Figure 4. Northwest-southeast structural cross section through Sandoval County. See Figure 2 for location.

New Mexico Bureau of Geology and Mineral Resources
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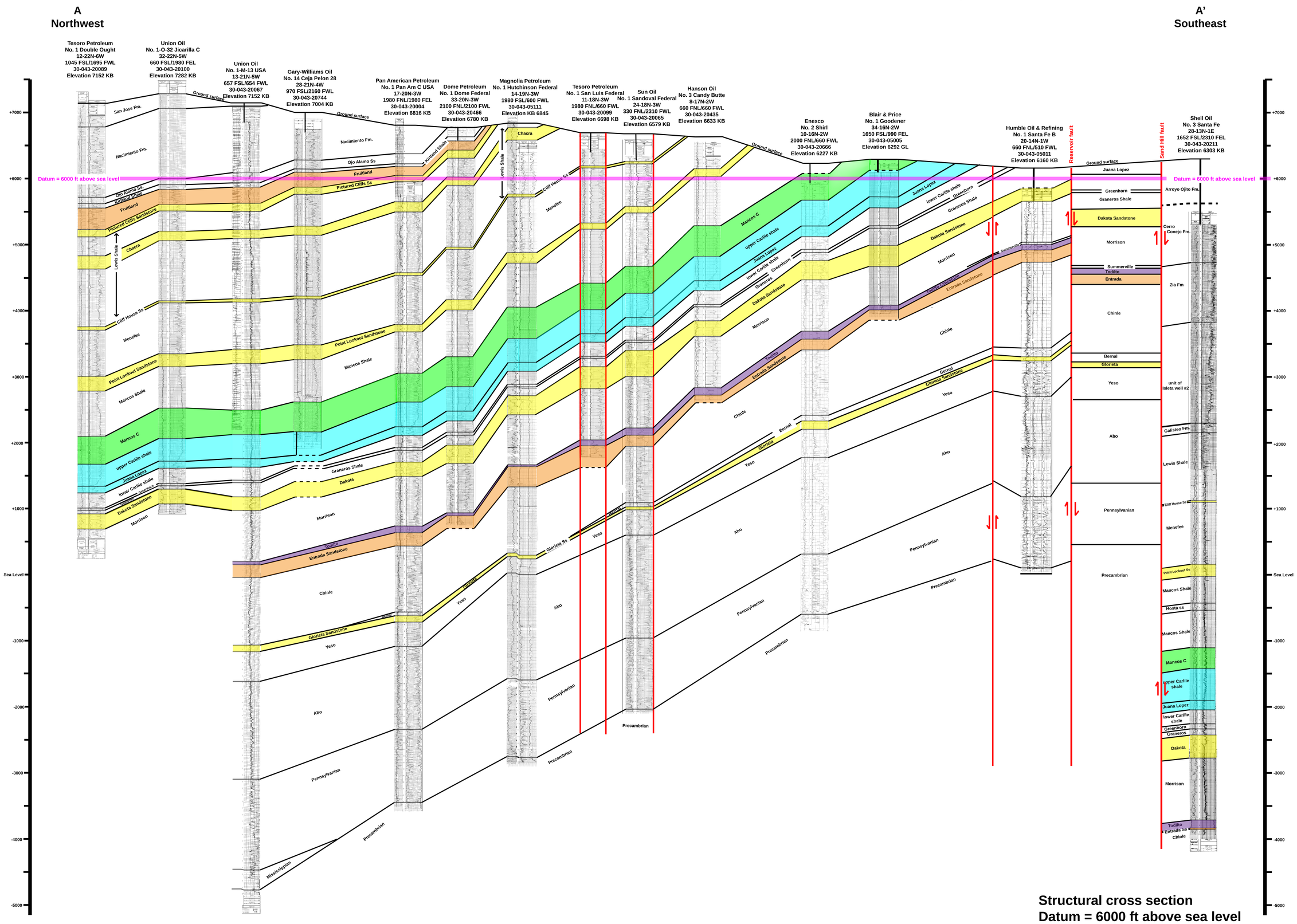
Sandoval County Project



Structural cross section
Datum = 6000 ft above sea level

R. Broadhead 3/2018

Figure 5. West-east structural cross section through Sandoval County. See Figure 2 for location.

New Mexico Bureau of Geology and Mineral Resources
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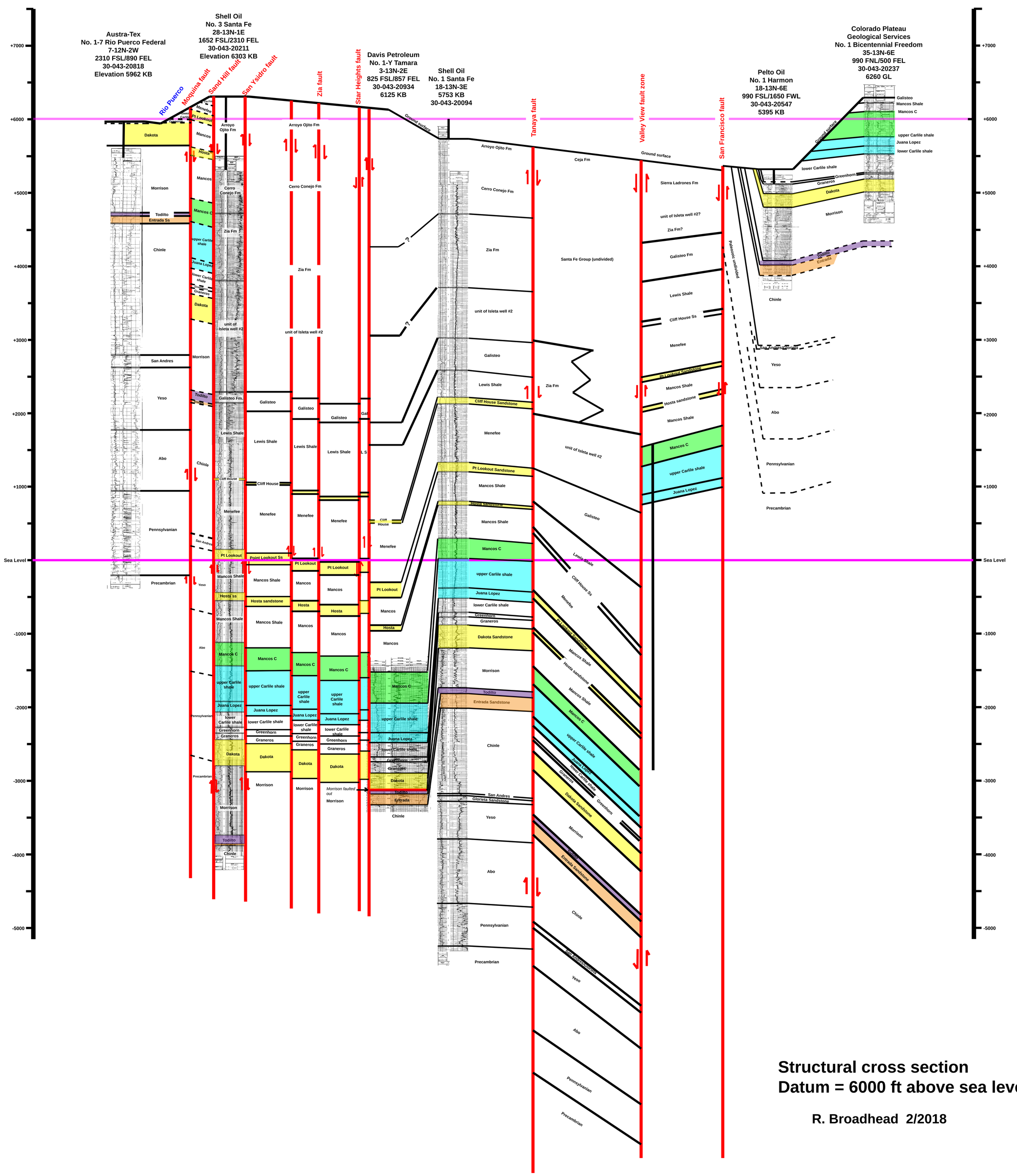
Sandoval County Project



Structural cross section
Datum = 6000 ft above sea level

R. Broadhead 2/2018

Figure 6. Structure contours on Mancos C. Contours are in feet with respect to sea level.
For well data utilized in making this map, see database ***Sandovalwells.xls*** in Appendix B.

Mancos C Structure

04/26/2018

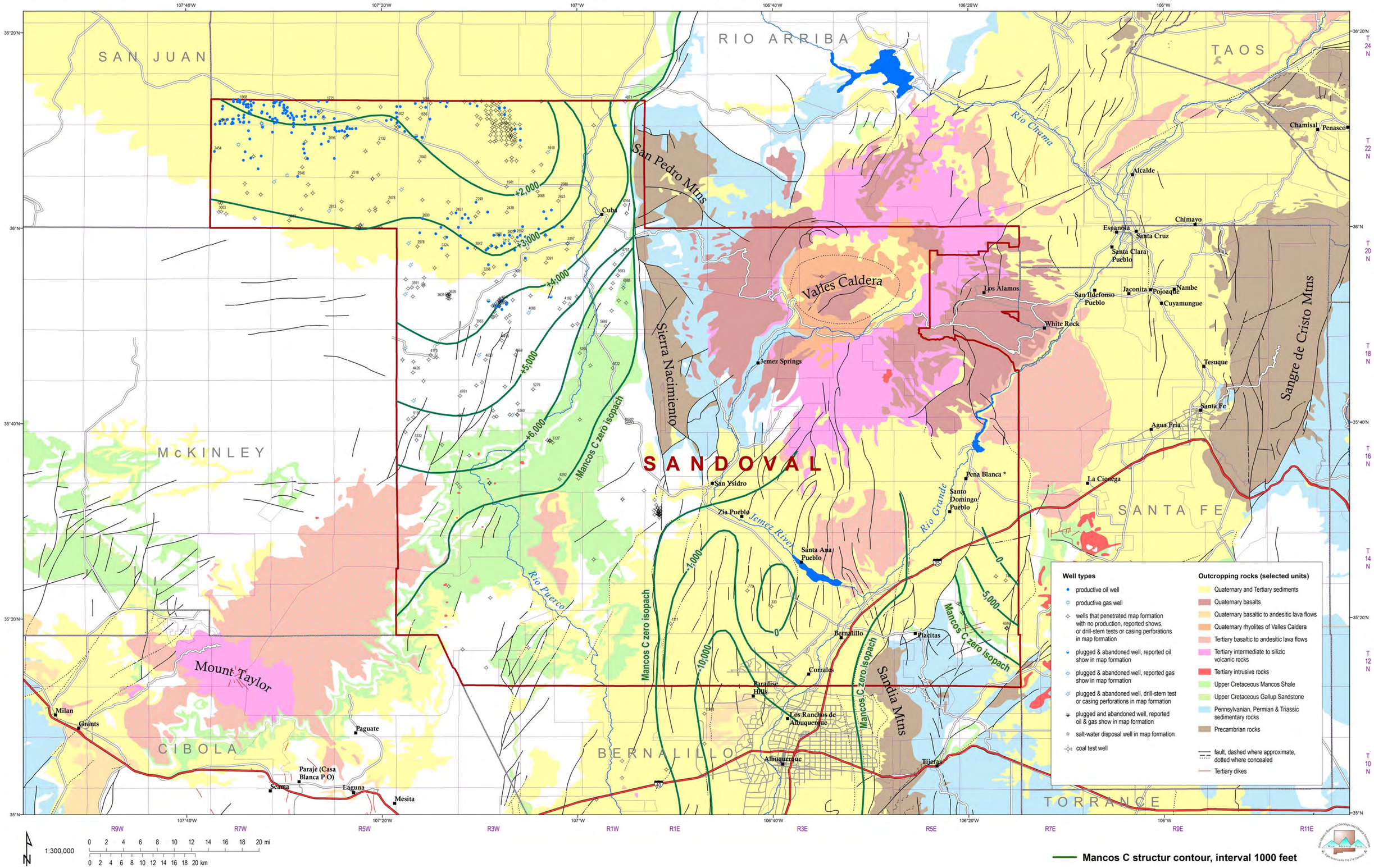


Figure 7. Contours of depth to top of Mancos C. For well data utilized in making this map, see database ***Sandovalwells.xls in Appendix B.***

