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UNIVERSITY OF UTAH  
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EARTH SCIENCE LAB.

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COLORADO

SPRINGS OF COLORADO

Springs contribute greatly to the agricultural, recreational, and medicinal worth of Colorado's natural resources. They supply water for numerous farm and ranch homes; range cattle and sheep; and deer, antelope, and other wildlife. Spring water is used by about 20 towns for a part or all of their public water supply. Many trout streams and lakes are spring fed, and at least 16 fish hatcheries get their water from springs. The mountain springs are scenic attractions for Colorado's summer visitors and provide them with refreshing water at many picnic and camp sites. Several hundred mineral and thermal springs in the Colorado Rockies add to the attractiveness of the State's vacation and health resorts.

Information on springs is collected and studied as a part of the studies made by the Ground Water Branch of the U. S. Geological Survey in cooperation with the Colorado Water Conservation Board. The records are included in the reports of the studies. Areas already studied or under study include the high plains, major river basins in eastern Colorado, and some of the mountain parks. Most of Colorado's springs are of the common potable type whose water is pleasing to the taste. Temperature of the spring water generally ranges from about 40 to 70 degrees Fahrenheit.

Most of the springs originate in the same way: water from precipitation percolates down through sand, gravel, or fractured rock until it is obstructed by tight rock such as clay, shale, or granite; the water then moves along the upper surface of the tight rock until it intersects the land surface and discharges as a spring. The points of discharge are commonly at the base of gravel terraces in alluvial valleys, such as those of the South Platte and Arkansas Rivers; and at the base of a sandstone bed which lies above a shale bed in a steep-walled valley or canyon, such as those of the Purgatoire and Colorado rivers. In the mountains, the points of spring discharge are commonly at the base of fractured rock masses and debris-covered slopes. Throughout the State most springs discharge at rates ranging from less than one gpm (gallon per minute) to 50 gpm, some yield more than 400 gpm, such as those on the slopes of Grand Mesa where springs issue at the base of fragmental volcanic rocks. The reservoir formed by the volcanic "debris" is recharged from the surface of the mesa principally by snowmelt.

Springs that discharge water of higher temperature or mineral concentration than the common potable type are called "thermal" or "mineral" springs. Most are both thermal and mineral and are found in or near the mountains where the rocks have undergone folding, faulting, and volcanism in the geologic past.

The water from many of the thermal and mineral springs is probably ordinary ground water whose temperature and mineral content have been raised considerably by ascending hot mineral-laden gases, commonly evident in the spring areas. The source of the gases is probably deep masses of cooling igneous rock, remnants of the period of deformation or volcanism, whose excess heat and volatile constituents have not been completely dissipated. Some thermal water may get that way simply by descending slowly to great depths along favorable geologic structures, being warmed by the adjacent rock which becomes warmer with depth, and then rising more rapidly along large fractures before it can cool to the normal shallow-water temperature.

Accounts of the more spectacular mineral and thermal springs of Colorado date back to the Hayden Survey in 1867. Bulletin No. 11 of the Colorado Geological Survey contains data on 254 mineral springs in the State, including nearly all the thermal springs. Water-Supply Paper 679-B of the U. S. Geological Survey discusses 1,059 thermal-spring areas in the United States, of which 45 are in Colorado. Seventeen of the 45 areas were developed as resorts and 16 for bathing, irrigation, or other purposes; 12 were not developed.

Steamboat Springs is the largest group of thermal springs in the State; the group consists of about 150 individual outlets, which have a total discharge of approximately 2,000 gpm. Glenwood Springs has the largest discharge of any in the State, the output being about 3,000 gpm.

Water from springs ranges in being the highest of Salida pipes water supplies a year. The Arch issuing from the

THERMAL SPRING DESC

This table does some of which, like given in degrees F. Boiling point is 212 C

Name
Agua Caliente Spring
Avalanche Springs...
Big Dotsero Spring...
Cebolla Hot Springs...
Chamberlain Hot Spring
Cottonwood Springs...
Geyser Warm Spring
Glenwood Springs.....
Hartsel Hot Springs...
Hot Sulphur Springs...
Idaho Springs.....
Juniper Hot Springs...
McIntyre Warm Spring
Moffat Spring .....
Mount Princeton Spring
Orvis Hot Spring.....
Ouray Hot Springs.....
Pagosa Hot Springs...
Pinkerton Springs.....
Poncha Springs.....
Red Creek Springs.....
Rhodes Spring.....
Routt Hot Springs.....
Shaw's Spring.....
Steamboat Springs.....
Trimble Springs .....
Tripp Springs .....
Valley View Hot Spring
Wagon Wheel Gap Spring
Waunita Hot Springs...
Wellsville Warm Spring

