



Garden Gulch Member,
Green River Formation
Puckett 11D-2

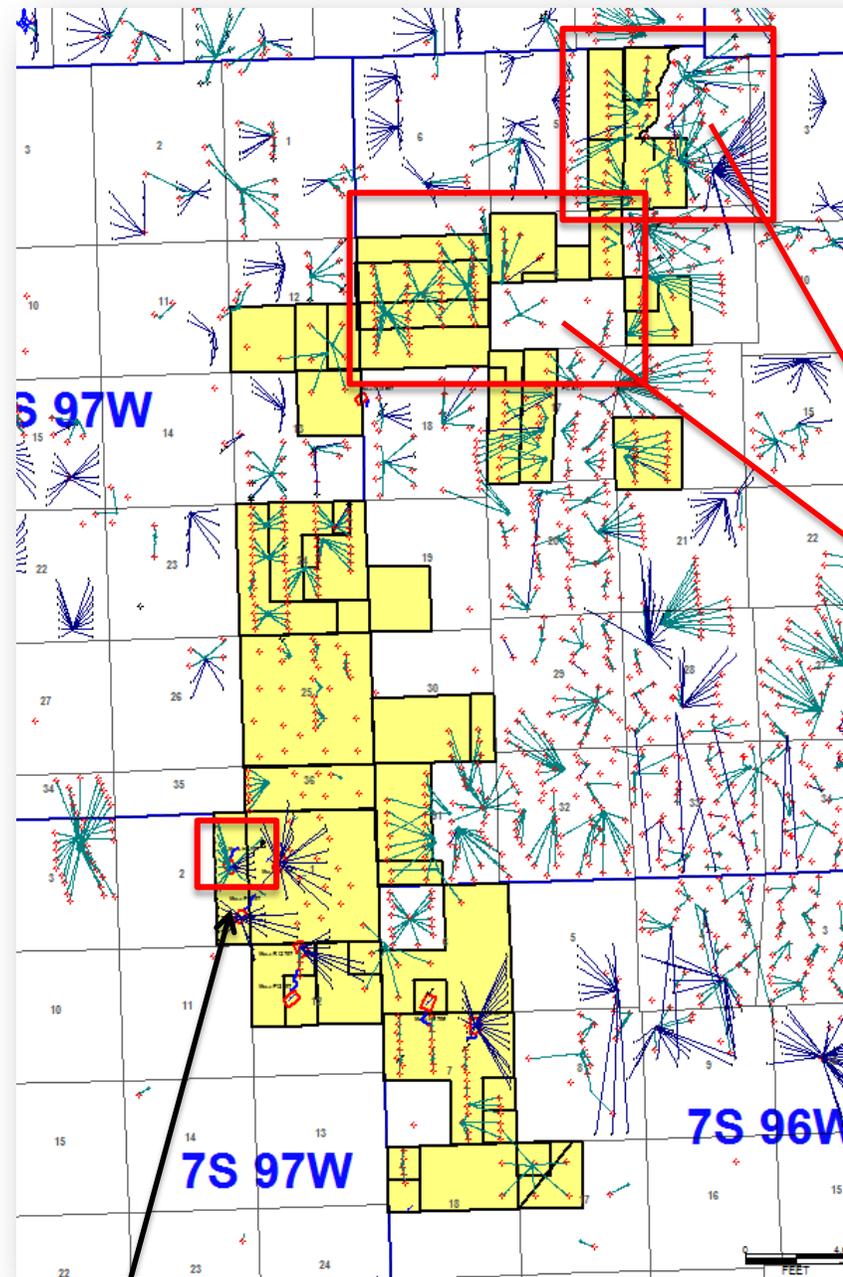
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Conclusions

- ▶ The top of the Garden Gulch member in the Parachute Creek area is ~1300' above the Wasatch formation, & 850' above surface casing of the Puckett 11D-2.