Depth to Mancos C

04/26/2018

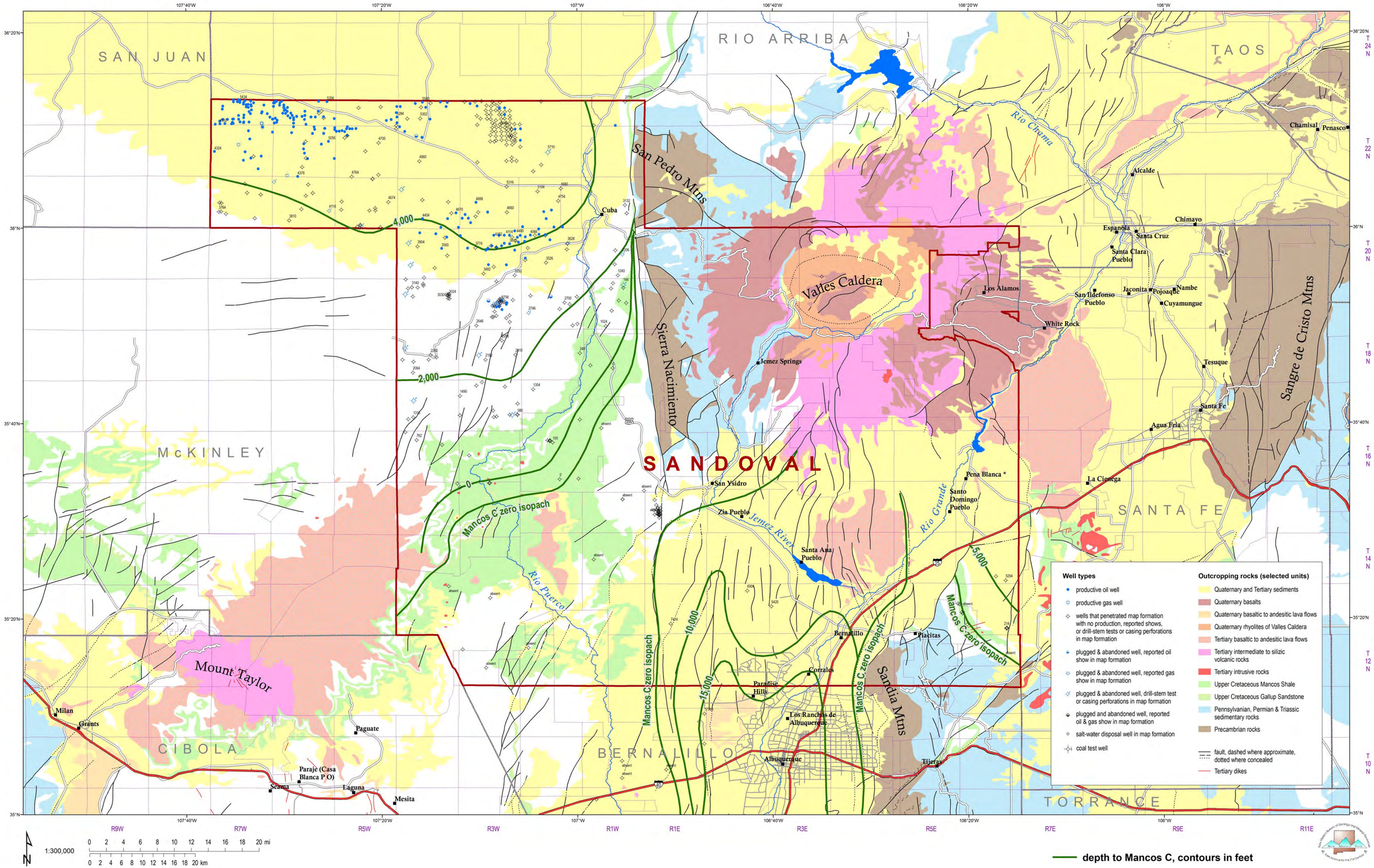


Figure 8. Contours of thickness of Tertiary strata in Sandoval County. Contours are in feet. For well data utilized in making this map, see database ***Sandovalwells.xls*** in Appendix B.

Thickness of Tertiary strata

04/27/2018

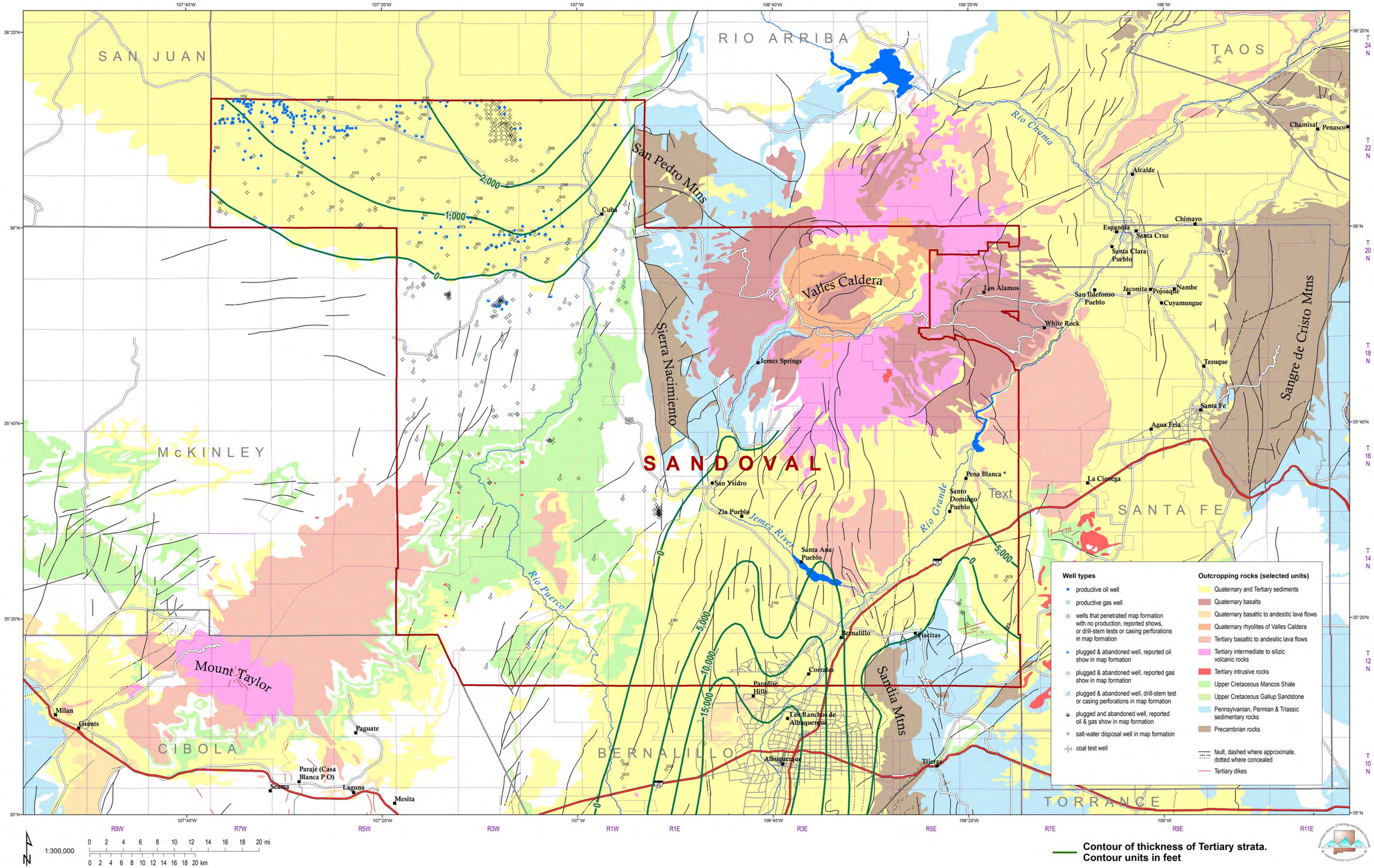


Figure 9. Wells that have penetrated the Fruitland Formation or, where the Fruitland is not present, older strata in Sandoval County, indicating wells productive of gas from the Fruitland. Outcrop of Fruitland shown in green.

Fruitland penetrations and productive wells

04/25/2018

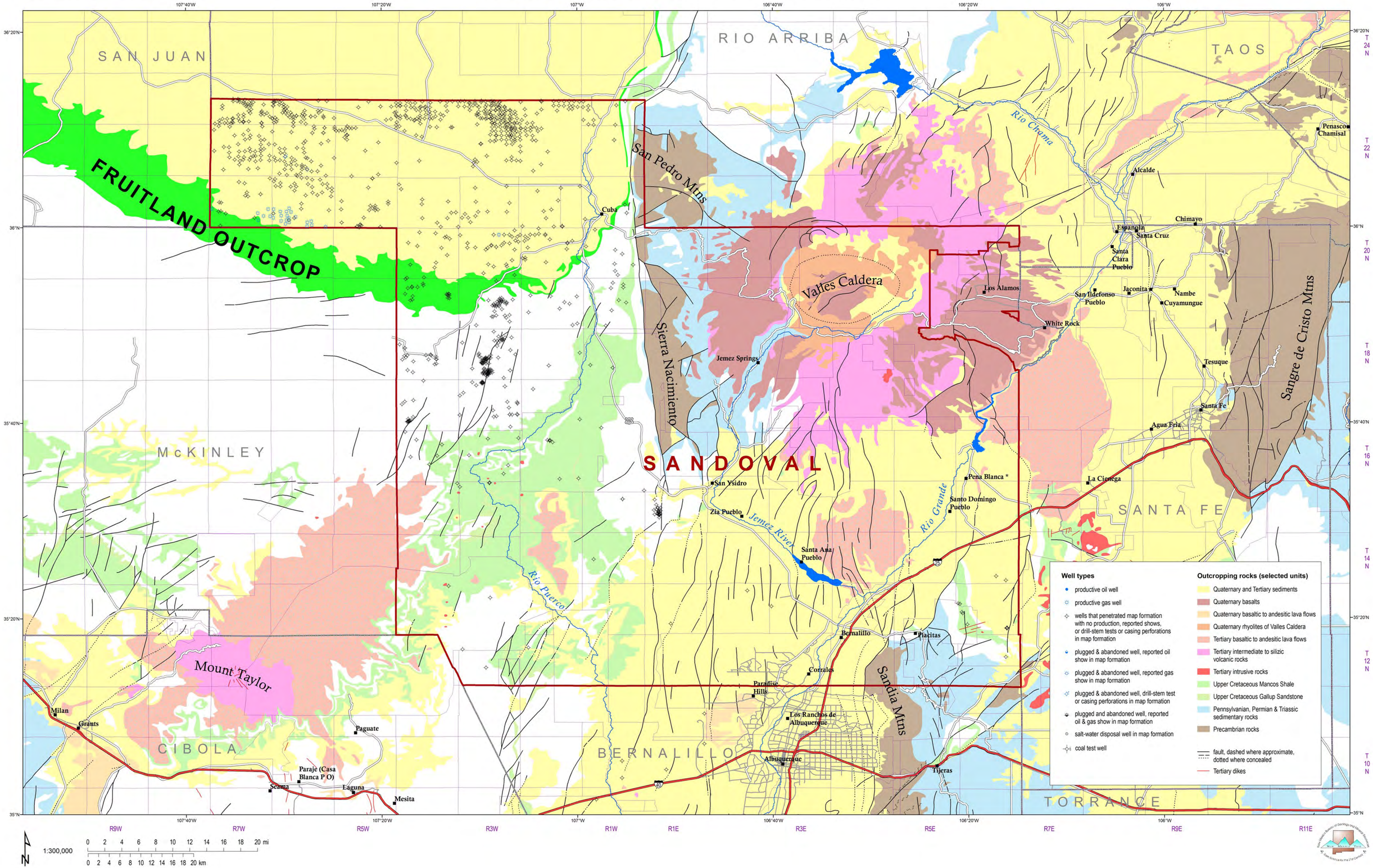


Figure 10. Wells that have penetrated the Pictured Cliffs Sandstone or, where the Pictured Cliffs is not present, older strat in Sandoval County, indicating wells productive of gas from the Pictured Cliffs and unproductive wells that have drill-stem tests or casing perforations in the Pictured Cliffs. Outcrop of Pictured Cliffs shown in green.

