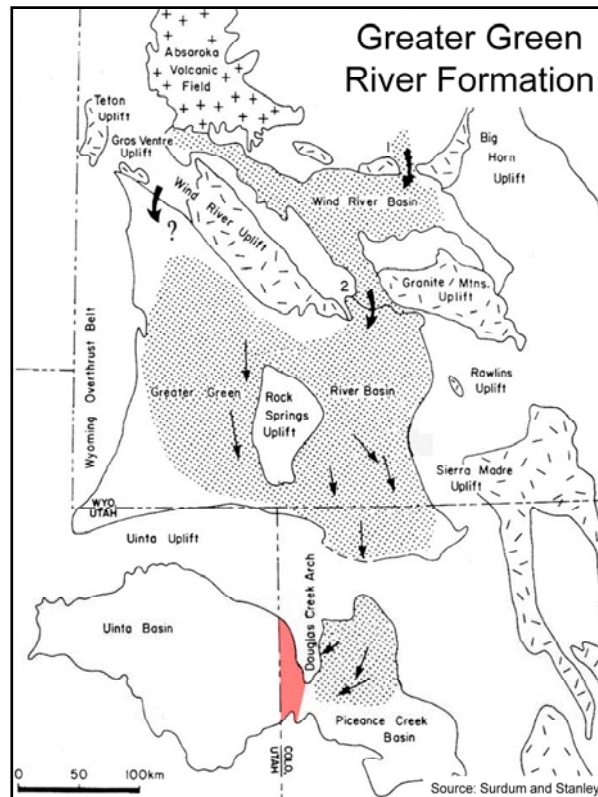


Colorado Wedge of the Uinta Basin

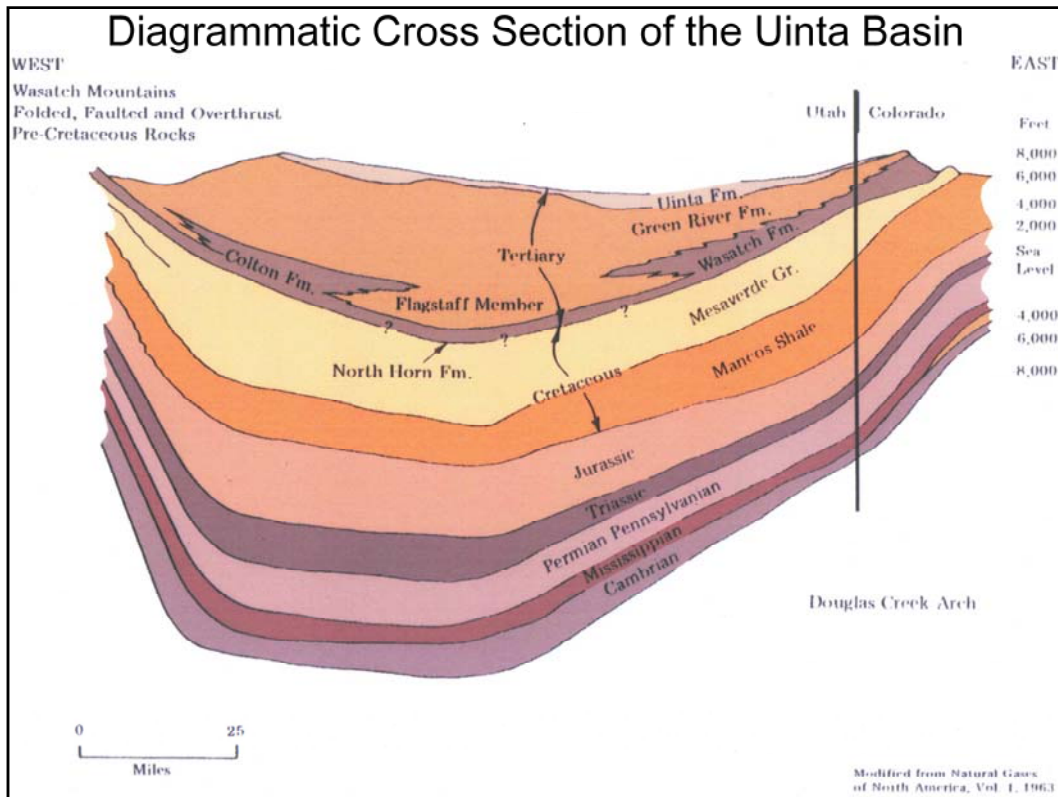
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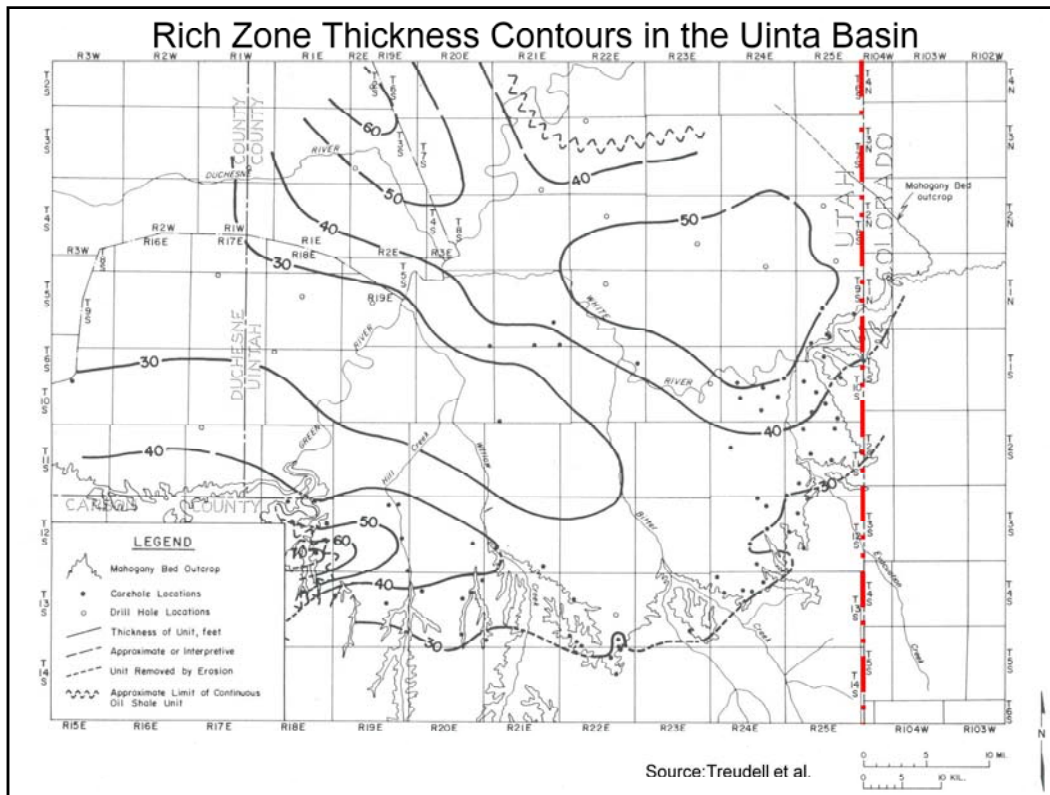
Slide # 1. During my years of overseeing Federal energy programs, I received great support from several dedicated geologists here on the Western Slope. I became intrigued by the unique geology created by the shorelines of the former Lake Uinta and it expanded and contracted.



