

# Arkansas River Basin Facts

Colorado Water Conservation Board

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Arkansas River Basin



Fountain Creek

## Overview

The Arkansas River begins in the central mountains near Leadville and flows south and east to Kansas. Approximately one-quarter of the state is drained by the Arkansas River. Principal tributaries include Fountain, Timpas and Grape Creeks; and St. Charles, Huerfano, Apishapa, and Purgatoire Rivers.

Irrigation is the major water use in the basin, with about 2.0 million acre-feet diverted for irrigation in 1998 out of total diversions of 3.7 million acre-feet. There is substantial reliance on groundwater in the basin for irrigation uses. Recreational use is an economic mainstay in the headwater region, with some of the best fishing and river rafting in the nation.

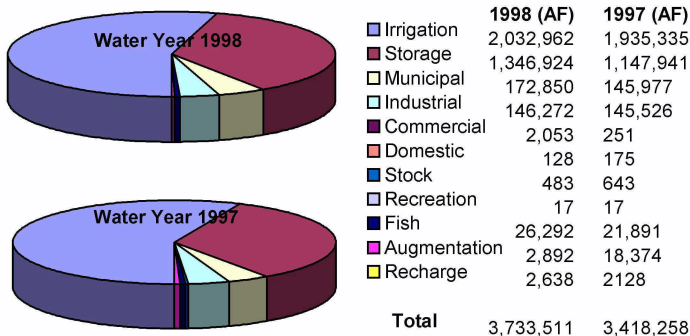
## Water Conservancy Districts

Arkansas River  
North La Junta  
Purgatoire River  
Southeastern Colorado  
Upper Arkansas

## Growth

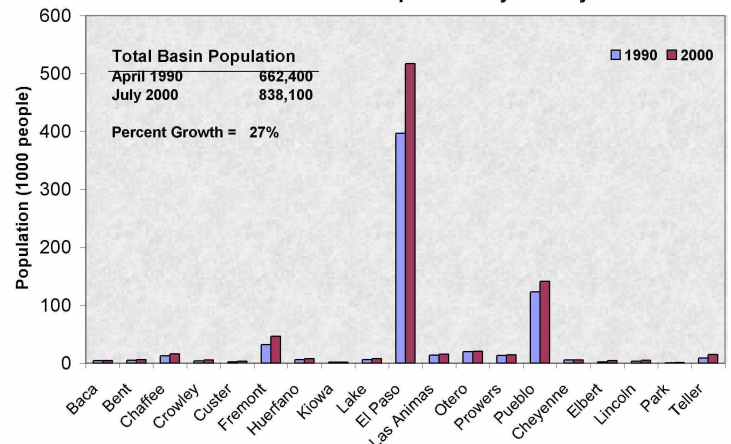
The basin is comprised of all or part of 19 counties. Between 1990 and 2000, the population in this region increased by 27 percent and now accounts for 19.5 percent of the total state population. The graph below outlines populations for the portions of the counties that are in the basin. A recent study by the Southeastern Colorado Water Conservancy District suggests that 173,000 acre-feet of additional storage will be needed to support growth in the basin through 2040.

## Surface Water Diversions in Acre-feet by Use



Source: Colorado Division of Water Resources, Division 2 Annual Reports

Arkansas River 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)
John Martin Reservoir	603,465*
Pueblo Reservoir	357,678
Great Plains Reservoirs	265,552
Twin Lakes	141,000*
Turquoise Reservoir	129,432
Trinidad Reservoir	119,877
Adobe Creek Reservoir	71,000
Cuchara Valley Reservoir	40,960
Lake Meredith	39,804
Horse Creek Reservoir	28,000
Clear Creek Reservoir	11,500
Mt. Elbert Forebay	11,530
Lake Henry	9,500
St. Charles Reservoir No. 3	8,638
Holbrook Reservoir	4,600
Deweese-Dye Reservoir	1,772
Brush Hollow Reservoir	3,933
Mt. Pisgah Reservoir	2,471
Dye Reservoir	5,640