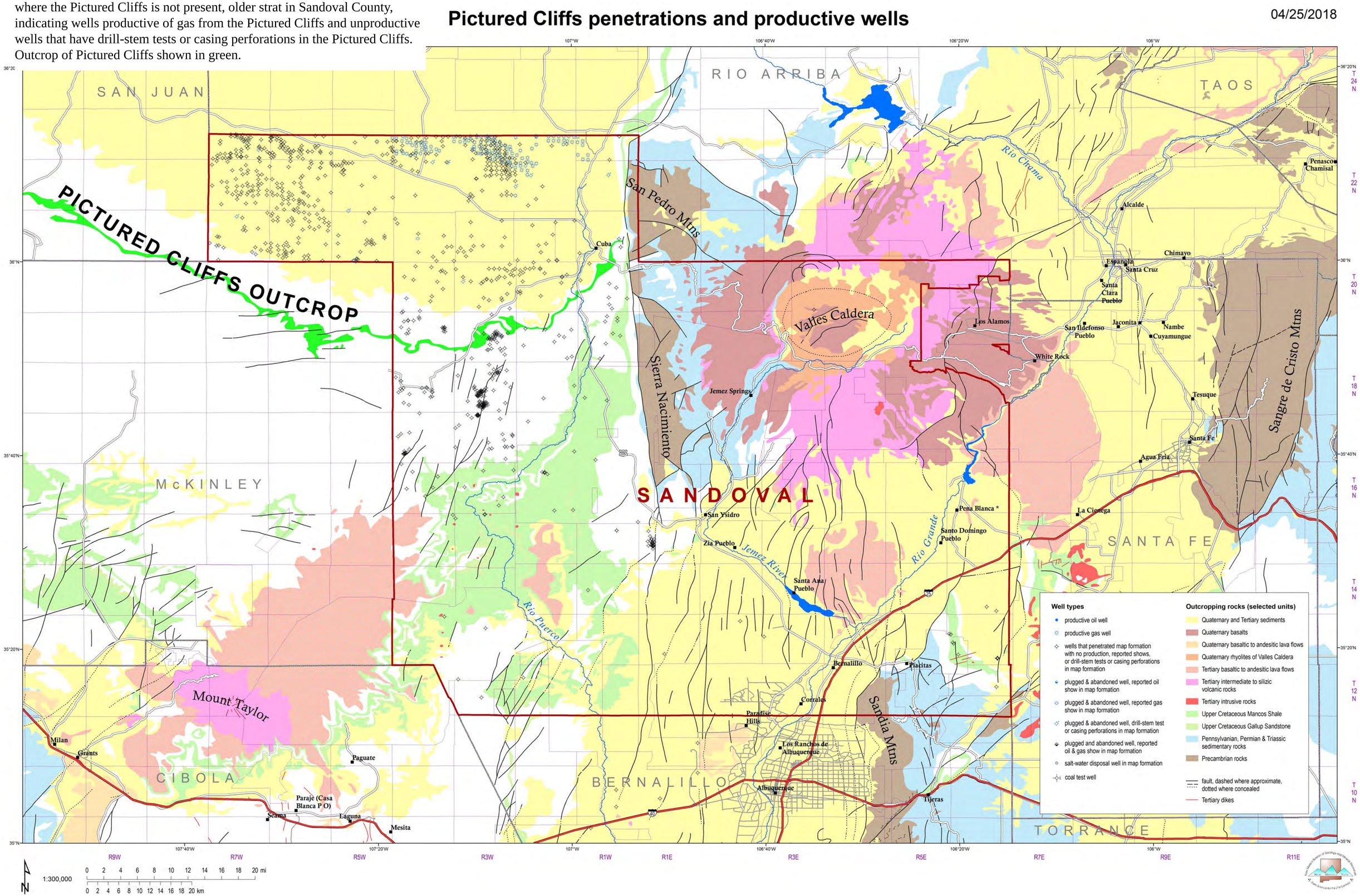


Figure 11. Wells that have penetrated the Chacra sandstones of the Lewis Shale or, where the Lewis is not present, older strat in Sandoval County, indicating wells productive of gas from the Chacra, unproductive wells with gas shows in the Chacra, and unproductive wells that have drill-stem tesst or casin perforations in the Chacra. Outcrop of Lewis Shale shown in green.

Chacra (Lewis) penetrations and productive wells

04/25/2018

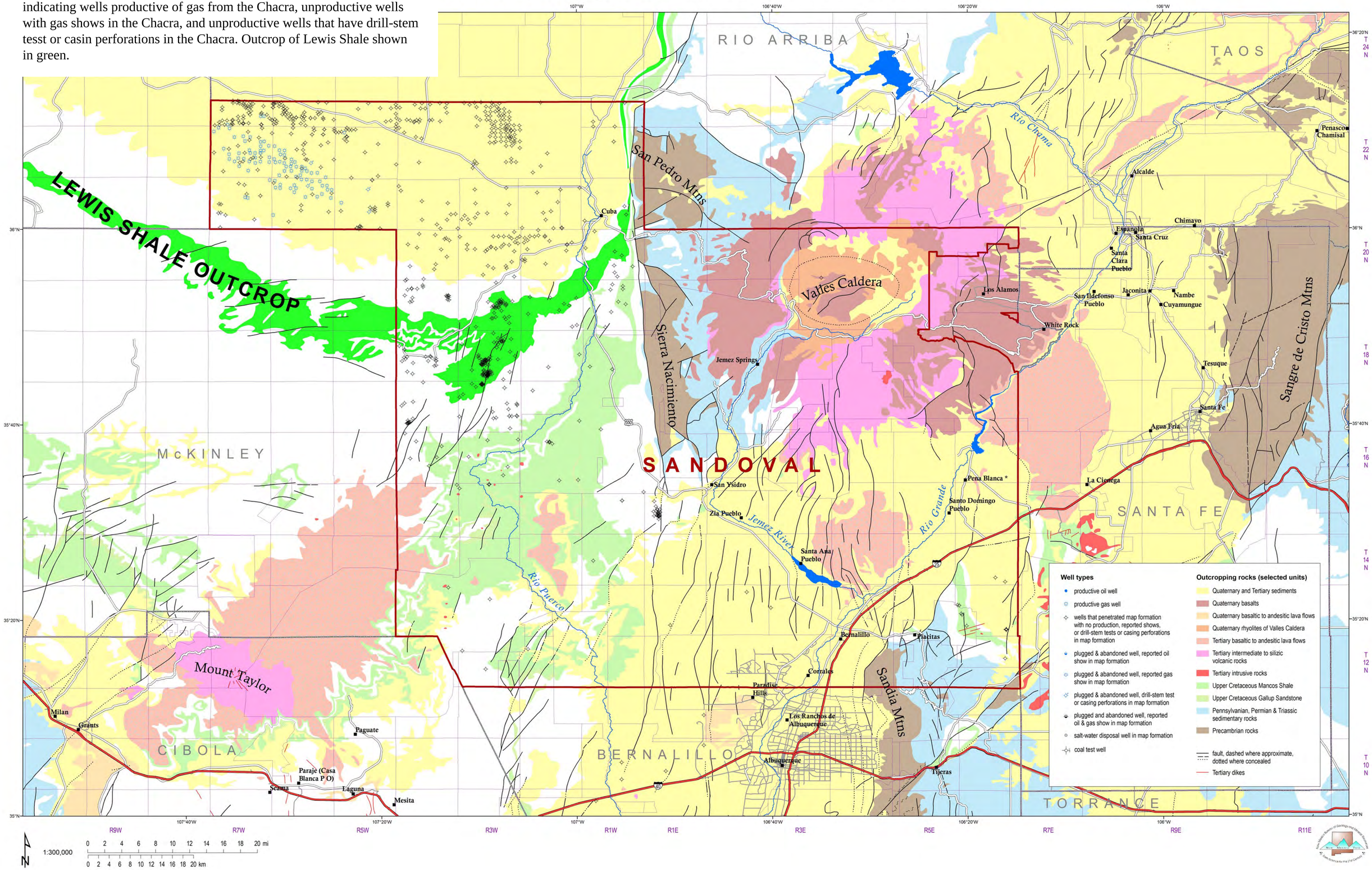


Figure 12. Wells that have penetrated the Menefee Formation or, where the Menefee is not present, older strata in Sandoval County, indicating wells productive of oil from the Menefee, unproductive wells with oil shows in the Menefee, and unproductive wells that have drill-stem tests of casing perforations in the Menefee. Outcrop of Menefee shown in green.

