Rio Grande Basin Facts

Colorado Water Conservation Board

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Medano Creek

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Rio Grande Basin

Overview

The Rio Grande system drains approximately 8,000 square miles in south central Colorado. The Rio Grande and the Conejos River rise in the eastern San Juan Mountains and flow through the San Luis Valley. In the northern portion of the basin, streams flow into the "Closed Basin," an internal drainage encompassing approximately two-thirds of the San Luis Valley.

The Rio Grande's largest tributary is the Conejos River, whose major tributaries, in turn, are the San Antonio and the Los Pinos Rivers. Other tributaries to the Rio Grande include the Alamosa River and La Jara and Trinchera Creeks. La Garita, Carnero, Saguache, San Luis and many other streams flow into the Closed Basin and do not have a natural surface outlet to the Rio Grande. Irrigated agriculture is the largest water use in the basin, consuming more than 85 percent of all water used. An estimated 600,000 acres are under irrigation which are supplied by conjunctive use of surface and groundwater.

Conservation and Conservancy Districts

Water Conservation District
Rio Grande

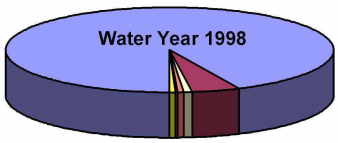
Water Conservancy Districts

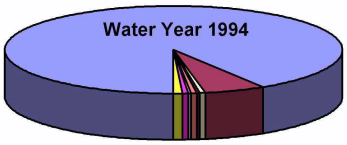
San Luis Valley	Alamosa-La Jara
Conejos	Costilla County
Trinchera	

Growth

The basin is comprised of all or portions of seven counties. Between 1990 and 2000, the population increased by 15 percent, and now accounts for approximately 1.1 percent of the state's total population. The graph below lists population for the portions of the counties that are in this basin.

Surface Water Diversions in Acre-feet by Use

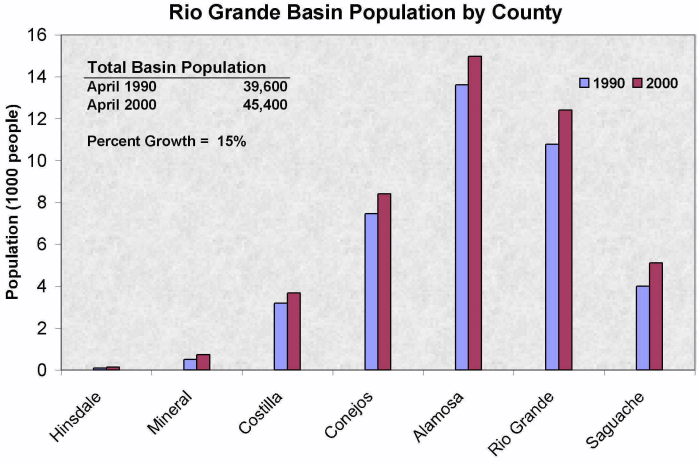




	1998 (AF)	1994 (AF)
Irrigation	1,144,192	1,191,835
Storage	58,052	77,667
Municipal	10,692	8,770
Industrial	155	202
Commercial	321	2,139
Domestic	5,958	7,977
Stock	0	849
Recreation	284	954
Fish	494	2,883
Augmentation	3,803	4,671
Recharge	6,660	11,702
Total	1,230,611	1,309,649

Source: Division 3 Annual Reports

Rio Grande Basin Population by County



Source: Colorado Department of Local Affairs

Additional information about this river basin is available at http://cwcb.state.co.us

Major Storage Projects

Reservoir	Normal Storage (acre-feet)
Sanchez Reservoir	103,114
Platoro Reservoir	59,571
Rio Grande Reservoir	52,192
Santa Maria Reservoir	43,826
Continental Reservoir	22,679
Mountain Home Reservoir	17,374
Terrace Reservoir	15,182
La Jara Reservoir	14,052
Smith Reservoir	5,808
Beaver Park Reservoir	4,758
Eastdale Reservoir No. 1	3,468
Eastdale Reservoir No. 2	3,041
Big Meadows Reservoir	2,436
Head Lake	1,500