Sources: Colorado Division of Water Resources Office of Dam Safety Database; \*Colorado Water Conservation Board

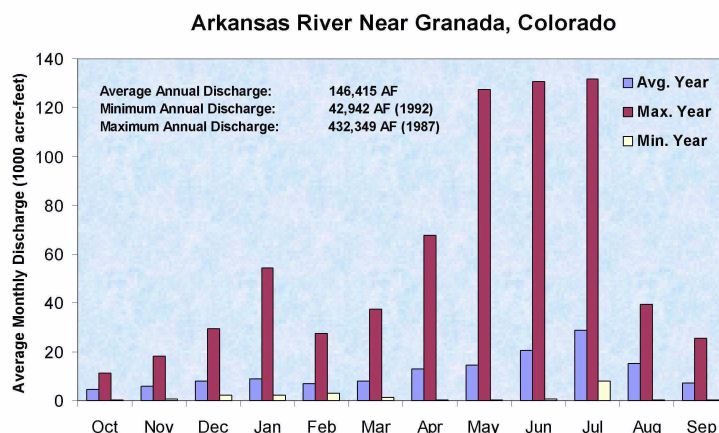
## Hydrological Variations

Examples of annual and seasonal variations are shown below.

Gage	Maximum Recorded Flow (cfs)	Minimum Recorded Flow (cfs)
Near Nepesta	6,930 (1994)	90 (1978)
Near Granada	3,330 (1987)	3 (1990)

Source: U.S. Geological Survey Water Data Reports

## Annual Discharges



Source: U.S. Geological Survey Water Data Reports

## Major Water Rights Calls

Major water rights calls during the winter come from John Martin Reservoir (1948), the Winter Water Storage Program (1910) and Pueblo Reservoir (1962). During the irrigation season, priority calls generally originate from the senior irrigation rights, including the Colorado Canal (1890), Fort Lyon Nos. 2 (1887) and 3 (1893), Holbrook (1889), Catlin (1887), Highline (1890), Otero (1890), Consolidated (1888), and Amity (1887). The Fort Lyon Storage (1906) right may also call during the irrigation season.

The available capacity for exchange between water rights diverting downstream from Pueblo to points of diversion or storage upstream from Pueblo (e.g. Pueblo, Twin Lakes and Turquoise Reservoirs) is an effective means of water resource management in the Arkansas Basin.

The Division 2 Engineer acts as the Operations Secretary to the Arkansas River Compact Administration. In this capacity, the Engineer is charged with conducting the operations of John Martin Reservoir during each Compact year (November 1 - October 31) according to the John Martin Reservoir Operating Plan. This is an important component in the operation and management of Arkansas River Basin water resources.

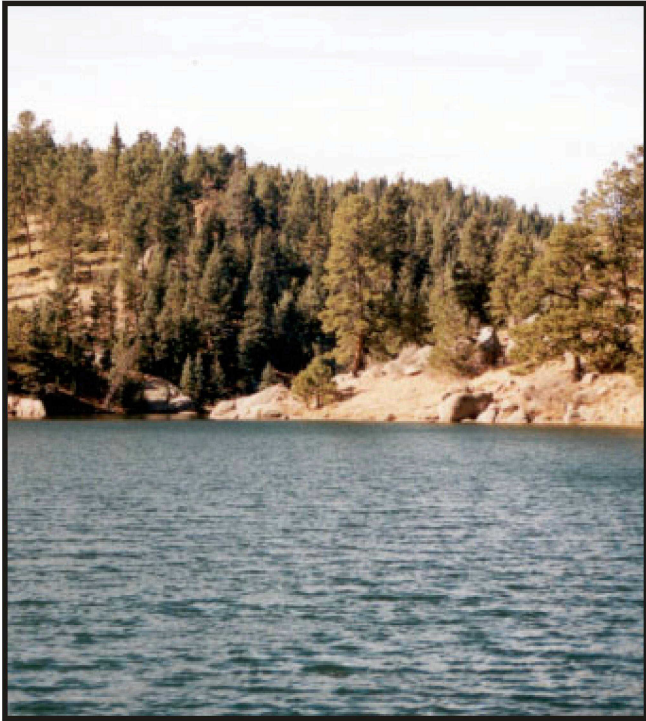
Implementation of the Amended Groundwater Measurement and Use Rules has resulted in nearly real-time administration of conjunctive use of groundwater and surface water in the basin.