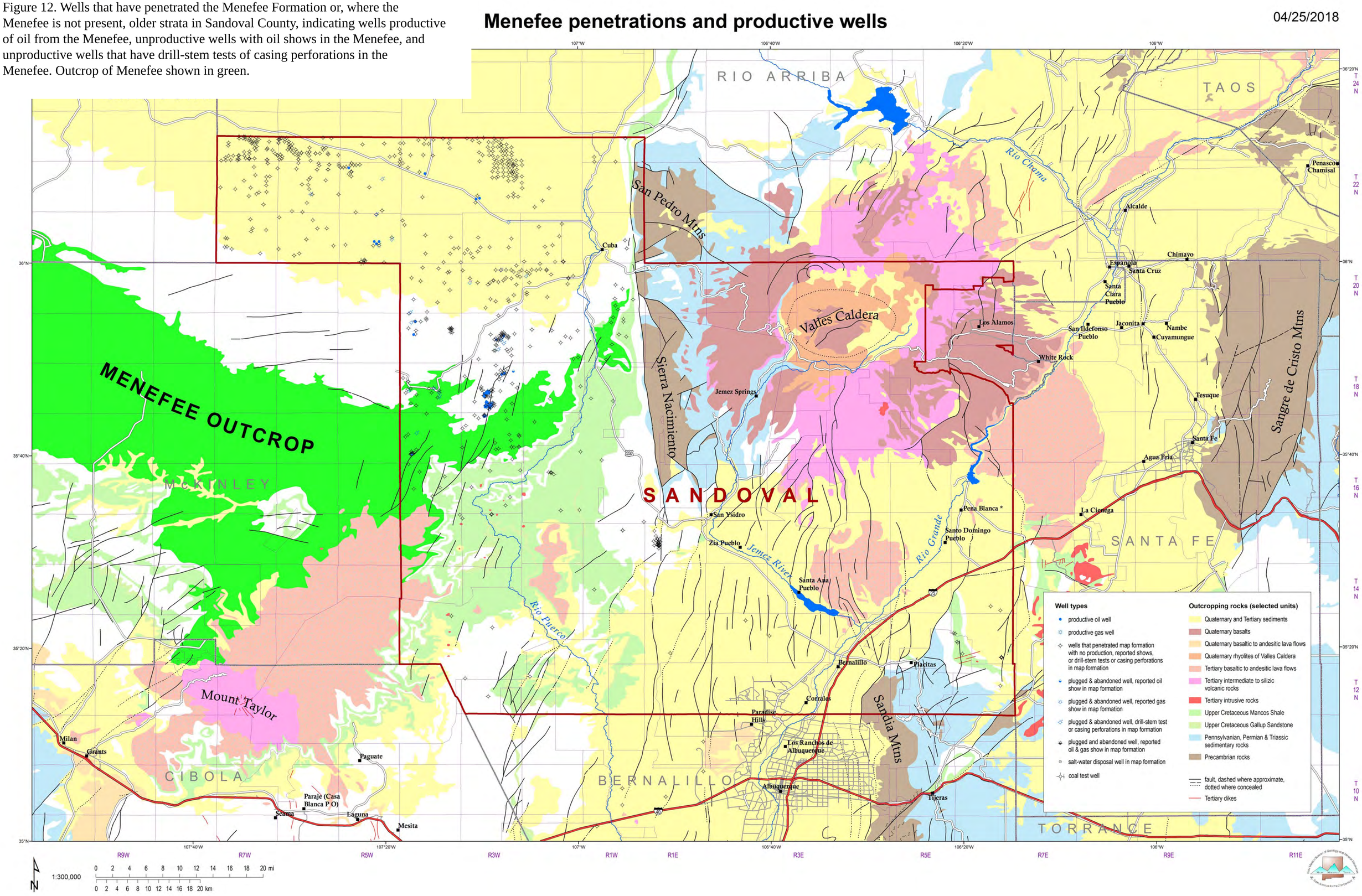


Figure 13. Wells that have penetrated the Upper Mancos Shale or, where the Upper Mancos is not present, older strata in Sandoval County, indicating wells productive of oil from the Upper Mancos, unproductive wells with oil shows in the Upper Mancos, and unproductive wells that have drill-stem tests or casing perforations in the Upper Mancos. Outcrop of Mancos Shale shown in green.

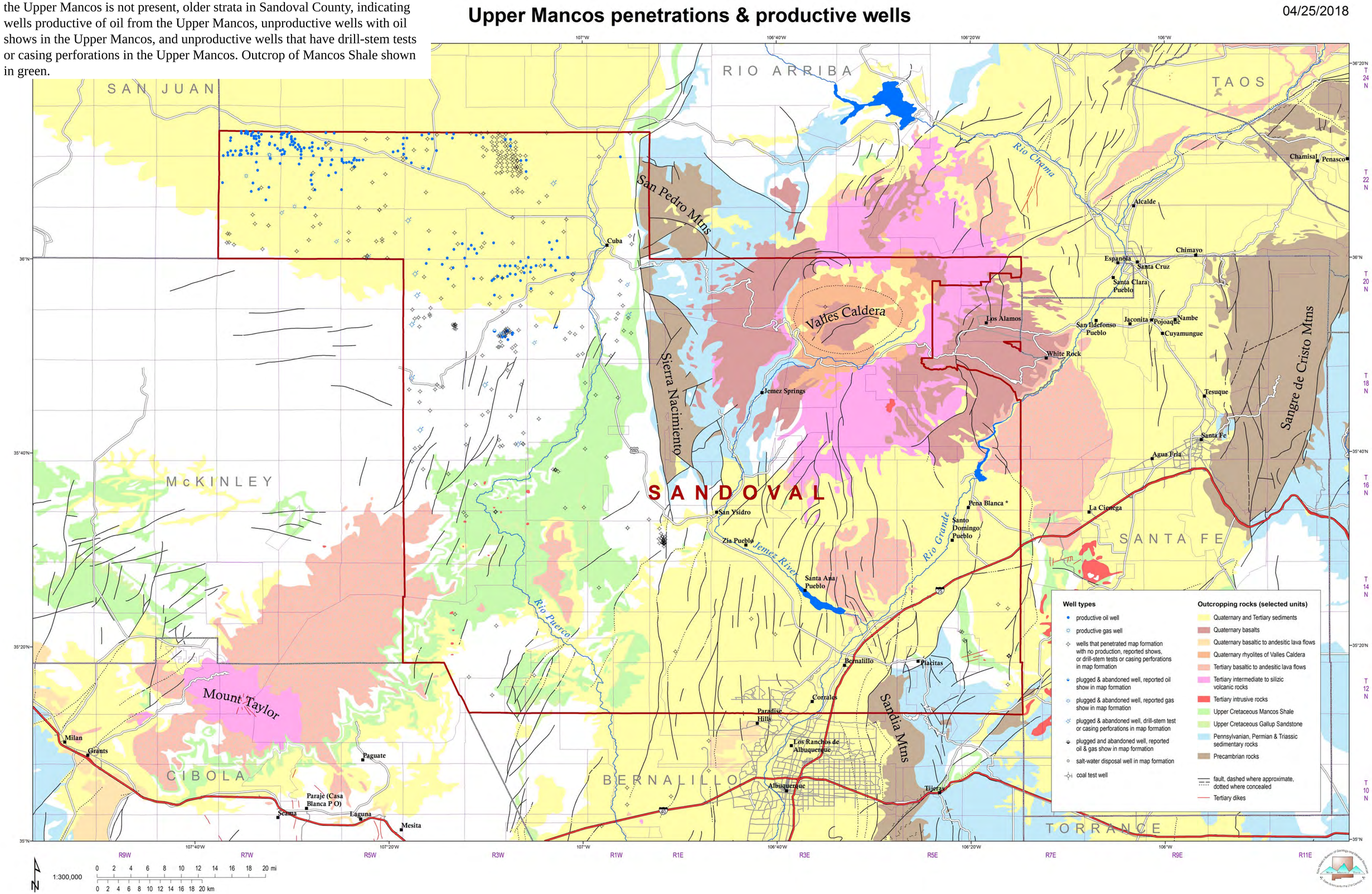


Figure 14. Contours of thickness of Mancos C. Contours are in feet.
Also shown are wells of Figure 13.

Thickness of Mancos C

04/27/2018

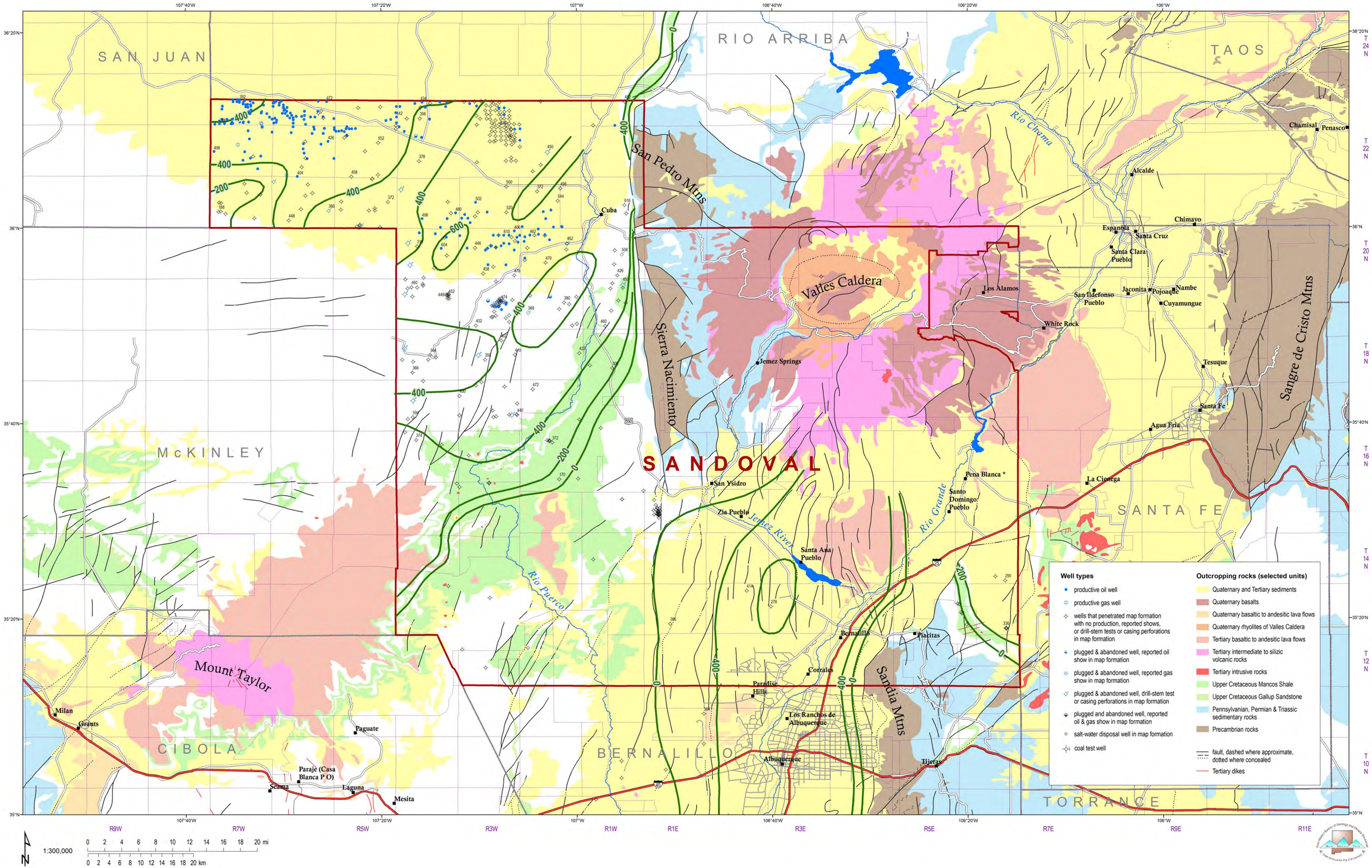


Figure 15. Wells that have penetrated the Lower Mancos Shale or, where the Lower Mancos is not present, older strata in Sandoval County, indicating wells productive of oil from the Lower Mancos, unproductive wells with oil shows in the Lower Mancos, and unproductive wells that have drill-stem tests or casing perforations in the Lower Mancos. Outcrop of Mancos Shale shown in green.

