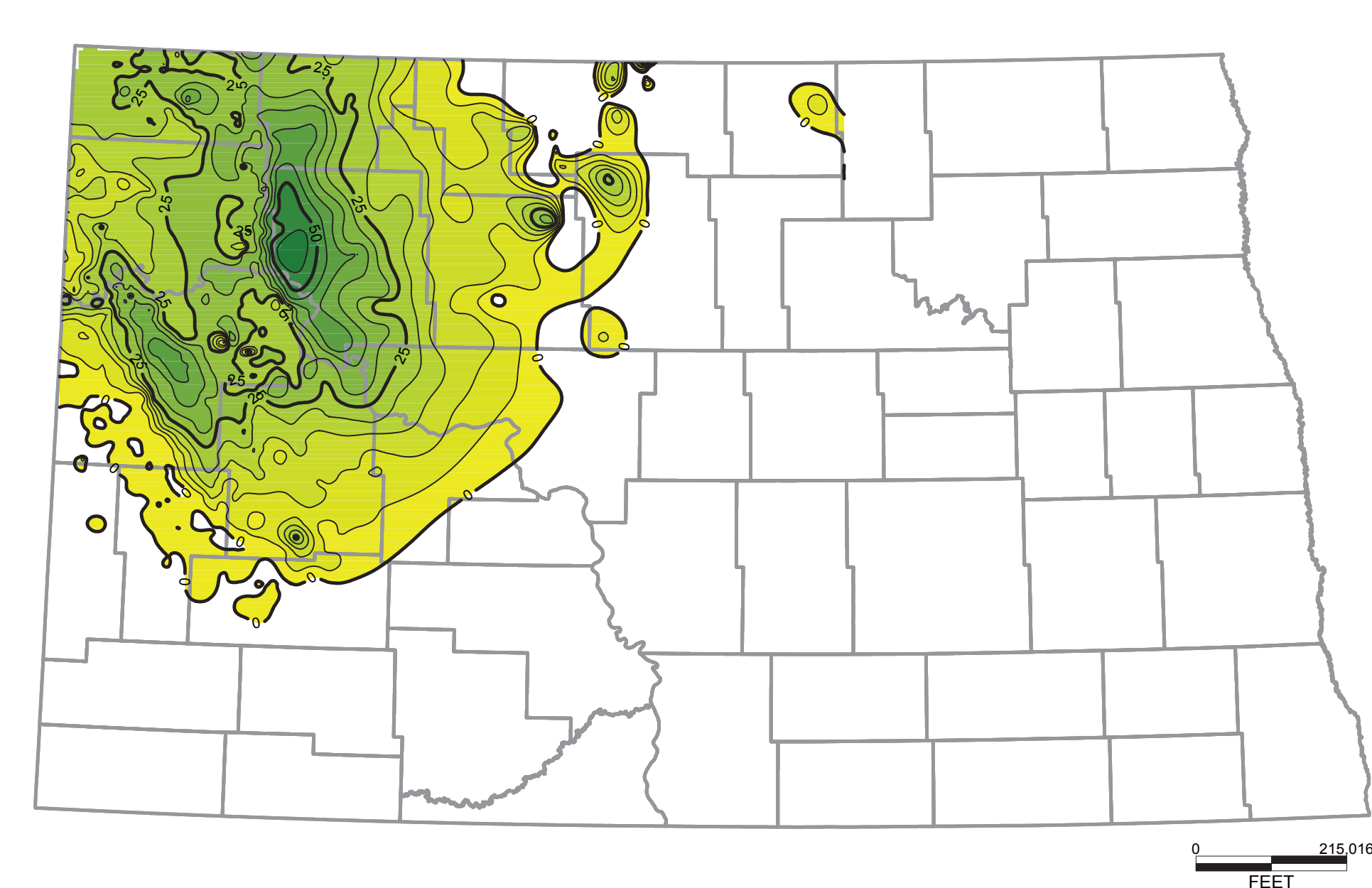
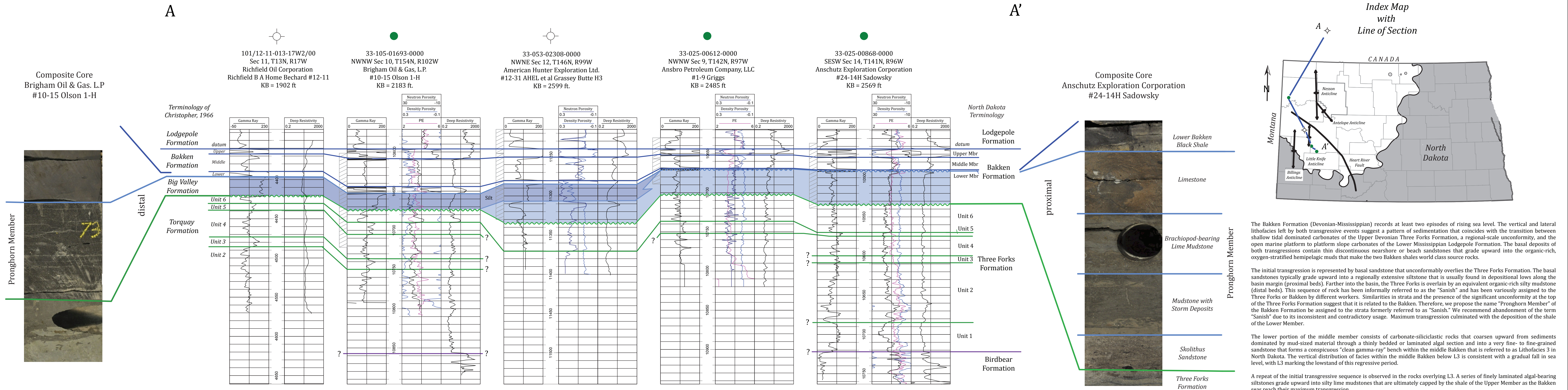
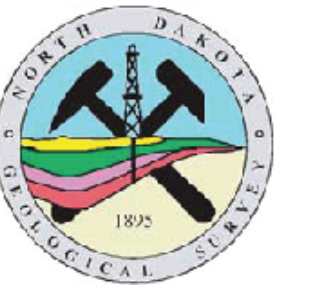