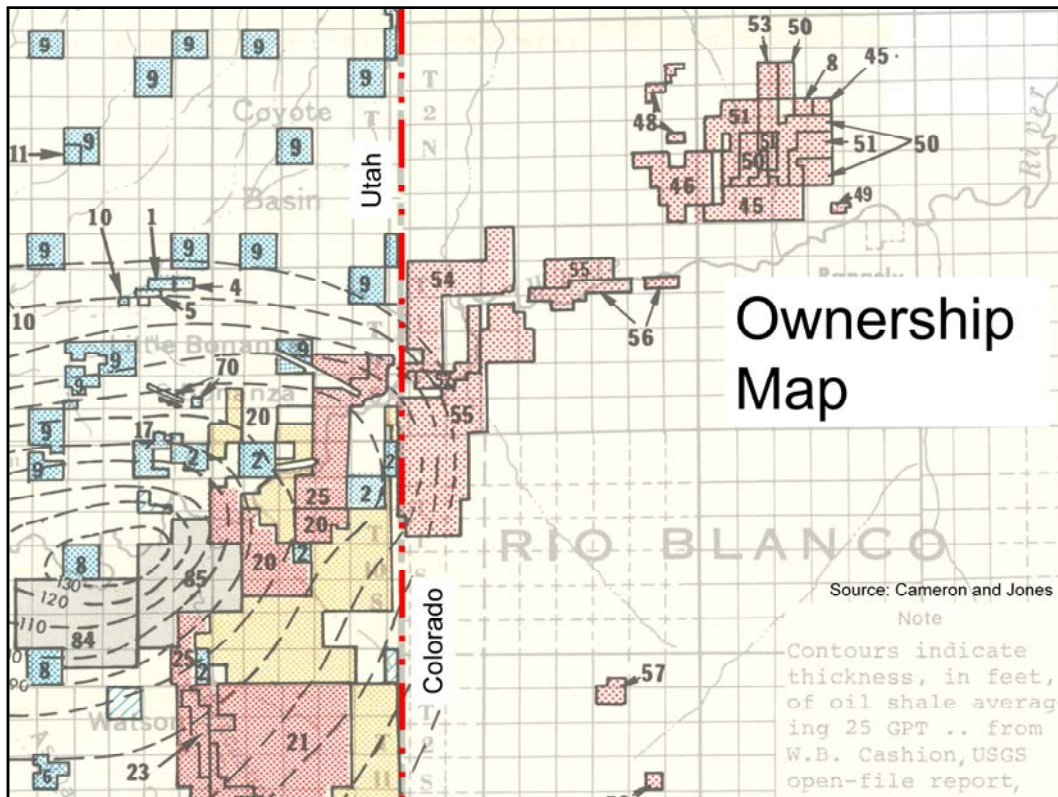
Slide # 2. This presentation will focus on the tiny wedge of the Uinta Basin that lies in Colorado. While it does not meet the geologic definition of a wedge, it does illustrate a great deal about the Green River Formation. Hereinafter, it will be referred to as the “Wedge”. It formed much of the eastern shoreline of the Uinta Basin portion of Lake Uinta.



