
Tectonics of the Texas Portion of the Sabine Island

Dale Short

Retired, 4904 Hallye Ln., Tyler, Texas 75703

GCAGS Explore & Discover Article #00388*

http://www.gcags.org/exploreanddiscover/2018/00388_short.pdf

Posted September 29, 2018.

*Article based on a full paper published in the *GCAGS Transactions* (see footnote reference below), which is available as part of the entire 2018 *GCAGS Transactions* volume via the GCAGS Bookstore at the Bureau of Economic Geology (www.beg.utexas.edu) or as an individual document via AAPG Datapages, Inc. (www.datapages.com), and delivered as an oral presentation at the 68th Annual GCAGS Convention and 65th Annual GCSSEPM Meeting in Shreveport, Louisiana, September 30–October 2, 2018.

ABSTRACT

Sabine island is a tectonic feature located on the southern end of the area known as the Sabine Uplift in East Texas; these features are unrelated. The island has a different tectonic history compared to that of surrounding areas. The objective of this investigation is to document the apparent vertical movement of the island. This is a new model and is meant to stimulate thought and additional research. The current study focuses only on the Texas portion of Sabine island, leaving the Louisiana portion of the island for future study. Previous work done by the author indicates that the Louisiana portion of the Sabine island has a similar tectonic history.

Sabine island and several other “basement highs” were emergent during the deposition of the Jurassic salt, leaving either a very thin salt (~100 ft), such as in the vicinity of the “Strickland Ridge” along the Shelby-Panola county line, or absence of salt as found on the Sabine island, and in northeast Shelby County in the vicinity of Juquin Field. These areas remained high during the deposition of the Smackover Formation up to the Valanginian unconformity. After the transgressive systems tract deposition of the B Lime occurred, the Sabine island area subsided and created accommodation space for a thicker section of the marine to paralic Travis Peak siliciclastic section. A reversal of motion on the Sabine island block occurred during the deposition of the Cretaceous carbonate section and is illustrated by apparent reefing in the section above the Rodessa and possibly up into the Georgetown and Goodland intervals. Another reversal occurred during the deposition of the Austin Chalk that can be demonstrated by thickening of that interval over the “island.” The final reversal documented in this paper is between the top of Austin Chalk and the Chicxalub tsunami event near the K/T unconformity.

TECTONIC MOVEMENT OF THE SABINE ISLAND

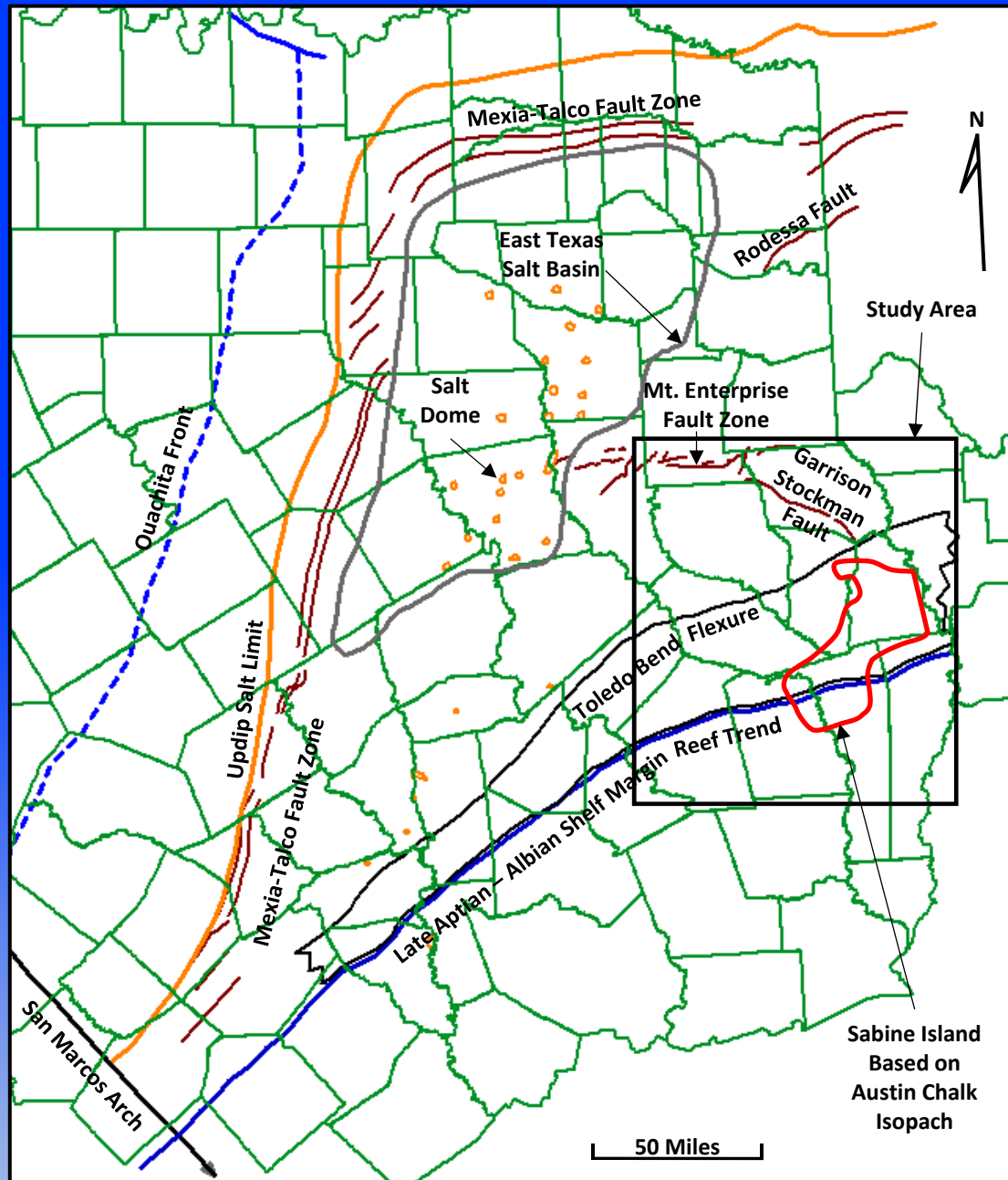
EAST TEXAS BASIN

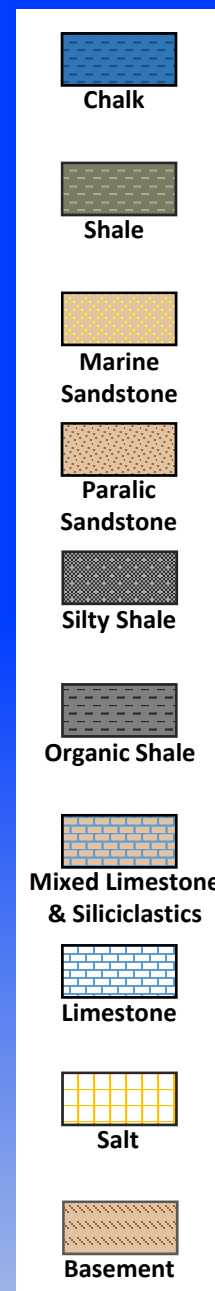
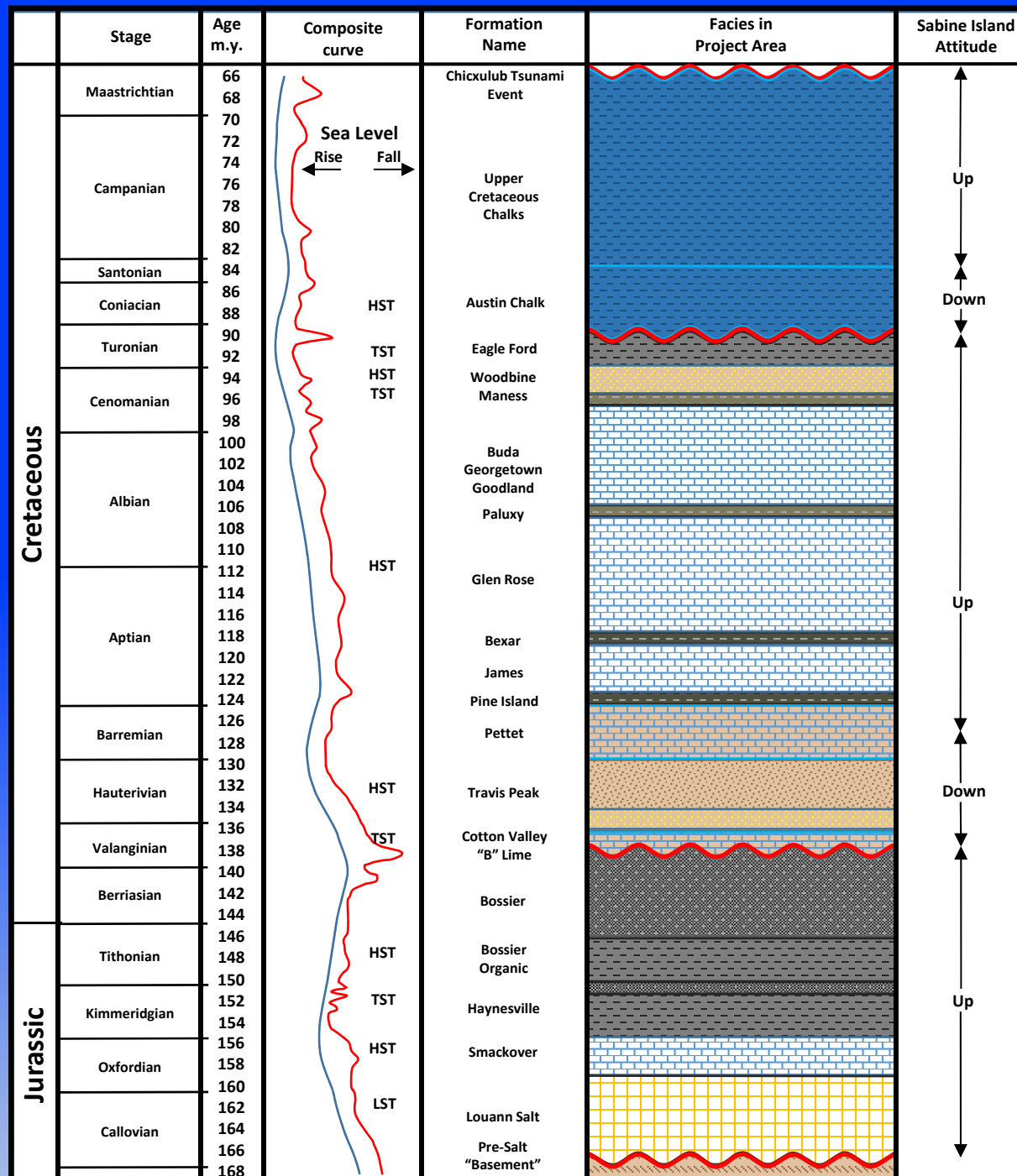
Dale M. Short

Outline

- Regional Geology
- Pre-Louann Salt Topography
- Sabine Island Movement
- Gravity Data
- Conclusions