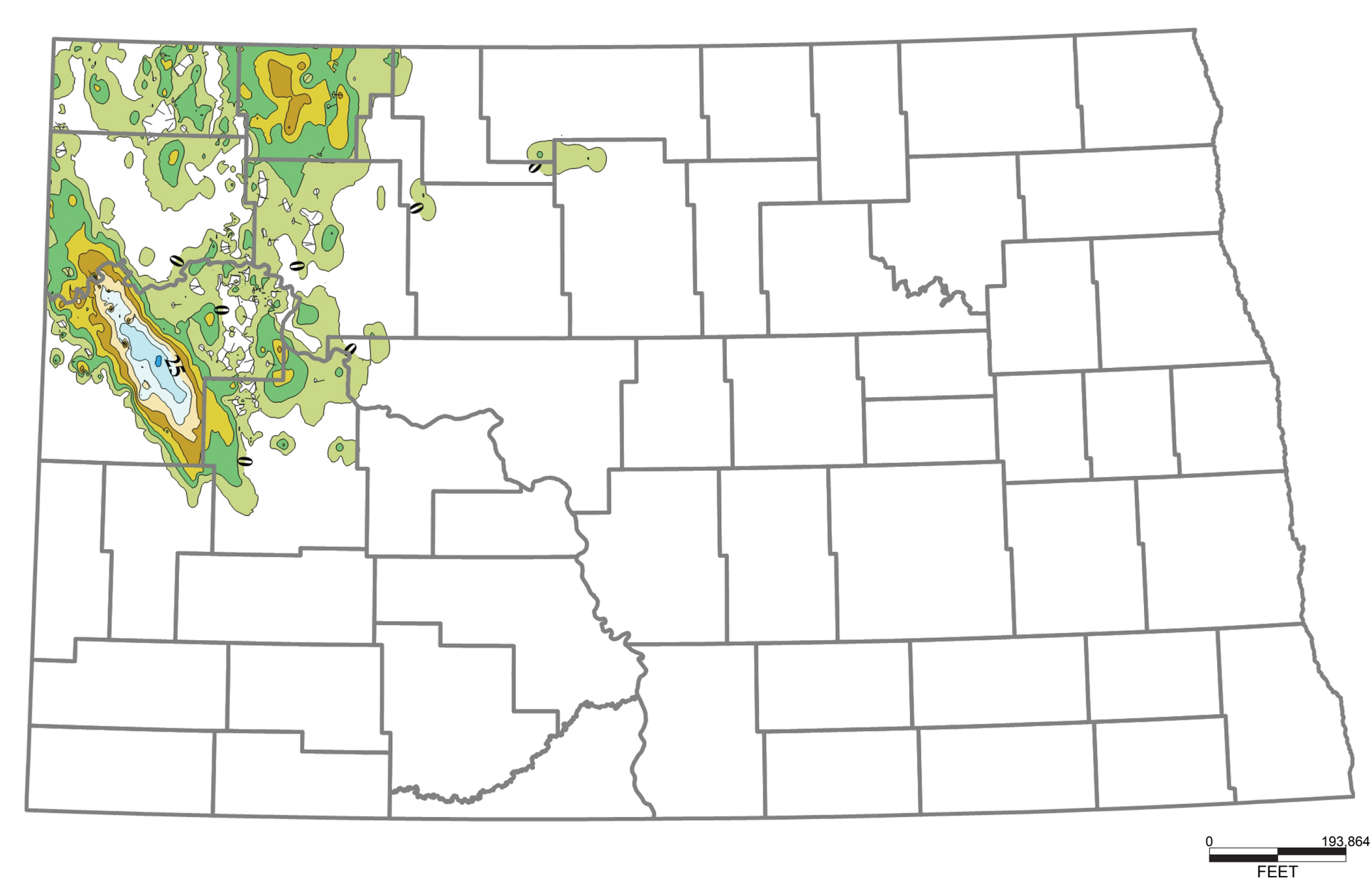


Revised Nomenclature for the Bakken Formation (Mississippian-Devonian), North Dakota