Source: Colorado Water Conservation Board and Division 2 Engineer's Office

## Stream and Lake Protection

There are 126 instream flow segments totaling approximately 607 stream miles in this basin. There are also 85 lakes with decreed natural lake levels. These decreed water rights are held by the CWCB to "protect the natural environment to a reasonable degree." The decreed amount for each of these instream flow segments and natural lakes is based on the flow or lake level required to maintain the water-dependent natural environment.

Source: Colorado Water Conservation Board



Stanley Reservoir (Photo courtesy of Dan Clayton)

## Major Imports into the Basin

Name	Recipient Stream	Diversions (acre-feet)
1* Boustead Tunnel	Lake Fork Creek	53,971
2 Twin Lakes Tunnel	Lake Creek	46,930
3 Homestake Tunnel	Lake Fork Creek	24,520
4 Hoosier Tunnel†	Fountain Creek	9,330
5 Busk-Ivanhoe Tunnel	Busk Creek	4,123
6 Wurtz Ditch	Tennessee Creek	2,070
7 Columbine Ditch	Arkansas River	1,669
8 Medano Ditch	Huerfano River	834
9 Ewing Ditch	Tennessee Creek	775
10 Larkspur Ditch	Poncha Creek	66

Source: Division 2 Annual Report (Water Year 1998)

## Major Exports from the Basin

Name	Diversions (acre-feet)
11 Aurora Rocky Ford Ditch	8,250

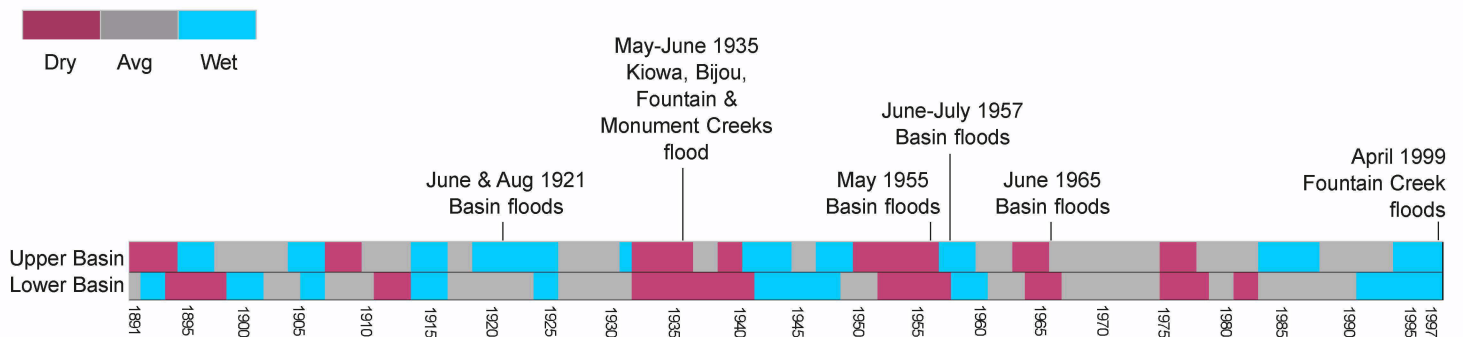
Source: Southeastern Colorado Water Conservancy District and Division of Water Resources

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

† Continental Hoosier Tunnel exports from the Colorado Basin to the Arkansas Basin through a portion of the South Platte Basin.