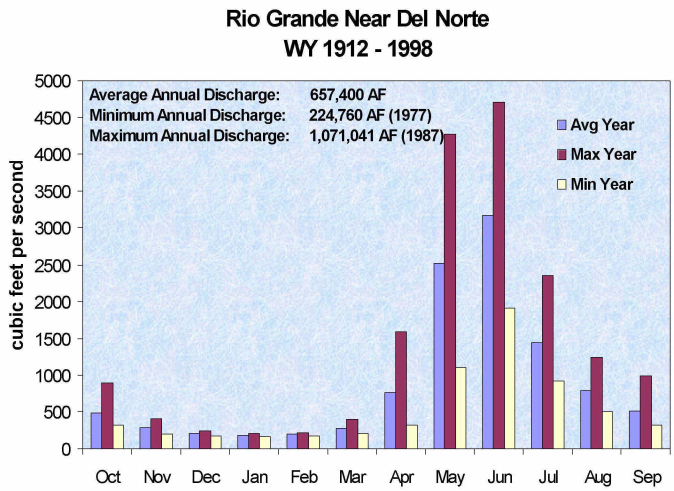
Hydrological Variations

Gage extremes for the Rio Grande near Del Norte, as the river enters the San Luis Valley, and at Lobatos, downstream of the last diversion in Colorado before the river enters New Mexico, are shown in the following table. Seasonal variations are shown below in the annual discharge graph.

Gage	Maximum Recorded Flow (cfs)	Minimum Recorded Flow (cfs)
Near Del Norte	14,000 (1911)	69 (1902)
Near Lobatos	13,100 (1905)	0 (1950)

Source: Colorado Department of Natural Resources

Annual Discharges



Source: US Geological Survey Water Data Reports

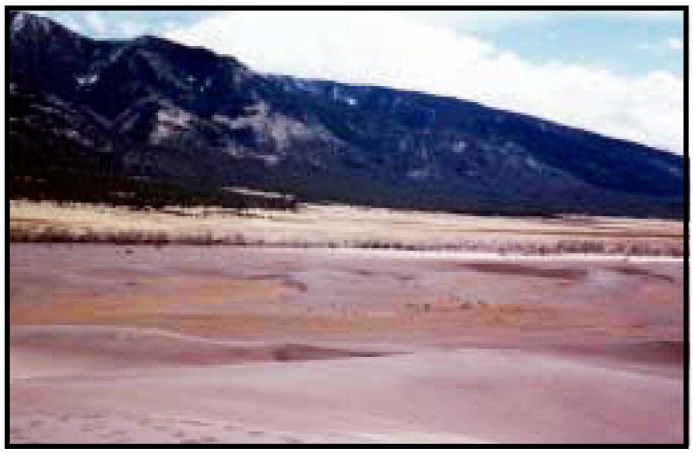
Major Water Rights Calls

Usually by mid-July native flows in all of the basin streams have receded to the point that only the most senior water rights have water available to them and reservoir releases provide supplemental water. All streams in the Rio Grande Basin are on call throughout any normal irrigation season. The Rio Grande and the Conejos River system are on call year-round from water right calls and/or the Rio Grande Compact. Much of the Rio Grande mainstem surface water is used conjunctively with the groundwater system in order to provide a reliable irrigation season supply.

The State Engineer has had a moratorium on new appropriations from non-exempt confined aquifer wells since 1972 and on non-exempt unconfined aquifer wells since 1982. Agreements have been reached with all major water user groups, including both surface and groundwater interests, that have precluded the need for groundwater administration rules at the present time. The CWCB and the State Engineer's Office (SEO) are currently working on the Rio Grande Decision Support System (RGDSS) that will answer many outstanding basin concerns. Under the legislation that enabled the RGDSS, the SEO will promulgate rules that address the potential for new appropriations in the confined aquifer.

Stream and Lake Protection

There are 133 instream flow segments totaling approximately 971 stream miles in the basin. There are also 48 lakes with decreed natural lake levels. These water rights are held by the CWCB to "protect the natural environment to a reasonable degree." The decreed flow or lake level for each of these instream flow segments and natural lakes is based on the amount required to maintain the water-dependent natural environment.



Ephemeral stream in the Great Sand Dunes National Park (Photo courtesy of Adam Bingham)

Unique Characteristics

- Approximately 2,700 square miles in the San Luis Valley form an internal drainage called the Closed Basin, for which there is no surface outlet to the Rio Grande.
- The Closed Basin Project is a system of 170 salvage wells which draw from the shallow, unconfined aquifer and salvage water that otherwise would be lost to evapotranspiration.
- San Luis Valley irrigation relies heavily upon conjunctive use of groundwater and surface water. An estimated 85 to 90 percent of irrigation water in the central part of the valley is from managed recharge and pumping of unconfined-aquifer wells.
- Development of new supplies may be affected by the Rio Grande Compact, endangered species, interstate litigation, and overappropriated surface and groundwater sources.