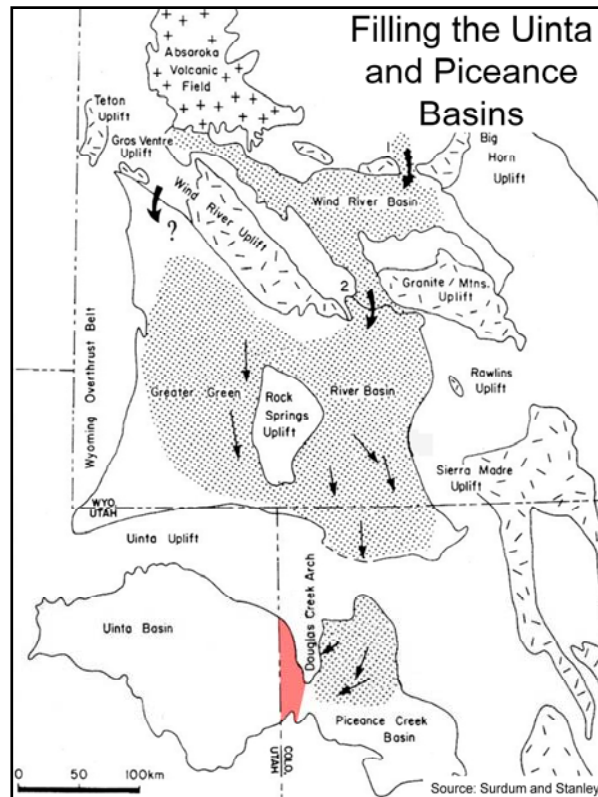
Slide # 3. On this east-west cross section of the Uinta Basin, it takes on the appearance of a wedge even with the vertical exaggeration. This discussion focuses primarily on the Tertiary and Cretaceous age rock with emphasis on the structural members of the Green River Formation. Together with a relatively thin layer of Uinta Formation, the Green River Formation forms the cap on over 25,000 feet of sedimentary material in the Basin.



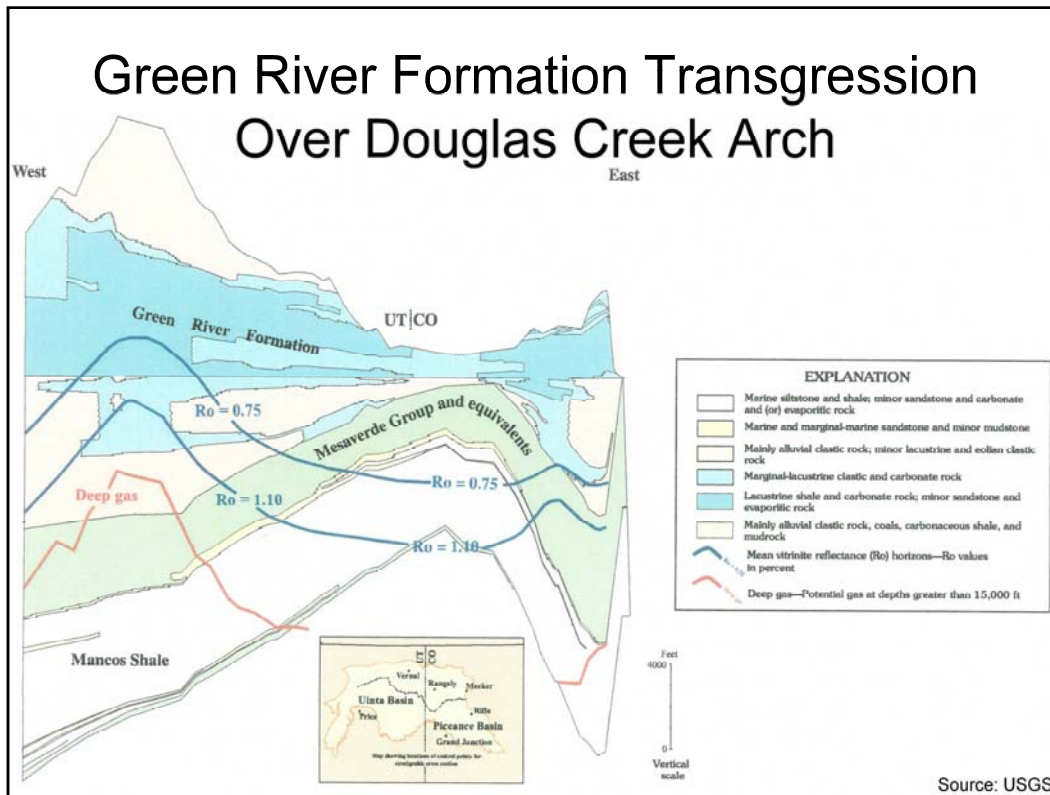
Slide # 6. While Trudell did not specifically extend his contours of oil shale thickness into Colorado and the Wedge, his work illustrates the important fact that the thickness of the oil shale members increase to the north of the current depositional axis of the Uinta Basin. The secondary axis noted near the northern boundary of the Basin corresponds to the depositional axis of the Basin early in Tertiary time when much of the oil shale was deposited. This had a significant impact on the thickness of the oil shale members in the north end of the Wedge.