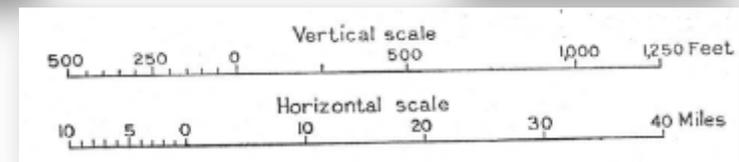
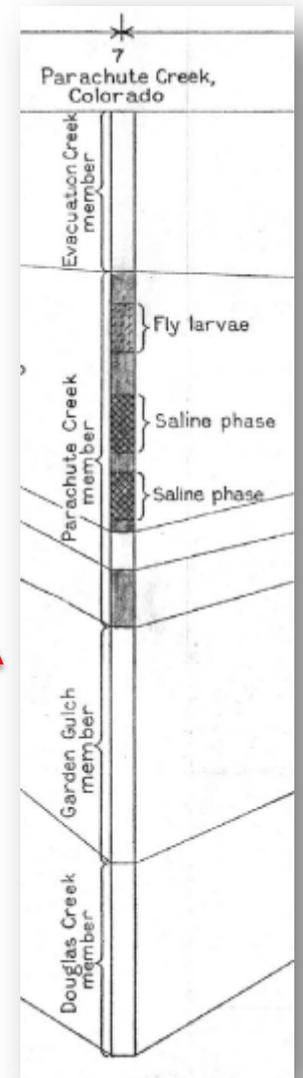
Garden Gulch Member

- ▶ The Garden Gulch member is a finely laminated shale with thickly laminated marlstone.
- ▶ Type location in Sec 7-8 T6S R96W is along Parachute Creek with total thickness 650 ft.
- ▶ The Garden Gulch member overlies the Douglas Creek member, the basal member of the Green River Formation, and underlies the Parachute Creek member.
- ▶ Douglas Creek member is measured at 550' in Sec 4 T6S R96W.