Lower Mancos Shale penetrations and productive wells

04/25/2018

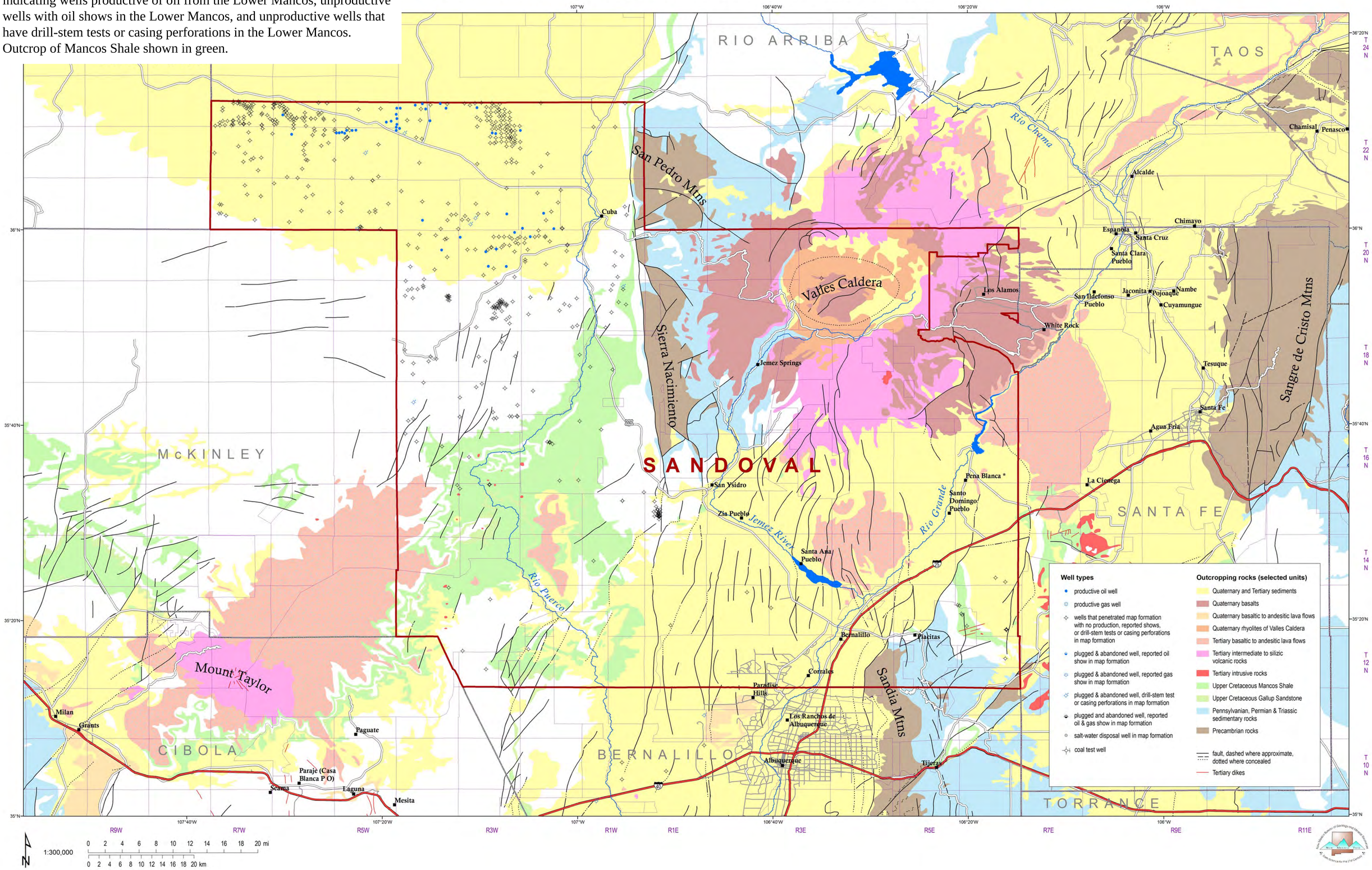


Figure 16. Wells that have penetrated the Dakota Sandstone or, where the Dakota is not present, older strata in Sandoval County, indicating wells productive of oil from the Dakota and unproductive wells that have drill-stem tests or casing perforations in the Dakota. Outcrop of Dakota shown in bright green.

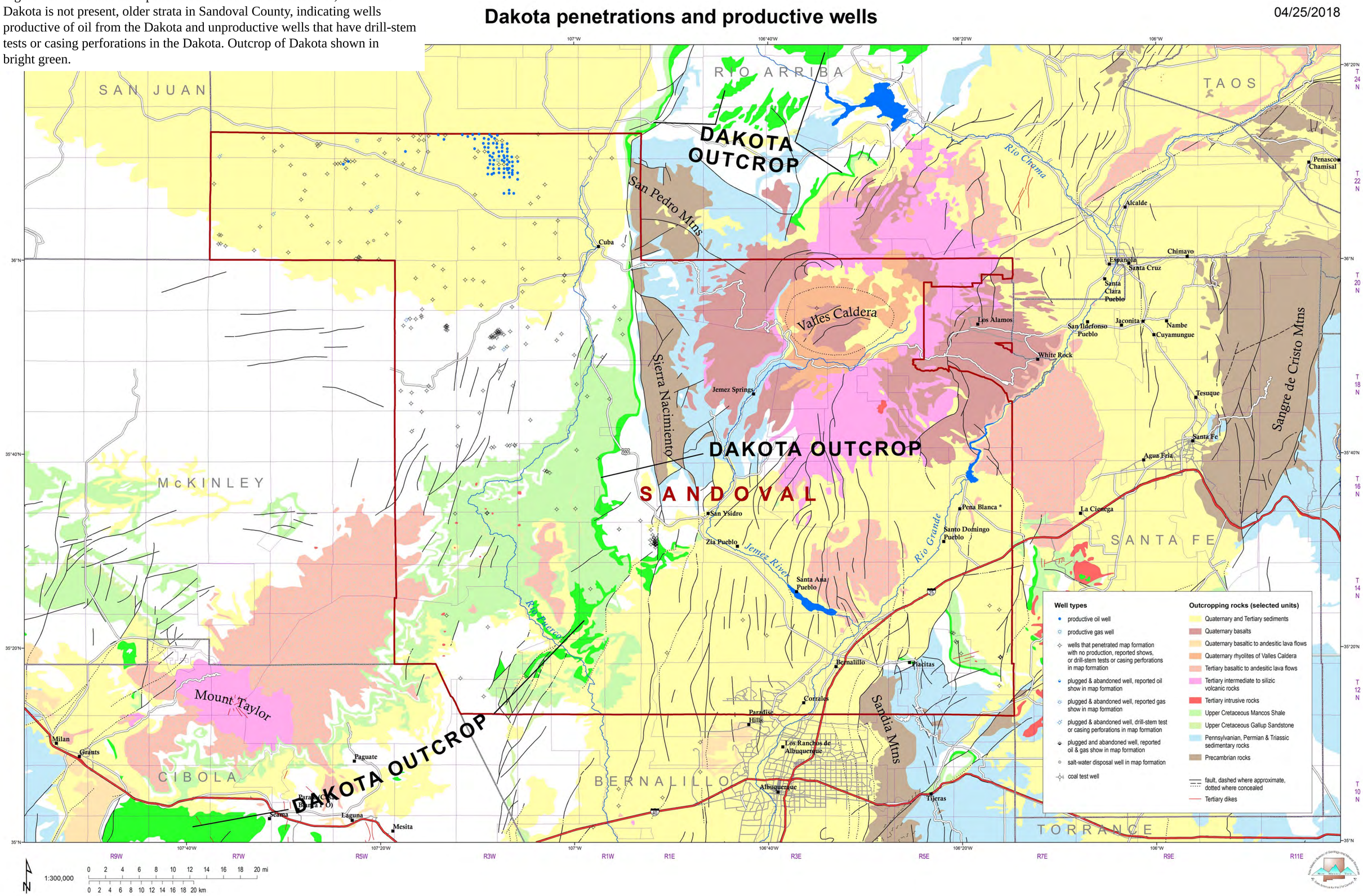


Figure 17. Wells that have penetrated the Entrada Sandstone or, where the Entrada is not present, older strata in Sandoval County, indicating wells productive of oil from the Entrada, unproductive wells with oil shows in the Entrada, and unproductive wells that drill-stem tests or casing perforations in the Entrada. Outcrop of Entrada Sandstone and overlying Todilto Formation shown in bright green.

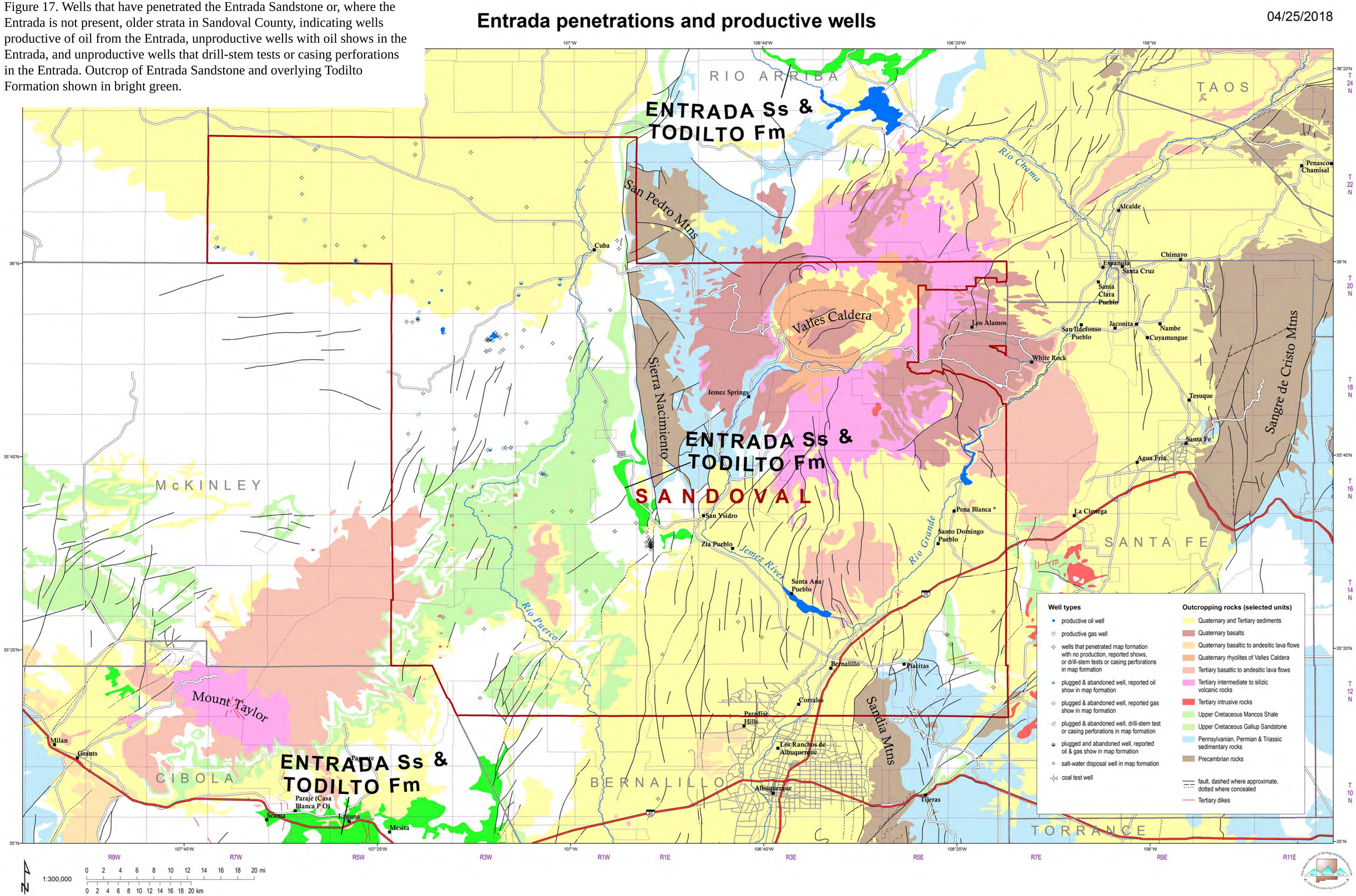


Figure 18. Thermal maturity map of kerogens in Upper Mancos Shale. See database ***Sandovalsrcrks.xls*** in Appendix B for supporting petroleum source rock analytical data. Shown are wells of Figure 13. Outcrop of Mancos Shale shown in green.