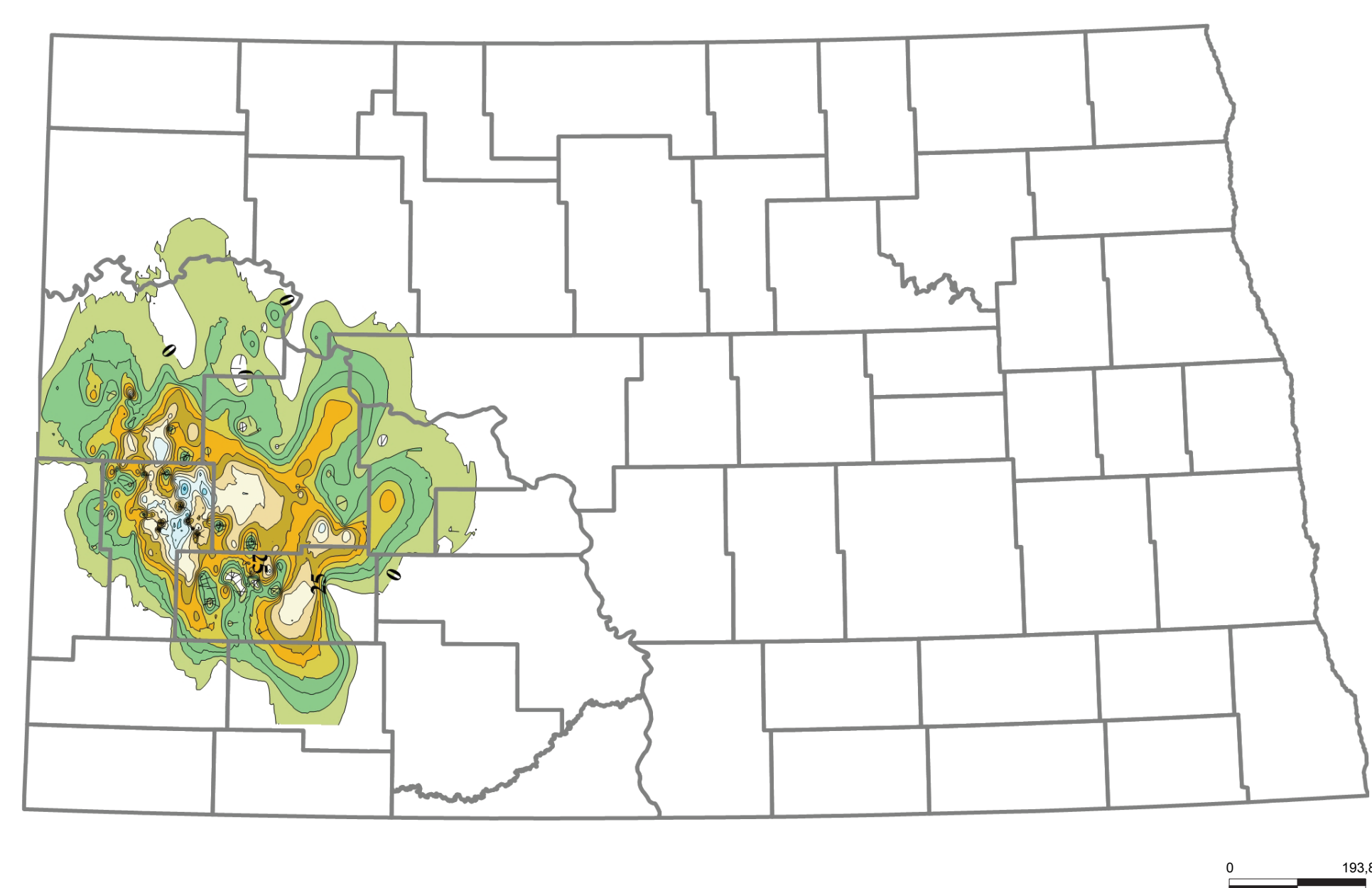
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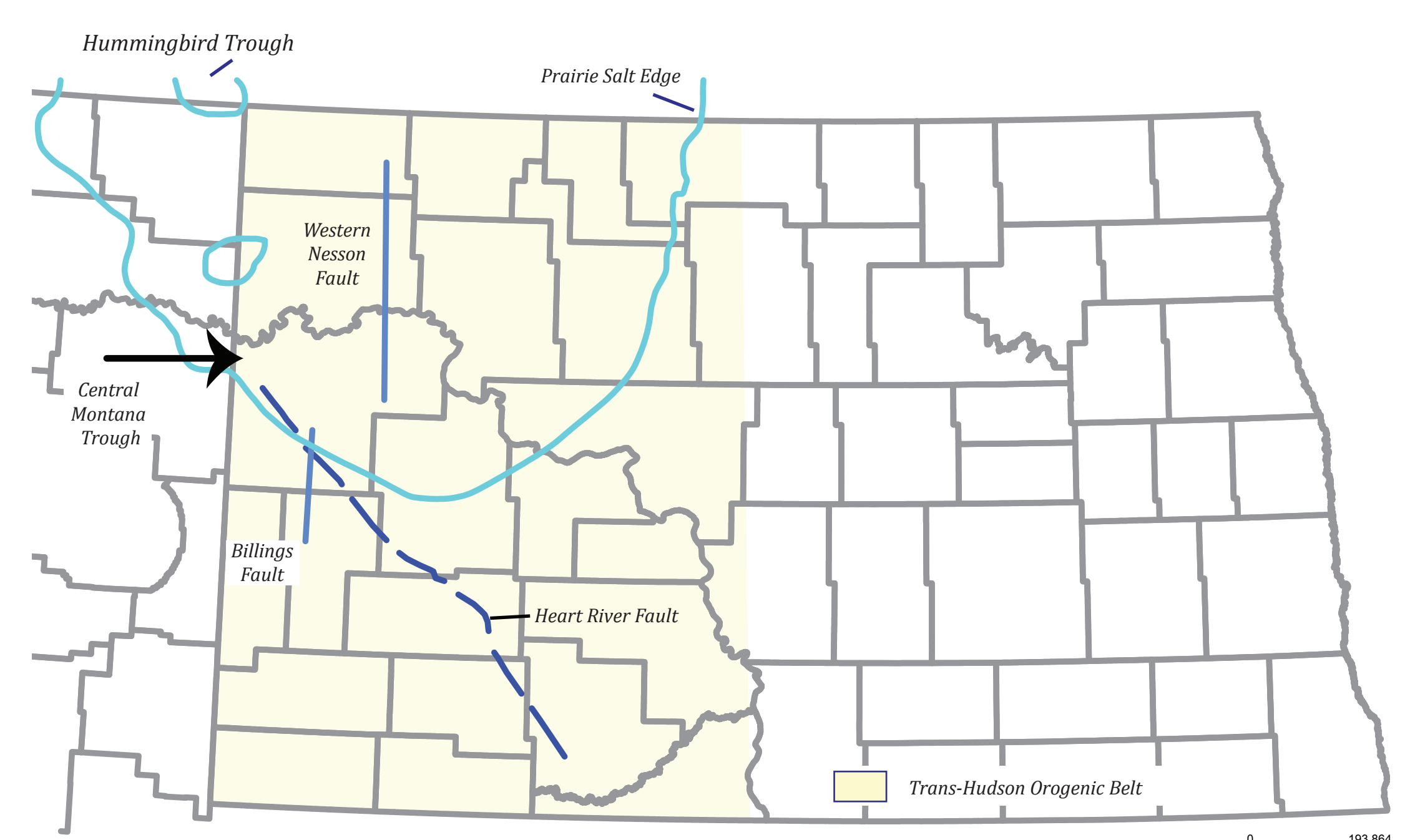
Original isopach of the Lower Member showing a linear thickening on the west side of state that results from the addition section. The additional section has been separated from the shale and is now referred to as the Pronghorn Member.