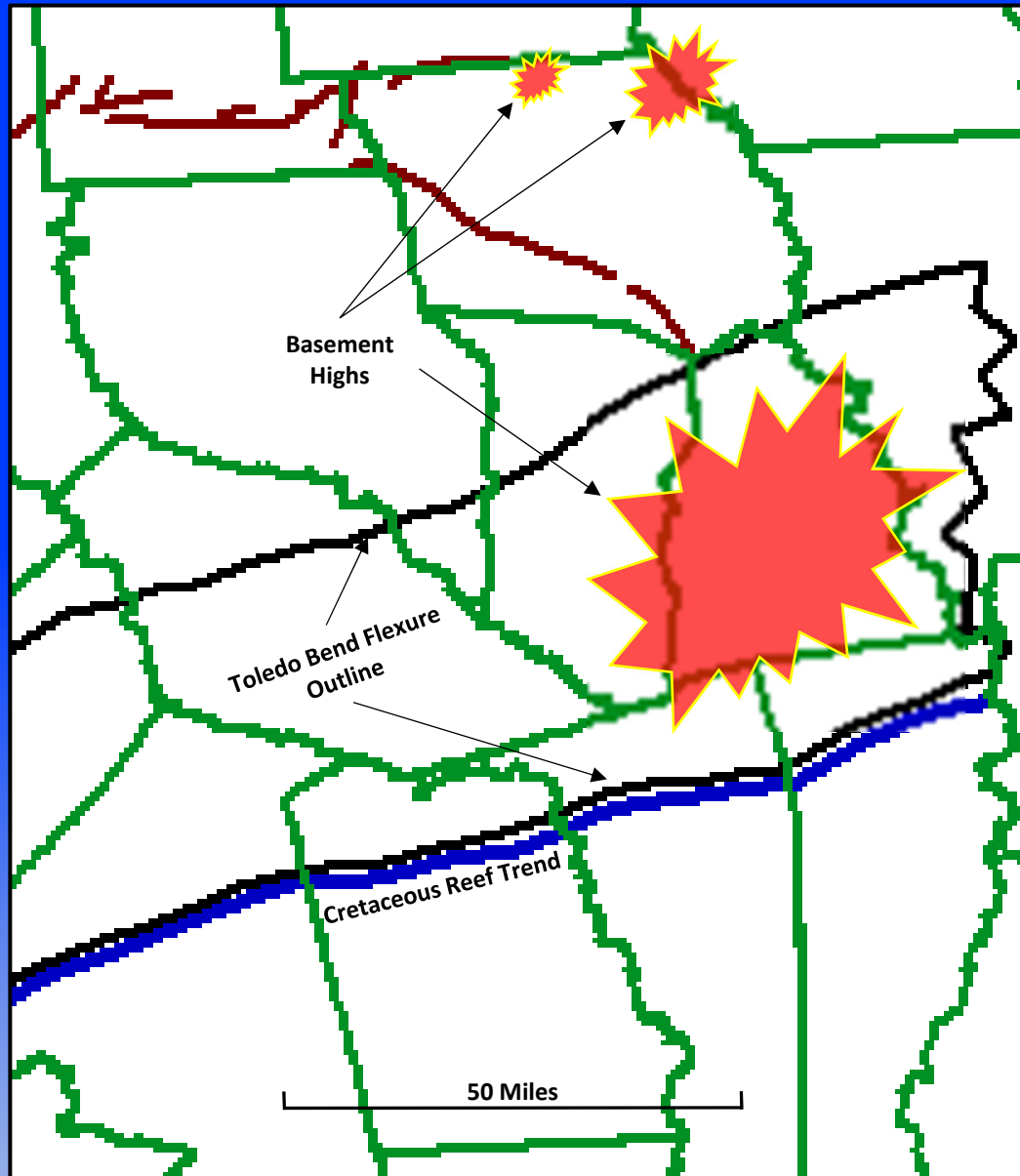
East Texas Regional Features



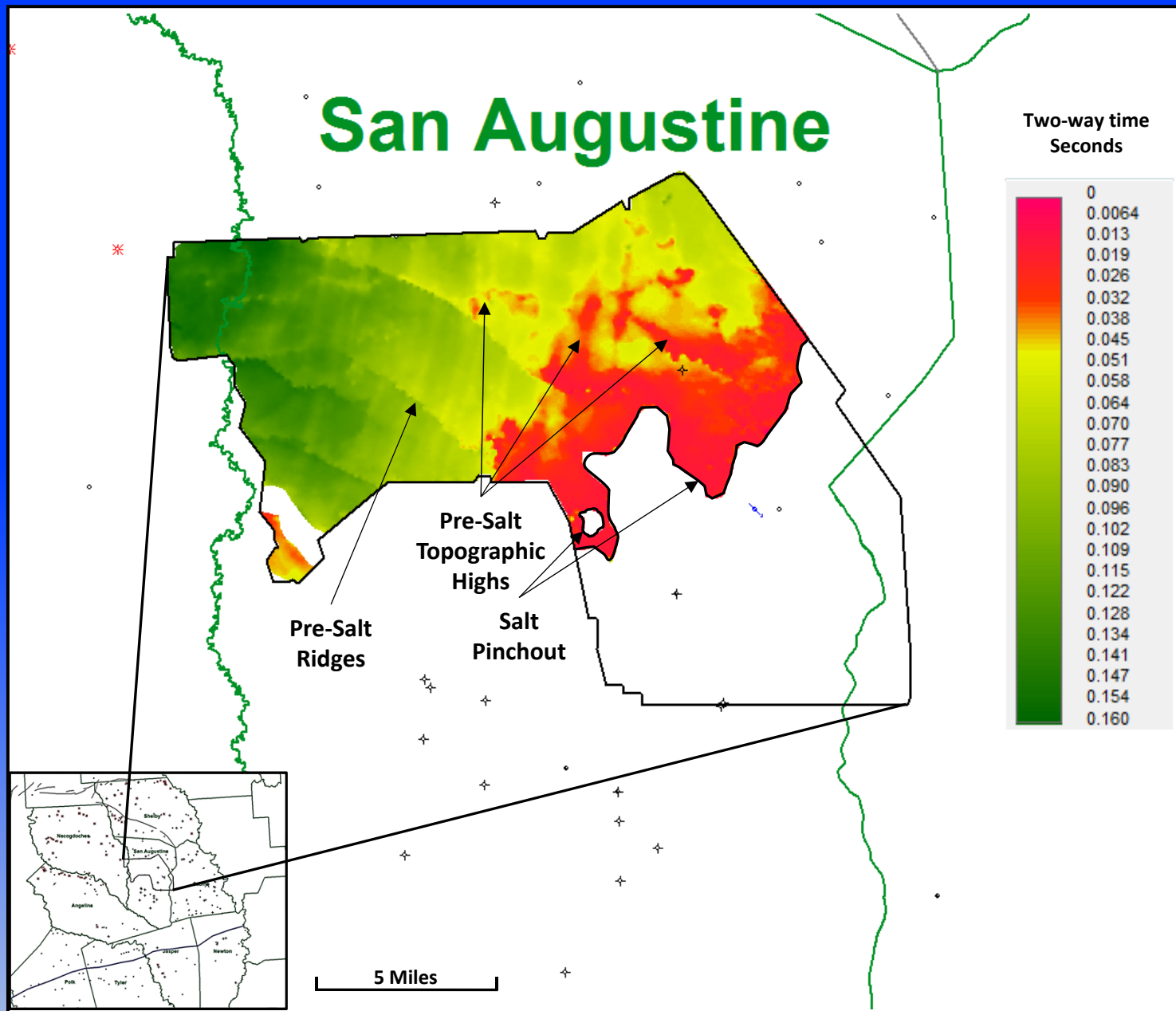


Pre-Louann Salt Topography

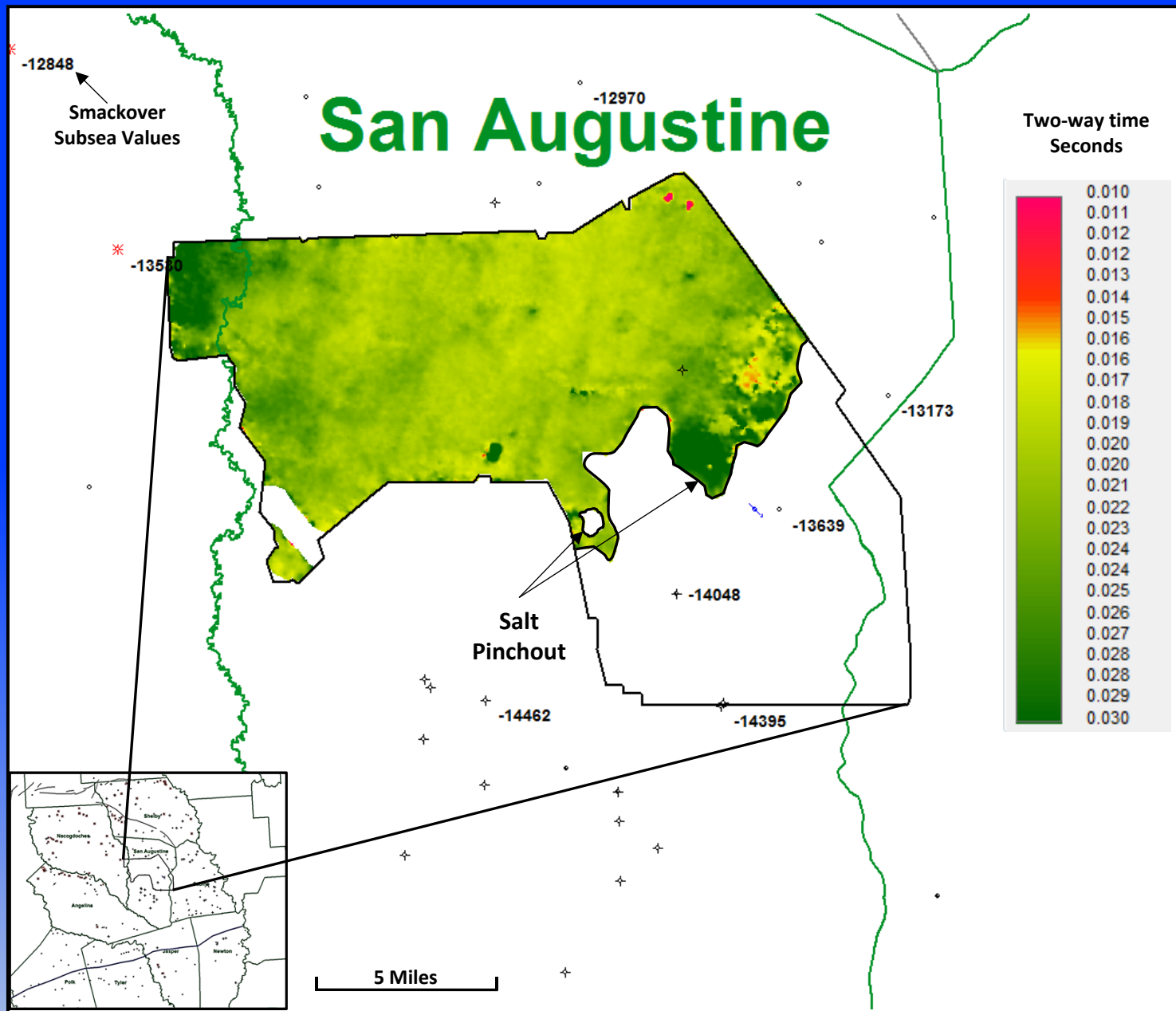
Basement Highs in Study Area



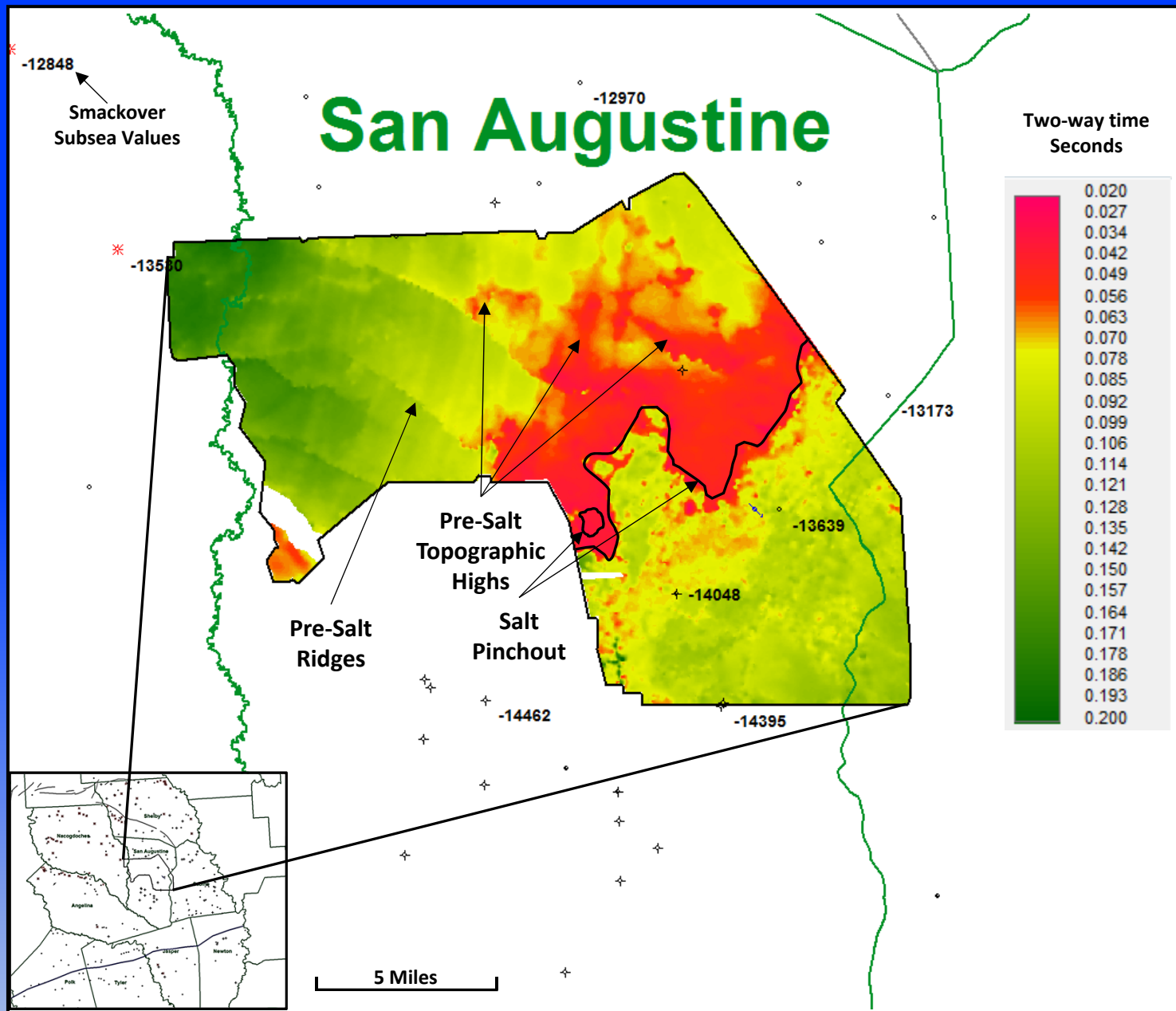
Isochron: Base Salt To Top Salt



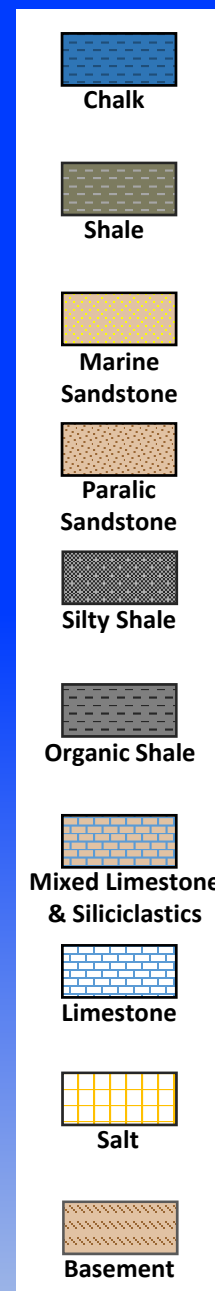
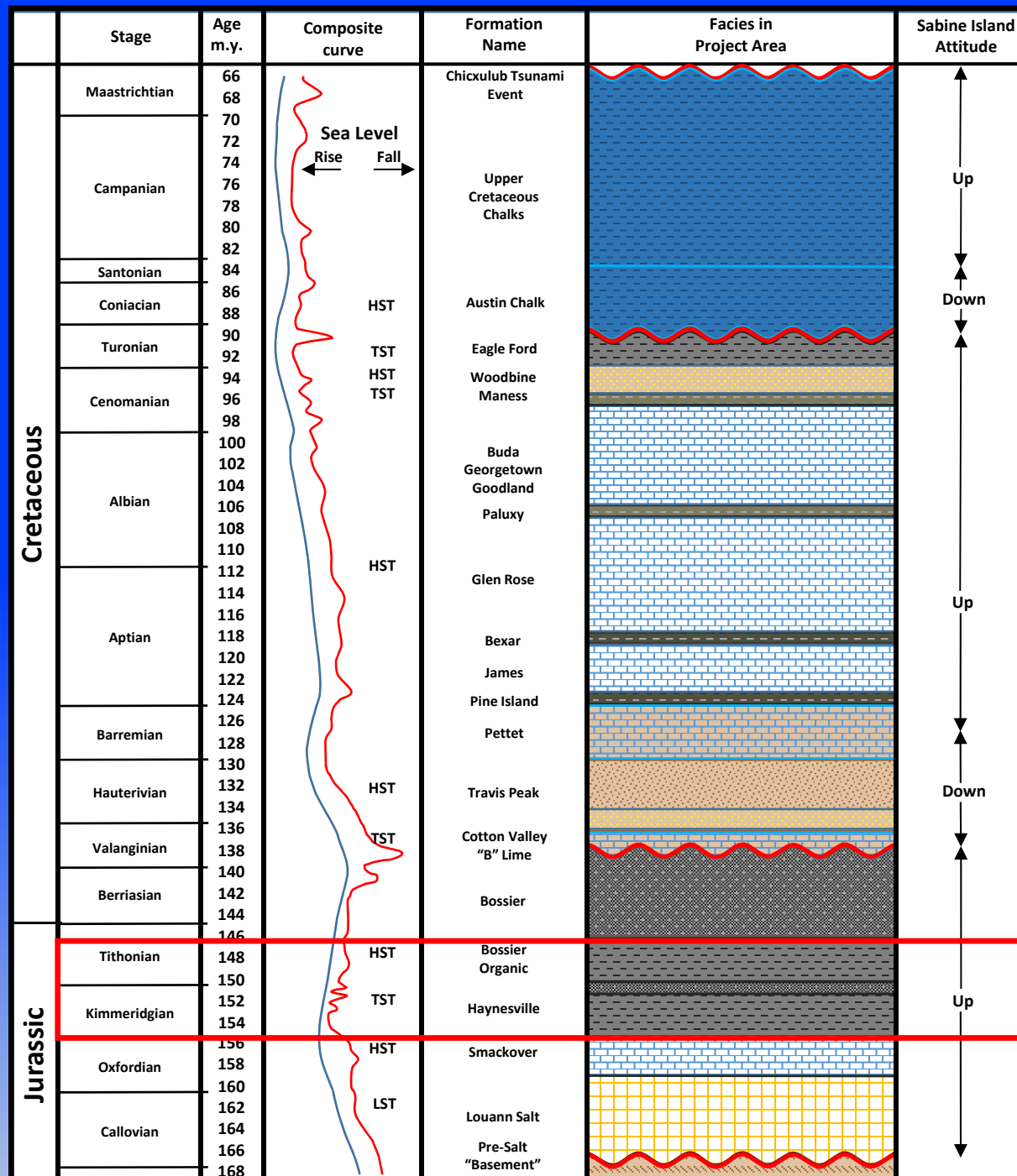
Isochron: Top Salt To Top Smackover