Upper Mancos thermal maturity

04/26/2018

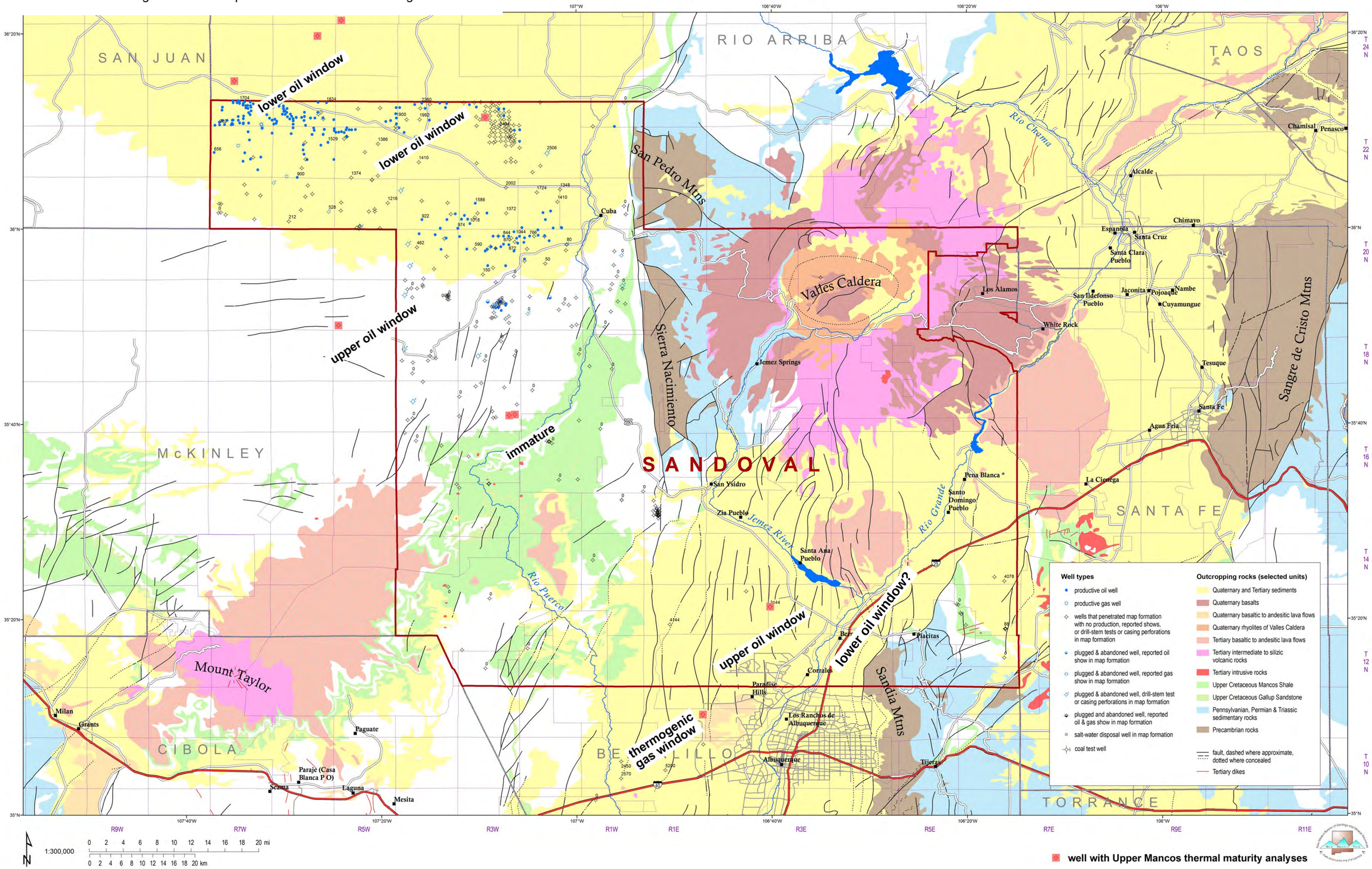


Figure 19. Thermal maturity map of kerogens in Lower Mancos Shale. See database ***Sandovalsrcrks.xls*** in Appendix B for supporting petroleum source rock analytical data. Shown are well of Figure 15. Outcrop of Mancos Shale shown in green.

Lower Mancos thermal maturity

04/26/2018

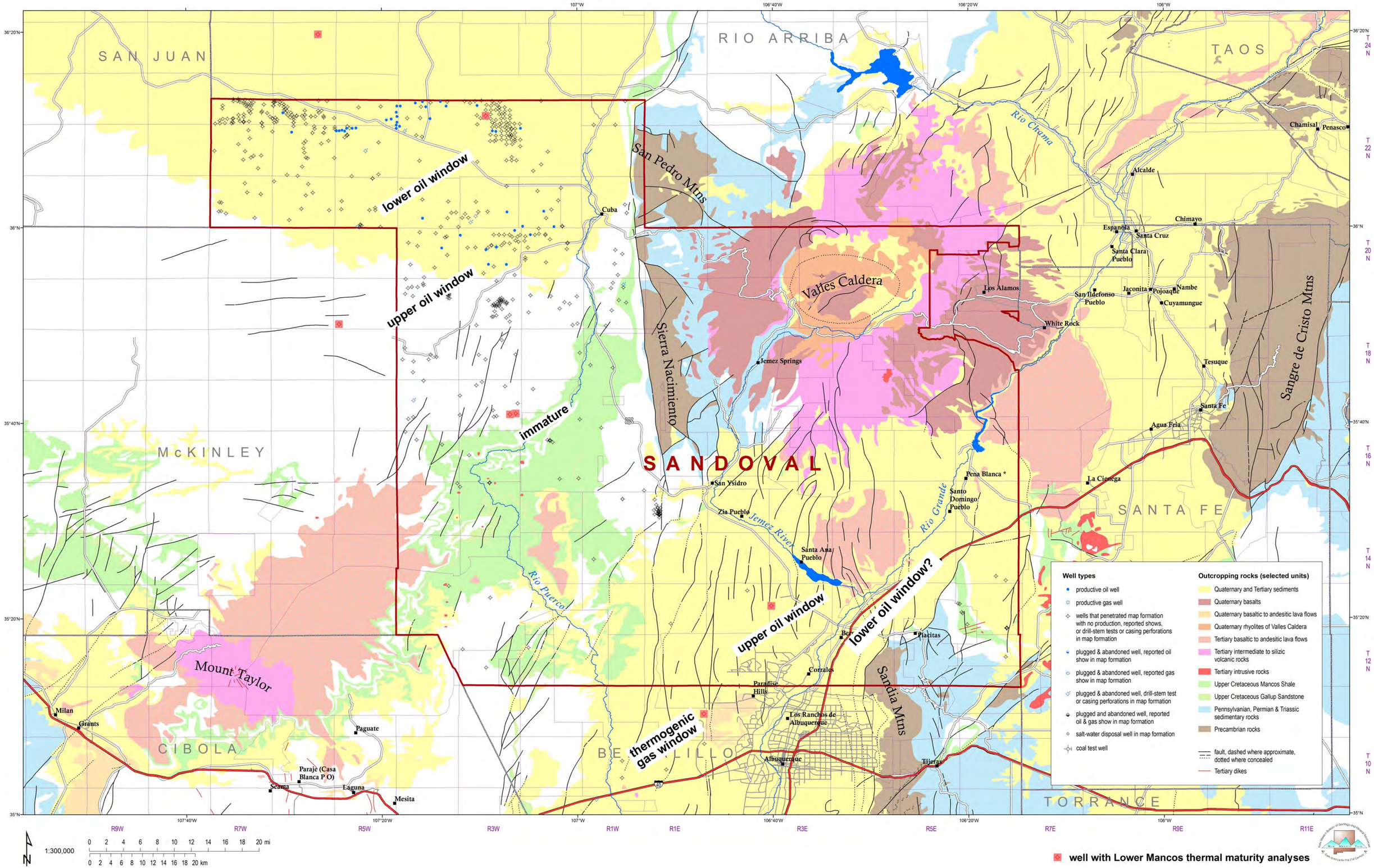


Figure 20. Thermal maturity map of kerogens in Todilto Formation. See database ***Sandovalsrcrks.xls*** in Appendix B for supporting petroleum source rock analytical data. Shown are wells of Figure 17. Outcrop of Entrada Sandstone and overlying Todilto Formation shown in bright green.

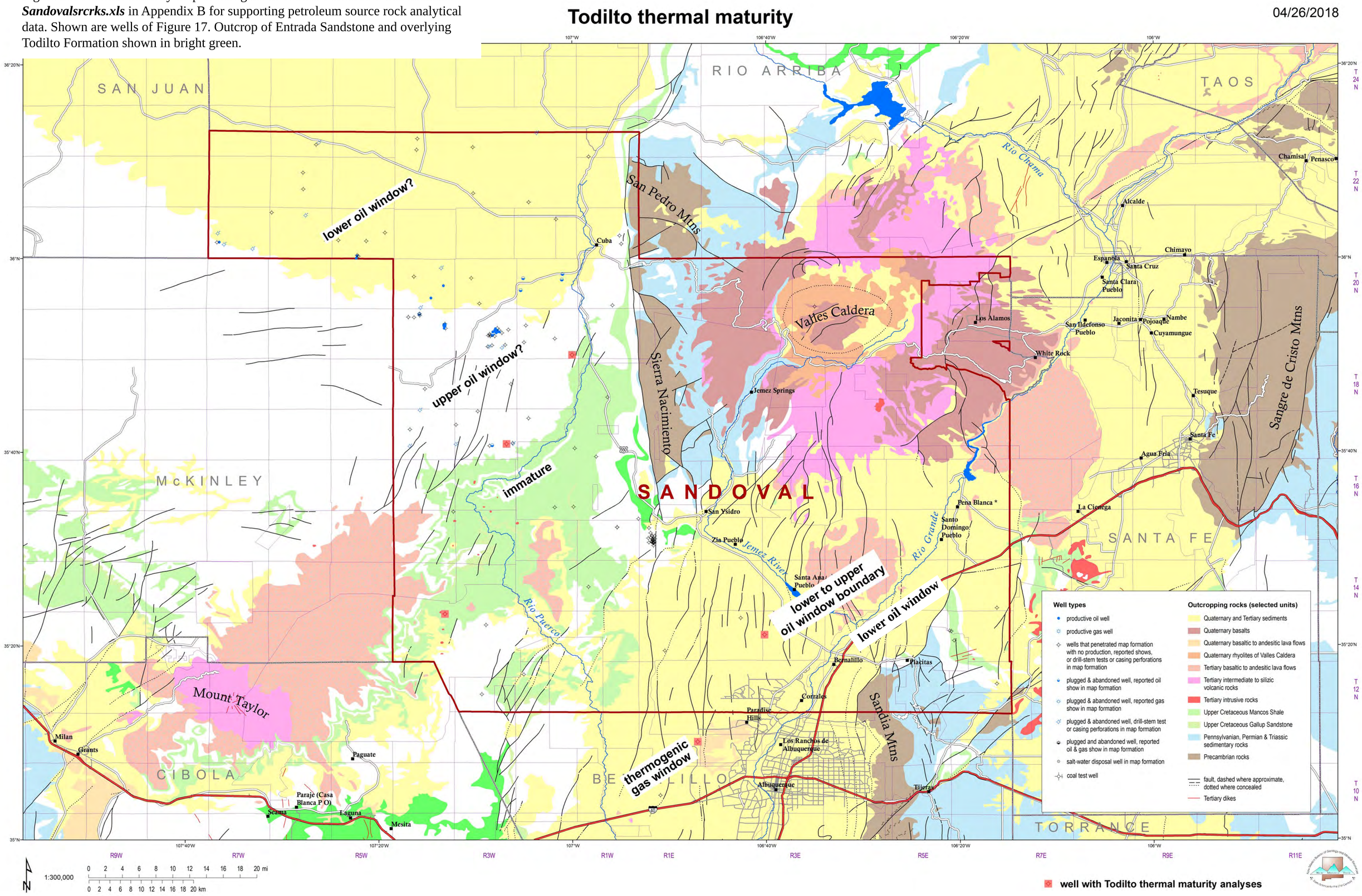


Figure 21. Thermal maturity map of kerogens in Pennsylvanian. See database ***Sandovalsrcrks.xls*** in Appendix B for supporting petroleum source rock analytical data. Shown are wells of Figure 17. There are no wells productive from Pennsylvanian strata in Sandoval County.

