South Park Basin				
Geologic Period	**Phase**	**Stratigraphic Unit**		**Hydrogeologic Unit**
Quaternary	Modern	Alluvium and outwash deposits		Alluvial Aquifer
	Glaciation	Glacial deposits		Glacial deposits
		Older stream and outwash terrace deposits		Local perched aquifer
Neogene	Extension	Wagontongue/ Trump formations		Wagontongue/ Trump Aquifer
Paleogene	Transition	Antero Formation		Antero Aquifer
		Thirtynine Mile Volcanics		Volcanics
		Tallahassee Creek Conglomerate		Tallahassee Creek Aquifer
		Wall Mountain Tuff and Buffalo Peaks volcanics		Volcanics
		Paleogene intrusive rocks		Crystalline bedrock
	Laramide	Echo Park Alluvium		Echo Park Aquifer
		South Park Formation	Arkosic Member	Upper South Park Aquifer
			Link Spring Tuff Member	Link Spring confining unit
			Conglomerate Member	Lower South Park Aquifer
			Reinecker Ridge Volcanic Member	Volcanics
		Paleogene and Cretaceous intrusive rocks		Crystalline bedrock
Cretaceous	Interior Seaway	Laramie Formation	Upper	Laramie confining unit
			Lower	Laramie- Fox Hills Aquifer
		Fox Hills Sandstone		
		Pierre Shale		Pierre confining unit
		Niobrara Formation	Smoky Hill Member	
			Fort Hayes Limestone	
		Benton Group	Carlile Shale	
			Greenhorn Limestone	
			Graneros Shale	
		Dakota Sandstone		Dakota Aquifer
Jurassic	Mesozoic Sandstones	Morrison Formation		Morrison Aquifer
		Garo Sandstone		Garo Aquifer
Triassic		No strata		
Permian	Ancestral Rocky Mountains	Maroon Formation		Maroon-Minturn Aquifer
Pennsylvanian		Minturn Formation	Upper member	
			Evaporite facies	Eagle Valley evaporite unit
			Lower member- Coffman Member	Minturn Aquifer
		Belden Formation		Belden confining unit
Mississippian	Paleozoic Carbonates	Leadville Limestone		Mississippian-Cambrian carbonate aquifer
Devonian		Chaffee Group		
Silurian				
Ordovician		Fremont Dolomite-Harding Sandstone		
		Manitou Formation		
Cambrian		Dotsero Formation and Sawatch Sandstone		
Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in mountainous region		Crystalline bedrock

Table 12a-01-01. South Park stratigraphic chart.