Water from Poncha Springs, in Chaffee County, a group of about 100 springs ranges in temperature from 80 to 168 degrees Fahrenheit, the latter being the highest temperature of any thermal spring in the State. The City of Salida pipes the water from Poncha Springs to the municipality; the water supplies a bathing pool in summer and sweat baths throughout the year. The Archuleta County Court House is heated by the hot water issuing from the Pagosa Hot Springs.

THEMAL SPRINGS IN COLORADO DEVELOPED FOR ECONOMIC USE; LOCATION AND DESCRIPTION OF USE; TEMPERATURE AND VOLUME OF FLOW  
(Source: United States Geological Survey)

This table does not include a number of cold springs producing highly mineralized water, some of which, like the Manitou Springs, are developed for economic use. Temperatures are given in degrees Fahrenheit. The normal body temperature of an adult is 98.6 degrees. Boiling point is 212 degrees.

Name	County	Temperature	Discharge in Gallons Per Minute	Remarks
Agua Caliente Spring.....	Conejos	90	50	Irrigation.
Avalanche Springs.....	Pitkin	112-134	200	Five springs for ¼ mile along Rock River Creek (Crystal River); bathing.
Big Dotsero Spring.....	Eagle	84	400	Bathing.
Cebolla Hot Springs.....	Gunnison	84-115	100	Twenty springs in two groups, resort. Also called Ojo de los Caballos.
Chamberlain Hot Springs.....	Saguache	116-133	50	Thirty springs; resort; tufa deposits.
Cottonwood Springs.....	Chaffee	120-144	150	Five springs; camping ground. Also called Buena Vista Hot Springs.
Geyser Warm Spring.....	San Miguel	94	5	Bathing.
Glenwood Springs.....	Garfield	106-125	3,000	Many springs; large pool and popular resort.
Hartsel Hot Springs.....	Park	105-134	10	Five springs; resort.
Hot Sulphur Springs.....	Grand	90-118	40	About 25 springs; resort; sanitarium; strong in sulphur.
Idaho Springs.....	Clear Creek	98-108	50	Several springs; resort.
Juniper Hot Springs.....	Moffat	105	25	Several springs; resort.
McIntyre Warm Springs.....	Conejos	62	600	Several springs; irrigation.
Moffat Spring.....	Boulder	84	12	Moffat Lakes; resort.
Mount Princeton Springs.....	Chaffee	98-150	50	About 35 springs; resort.
Orvis Hot Spring.....	Ouray	132	300	Bathhouse and pool. Irrigation. Formerly called Ridgway Hot Springs.
Ouray Hot Springs.....	Ouray	100-158	200	Three groups; resort; two sanitariums and municipal pool.
Pagosa Hot Springs.....	Archuleta	110-160	600	Several springs; resort. Large deposits of sinter.
Pinkerton Springs.....	La Plata	87-95	8	Five large springs and several small ones; resort.
Poncha Springs.....	Chaffee	80-168	500	About 100 springs; piped to Salida pool; tufa deposits.
Red Creek Springs.....	Pueblo	59-73	5	Five springs; local use. Also called Parnassus Springs.
Rhodes Spring.....	Park	79	300	Local use.
Routt Hot Springs.....	Routt	150	60	Picnic ground.
Shaw's Spring.....	Rio Grande	88	10	Local use.
Steamboat Springs.....	Routt	103-150	2,000	Greatest group in Colorado. About 150 springs; resort.
Trimble Springs.....	La Plata	90-110	50	Five springs; resort. Large mound of tufa.
Tripp Springs.....	La Plata	90-95	50	Several springs. Bathhouse and pool.
Valley View Hot Springs.....	Saguache	87-99	300	Five springs; local use.
Wagon Wheel Gap Springs.....	Mineral	105-150	100	Three springs; resort.
Waunita Hot Springs.....	Gunnison	140-160	1,000	More than 100 springs in two groups ½ mile apart. Also called Tomichi Hot Springs.
Wellsville Warm Spring.....	Fremont	94	150	Local use.
.....	Dolores	110	20	One spring; local use.
.....	Archuleta	120	3	Five small springs; camping ground.