Pennsylvanian thermal maturity

04/26/2018

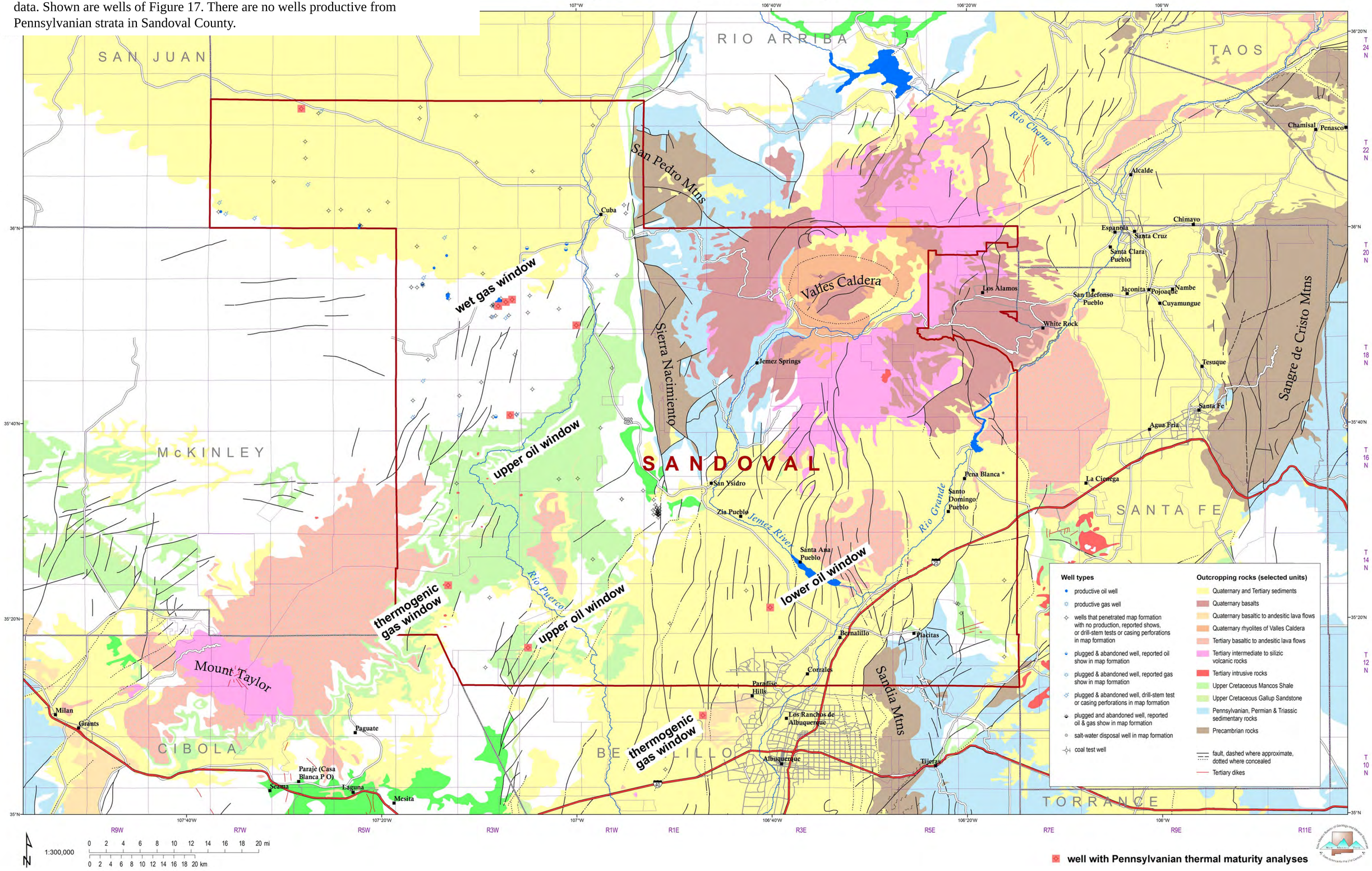


Figure 23. Contour map of thickness of Cretaceous shales above the Mancos C. This includes shales in the Lewis Shale, the Menefee Formation, and the Mancos A and B units. Contours are in feet. See database ***Sandovalwells.xls*** in Appendix B for data.

Thickness of Cretaceous Shales above Mancos C

04/26/2018

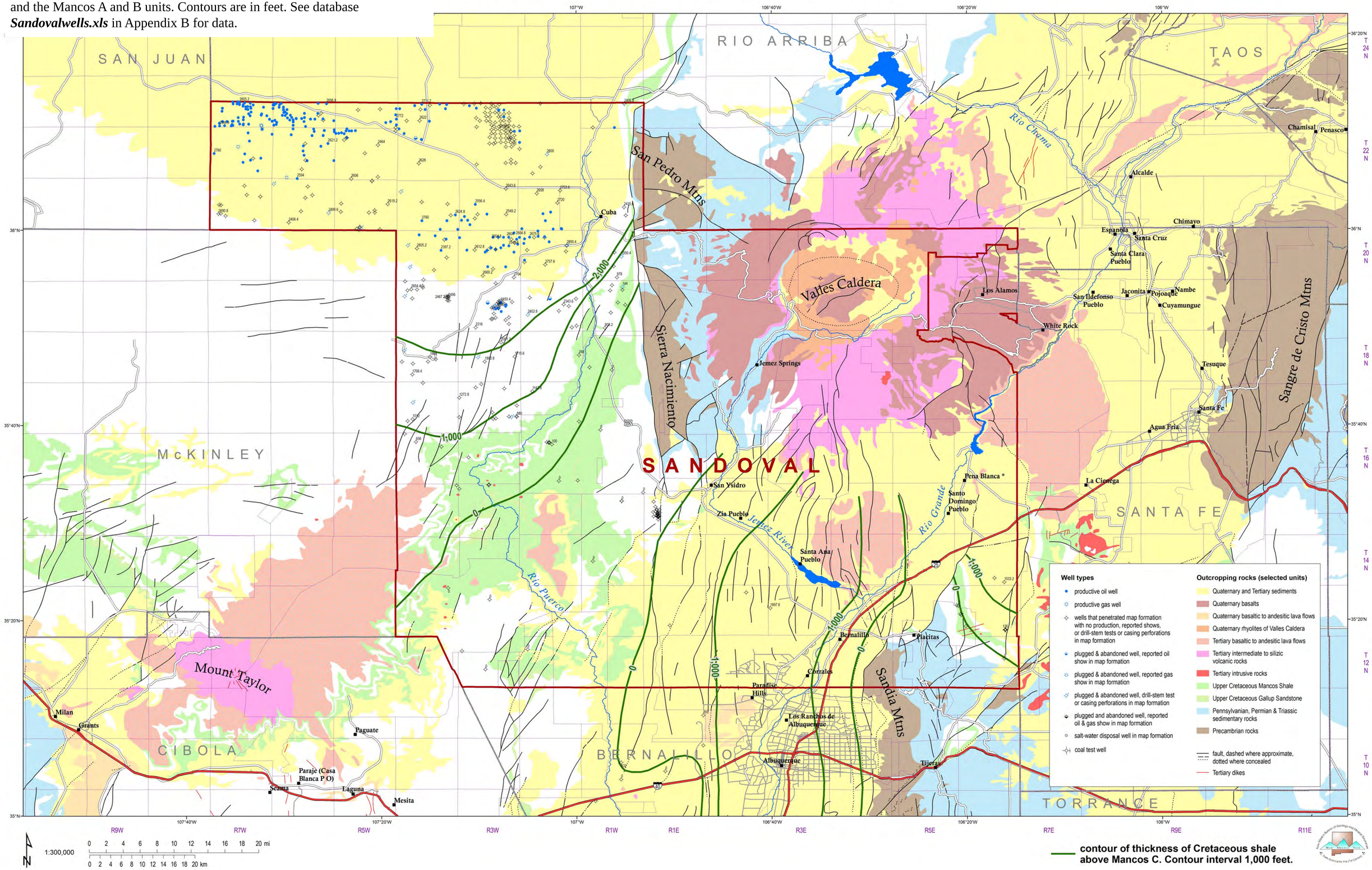


Figure 24. Map of generalized geology of Sandoval County, based on NMBGMR (2003).

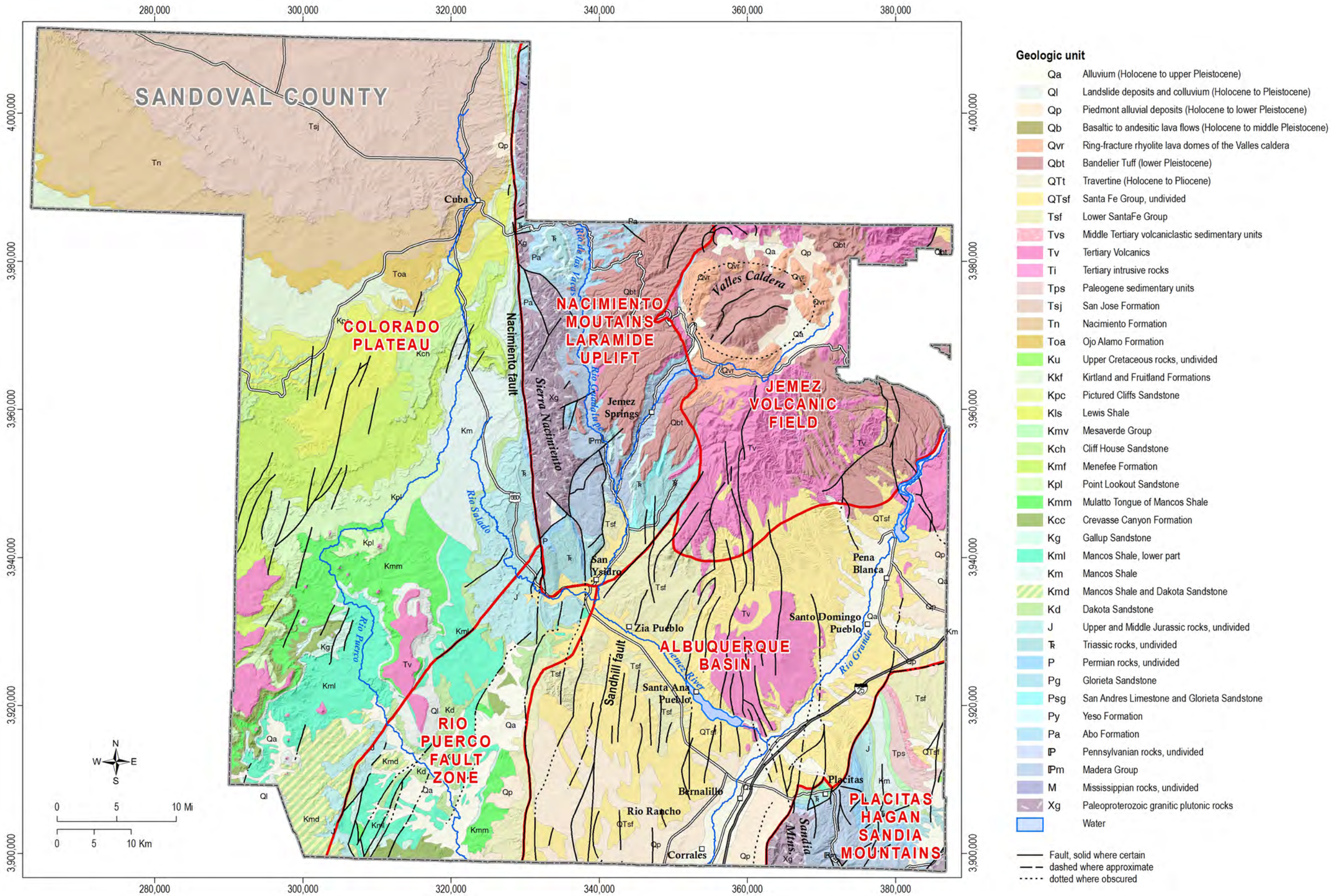


Figure 25. Map of mean well depth of New Mexico Office of the State Engineering Water Rights Reporting System (NMWRRS)-permitted wells at 1-km grid, and well depth of wells in New Mexico Bureau of Geology Aquifer Mapping Program database, overlain on geology simplified from NMBGMR (2003).