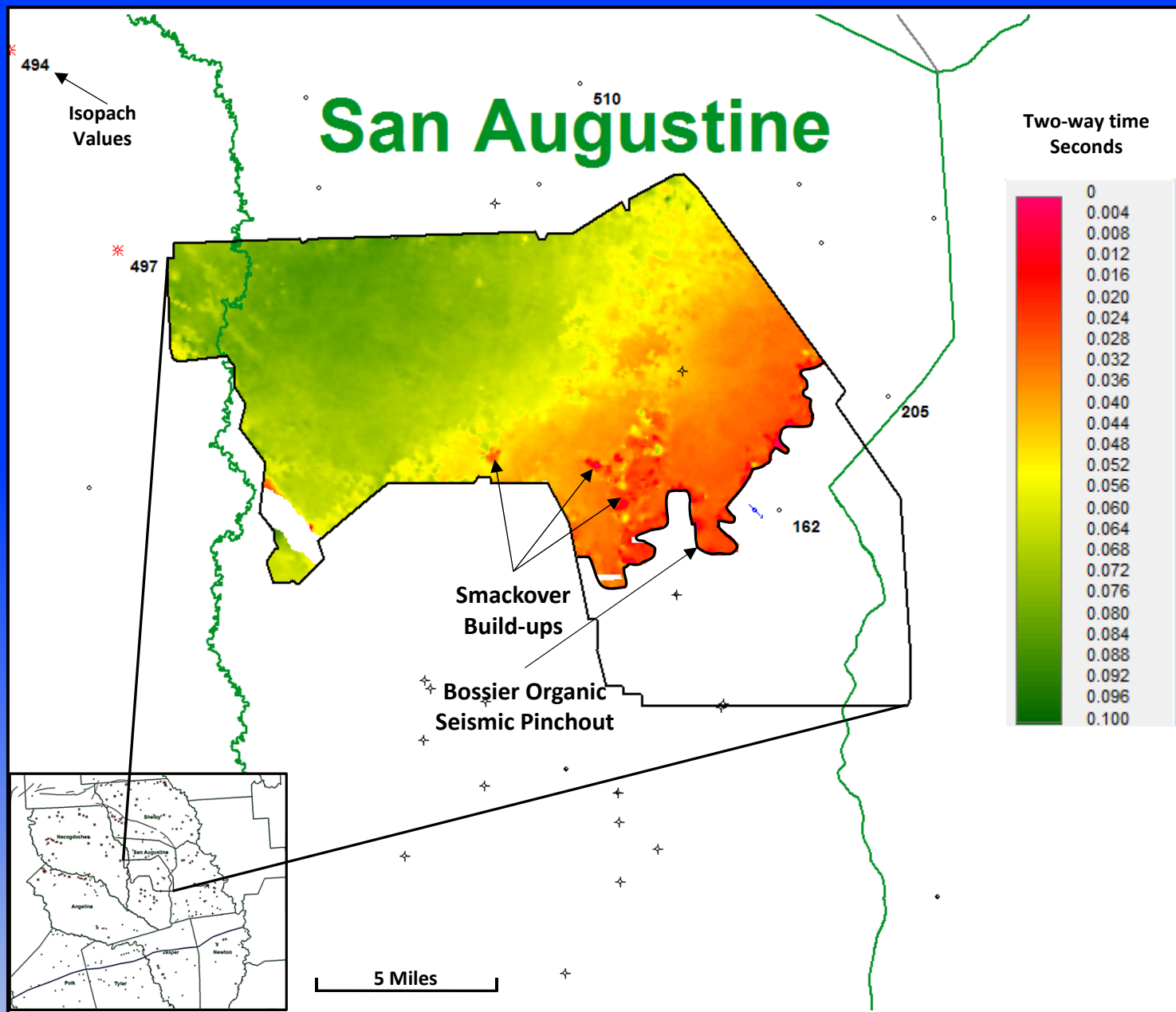
Isochron: Top Basement (Base Salt) To Top Smackover



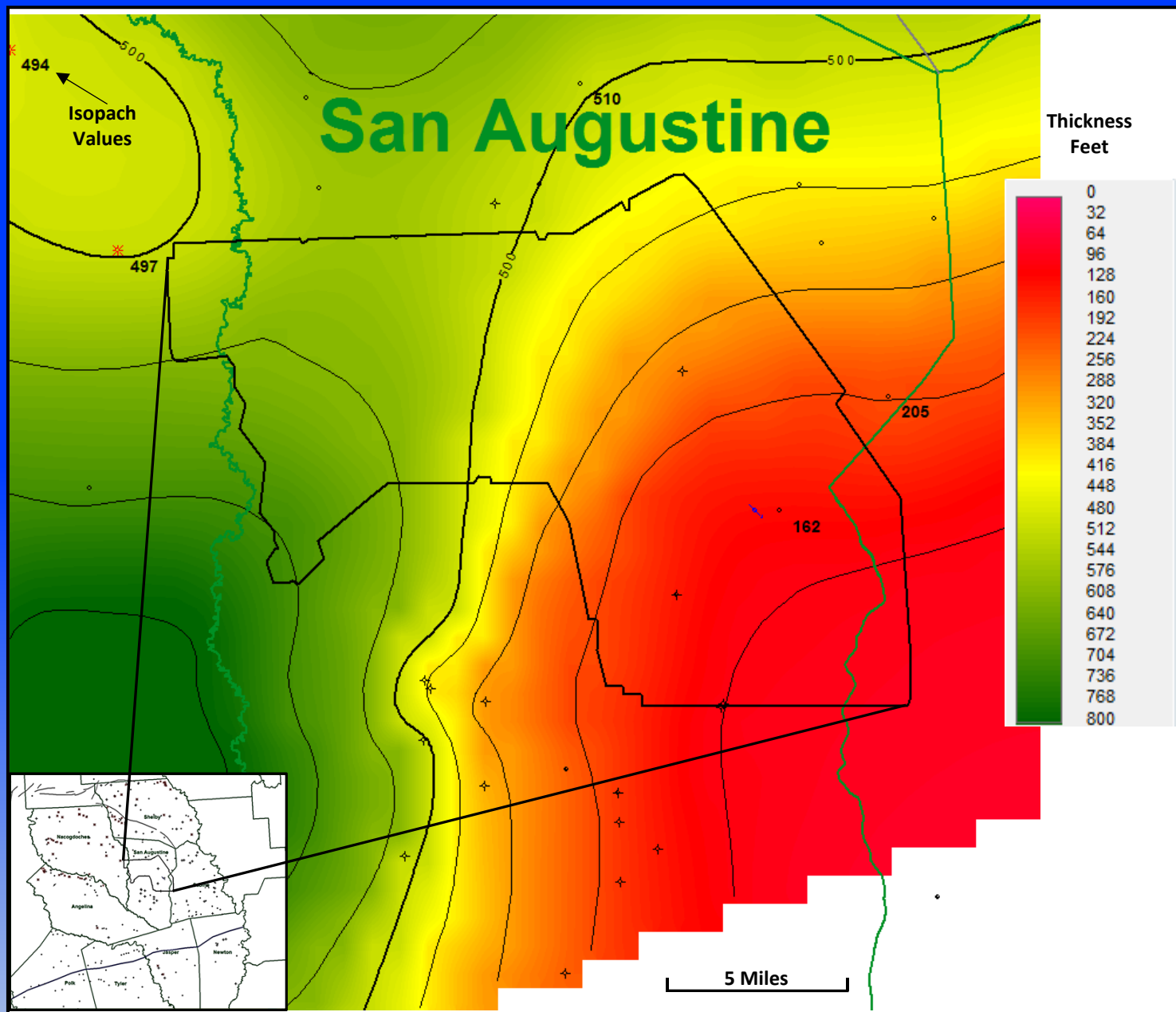
Sabine Island Movement



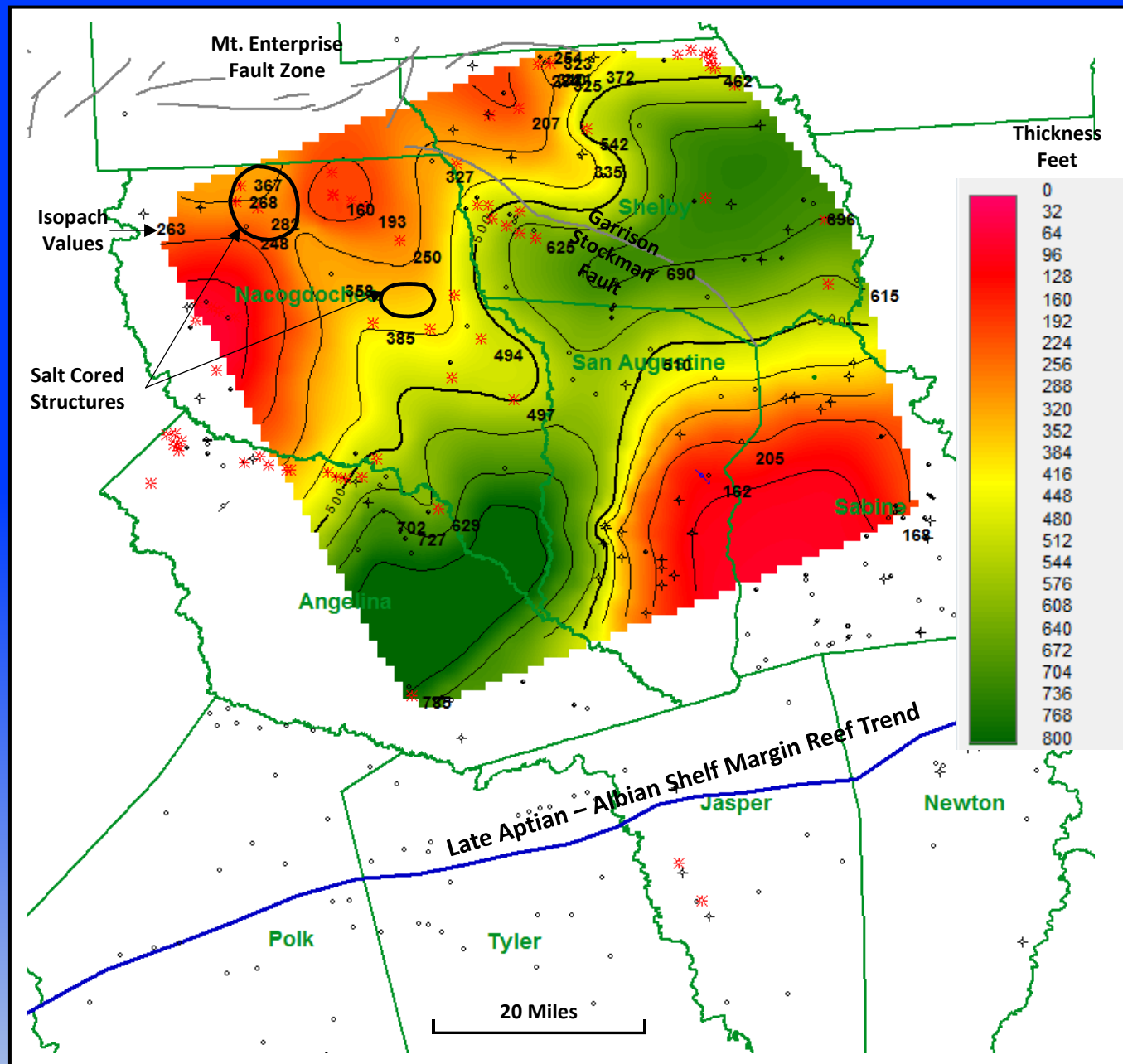
Isochron: Top Smackover To Bossier Organic

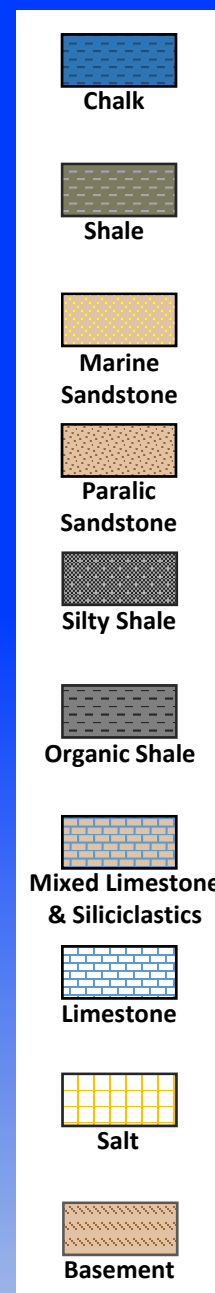
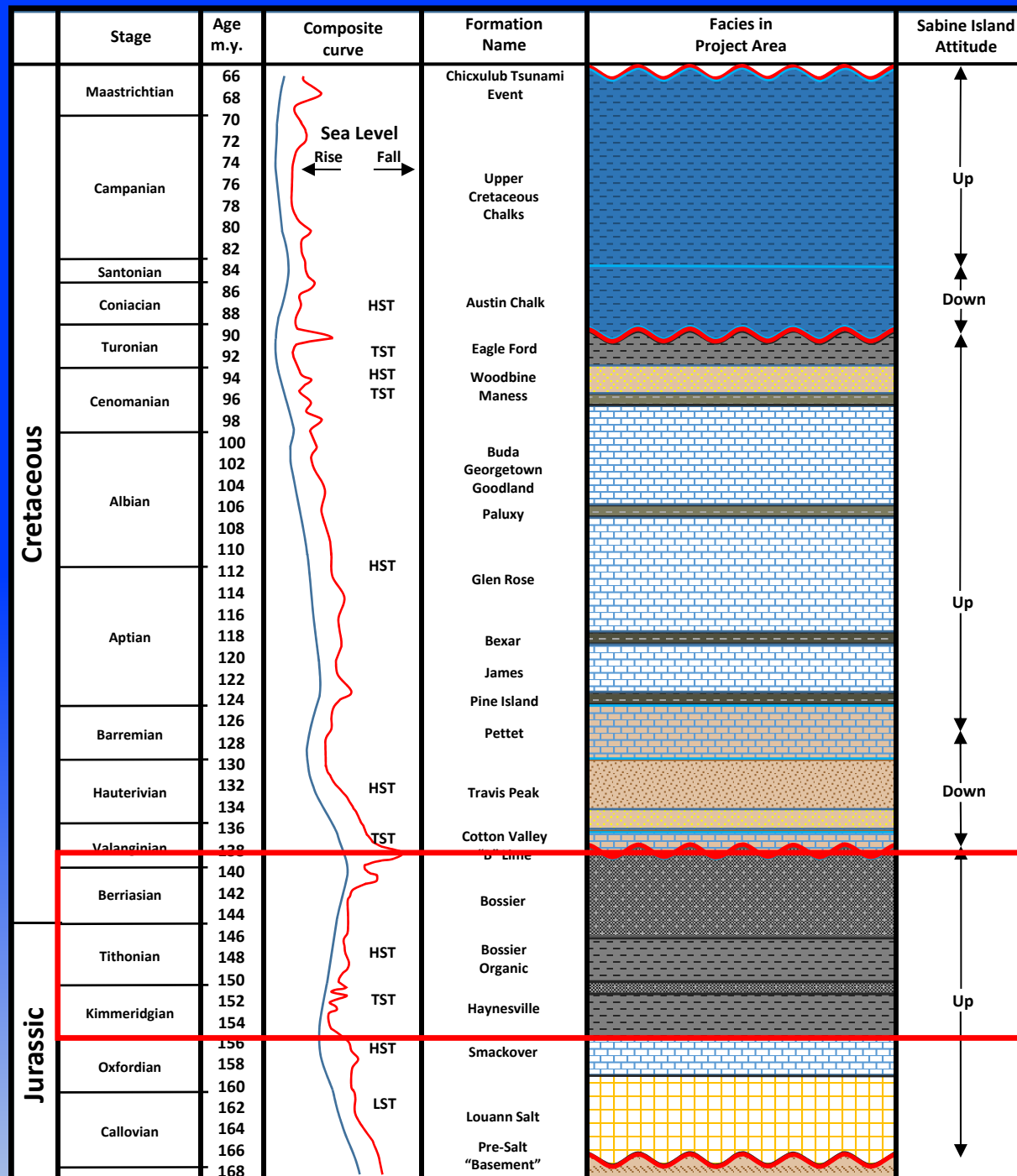