Puckett 11D-2

Measured Section



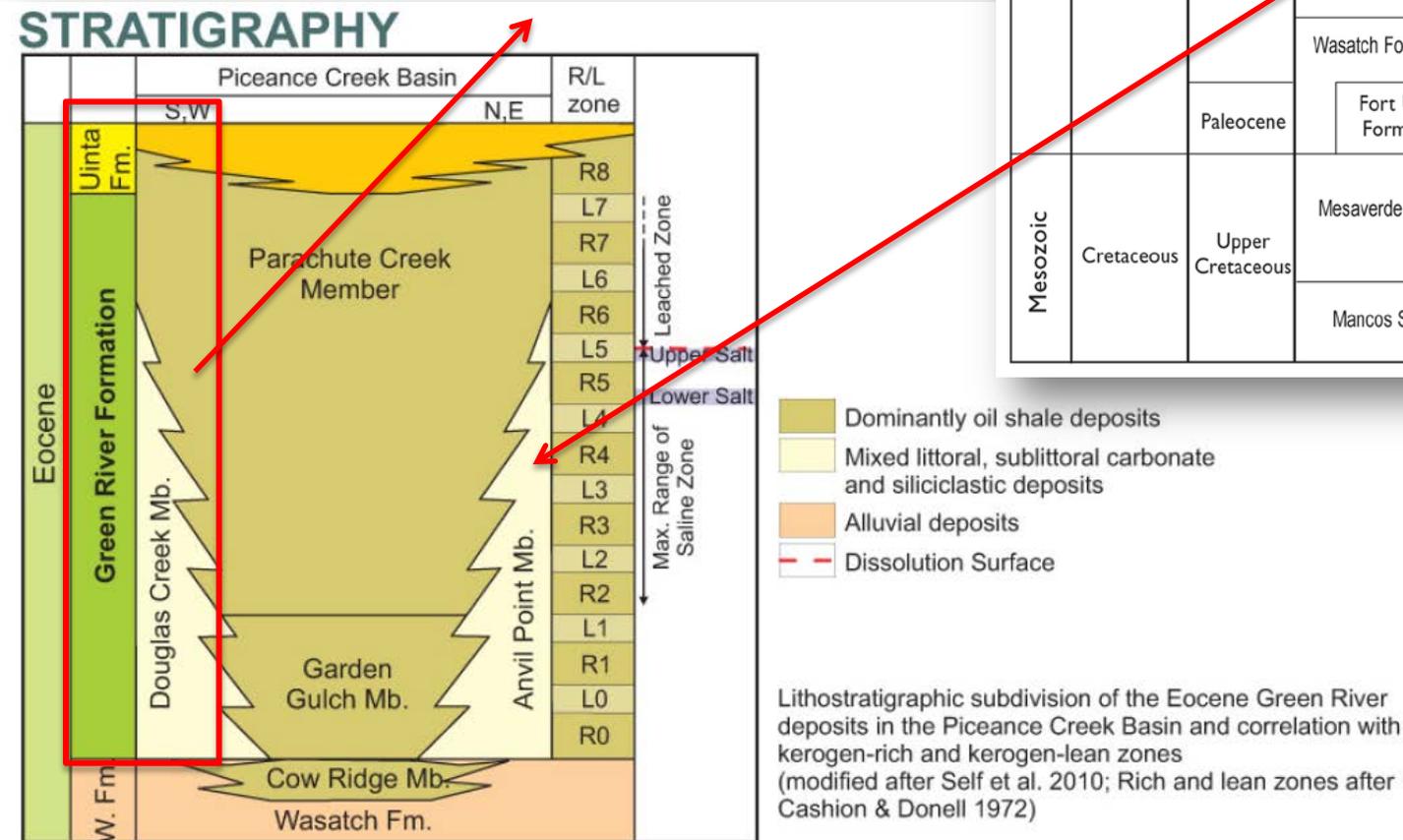
Bradley, 1931

Hydrogeologic Units in Piceance Basin

- ▶ Anvil Points member is not present in our acreage position. It is only present on the Eastern portion of the Basin.
- ▶ Garden Gulch and Douglas Creek members part of the confining unit below the Lower Piceance Basin aquifer.

Era	System	Series	Stratigraphic Unit	Unit Thickness (feet)	Physical Description	Hydro-geologic Unit	Saturated Thickness (feet)	Hydrologic Characteristics	
Cenozoic	Tertiary	Eocene	Uinta Formation	0-1,400	Silty sandstone, siltstone and marlstone	Upper Piceance Basin aquifer		Conductivity range <0.2 to >1.6 ft/day; yield 1 to 900 gpm; transmissivity 610-770 ft ² /day	
			Green River Formation	As much as 5,000	Parachute Creek Member	kerogenous, dolomitic marlstone and shale 500-1,800 ft	Mahogany confining unit		
					Anvil Points Member	shale, fine-grained sandstone and marlstone 0-1,870 ft	Lower Piceance Basin aquifer		Conductivity range <0.1 to >1.2 ft/day; yield 1 to 1,000 gpm; transmissivity 260-380 ft ² /d
					Garden Gulch Member	claystone, siltstone, clay-rich oil shale and marlstone 0-900 ft	Confining unit		
			Douglas Creek Member	siltstone, shale and channel sandstone 0-900 ft					
Wasatch Formation	About 5,000	Shale and lenticular sandstone							
Mesozoic	Cretaceous	Paleocene	Fort Union Formation	Very thin	Coarse-grained sandstone	Fort Union aquifer			
			Upper Cretaceous	Mesaverde Group	Averages 3,000 may be >7,000	Fox-Hills Sandstone, Lewis Shale, Williams Fork Formation, Iles Formation; sandstone interbedded shale and coal	Mesaverde aquifer	<500-2,000	
				Mancos Shale	More than 7,000	Mainly shale but Frontier Sandstone may be local aquifer	Mancos confining unit		