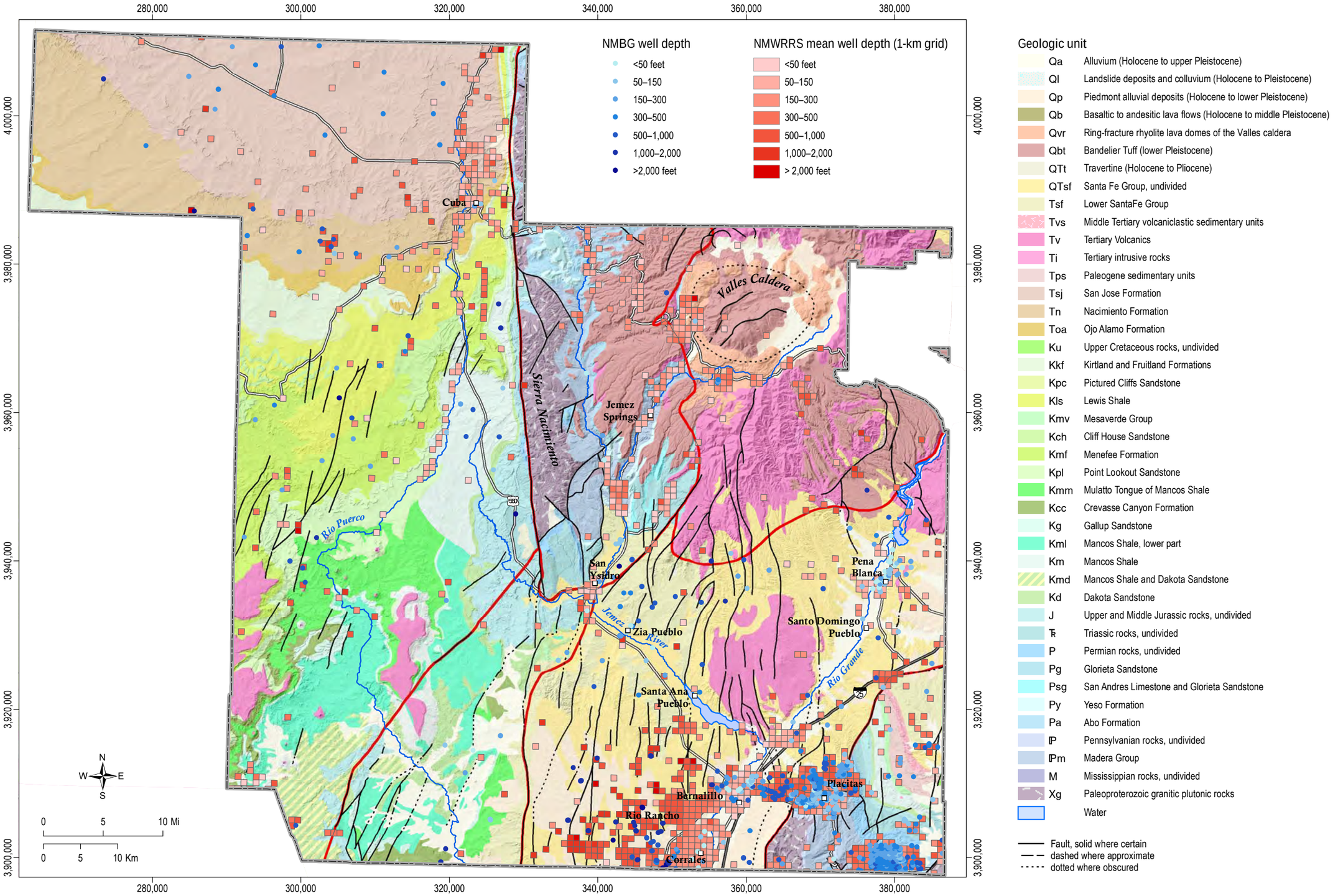


Figure 26. Map of static gridded depth-to-water (ft bgs) from NMWRRS (colored by median, hashed by minimum), and most recent depth-to-water (ft bgs; well locations colored by depth-to-water) as measured by USGS, Bernalillo County Water Authority and New Mexico Bureau of Geology and Mineral Resources.

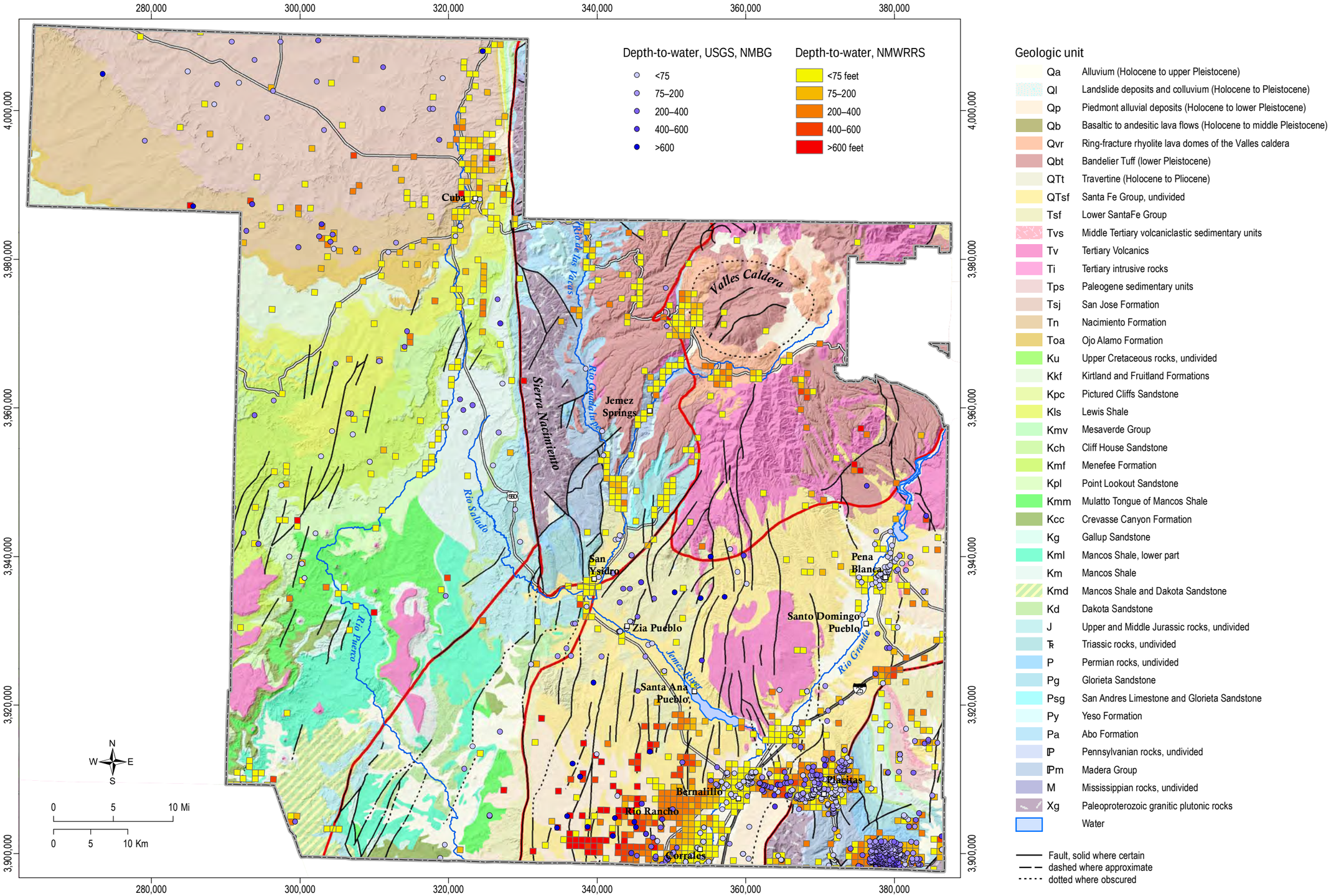
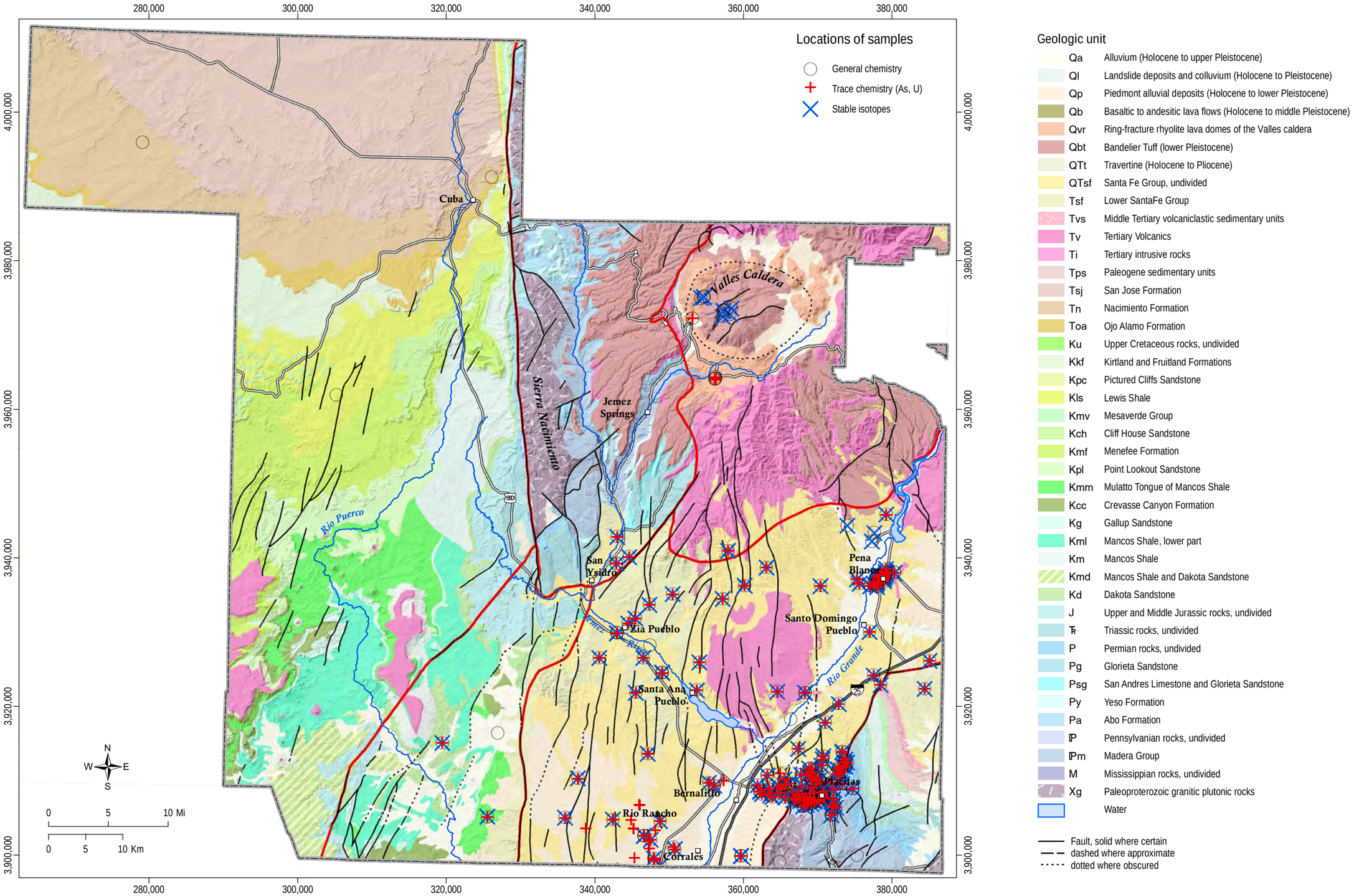



Figure 27. Map of locations of sampled for (o), trace element chemistry (+) and stable isotopes (x). Water chemistry is from NMBGMR Aquifer Mapping Database, and compiled published values and internally measured values from NMBGMR, USGS and other sources.