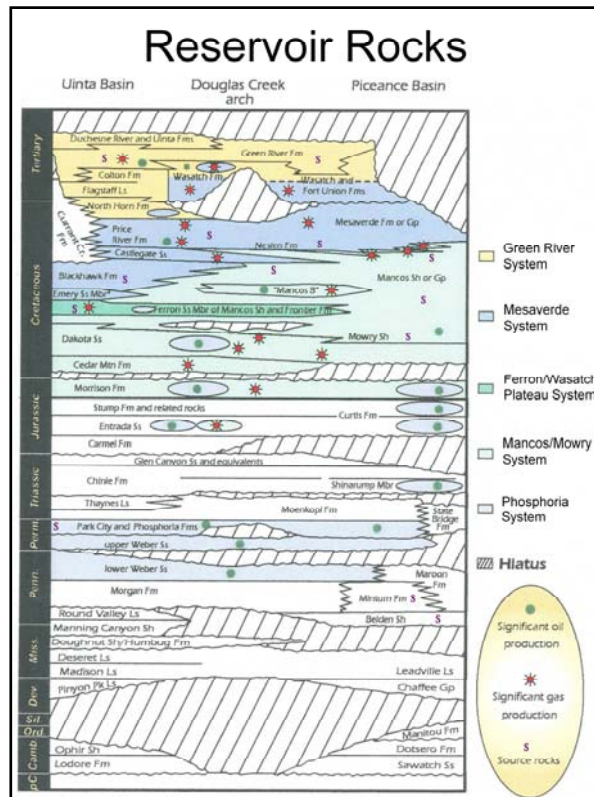
Slide # 7. Another important fact about oil shale resources in the Wedge is that more than 80 percent is privately owned compared to oil shale resources in general where 80 percent is controlled by the Federal government. This combined with the fact that much of the rich Parachute Creek member is exposed by erosion in this area may be very important for startup projects. This is a segment of the classic Cameron and Jones oil shale ownership map. The map does not show the dozen of owners of oil and gas rights in the area and the multiple owners of the Gilsonite vein in southwest Rio Blanco County.