Isopach: Top Smackover To Bossier Organic

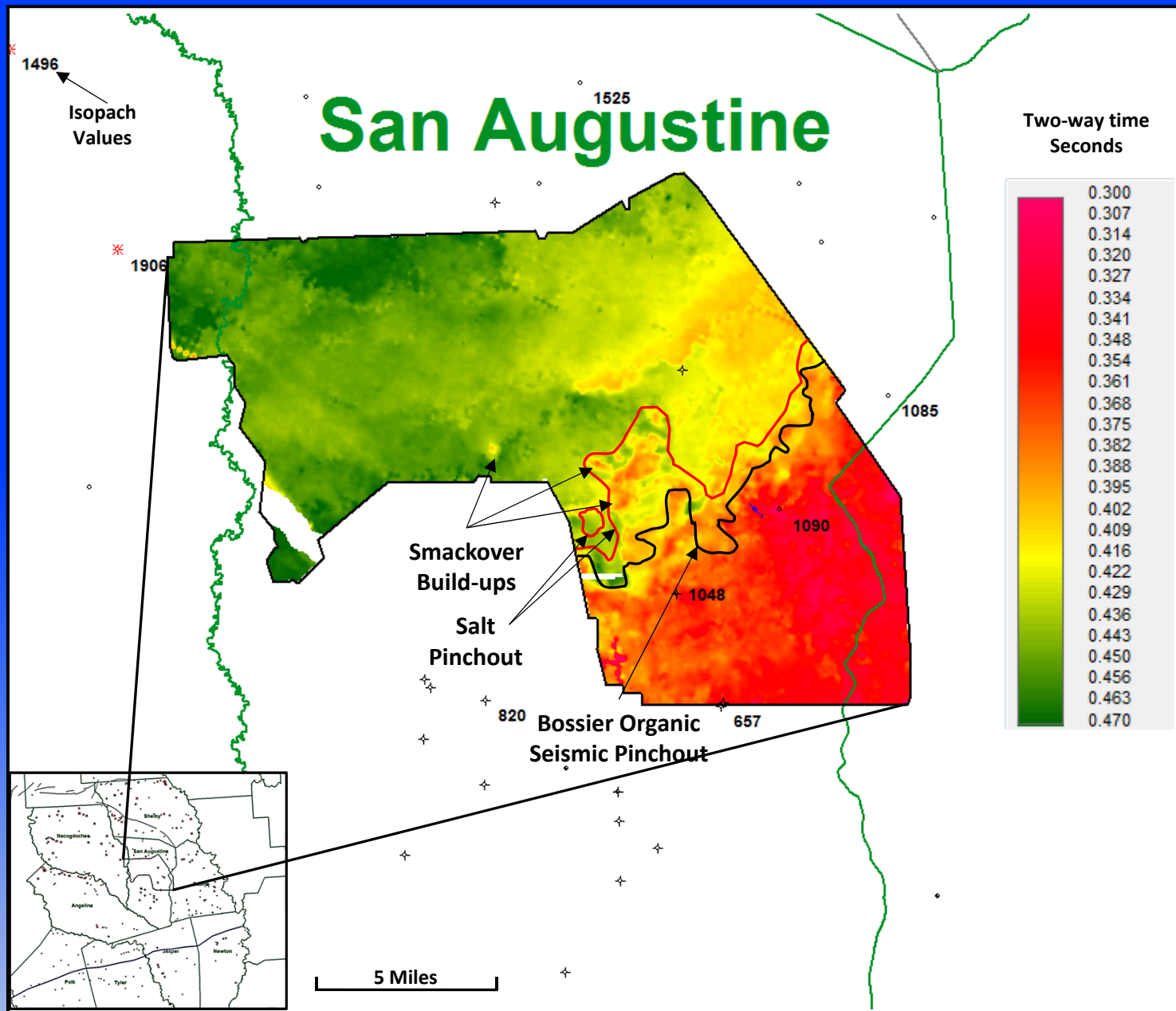


Isopach: Top Smackover To Bossier Organic

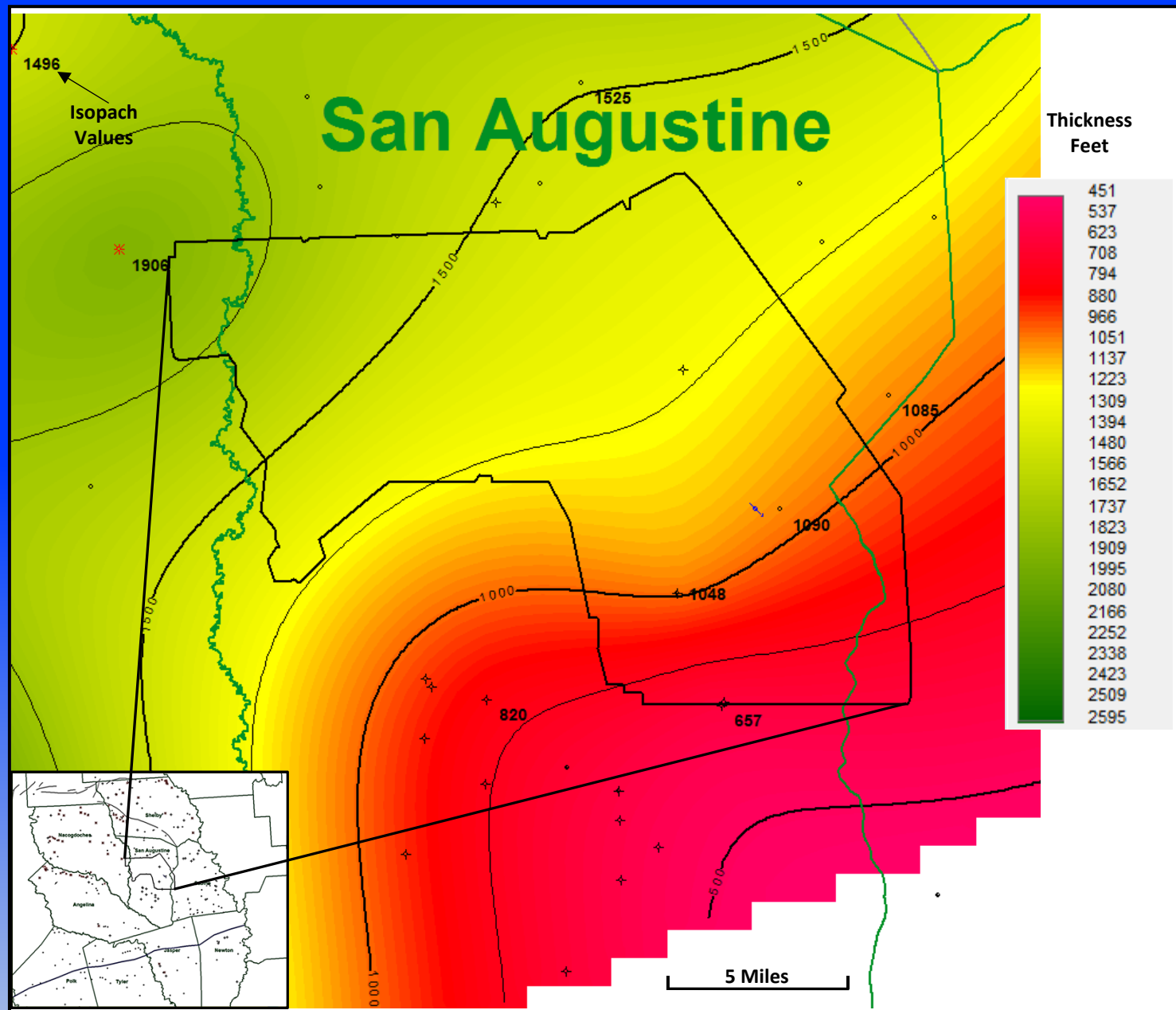




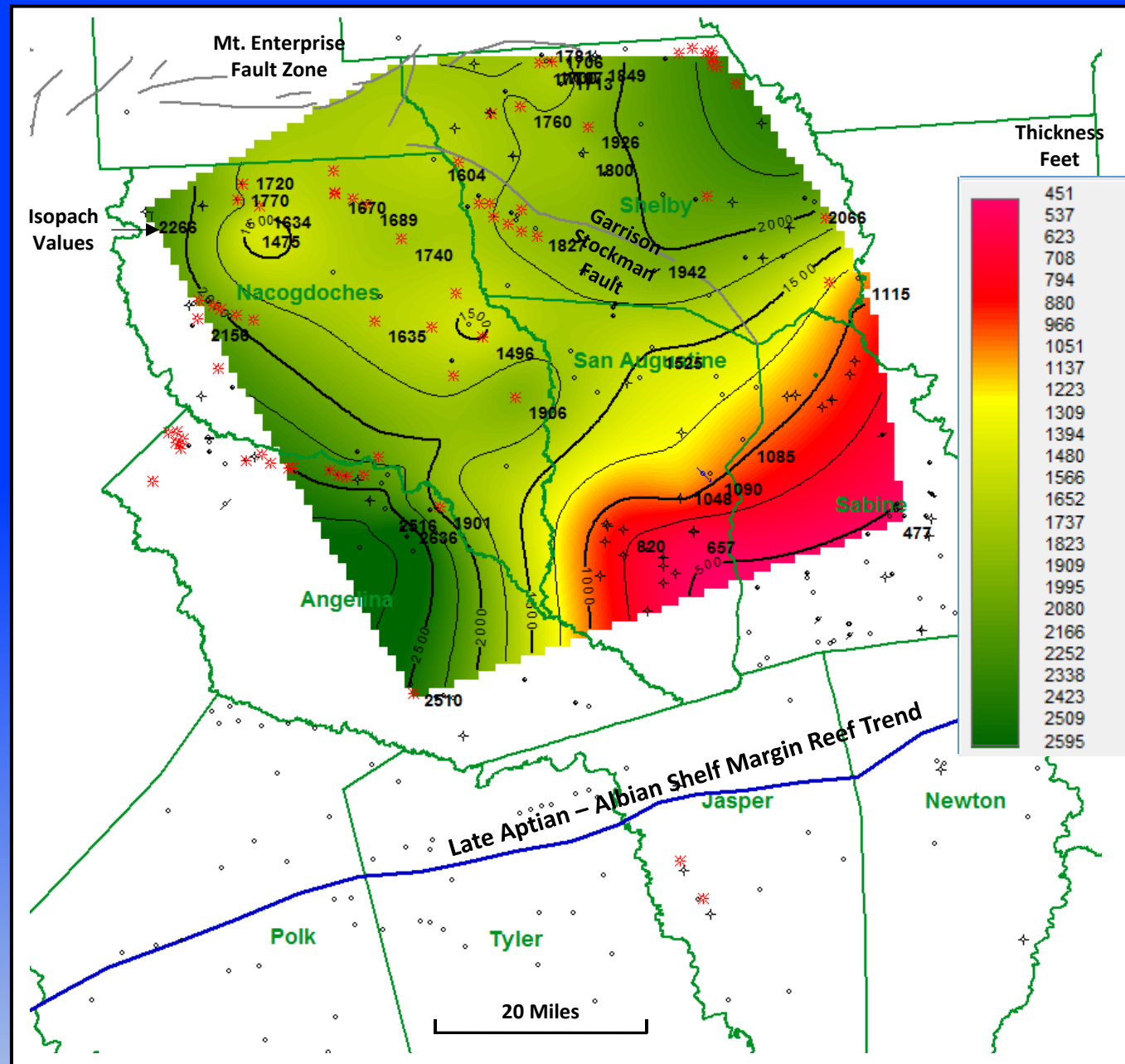
Isochron: Top Smackover To Valanginian Unconformity