Source: Colorado Water Conservation Board

Major Imports into the Basin

Name	Recipient Stream	Diversions (acre-feet)
1* Tarbell	Saguache	310
2 Weminuche Pass Ditch	Weminuche	652
3 Pine River-Weminuche Pass Ditch	Weminuche	433
4 Wms Cr.-Squaw Pass D.	Squaw	308
5 Don La Font D. 1 & 2	Red Mountain	198
6 Treasure Pass Ditch	Pass	98
7 Tabor Pass Ditch	Spring	846

Major Exports from the Basin

Name	Diversions (acre-feet)
8 Hudson Branch Ditch	117
9 Medano Ditch	1,047

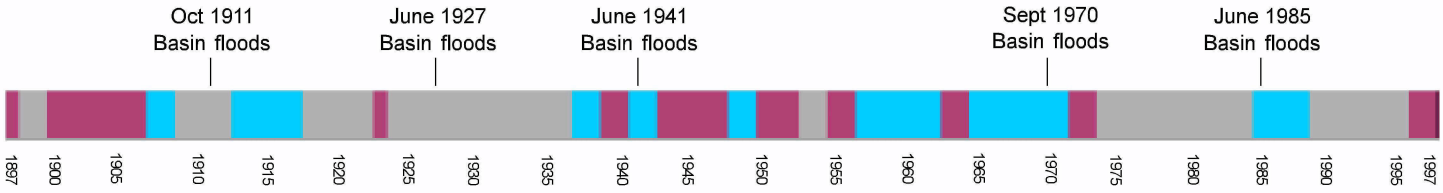
** Numbers in the above tables correspond to numbers that accompany arrows on the basin map (p. 5).*

Source: Division 3 1998 Annual Report, 10-year Averages

Great Sand Dunes National Park (Photo courtesy of Adam Bingham)

Wet and Dry Periods

Every year, Colorado experiences at least one 100-year flood somewhere in the state. Colorado's total flood losses to date have been documented to be $4.9 billion. The basin's most recent flood event was June 9, 1985. The estimated total historic flood damages for this basin are $12.1 million to date.



Source: Colorado Water Conservation Board; and McKee, Doesken, and Kleist, Historical Dry and Wet Periods in Colorado, Figures, Colorado Climate Center, Colorado State University, 1999.

Endangered Species

The Colorado Wildlife Commission has listed the Rio Grande sucker as endangered. The Division of Wildlife is coordinating a recovery plan for this species.

The silvery minnow is federally listed as endangered. Historically, this species occurred throughout the Rio Grande Basin in New Mexico and Texas. It now occurs only in the Rio Grande downstream of Cochiti Dam to the headwaters of Elephant Butte Reservoir in New Mexico, about five percent of its historic range. The primary limitation to recovery is a lack of perennial river flows in the middle Rio Grande, diversion structures and water quality.

Compact Facts

United States - Mexican Water Treaty of 1906
Guarantees the delivery of 60,000 acre-feet of water annually at the International Dam at Ciudad Juarez, except during periods of extreme drought. Elephant Butte Reservoir in New Mexico was constructed partly to ensure the nation's ability to meet this obligation. The Rio Grande Compact provides that the allocations of water to the states shall not be increased or diminished by reason of changes in the delivery or loss of water to Mexico.

Rio Grande Compact of 1938
Establishes Colorado's obligation to ensure deliveries of water at the New Mexico state line and New Mexico's obligation to assure deliveries of water at the Elephant Butte Reservoir, with some allowance for credit and debit accounts. The obligations are calculated based on a schedule of deliveries. The Compact establishes the Rio Grande Compact Commission to administer the terms of the Compact. The Commission consists of one representative from each state and a non-voting federal representative. Several tributaries to the Rio Grande are not subject to the Rio Grande Compact administraton.

Amended Costilla Creek Compact of 1963
Establishes uses, allocations and administration of the waters of Costilla Creek in Colorado and New Mexico. The Compact makes apportionments and allocations among specific facilities. It is administered by the Costilla Creek Compact Commission, which is composed of the water officials from Colorado and New Mexico.

Groundwater

The use of groundwater in the San Luis Valley dates from the late 1800s, when small-production wells were drilled into the upper few hundred feet of the confined aquifer. Since the 1970s conjunctive use by controlled recharge of surface water through ditch diversions and well pumping from the shallow ("unconfined") aquifer has become the predominant method of irrigation water management, particularly north of the Rio Grande.

