San Juan Basin				
Geologic Period	**Phase**	**Stratigraphic Unit**		**Hydrogeologic Unit**
Quaternary	Modern-Glaciation	Alluvium associated with present rivers		Alluvial Aquifers
Neogene	Extension	San Juan volcanic field		Volcanics
Paleogene	Transition			
	Laramide	San Jose - Blanco Basin Formations		San Jose Aquifer
		Animas-Nacamiento-Ojo Alamo Formations		Animas Aquifer
Cretaceous		Kirtland Shale		Kirtland confining unit
	Interior Seaway	Fruitland Formation		Fruitland-Pictured Cliffs Aquifer
		Pictured Cliffs Sandstone		
		Lewis Shale		Lewis confining unit
		Mesaverde Group	Cliff House Sandstone	Mesaverde Aquifer
			Menefee Formation	
			Point Lookout Sandstone	
		Mancos Shale		Mancos confining unit
		Regional Cretaceous Seaway shale-dominated formations form multiple hydrogeologic units, most are confining units		Colorado Plateaus Regional and Paradox Basin hydrogeologic units
Jurassic	Mesozoic Sandstones	Multiple sedimentary units deposited i		
Triassic				
Permian	Ancestral Rocky Mountains	Ancestral Rocky Mountains event marine and non-marine sedimentary formations form multiple hydrogeologic units in the Paradox Basin and may be present, depending on location		
Pennsylvanian				
Mississippian	Paleozoic Carbonates	Lower Paleozoic sedimentary formations that are dominantly limestone and dolomite form multiple aquifers preserved in the Paradox Basin may be present depending on location		
Devonian				
Silurian				
Ordovician				
Cambrian				
Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in mountainous region		Crystalline bedrock

Table 11b-02-04-01. San Juan Basin stratigraphic chart.

San Juan Basin						
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	San Juan volcanic field		Basaltic, andesitic and rhyolitic volcanic flows, ash flow tuffs and clastic debris	Volcanics	Mountainous region
Paleogene	Transition					
	Laramide	San Jose - Blanco Basin Formations	1,000	Red, gray, and brown mudstone to sandy shale with beds of fine to conglomeratic sandstone	San Jose Aquifer	
		Animas-Nacamiento-Ojo Alamo Formations	500-2,700	Varicolored shale, with interbedded breccia, conglomerate, and light to rusty browntuffaceous sandstone; McDermott Member at base is predominately conglomeratic	Animas Aquifer	Important source of water in areas southeast of Durango
Cretaceous		Kirtland Shale	1,500	Interbedded sandstone, olive to gray shale, and siltstone; Farmington Sandstone Member, is thick to massive and crossbedded	Kirtland confining unit	Usable yields probably limited to Farmington Sandstone Member.
	Interior Seaway	Fruitland Formation	500	Interbedded gray, brown and olive sandstone, shale, and coal.	Fruitland-Pictured Cliffs Aquifer	Target formation for coal mining and coal-bed methane development; typically poor quality water due to presence of coal
		Pictured Cliffs Sandstone	400	Sandstone, light-olive-gray, to grayish-orange and orange, well-sorted, fine- to medium-grained, medium- to thick-bedded, and cliff-forming		Not a significant aquifer in Colorado
		Lewis Shale	1,800	Shale	Lewis confining unit	
		Mesaverde Group: Cliff House Sandstone	50-350	Gray calcareous marine sandstone, shaly sandstone, and silty shale; crossbedded and massive in places	Mesaverde Aquifer	
		Mesaverde Group: Menefee Formation	400-1,000	Light-gray sandstone, siltstone, and shale with several interbedded coal seams; thickness decreases to the north where it pinches out		Presence of coal beds often determines water quality; widely used regional aquifer where water quality is acceptable
		Mesaverde Group: Point Lookout Sandstone	350	Light-gray to brown marine sandstone, massive and cliff-forming; contains interbedded siltstone and shale in the lower part		
		Mancos Shale	1,900	Dark-gray, silty and sandy marine shale; contains some interbedded sandstones and limestones.	Mancos confining unit	
		Regional Cretaceous Seaway shale-dominated formations form multiple hydrogeologic units, most are confining units			Colorado Plateaus Regional and Paradox Basin hydrogeologic units	
Jurassic	Mesozoic Sandstones	Multiple sedimentary units deposited in the stable continent interior may be present that may form aquifers				
Triassic						
Permian	Ancestral Rocky Mountains	Ancestral Rocky Mountains event marine and non-marine sedimentary formations form multiple hydrogeologic units in the Paradox Basin and may be present, depending on location				
Pennsylvanian						
Mississippian	Paleozoic Carbonates	Lower Paleozoic sedimentary formations that are dominantly limestone and dolomite form multiple aquifers preserved in the Paradox Basin may be present depending on location				
Devonian						
Silurian						
Ordovician						
Cambrian						
Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in mountainous region			Crystalline bedrock	

Table 11b-02-04-01. San Juan Basin stratigraphic chart,detailed. Colorado Geological Survey ON-010 Colorado Groundwater Atlas.

Sources: Steven and others (1974); Lipman and Hail (1975); Craigg and others (1990); Dam and others (1990); Kernodle and others (1990); Levings and others (1990); Levings and others (1990b); Thorn and others (1990); Kernodle (1996); Levings and others (1996); Raynolds and Hagadorn (2017)