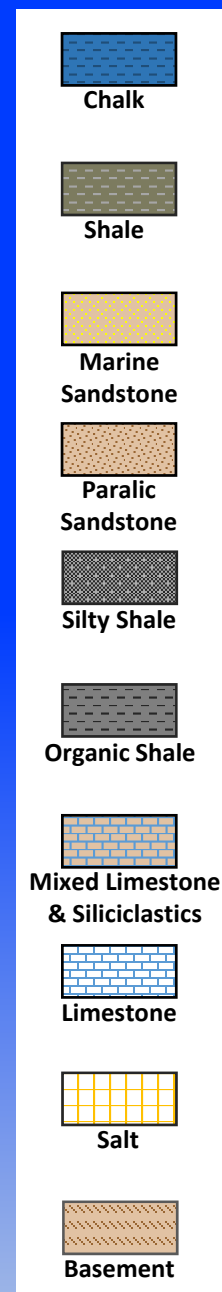
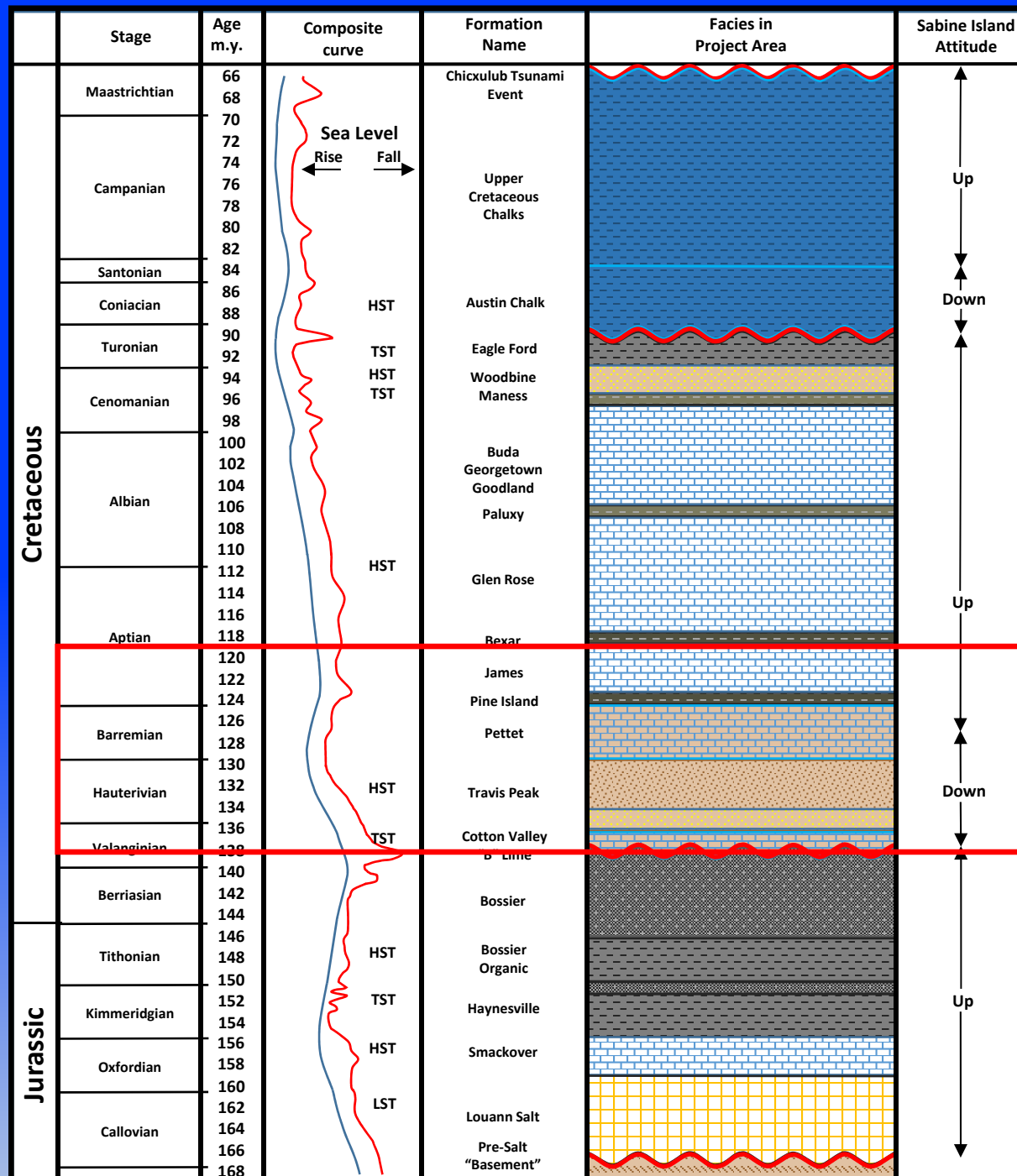


Isopach: Top Smackover To Base B Lime (Valanginian Unconformity)

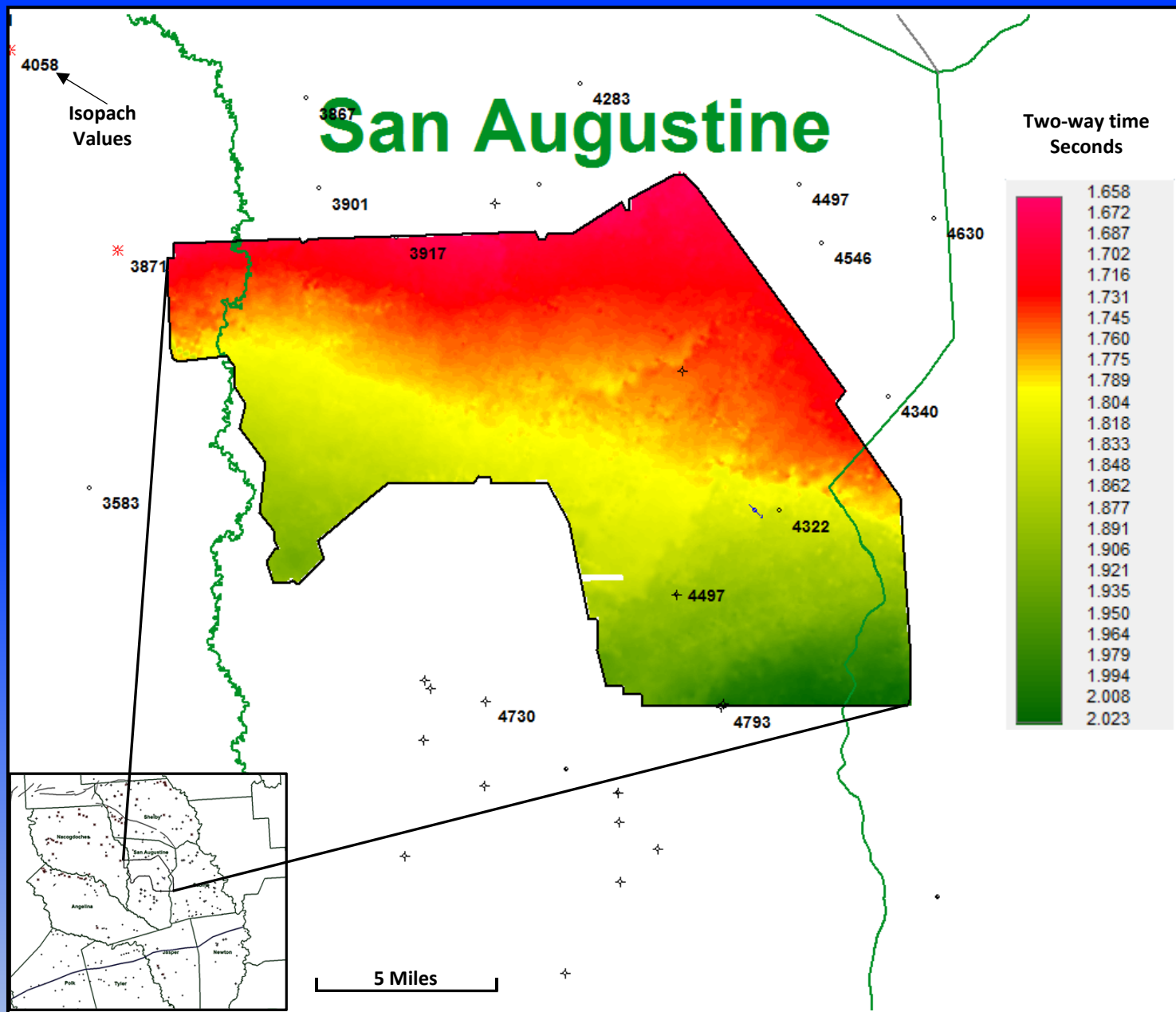


Isopach: Top Smackover To Base B Lime (Valanginian Unconformity)

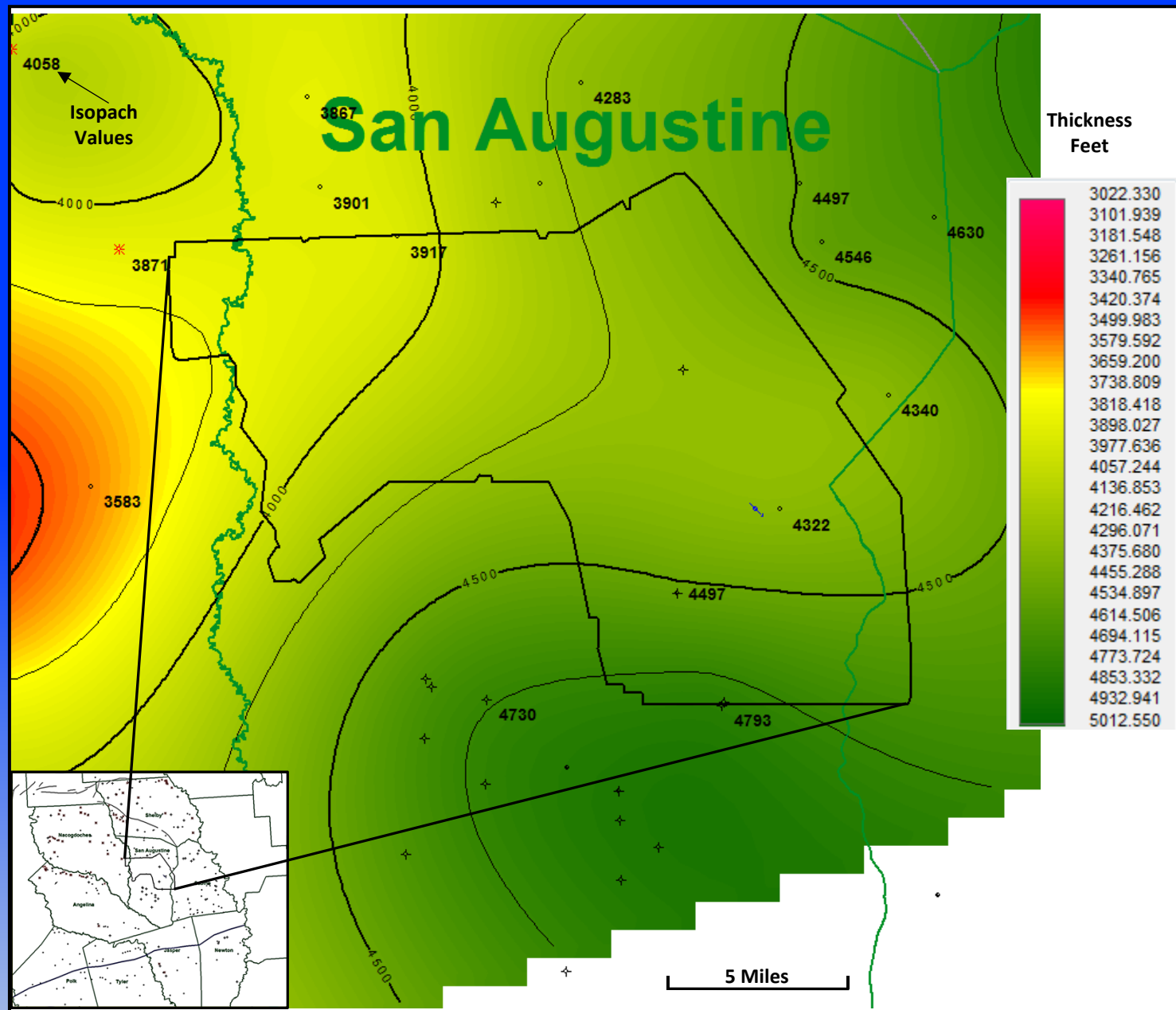




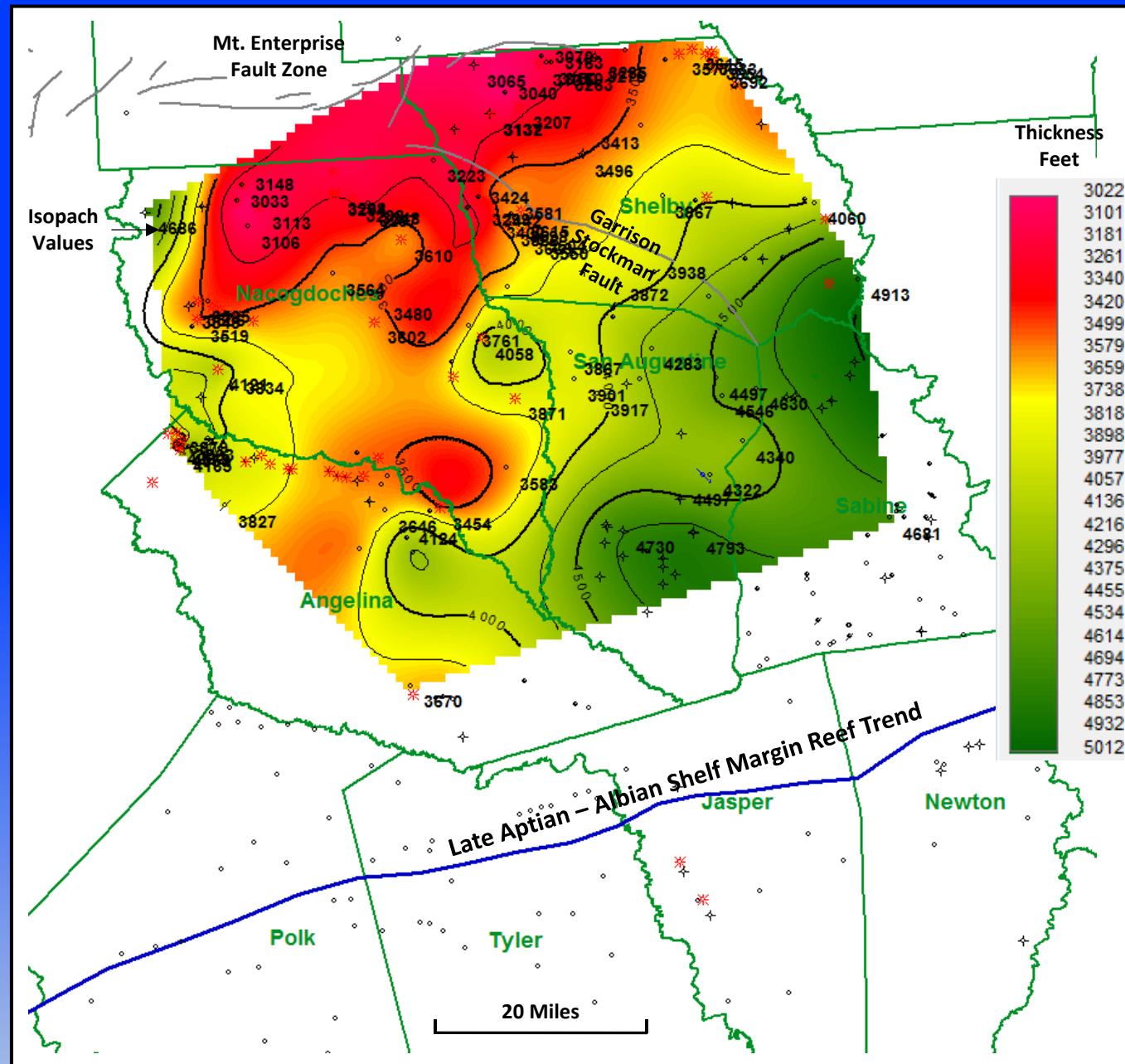
Isochron: Valanginian Unconformity To James Lime