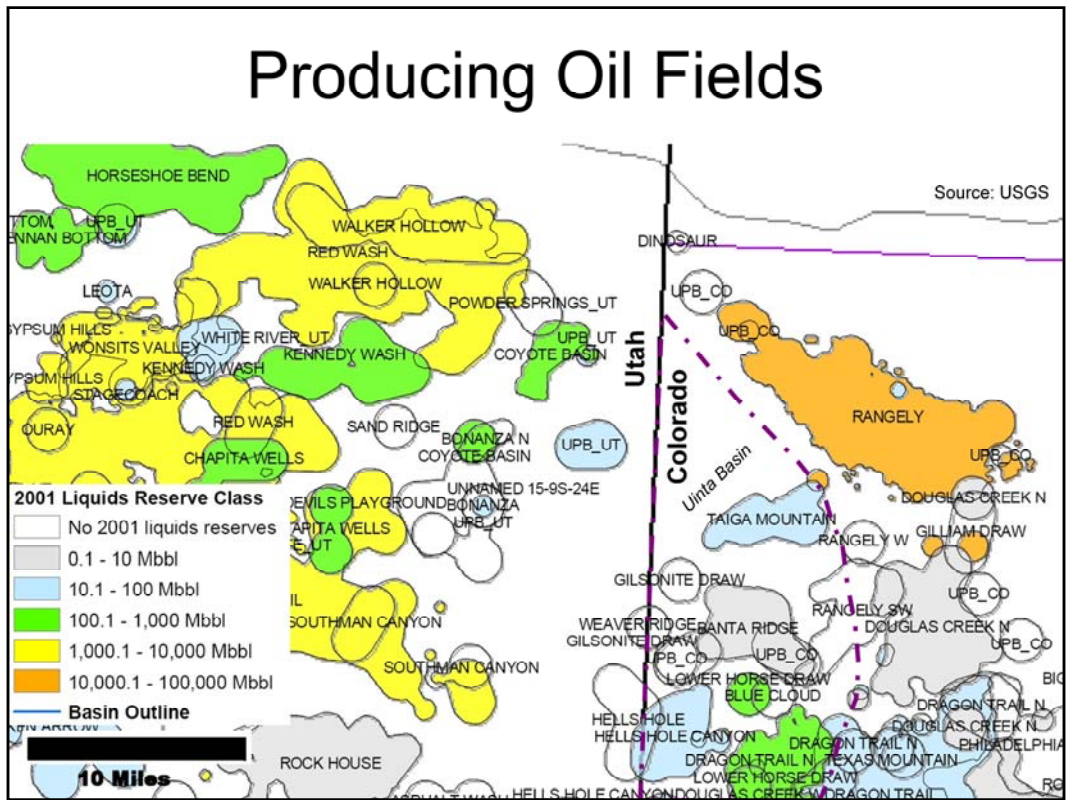
Slide # 8. A return to this map is made to explain the arrows and the dual roles of the Douglas Creek Arch in the filling of the Uinta Basin. The Arch was an important hinge line to accommodate differential elevations as the two basins filled with sediment. It was also a baffle that directed the flow of sediment laden water south in the Piceance Basin before it could cross over into the Uinta Basin. The result was that only very fine particles and light material made it around the Arch and into the northern reaches of the Uinta Basin. The Piceance Basin also received considerable flow from the east, again resulting in the heavier particles dropping out in the Piceance Basin before reaching the Uinta Basin.



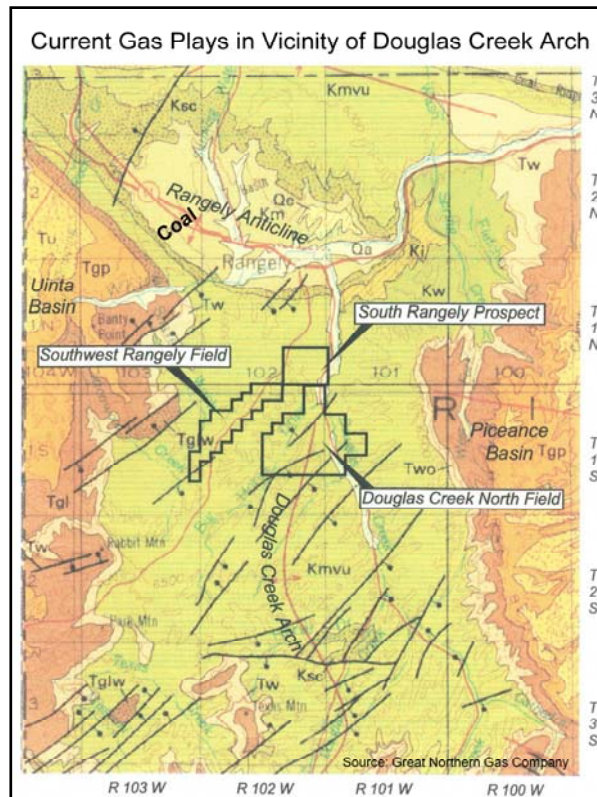
Slide # 9. This USGS cross-section illustrates the continuity of the Cretaceous and Tertiary members across the Douglas Creek Arch. The Current important producers of oil and gas are the Mesaverde Group and the Mancos Shale.