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**WATER CONSERVATION AGENCIES OF THE STATE OF COLORADO, JANUARY 1, 1960**  
 Source: Colorado Water Conservation Board

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District	Location	Date of Organization	Counties Included	Principal Development Project	Assessed Valuation, 1959
Colorado River Water Conservation District	Glenwood Springs	1937	Delta, Eagle, Garfield, Mesa, Moffat, Grand, Gunnison, Ouray, Pitkin, Rio Blanco, Routt, Summit and Montrose (part), Hinsdale (part), and Saguache (part)	All development within counties listed	\$326,264,430
Southwestern Water Conservation District	Durango	1941	Montezuma, Archuleta, Dolores, Hinsdale (part), La Plata, Montrose (part), San Juan, San Miguel and Mineral (part)	All development within counties listed	94,453,781
Collbran Water Conservancy District	Collbran	1955	Mesa	Collbran Project (under construction)	1,709,100
Conejos Water Conservancy District	Manassa	1940	Conejos	Platoro Dam (completed)	4,971,250
Crawford Water Conservancy District	Crawford	1957	Delta, Montrose, and Gunnison	Smith Fork Project (under construction)	422,960
Florida Water Conservancy District	Durango	1948	La Plata	Florida Project (under construction)	5,906,190
Fruitland Mesa Water Conservancy District	Crawford	1960	Delta, Montrose, and Gunnison	Fruitland Mesa Project (under investigation)	260,185
La Plata Water Conservancy District	Hesperus	1944	La Plata	Animas-La Plata Project (under construction)	1,875,725
Mancos Water Conservancy District	Mancos	1942	Montezuma	Mancos Project (completed)	1,725,680
Middle Park Water Conservancy District	Granby	1950	Grand and Summit	Parshall, Troublesome and Rabbit Ear Projects (under investigation)	14,029,645

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National Water Conservation Council  
 U.S. Department of the Interior  
 Bureau of Reclamation  
 Denver, Colorado  
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Northern Colorado Water Conservancy District ..... Loveland .....	1937	Boulder, Larimer, Weld, Morgan, Logan, Sedgwick, and Washington.....	Colorado-Big Thompson Project (completed) .....	365,000,000
North Fork Water Conservancy District ..... Hotchkiss .....	1941	Delta and Gunnison.....	Paonia Project (under construction).....	7,470,510
Ouray Water Conservancy District..... Montrose .....	1957	Montrose and Ouray.....	Undetermined .....	4,331,867
Pot Hook Water Conservancy District ..... Slater .....	1960	Moffat .....	Savery-Pot Hook Project (under investigation) .....	253,942
San Luis Valley Water Conservancy District ..... Alamosa .....	1949	Alamosa, Rio Grande, and Saguache.....	Wagon Wheel Gap Project (under investigation) .....	23,919,516
San Miguel Water Conservancy District ..... Norwood .....	1957	San Miguel, and west portion of Montrose .....	San Miguel Project (under investigation) .....	2,560,610
Silt Water Conservancy District..... New Castle .....	1957	Garfield .....	Silt Project (under investigation).....	4,870,920
Southeastern Colorado Water Conservancy District ..... Pueblo .....	1958	Chaffee, Fremont, El Paso, Pueblo, Otero, Bent, Kiowa, Prowers, and Crowley .....	Fryingpan-Arkansas Project (under investigation) .....	400,000,000
Tri-County Water Conservancy District ..... Montrose .....	1957	Delta, Montrose, and Ouray.....	Dallas Creek and Bostwick Park Projects (under investigation).....	28,445,945
Upper Gunnison River Water Conservancy District ..... Gunnison .....	1959	Gunnison, Saguache, and Hinsdale.....	Ohio Creek, Tomichi Creek, East River, Cochetopa Creek, and Gateview Projects (under investigation).....	11,075,720
Ute Water Conservancy District..... Grand Junction .....	1956	Mesa .....	Ute Water District (under construction) .....	22,579,140
Yellow Jacket Water Conservancy District ..... Meeker .....	1959	Rio Blanco, Moffat, and Garfield.....	Yellow Jacket Project (under investigation) .....	5,823,605
Upper South Platte Water Conservancy District ..... Fairplay .....	1955	Park, Teller, Douglas, Jefferson, and Clear Creek .....	None contemplated at this time.....	10,180,995

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