



## Umatilla Basin Late Tertiary Basalt Aquifers: Columbia River Basalt Group

This basalt has 42% of ideal conditions for artificial recharge. These extensive flood basalts are hydrogeologically unique due to their low vertical hydraulic conductivity combined with distinct flow tops, bottoms and interflow zones that have high horizontal conductivity. This characteristic makes them a favorable environment for ASR in some places. The basalts of the Columbia River Basalt Group extend across the entire Umatilla Basin. The rating table is included below, and interested parties may insert site-specific data to produce results that reflect localized aquifer conditions.

Positive characteristics for artificial recharge:

- Interflow zones often have high hydraulic conductivity, allowing injection at significant rates.
- Static water level is often hundreds of feet below the surface, which allows for water level rise during injection.
- Columbia River Basalt at Oregon ASR test sites has shown low geochemical reactivity and generally high native groundwater quality.

Negatives:

- Injection pressure responses can appear at wells as far as a mile away.
- Deep static water levels also indicate a potential expense involved with lifting water during recovery.

Surface water availability will strongly affect underground storage potential. This requires site-specific knowledge of water rights quantity and timing.

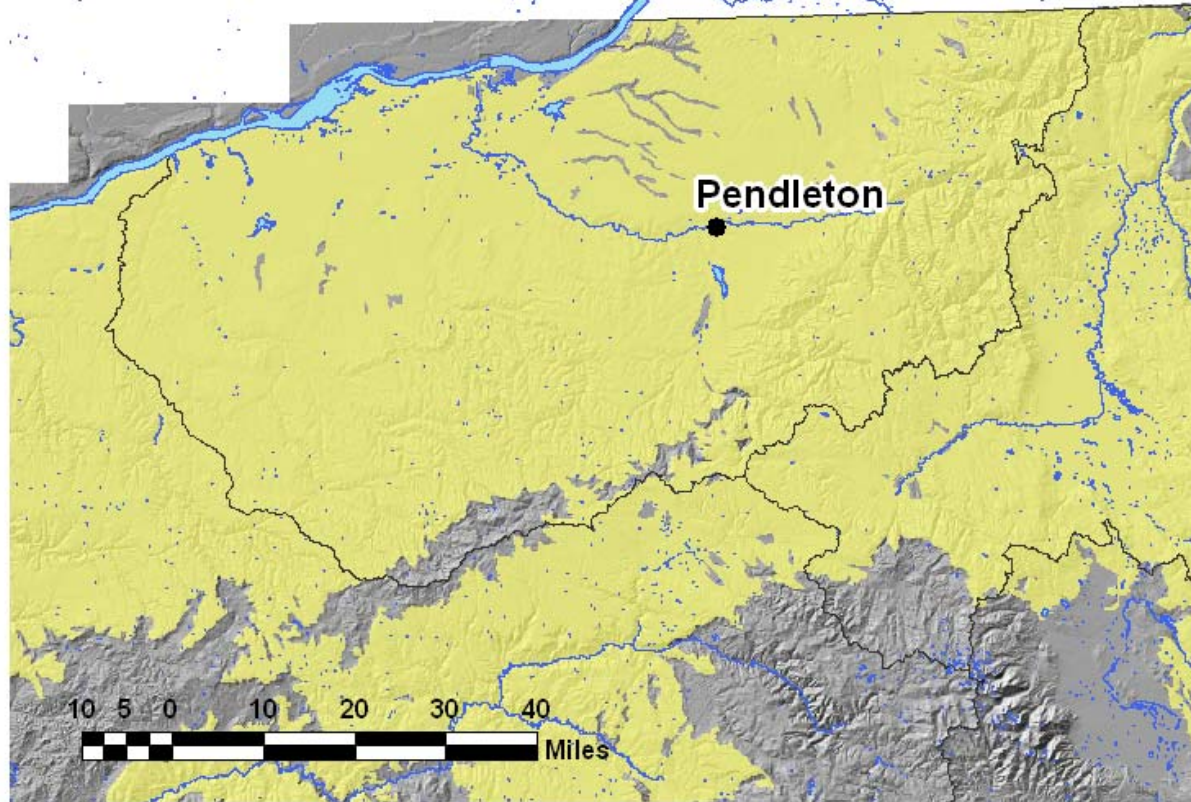
Sources:

- USGS Professional Paper 1413-B
- OWRD pump test database
- OWRD Open-File Reports 89-01 and 88-03