## 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 April 29-May 3, 1999. The estimated total historic damages for this basin are \$1.3 billion 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 native greenback cutthroat trout is the Colorado State Fish. It is federally listed as threatened but has been reintroduced into many streams and lakes. The Arkansas darter is a federal candidate species for listing under the Endangered Species Act and is listed as threatened by the Colorado Division of Wildlife.

## Unique Characteristics

-  Erosion and channel instability in lower reaches of Fountain Creek.
-  An unusual groundwater mound exists at La Junta and is under investigation, along with substantial channel degradation.
-  Development of water supplies will be limited and complex due to the Compact allocation, interstate litigation, and salinity concerns.
-  Litigation with Kansas over compact issues.

## Groundwater

	Upper Basin -- Above Pueblo Reservoir		Lower Basin -- Below Pueblo Reservoir	
	Alluvium	Bedrock Aquifer	Shallow Alluvium	Bedrock Aquifer
Aquifer Characteristics	Stream and glacial deposits -- silt to large boulders	Dry Union Formation up to 500 ft thick. Fractured granite -- Sawatch and Mosquito ranges; carbonate rock -- Leadville	Width varies from 1 to 10 miles; 30 to 200 ft thick. Designated groundwater basins within the Arkansas Basin include the Upper Black Squirrel and Big Sandy.	Up to 1,000 ft thick. Sandstone formation in the Ogallala (Northern and Southern High Plains) The southern part of the Denver Basin bedrock aquifers provides water to Douglas, El Paso and Elbert counties.
Primary Uses	Domestic	Domestic	Agriculture	Agriculture, domestic and municipal
Yield	Varies widely due to range of materials: up to 500 gpm at Salida to Buena Vista reach	Varies widely: 10 to 200 gpm	10 to 4,000 gpm, depending on location	50 to 500 gpm
Water Quality	Generally potable, a few local exceptions of natural and manmade contamination	Generally potable, a few local exceptions of natural and manmade contamination	Degrades downstream from good in the upper portion of the reach to poor, only marginally useful for irrigation and stockwatering due to salinity	Generally very good