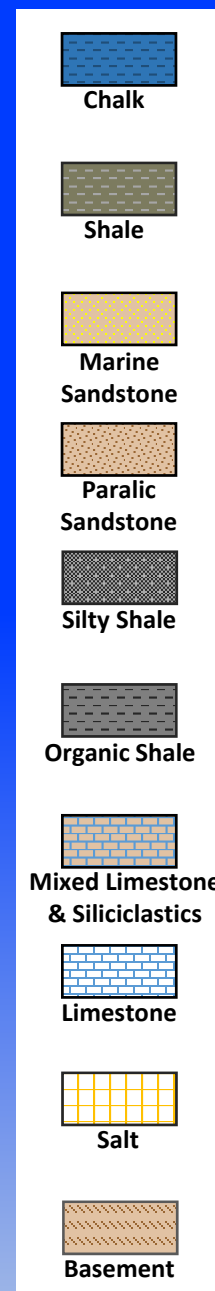
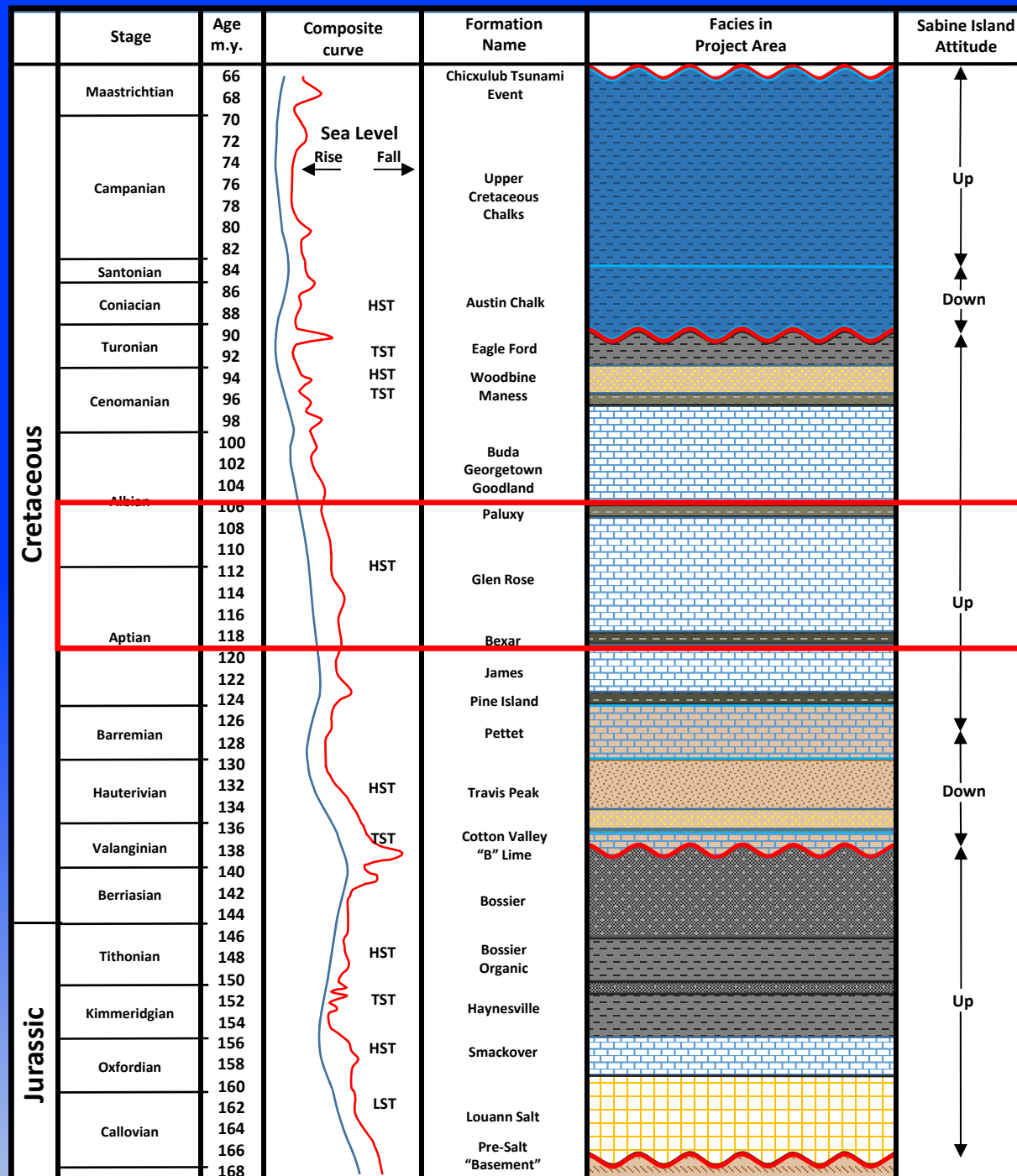