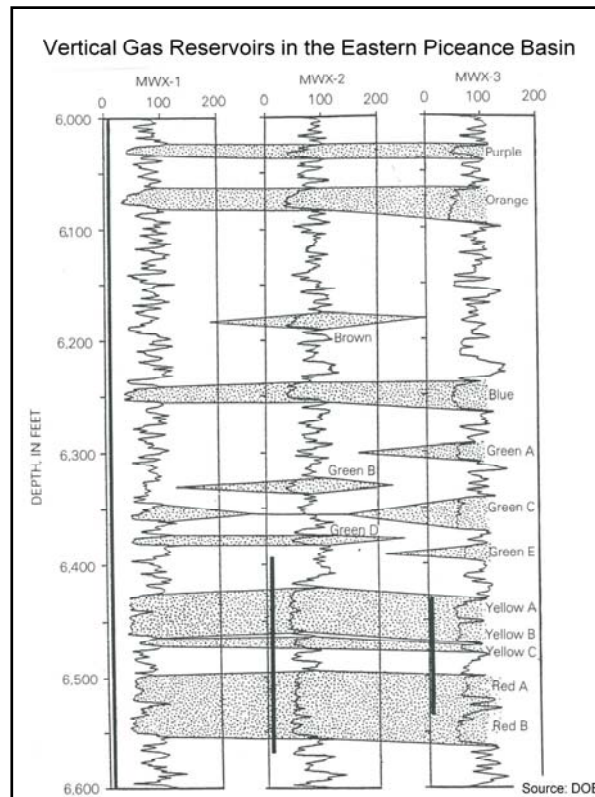
Slide # 10. This USGS conceptual cross-section of the Basins and the Douglas Creek Arch identifies the geospatial relationships of the important reservoir rocks. USGS includes the Green River System as one of their Total Petroleum Systems.



Slide # 11. On a geographic map, the Wedge is dominated by producing oil fields starting with the Taiga Mountain Field adjacent to the White River.

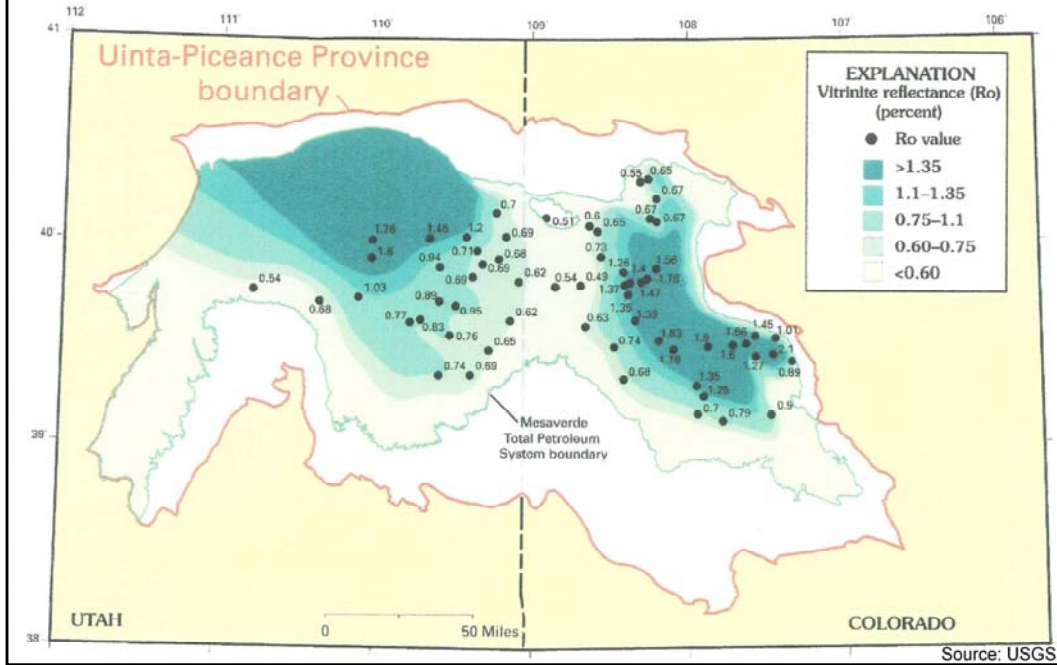


Slide # 12. This industry map shows the geographic relationship of important current gas plays to the Douglas Creek Arch and Wedge.