Source: Colorado Department of Natural Resources

## Compact Facts

### Arkansas River Compact of 1948

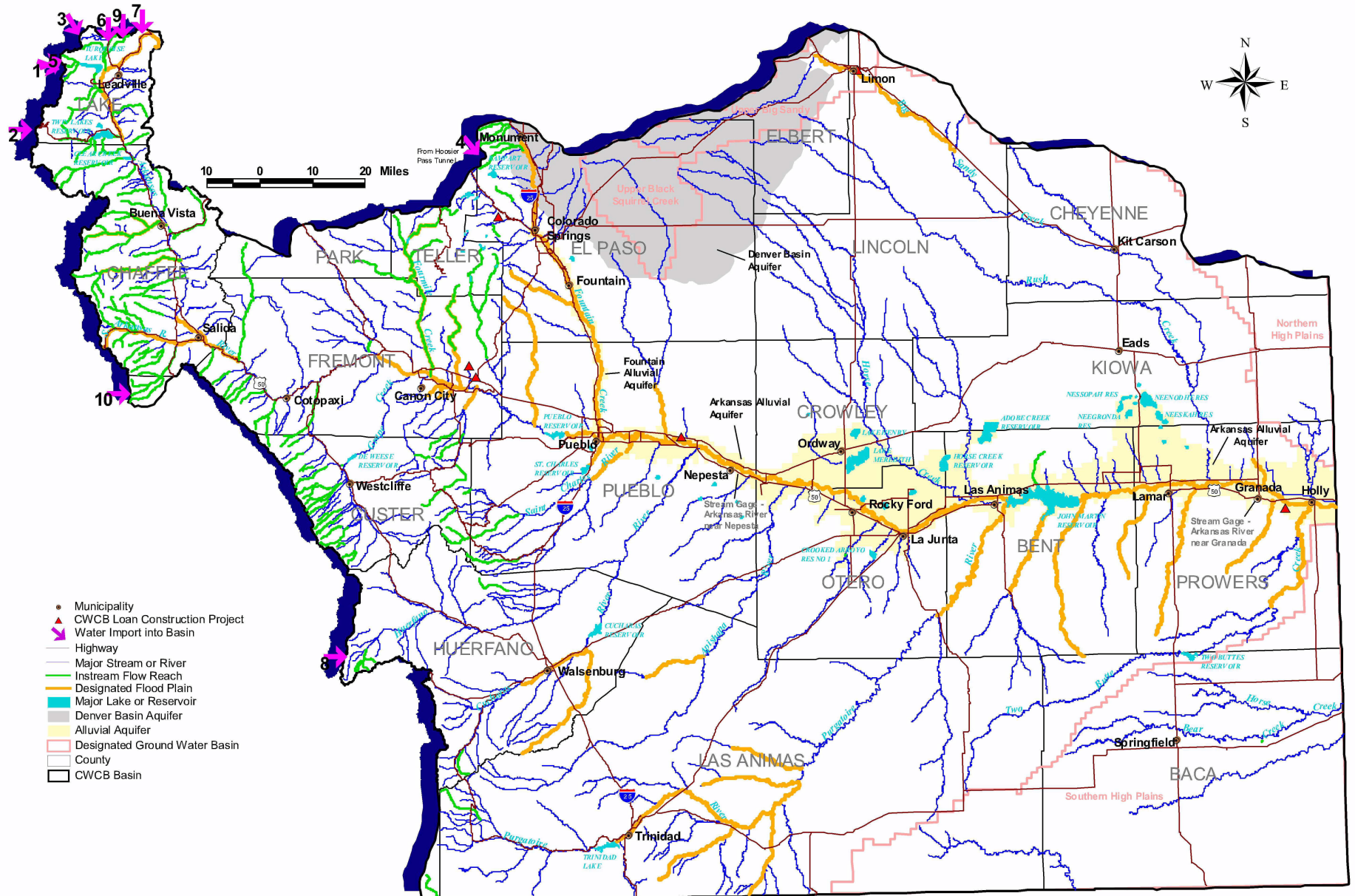
The Compact apportions the waters of the Arkansas River between Colorado (60%) and Kansas (40%) based on the opinion of the U.S. Supreme Court in *Colorado v. Kansas*, 320 U.S. 383 (1943). The Compact established the Arkansas River Compact Administration to prescribe procedures for Compact administration, including three representatives from Colorado (a water user from above and below John Martin Reservoir and the Director of the Colorado Water Conservation Board), three Kansas representatives, and a federal representative.

The 1980 Operating Principles provide for storage accounts in John Martin Reservoir and the release of water from those accounts for Colorado and Kansas water users. If the conservation pool in the reservoir is depleted, Colorado is required to administer water rights priorities in District 67 (downstream from John Martin). During such periods, Kansas is not entitled to water flowing into the reservoir.

Colorado and Kansas have litigated claims concerning Arkansas River water since the early twentieth century. Supreme Court decrees establish principles of equitable apportionment of water between states. In 1995, Colorado was found to have depleted stateline flows in violation of the Compact. The states are now litigating the nature and extent of the injury to Kansas and the method of repayment by Colorado before a Supreme Court appointed Special Master. In response to an order of the Special Master, the Colorado State Engineer promulgated well administration rules to bring Colorado into compliance with the Compact.

Since 1971, the CWCB has provided over \$11.7 million in loan financing for 22 water projects in this basin. Projects receiving over \$500,000 are shown on the basin map as a red triangle ▲.

# Arkansas River Basin



- Municipality
- ▲ CWCB Loan Construction Project
- ▲ Water Import into Basin
- Highway
- Major Stream or River
- Instream Flow Reach
- Designated Flood Plain
- Major Lake or Reservoir
- Denver Basin Aquifer
- Alluvial Aquifer
- Designated Ground Water Basin
- County
- CWCB Basin