Isopach of the distal section of the Pronghorn Member underlying the Lower Member. This is represented by the Brigham - Olson well in cross-section A - A'.



Isopach of the proximal section of the Pronghorn Member as illustrated in the Anschutz - Sadowsky well in the overlying cross-section A - A'.



Structures of the Williston Basin that may result in the preservation of additional Bakken section. Features include north-south basement faults related to the Trans-Hudson orogenic belt, the Heart River Fault, dissolution of the Devonian Prairie Salt especially with reference to the Hummingbird trough, the central Montana trough, or a combination of any of the features listed.

The Bakken Formation (Devonian-Mississippian) records at least two episodes of rising sea level. The vertical and lateral lithofacies left by both transgressive events suggest a pattern of sedimentation that coincides with the transition between shallow tidal dominated carbonates of the Upper Devonian Three Forks Formation, a regional-scale unconformity, and the open marine platform to platform slope carbonates of the Lower Mississippian Lodgepole Formation. The basal deposits of both transgressions contain thin discontinuous nearshore or beach sandstones that grade upward into the organic-rich, oxygen-stratified hemipelagic muds that make the two Bakken shales world class source rocks.

The initial transgression is represented by basal sandstone that unconformably overlies the Three Forks Formation. The basal sandstones typically grade upward into a regionally extensive siltstone that is usually found in depositional lows along the basin margin (proximal beds). Farther into the basin, the Three Forks is overlain by an equivalent organic-rich silty mudstone (distal beds). This sequence of rock has been informally referred to as the "Sanish" and has been variously assigned to the Three Forks or Bakken by different workers. Similarities in strata and the presence of the significant unconformity at the top of the Three Forks Formation suggest that it is related to the Bakken. Therefore, we propose the name "Pronghorn Member" of the Bakken Formation to be assigned to the strata formerly referred to as "Sanish." We recommend abandonment of the term "Sanish" due to its inconsistent and contradictory usage. Maximum transgression culminated with the deposition of the shale of the Lower Member.

The lower portion of the middle member consists of carbonate-siliciclastic rocks that coarsen upward from sediments dominated by mud-sized material through a thinly bedded or laminated algal section and into a very fine- to fine-grained sandstone that forms a conspicuous "clean gamma-ray" bench within the middle Bakken that is referred to as Lithofacies 3 in North Dakota. The vertical distribution of facies within the middle Bakken below L3 is consistent with a gradual fall in sea level, with L3 marking the lowstand of this regressive period.

A repeat of the initial transgressive sequence is observed in the rocks overlying L3. A series of finely laminated algal-bearing siltstones grade upward into silty lime mudstones that are ultimately capped by the shale of the Upper Member as the Bakken seas reach their maximum transgression.