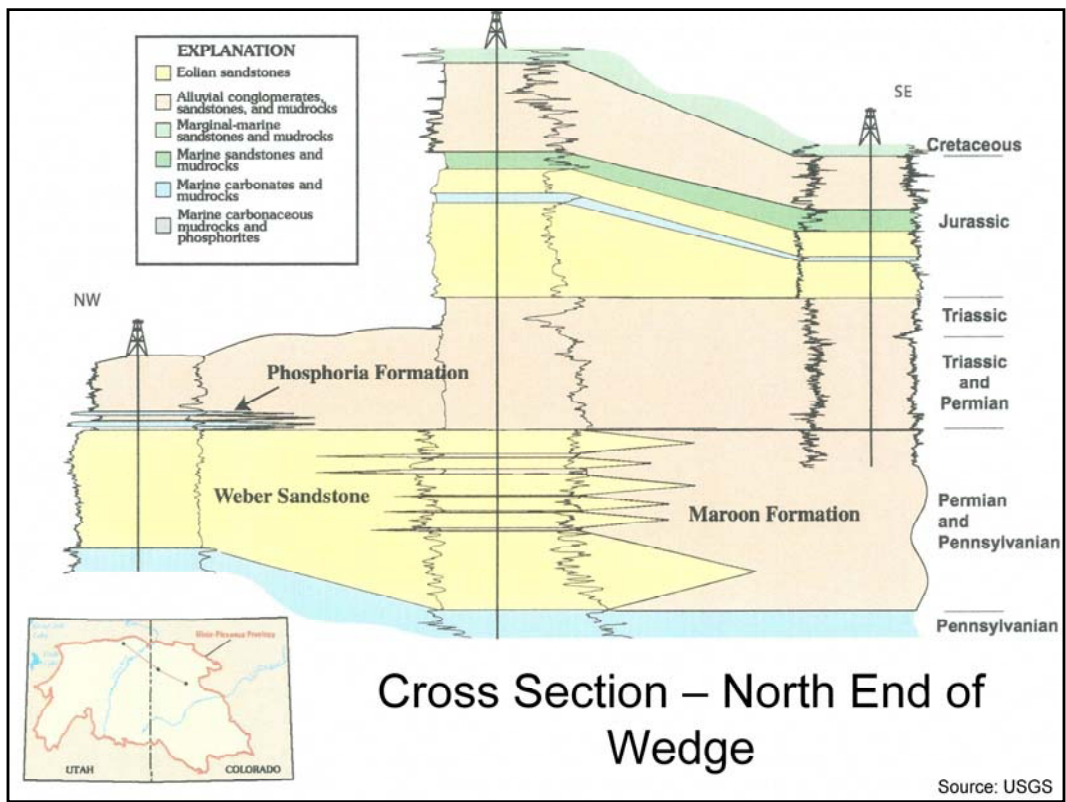


Slide # 13. The Department of Energy's Multiwell Experiment that kicked off the unconventional gas industry which exploits lenticular sand deposits, encountered as many as eight sand lenses in a single well. These lenses are believed to be the sand beaches formed at various levels of Lake Uinta as it expanded and contracted. Geologists generally believe that Lake Uinta contracted to as far west as Asphalt Ridge and cycles of expansion grew back to the Douglas Creek Arch and beyond to encompass all of the Piceance Creek Basin. How many sand beaches this left and buried in the Wedge or between the Wedge and Asphalt Ridge is a matter of current conjecture.

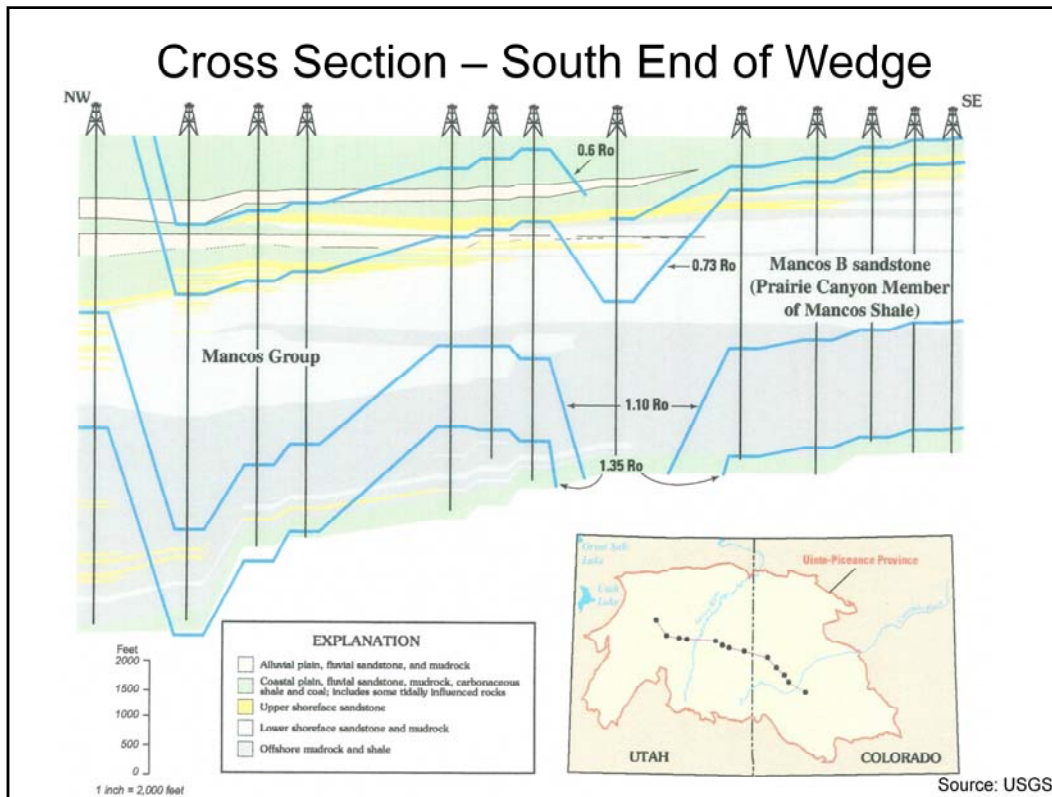
Thermal Maturity in Uinta-Piceance Province