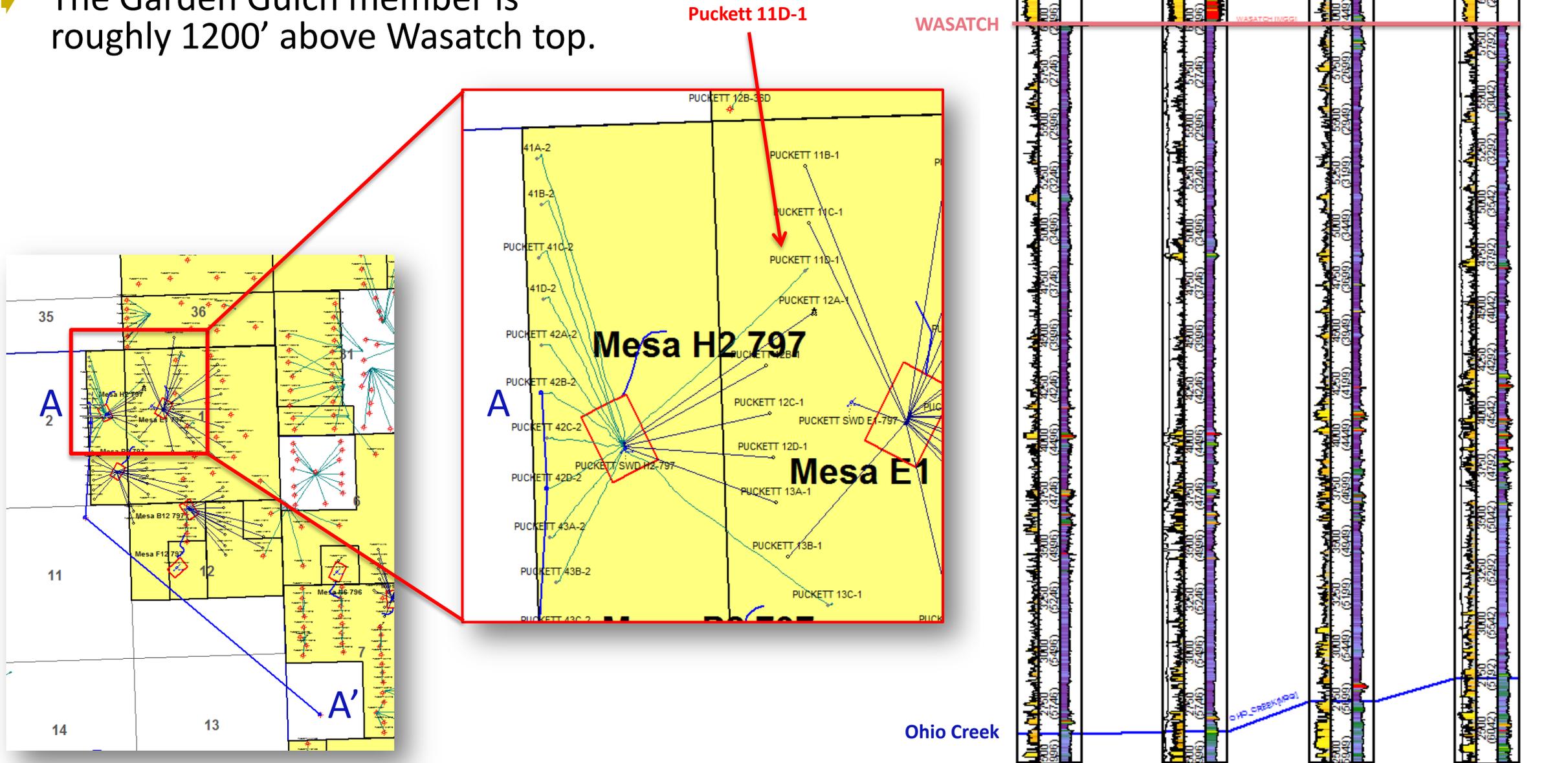
Stratigraphy under Caerus Acreage



Colorado Geologic Survey

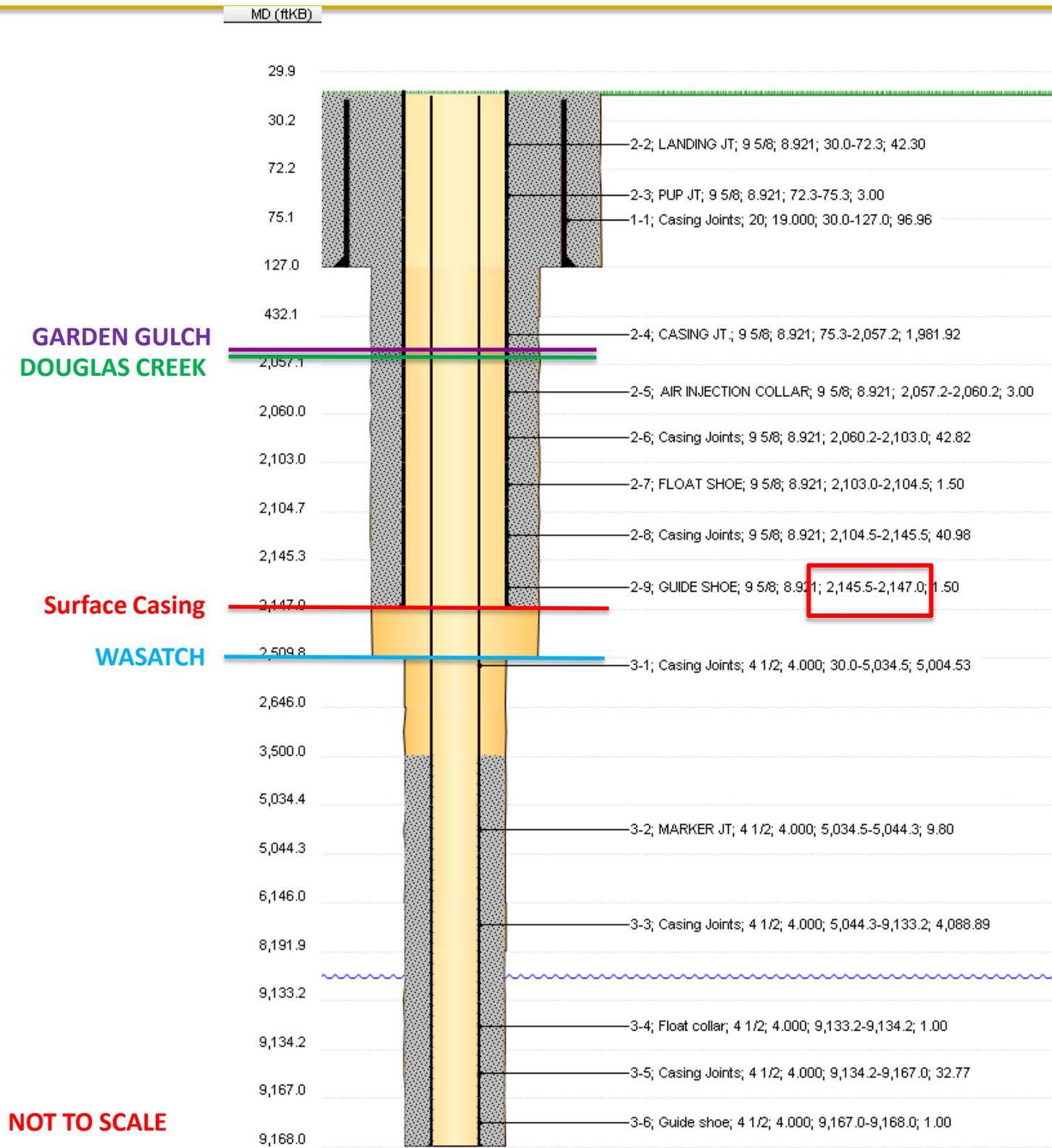
Cross-Section

- ▶ Most resistivity logs in the area are not shallow enough to reach the Garden Gulch member.
- ▶ Wasatch tops nearest to Puckett 11D-2 are between 2502-2528' MD.
- ▶ The Garden Gulch member is roughly 1200' above Wasatch top.



Puckett 11D-2

- ▶ The top of the Garden Gulch member in the Parachute Creek area is ~1300' above the Wasatch, & 850' above surface casing.
- ▶ Puckett 11D-2 surface casing was set to 2,147' MD.
- ▶ The top of the Wasatch for neighboring wells are at ~2500' MD.
- ▶ The surface casing of Puckett 11D-2 is much deeper than the top of the Garden Gulch member and thus poses no threat to the Lower Piceance Basin aquifer.



References

- ▶ W. H. Bradley, 1931, Origin and Microfossils of the Oil Shale of the Green River Formation of Colorado and Utah, p.10