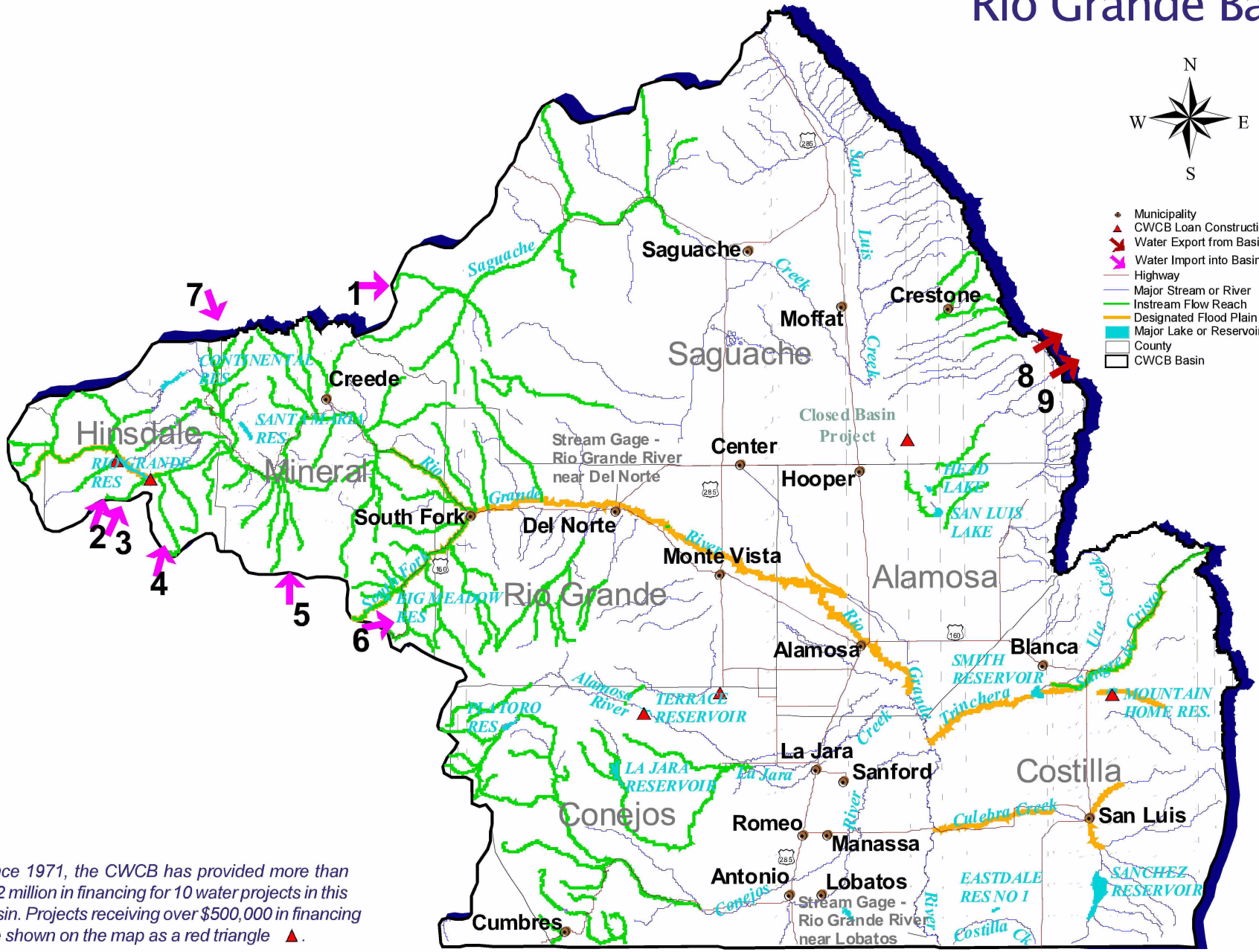
Irrigated agriculture is by far the dominant water use in the basin, using an estimated average of 2 million acre-feet annually, of which an estimated 800,000 acre-feet is from groundwater sources. Approximately 3,500 of the 6,500 wells in the basin with greater than 50 gpm capacity are in use.

Source: Colorado Department of Natural Resources and RGDSS

Groundwater Source in San Luis Valley	Unconfined Aquifer	Confined Aquifer
Aquifer Characteristics	40 to 100 feet thick Unconsolidated alluvial sand and gravel. Clay layers separate the aquifers.	500 to <4,000 feet thick and estimated to average 2,000 feet thick across most of the San Luis Valley. Upper portions same as unconfined. Sandstones and fractured volcanic rocks in deeper portions.
Recharge Source	Ditch and canal leakage. Percolation of surface water from streams on alluvial fans along the periphery of the valley where the clay layers are not present.	Deep percolation of surface water from streams on alluvial fans along the periphery of the valley where the clay layers are not present.
Yield	Up to 1,500 gpm on the west side of the valley. Typically 50 to 700 gpm in the central and eastern parts of the valley.	From 50 gpm to over 3,000 gpm in the southern and western parts of the valley.
Water Quality	Usually acceptable for potable use, although in localized areas of the central valley, nitrate, sodium, and total dissolved solids are unacceptably high.	Typically acceptable for potable use.

Source: Colorado Department of Natural Resources

Rio Grande Basin



Since 1971, the CWCB has provided more than $12 million in financing for 10 water projects in this basin. Projects receiving over $500,000 in financing are shown on the map as a red triangle ▲.