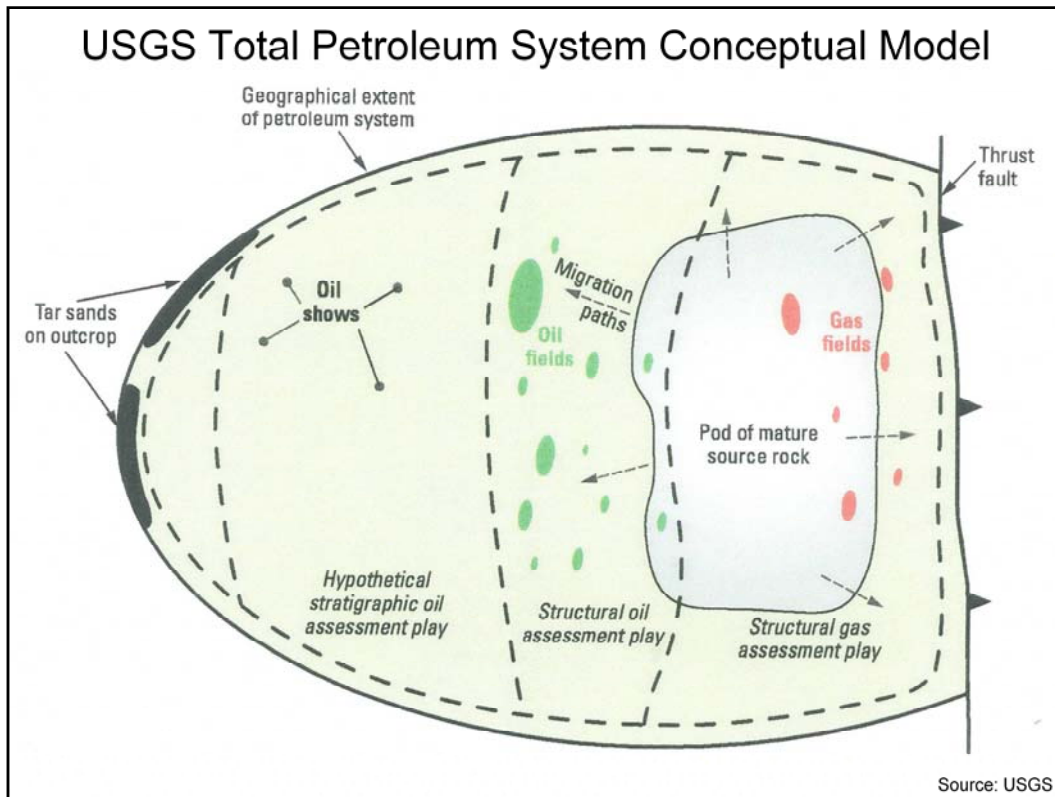
Slide # 14. The USGS has defined five Total Petroleum Systems in the Uinta-Piceance Province; four of these involve the Douglas Creek Arch and the Wedge. This thermal maturity map shows where petroleum was formed in the deep source rock. Under the enormous pressure of thousands of feet of sedimentary rock and gravity, petroleum migrated about in the two Basins to form such anomalies as the Gilsonite veins in the Uinta Basin.



Slide # 15. This cross-section near the north end of the Wedge shows the source rock for the Phosphoria Total Petroleum System.



Slide # 16. And this cross-section through the south end of the Wedge illustrates the importance of the Mancos Group.



Slide # 17. It is appropriate to conclude with the conceptual model of the USGS Total Petroleum System (TPS). Those of you familiar with the Uinta Basin will recognize the clear application of the TPS to this Basin. Recall that the well known tar sands outcrop on the south and west sides of the Basin, the famous Asphalt Ridge on the northwest and running on to the lesser known outcrops at Rim Rock and Raven Ridge. Almost anywhere one drills in the Basin there are hydrocarbon shows. As we move to unconventional oil and gas production in this Basin, the conventional petroleum industry will be leaving an infrastructure upon which to build the expanded industry without the usual boom and bust that typically accompanies change.

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Slide # 18 of 18.