Isopach: Base B Lime (Valanginian Unconformity) To James Lime

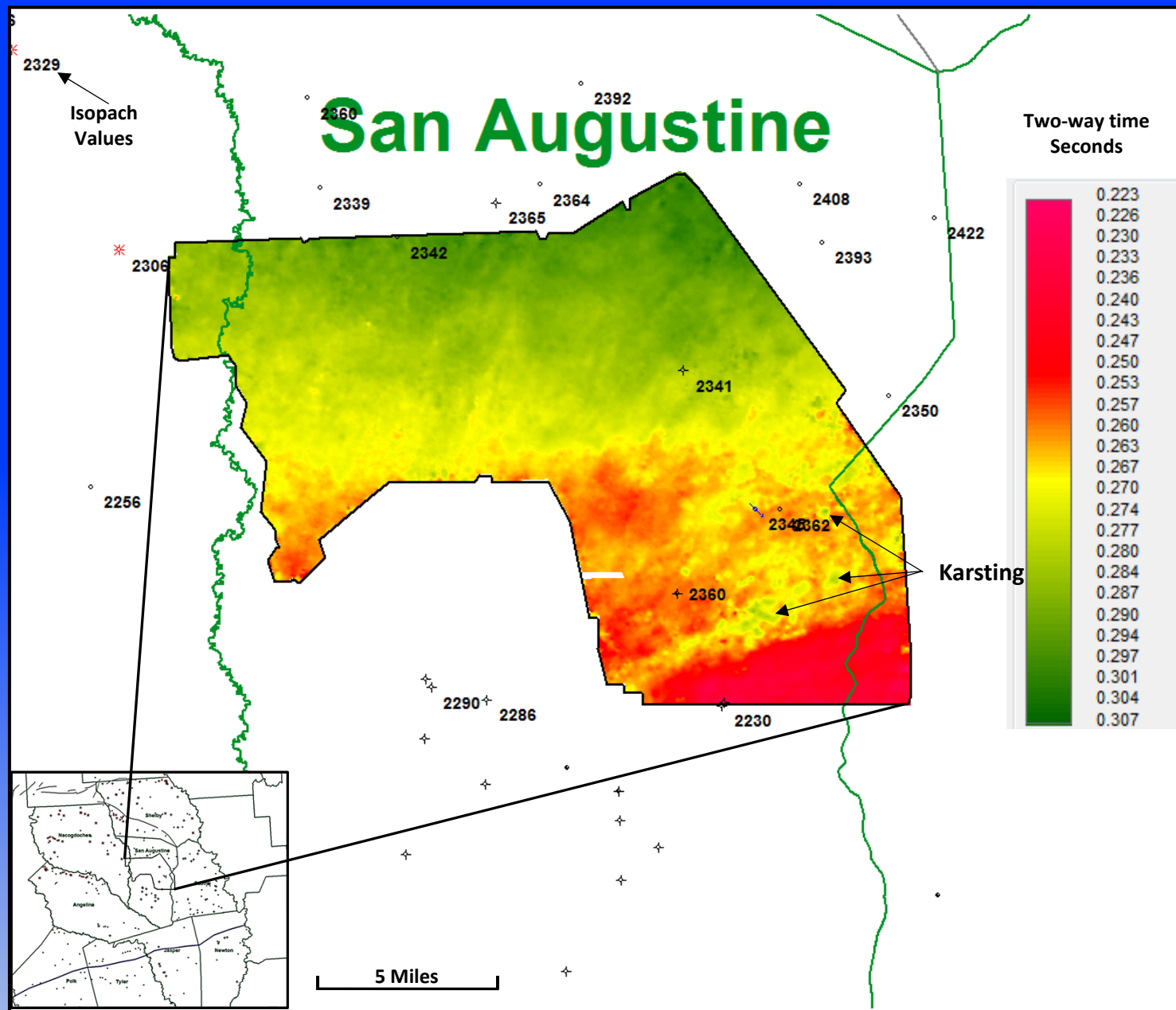


Isopach: Base B Lime (Valanginian Unconformity) To James Lime

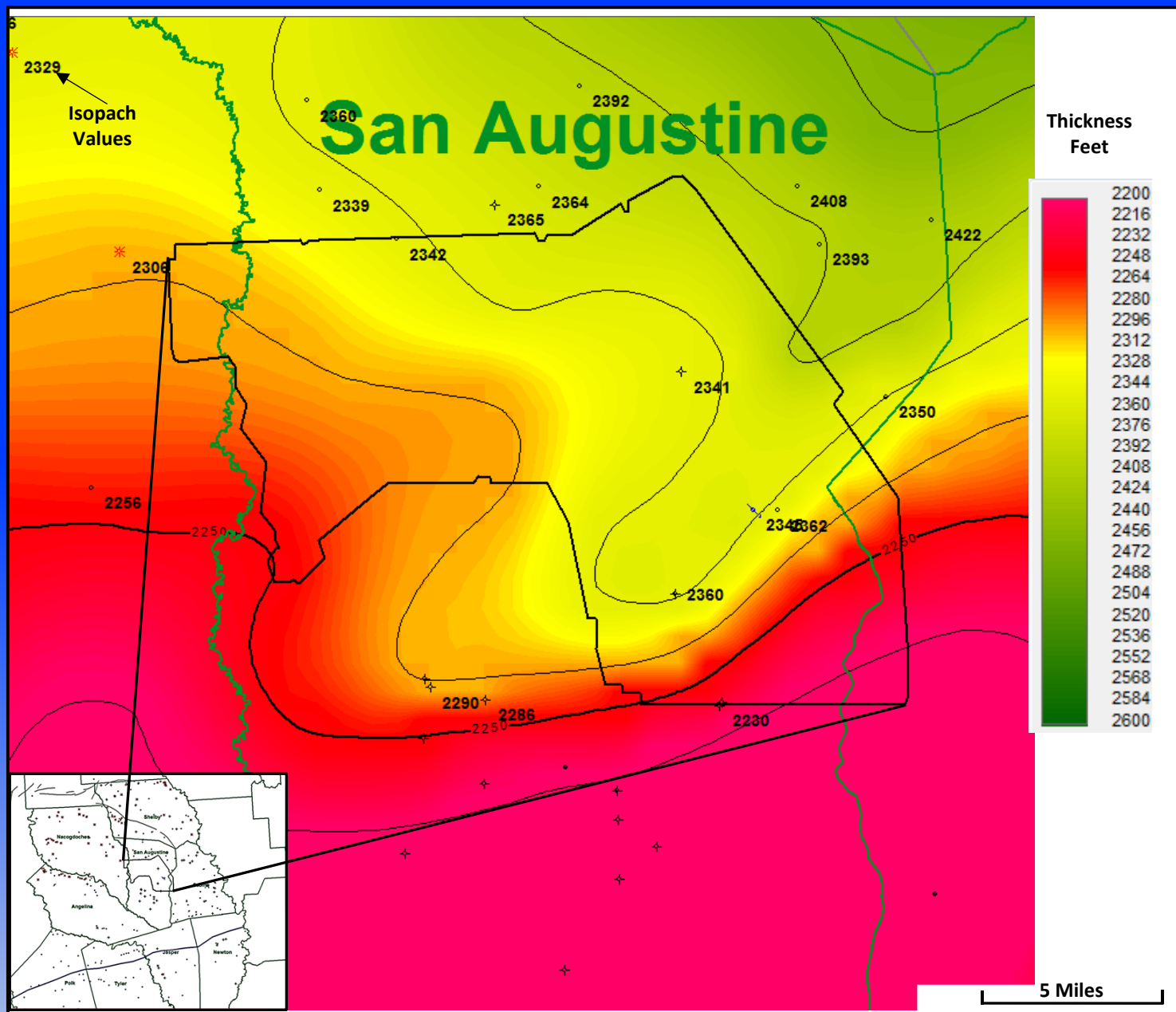




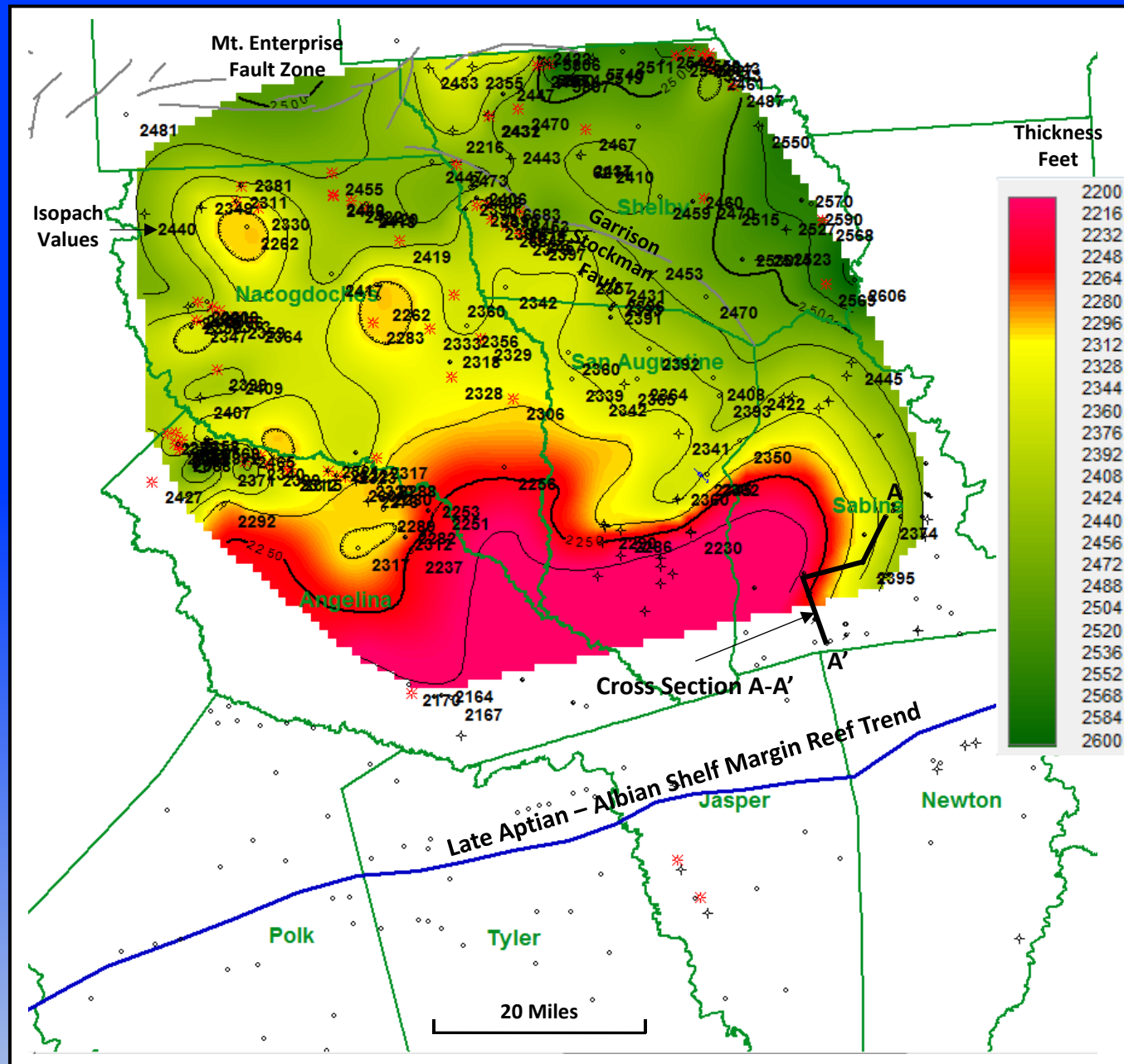
Isochron: James Lime To Paluxy Shale



Isopach: James Lime To Paluxy Shale



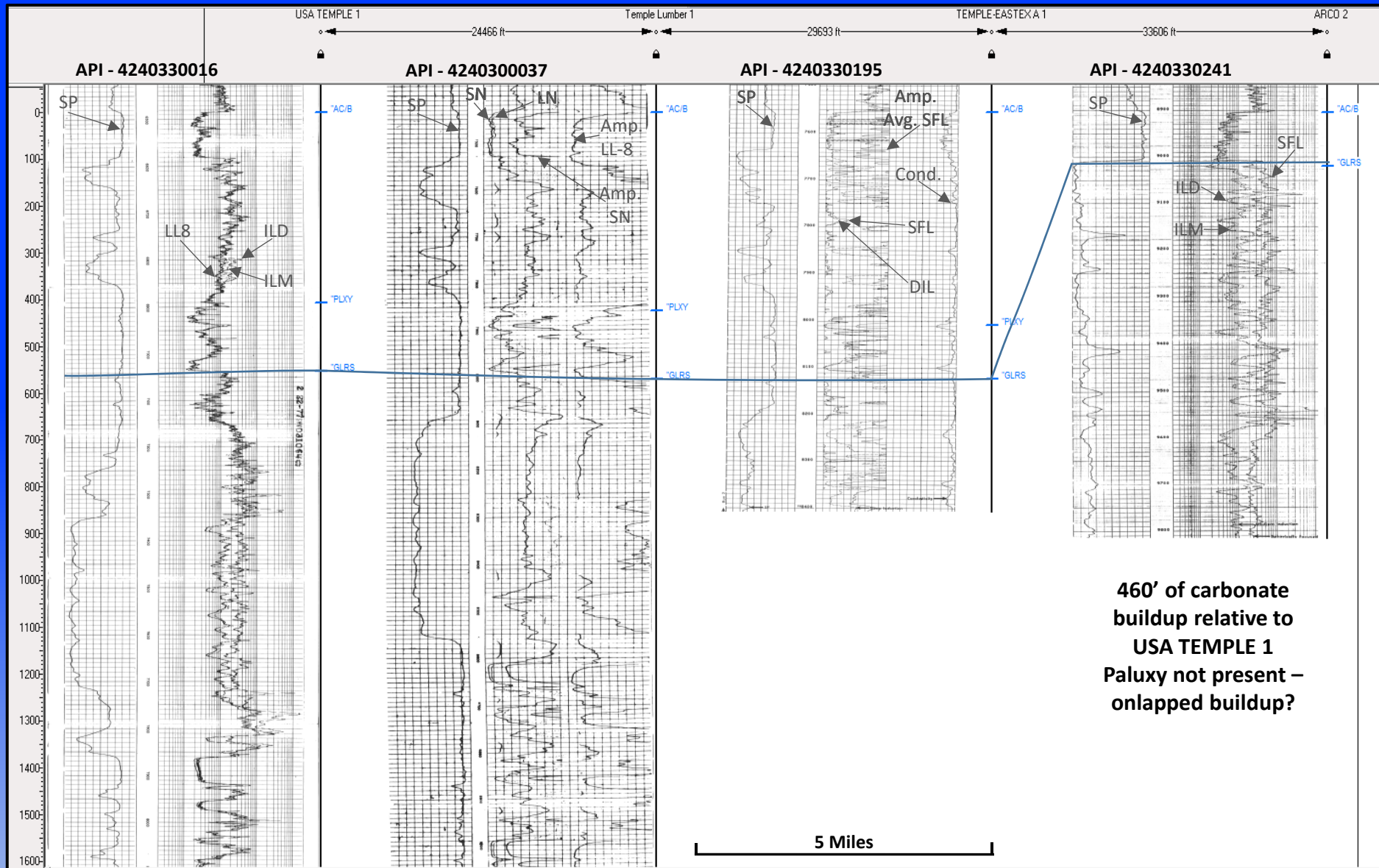
Isopach: James Lime To Paluxy Shale

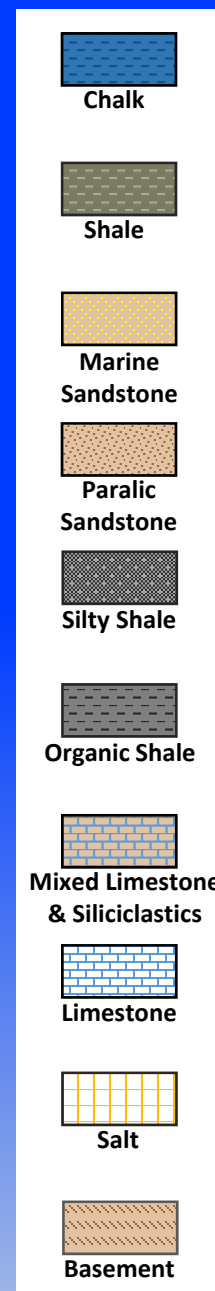
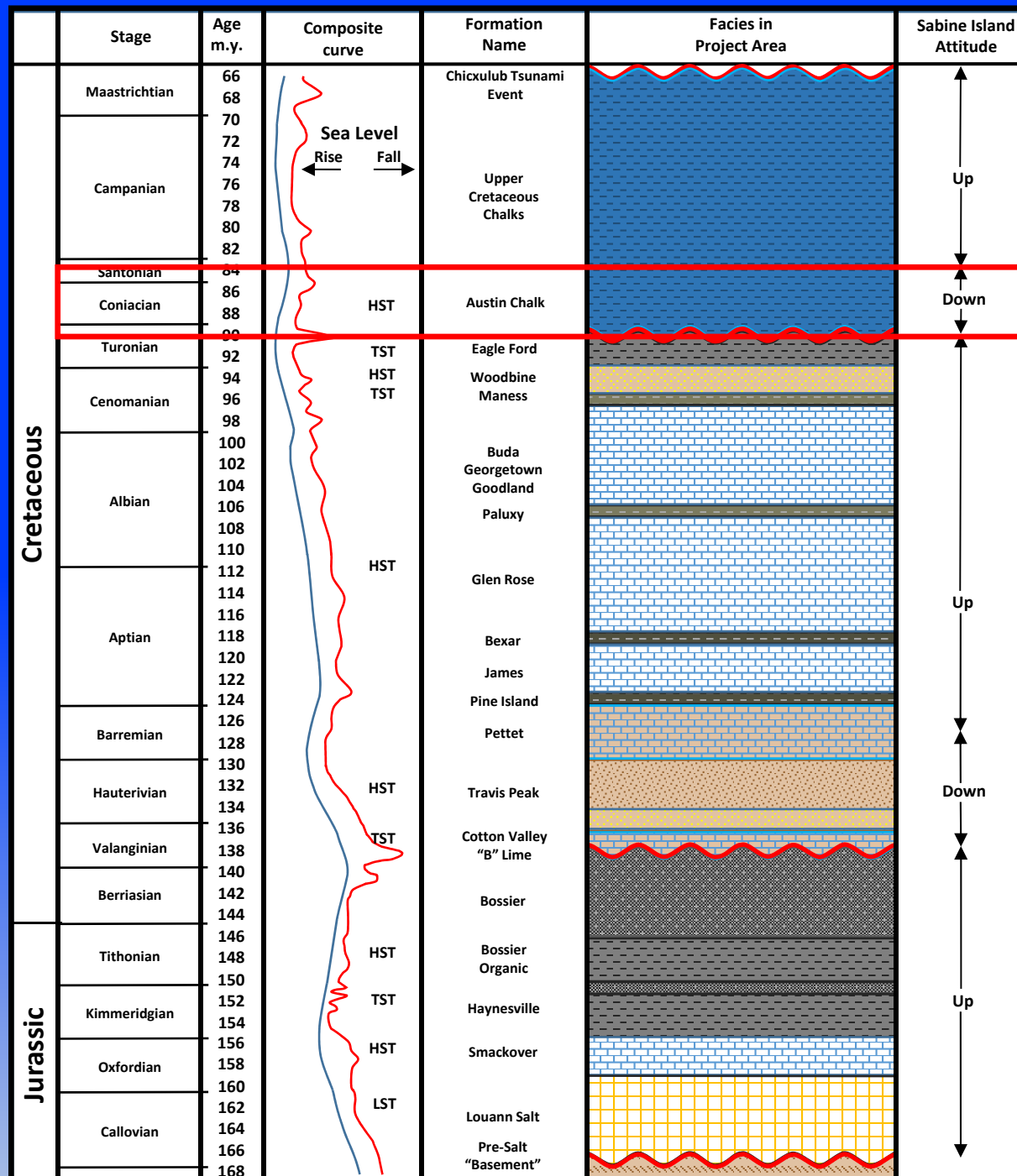