South Park Basin

Geologic Period	Phase	Stratigraphic Unit		Unit Thickness (ft)	Physical Characteristics	Hydrogeologic Unit	Hydrologic Characteristics
Quaternary	Modern	Alluvium and outwash deposits		0-50	Well to poorly-sorted, uncemented sands, silts and gravels along modern streams and as valley-fill	Alluvial Aquifer	
	Glaciation	Glacial deposits		0-100	Unstratified sand, gravel, and silt within, and at the mouths of, mountain valleys of the Mosquito and Continental Divide ranges	Glacial deposits	
		Older stream and outwash terrace deposits		0-20	Well to poorly-sorted, uncemented sands, silts and gravels on bedrock-cored terraces above modern streams	Local perched aquifer	
Neogene	Extension	Wagontongue/ Trump formations		50-1,400	Conglomerate, sandstone and siltstone	Wagontongue/ Trump Aquifer	
Paleogene	Transition	Antero Formation		up to 2,000	Tuffaceous conglomerate, sandstone, siltstone, ash-flow tuff	Antero Aquifer	
		Thirtynine Mile Volcanics		up to 2,600	Andesite and basalt flows, flow breccias, conglomerates, and ash-flow tuff	Volcanics	
		Tallahassee Creek Conglomerate		up to 800	Conglomerate with sandstone, siltstone and some limestone	Tallahassee Creek Aquifer	
		Wall Mountain Tuff and Buffalo Peaks volcanics		up to 1,200	Welded ash flow tuff and andesitic flows, breccias, conglomerates, and ash beds	Volcanics	
		Paleogene intrusive rocks			Numerous felsic bodies intruded between 33 and 49 million years ago; primarily in the Mosquito Range and along the Continental Divide	Crystalline bedrock	Produces from fractures
	Laramide	Echo Park Alluvium		50 -1,000	Conglomerate, sandstone, siltstone and mudstone	Echo Park Aquifer	
		South Park Formation	Arkosic Member	up to 3,000	Arkosic sandstone, conglomerate and mudstone	Upper South Park Aquifer	
			Link Spring Tuff Member	700	Laminated tuff, sandstone and conglomerate	Link Spring confining unit	
			Conglomerate Member	1,200-5,100	Conglomerate, sandstone, siltstone and mudstone; predominately andesitic clasts	Lower South Park Aquifer	
			Reinecker Ridge Volcanic Member	300-900	Conglomerate, sandstone, andesite flows and volcanic breccia	Volcanics	
		Paleogene and Cretaceous intrusive rocks			Intermediate to felsic bodies intruded between 56 and 70 million years ago	Crystalline bedrock	
Cretaceous	Interior Seaway	Laramie Formation	Upper	up to 375	Shale, silty shale, siltstone, and interbedded fine sandstone; bituminous coal seams common	Laramie confining unit	
			Lower		Sandstone, shale and coal	Laramie- Fox Hills Aquifer	
		Fox Hills Sandstone		up to 350	Sandstone and siltstone interbedded with shale		
		Pierre Shale		4,200-5,300	Shale, siltstone with interbedded sandstone	Pierre confining unit	Sandstone and limestone layers can yield limited water
		Niobrara Formation	Smoky Hill Member	400-550	Chalk interbedded with chalky shale, gray shale, and limestone		
			Fort Hayes Limestone		Chalky limestone and marl interbedded with thin shale		
		Benton Group	Carlile Shale	~250	Shale, limestone and beds of bentonite		Limestone beds and fractures can produce water
			Greenhorn Limestone				
			Graneros Shale				
		Dakota Sandstone		175-300	Fine-grained, thin bedded to massive sandstone, pebble conglomerate	Dakota Aquifer	Statewide regional aquifer with potential for domestic, stock, commercial and industrial uses; yields are higher when fractured
Jurassic	Mesozoic Sandstones	Morrison Formation		180-360	Red-brown, gray, yellowish-gray, claystone with beds of sandstone, limestone, siltstone, conglomerate, and gypsum	Morrison Aquifer	Heterogenous unit, yields depend on rock tupes
		Garo Sandstone		60-230	Fine- to medium-grained orange and red to buff and white sandstone with shaley lenses and local basal conglomerate	Garo Aquifer	May be part of regional Entrada-Sundance Aquifer
Triassic		No strata					
Permian	Ancestral Rocky Mountains	Maroon Formation		0-3,300	Red, tan, and gray interbedded sandstone, siltstone, shale, conglomerate, and rare limestone	Maroon-Minturn Aquifer	Heterogenous unit, yields depend on rock tupes and structural setting
Pennsylvanian		Minturn Formation	Upper member	0-5,000	Sandstone, siltstone, limestone in various shades of gray with some red, orange and brown beds		
			Evaporite facies	0-1,000	Pale gray siltstone, shale, sandstone and limestone with beds of gypsum and halite	Eagle Valley evaporite unit	Dissolution features common, sources saline springs
			Lower member- Coffman Member	0-800	Sandstone, siltstone, shale, conglomerate, and limestone	Minturn Aquifer	Heterogenous unit, yields depend on rock tupes and structural setting
		Belden Formation		0-850	Gray to black shale, sandy shale, limestone and dolomite	Belden confining unit	
Mississippian	Paleozoic Carbonates	Leadville Limestone		100-400	Limestone and dolomite with chert and beds of quartz sandstone	Mississippian-Cambrian carbonate aquifer	Transmits water through interconnected solution channels and fractures
Devonian		Chaffee Group		80-200	Quartz sandstone, dolomite, and limestone		
Silurian							
Ordovician		Fremont Dolomite-Harding Sandstone		80-200	Sandstone and dolomite		
		Manitou Formation		65-230	Dolomite and shale		
Cambrian		Dotsero Formation and Sawatch Sandstone		10-250	Quartz sandstone and dolomitic sandstone with shale partings, arkosic conglomerate at base		
Precambrian	Precambrian	Crystalline rocks of igneous and metamorphic origin in mountainous region				Crystalline bedrock	

Table 12a-01-01. South Park stratigraphic chart, detailed. Colorado Geological Survey ON-010 Colorado Groundwater Atlas.

Sources: Stark and others (1949); Chronic (1964); Leroy (1964); Barker and Wyant (1976); Klein and others (1978); Jehn Water Consultants (1997); Barkmann and others (2015); Raynolds and Hagadorn (2017)