

Colorado Piedmont Region				
Geologic Period	Phase	Stratigraphic Unit	Hydrogeologic Unit	
Quaternary	Modern-Glaciation	Alluvium associated with present rivers	Alluvial Aquifers	
Neogene	Extension	Nussbaum Alluvium	Nussbaum Aquifer	
		High Plains regional aquifer	High Plains Aquifer	
Paleogene	Transition	Laramide basin formations form multiple aquifers; include Denver, Cheyenne and Raton basins	Multiple	
Cretaceous	Interior Seaway	Pierre Shale	Upper member	Pierre confining unit
			Upper Pierre sand	Upper Pierre Aquifer
			Main body	Pierre confining unit
		Niobrara Formation	Smokey Hill Member	Fort Hays-Codell Aquifer
			Fort Hays Limestone	
		Carlile Shale	Codell Sandstone	Carlile confining unit
			Carlile Shale	
		Greenhorn Limestone		Greenhorn Aquifer
		Graneros Shale		Graneros confining unit
		Dakota Group	Dakota Sandstone	Dakota-Cheyenne Aquifer
Purgatoire Formation				
Jurassic	Mesozoic Sandstones	Morrison- Ralston Creek Formations	Morrison confining unit	
		Entrada-Sundance Sandstone	Entrada-Dockum Aquifer	
Triassic	Mesozoic Sandstones	Jelm-Dockum Formations	Lykins confining unit	
		Lykins- Glendo- Taloga- Whitehorse Formations- Blaine Formation		
Permian	Ancestral Rocky Mountains	Ancestral Rocky Mountains event marine and non-marine sedimentary formations form multiple aquifers in the Ancestral Denver and Eagle Basin- Central Colorado Trough	Multiple	
Pennsylvanian				
Mississippian	Paleozoic Carbonates	Lower Paleozoic sedimentary formations that are dominantly limestone and dolomite form multiple aquifers preserved in the Ancestral Denver and Eagle Basin- Central Colorado Trough may be present depending on location	Lower Paleozoic carbonate aquifers	
Devonian				
Silurian				
Ordovician				
Cambrian				
Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in the mountainous region	Crystalline bedrock	

Table 11a-01-01. Colorado Piedmont region stratigraphic chart.

Colorado Piedmont Region

Geologic Period	Phase	Stratigraphic Unit	Unit Thickness (ft)	Physical Characteristics	Hydrogeologic Unit	Hydrologic Characteristics	
Quaternary	Modern-Glaciation	Alluvium associated with present rivers			Alluvial Aquifers		
Neogene	Extension	Nussbaum Alluvium	up to 175	Gravel on pediment; cobbly and pebbly gravel, silty sand	Nussbaum Aquifer	Local aquifer with numerous stock and irrigation wells	
		High Plains regional aquifer			High Plains Aquifer		
Paleogene	Transition						
Cretaceous	Laramide	Laramide basin formations form multiple aquifers; include Denver, Cheyenne and Raton basins				Multiple	
		Pierre Shale	Upper member	3,000-8,000	Interbedded fine-grained sand, siltstone and shale	Pierre confining unit	
			Upper Pierre sand			Upper Pierre Aquifer	Sandstone layers might yield limited water
			Main body			Pierre confining unit	
		Niobrara Formation	Smokey Hill Member	150-500	Yellowish chalk and gray shale	Fort Hays-Codell Aquifer	Yields water to stock wells and springs north of Arkansas River; increased yield when fractured
			Fort Hays Limestone	50-65	White to cream, chalky limestone with thin beds of gray calcareous shale		
		Carlile Shale	Codell Sandstone	0-34	Buff crossbedded calcareous sandstone and sandy shale	Carlile confining unit	Often considered with the Fort Hays Limestone as the Fort Hays-Codell aquifer
			Carlile Shale	200-235	Black, fissile shale; lower unit is chalky shale		
		Greenhorn Limestone		25-65	Upper unit chalky shale and thin limestone; lower unit hard crystalline limestone	Greenhorn Aquifer	
		Graneros Shale		85-200	Gray to black shale	Graneros confining unit	
		Dakota Group	Dakota Sandstone	150-235	Fine-grained, thin bedded to massive sandstone	Dakota-Cheyenne Aquifer	Yields can be sufficient for industrial, municipal, and irrigation use; increased yields where fractured
			Purgatoire Formation	60-350	Upper unit, Kiowa Shale, is gray to black clayey shale; lower unit, Cheyenne Sandstone, is massive fine-grained sandstone		
Jurassic	Mesozoic Sandstones	Morrison- Ralston Creek Formations	20-240	Red-brown, gray, yellowish-gray, claystone with beds of sandstone, limestone, siltstone and gypsum	Morrison confining unit	Minimal yield to wells from sandstone lenses	
		Entrada-Sundance Sandstone	>500	Fine- to medium-grained orange and red to buff and white sandstone interbedded with siltstone and shale; rare beds of carbonate and anhydrite	Entrada-Dockum Aquifer	Limited extent but is a local source for domestic and stock uses	
Jelm-Dockum Formations	Pink, orange, and red to buff calcareous sandstone, locally interbedded with siltstone and shale						
Triassic		Lykins- Glendo- Taloga- Whitehorse Formations- Blaine Formation	>420	Reddish-brown silty sandstone and siltstone with pink limestone, brown to green siltstone, gypsum	Lykins confining unit	The Blain Formation contains beds of gypsum and halite that are suspected to be subject to dissolution and the formation of collapse features in Western Kansas	
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Pennsylvanian							
Mississippian	Paleozoic Carbonates	Lower Paleozoic sedimentary formations that are dominantly limestone and dolomite form multiple aquifers preserved in the Ancestral Denver and Eagle Basin- Central Colorado Trough may be present depending on location			Lower Paleozoic carbonate aquifers		
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Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in the mountainous region			Crystalline bedrock		

Table 11a-01-01. Colorado Piedmont region stratigraphic chart, detailed. Colorado Geological Survey ON-010 Colorado Groundwater Atlas.

Sources: McLaughlin (1954); Voegeli and Hershey (1965); Kiteley (1978); Robson and Banta (1987); Romero (1994); Topper and others (2017); Barkmann and others (CGS OF 18-12 in publication); Raynolds and Hagadorn (2017)