Cross Section A-A' Flattened On Base Austin Chalk

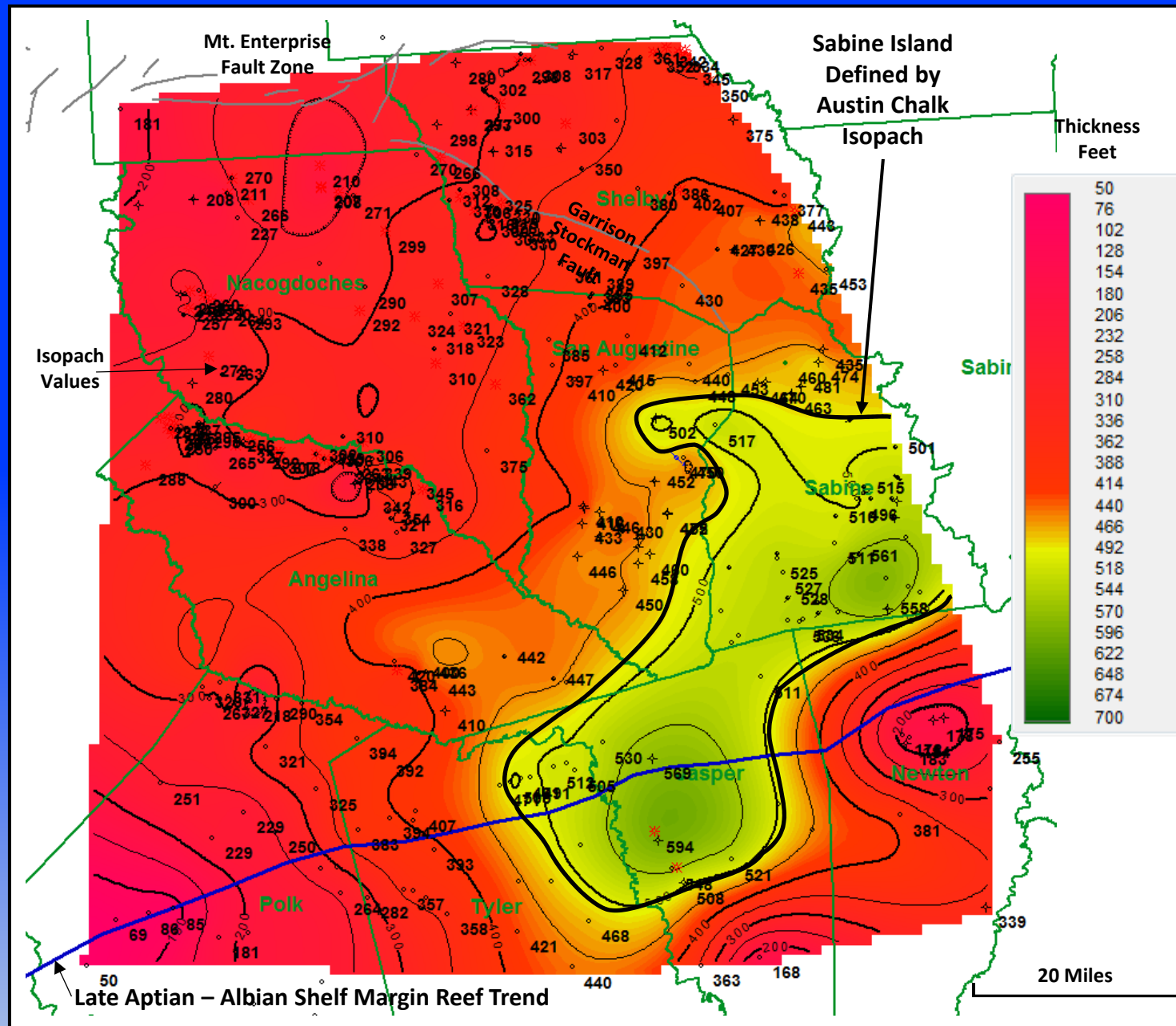
N

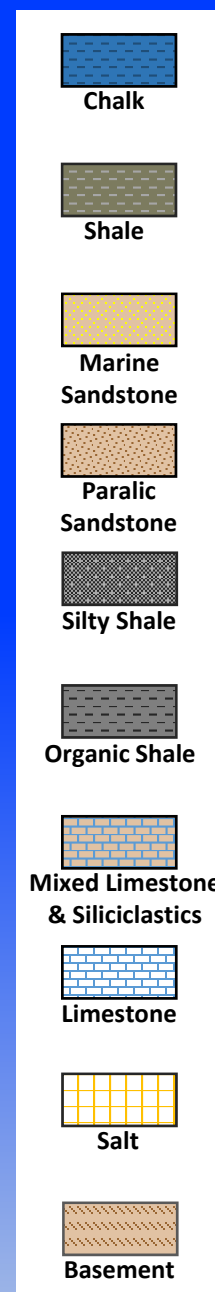
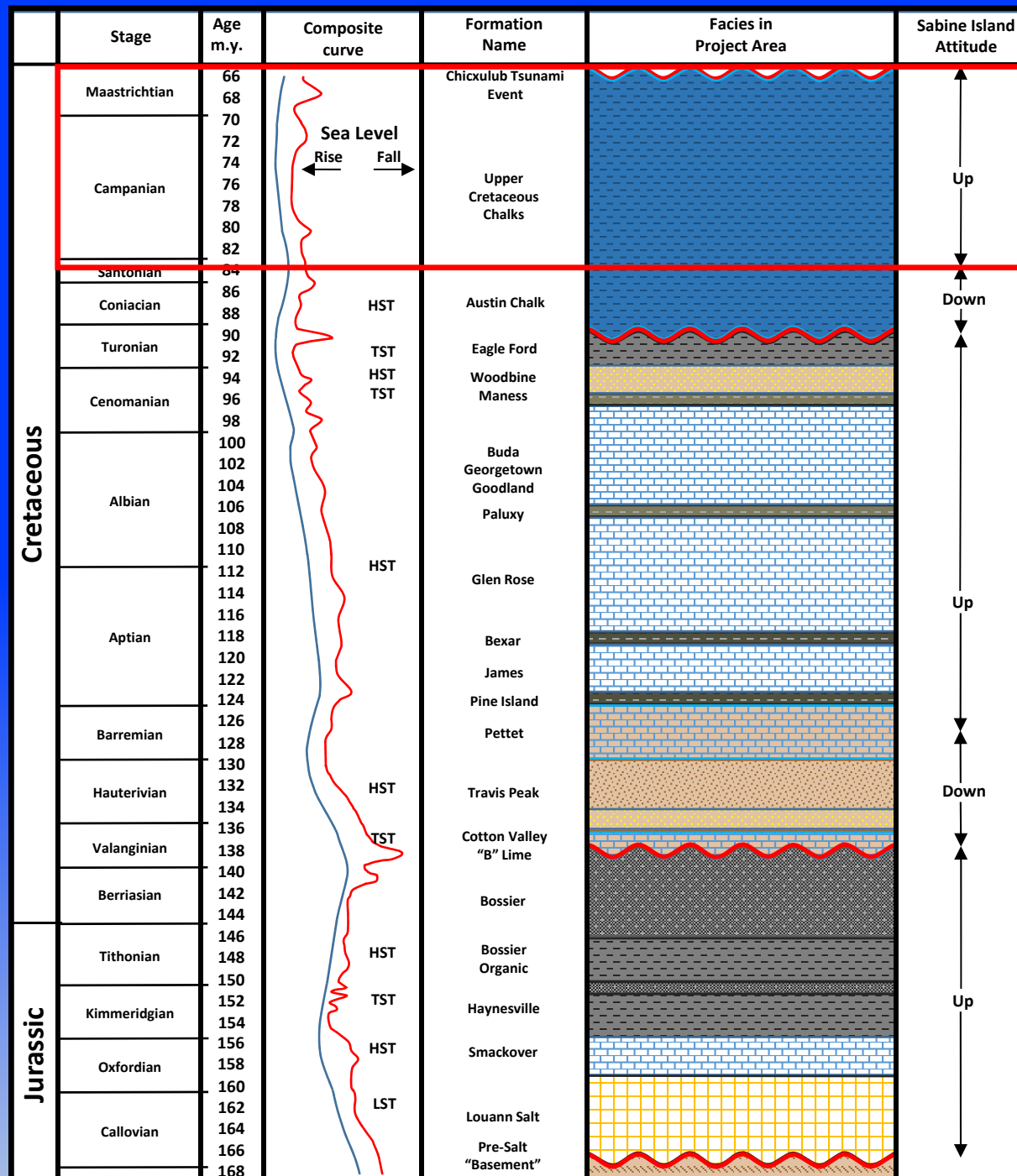
S



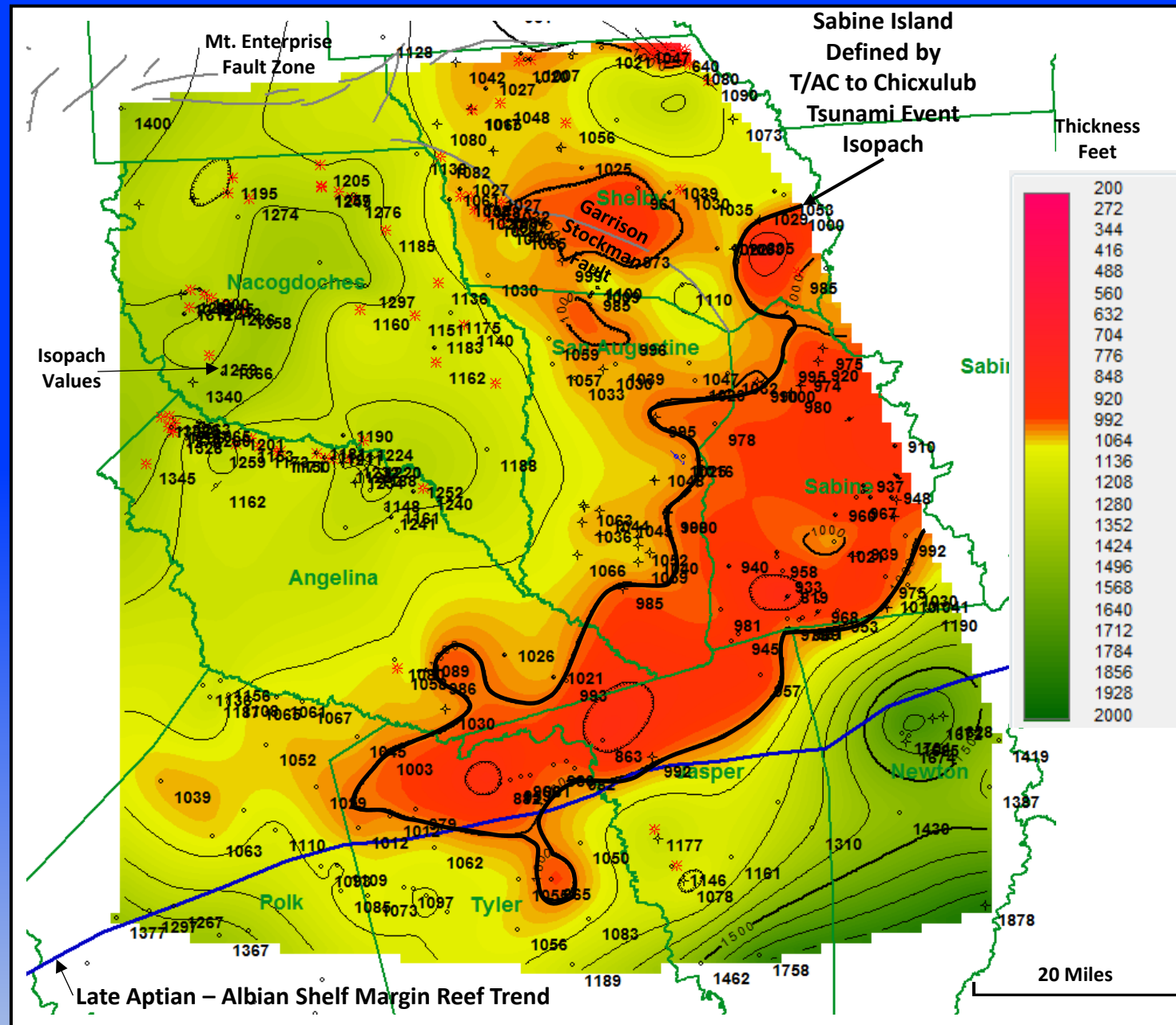


Isopach: Base Austin Chalk To Top Austin Chalk



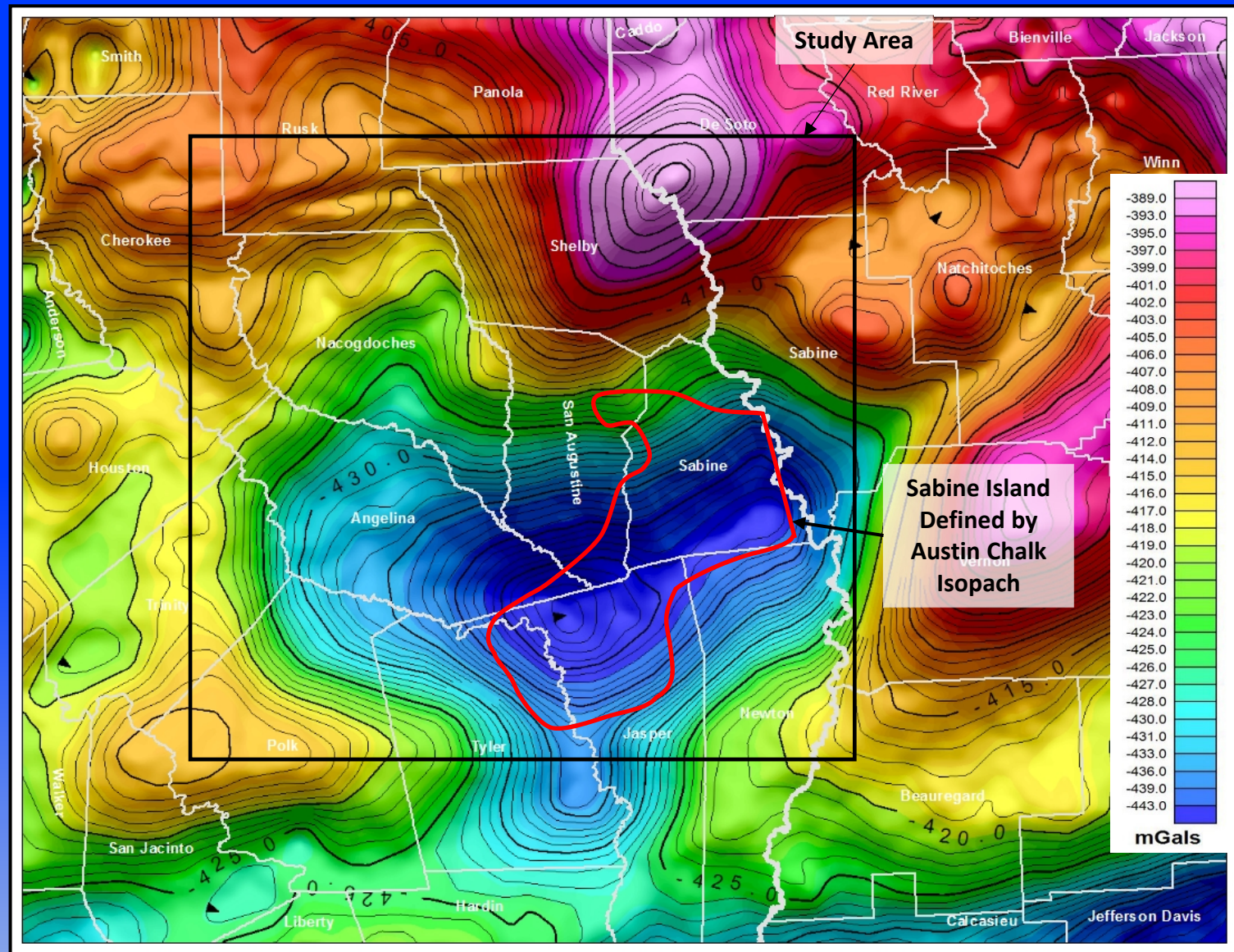


Isopach: Top Austin Chalk To Chicxulub Tsunami Event

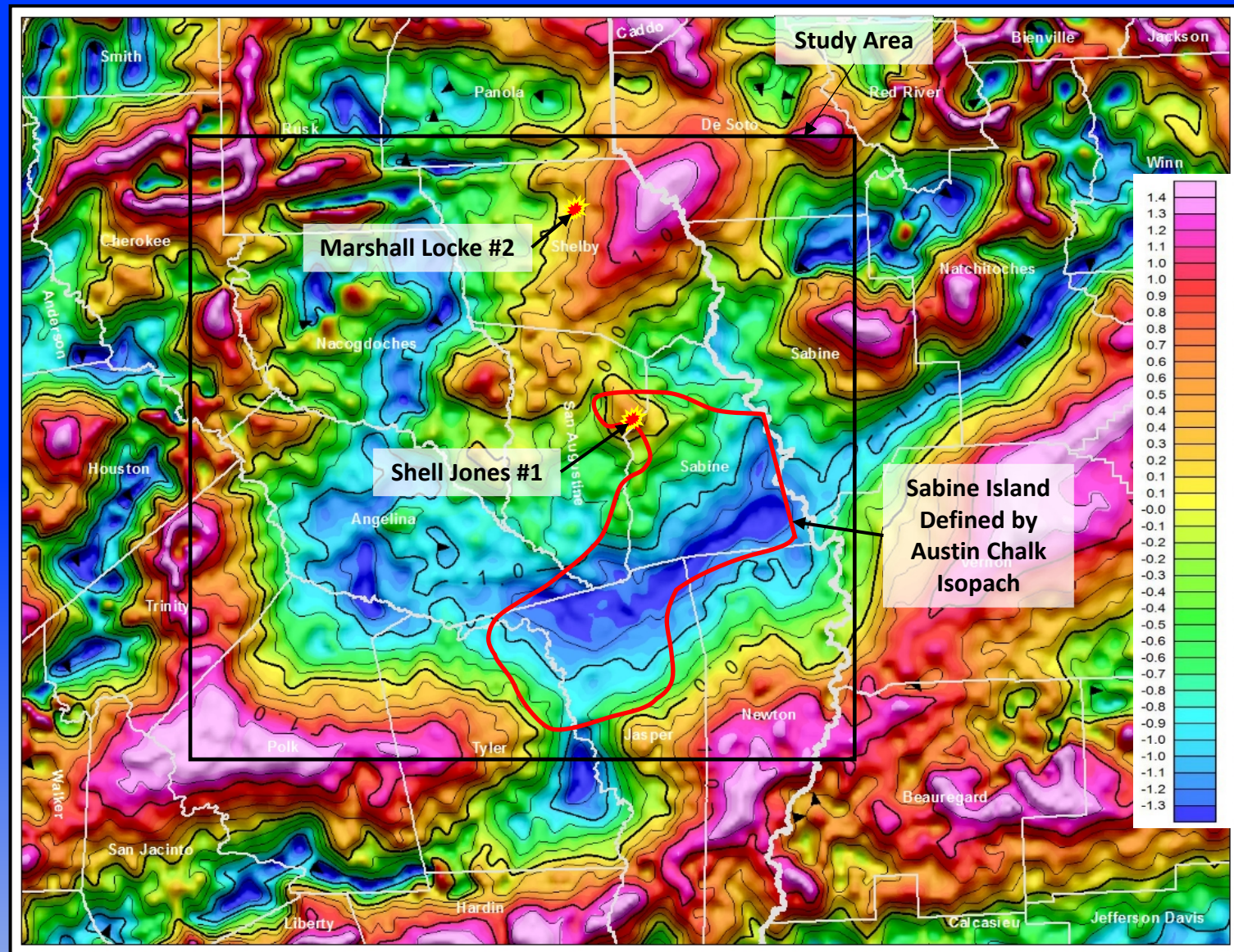


Gravity
Data

Isostatic Residual Gravity Anomaly



Gravity Tilt Derivative



Conclusions

- The Pre-Louann Salt topography was not a peneplain
- Sabine Island Movement
 - Up from Louann Salt through Valanginian unconformity
 - Down during Travis Peak deposition
 - Up from Pettet/James through Base Austin Chalk Unconformity
 - Down during Austin Chalk deposition
 - Up at the time of the Chicxulub tsunami event
 - Down during Midway deposition: Broussard
- May have deep-seated origins

Acknowledgements:

- Richard L. Adams
- Duane Pierce, Blackstone Minerals
- Seitel Inc.
- WhiteStar Corporation
- Robert Neese, Gravity Map Service
- Gary Thompson, Thompson Solutions LLC
- Kevin Broussard, MS Geology student ULL
- William A. Ambrose, Bureau of Economic Geology