# Extent of Umatilla Basin Late Tertiary Basalt Aquifers



**Less Storage**



**More Storage**

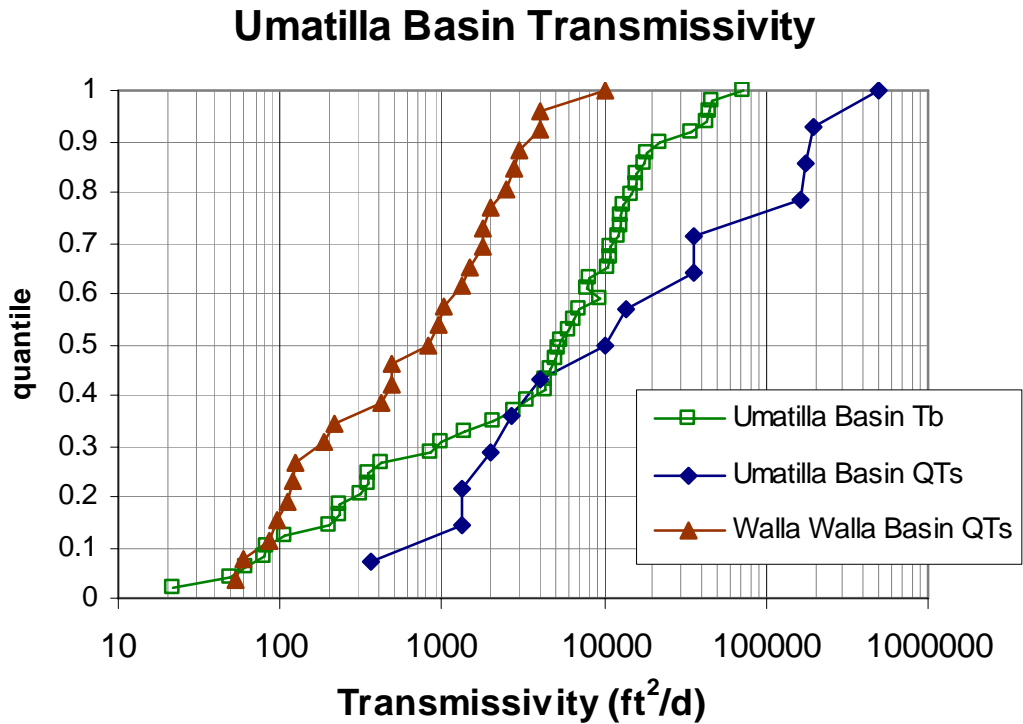
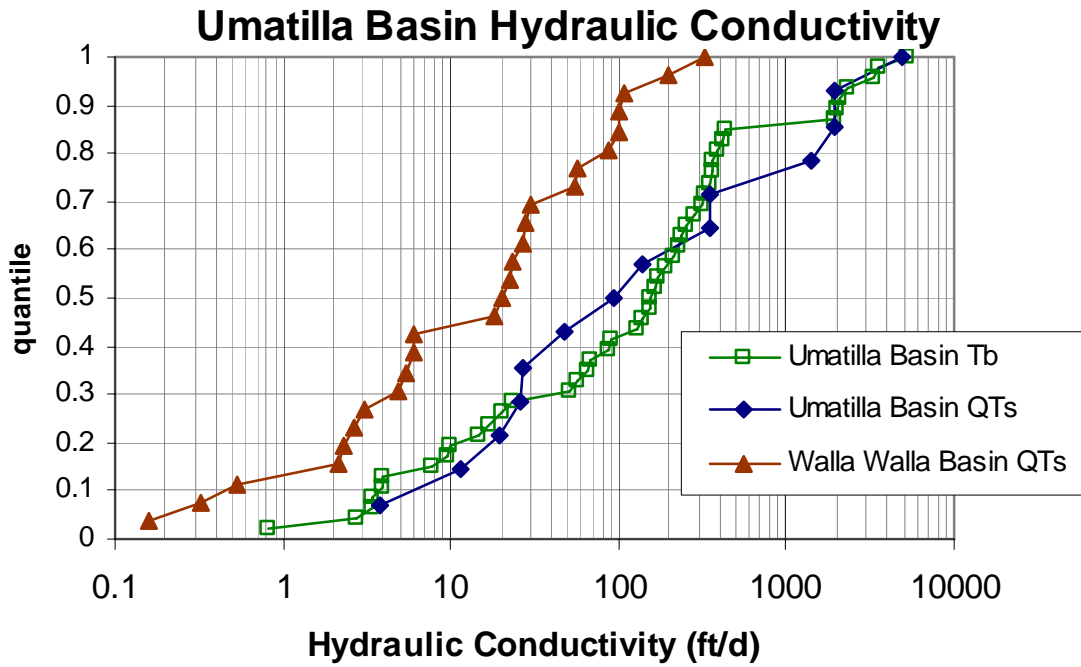
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### Consolidated Unit: Umatilla Basin Late Tertiary Basalt Aquifers: Columbia River Basalt Group

Physical Parameter	Range of reported values	Value for calculation	Find the "value range" where the "value for calculation" falls, and select the corresponding rating										Selected Rating	Data Quality
			Value Range	Rating	Value Range	Rating	Value Range	Rating	Value Range	Rating	Value Range	Rating		
Depth to Formation (ft)	20-330	195	0-99	10	100-499	20	500-999	15	1000-1999	3	>2000	1	20	3
Saturated Thickness (ft)	70-100	87	0-99	1	100-249	3	250-499		500-999	15	>1000	30	1	3
Head Freeboard (ft)	250-600	305	0-49	1	50-99	2	100-299	6	300-749	15	750	30	15	3
Storage Coefficient	0.00001-0.0011	0.0005	0-0.0009	1	0.001-0.009	5	0.01-0.09	10	>0.1	25			1	4
Hydraulic Conductivity (ft/d)	0.8-6100	5	0-0.0009	1	0.001-0.009	5	0.01-0.9	10	1-9	50	>10	100	50	4
Totals:												87	17	

Sum of Selected Ratings/Perfect Rating = 87/205 = 42%

**Data Quality:** 1=based on general values for this aquifer lithology  
 2=based on 8 or less well logs  
 3=based on more than 8 well logs  
 4=based on published information and/or data specific to this aquifer



Abbreviations: Tb = Late Tertiary Basalt Aquifers  
 QTs = Quaternary-Late Tertiary Sediment Aquifers