

WATER DEVELOPMENT IN THE UPPER ARKANSAS RIVER
Prepared for Water 2012

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The Arkansas River Basin's water rights were developed by custom and tradition typical of other basins in Colorado. However, the Arkansas has some remarkable features that distinguish it from others in the State. By 1890 most of the basin's reliable water was appropriated and decreed. One of the more distinguishing characteristics is the number of trans-basin diversions that import water into the Arkansas. Further, a substantial amount of both native water, as well as trans-basin water previously imported into the basin, is diverted from the Arkansas to other Colorado basins. It is the largest in land area of all water basins in Colorado. As the Arkansas River makes its way from the headwaters in Lake County to the Kansas Stateline, its supply is derived from a combination of native and imported water fed from numerous tributaries. The Northern main stem of the River begins above Leadville and after receiving trans-basin flows from three major diversion projects accepts flows from the South Arkansas River at the Eastern edge of Chaffee County in Salida. From Chaffee County it travels through Fremont County and accepts flows from Grape Creek that drains the Wet Mountain Valley. Further on at Pueblo, Fountain Creek flows into the River from El Paso County and en-route to the Kansas Stateline receives flows from the Southwestern end of the basin from the Huerfano and Purgatory rivers as well as other streams.

Early in the State's history the major use of water was for mining and milling. As the State matured and mining became less significant agricultural uses of water for irrigation of crops became the dominant use of water. Today irrigation consumes nearly 80 percent of the water diverted within the basin. Since the 1950's population growth in the cities along the Front-Range of Colorado have exerted tremendous pressure for the change of the irrigation water rights to municipal uses. Farmers seeking water to supplement their native water supplies developed most of the major trans-mountain diversions by successfully capturing un-appropriated water supplies from the wetter Colorado River Basin. Many of these were open ditches that were dug from the Western side of the divide to the Eastern slope. Others were major diversions transiting the continental divide through tunnels bored through the mountains. Some of the major trans-mountain diversion tunnels are the Twin Lakes, Boustead, Homestake, and the Busk-Ivanhoe. At times as much as 30 percent of the Arkansas River flow is from trans-mountain sources.

Twin Lakes Reservoir and Canal Company's history is a reflection of development and evolution of water use in the Arkansas Basin. It involves an extensive irrigation system composed of a trans-mountain diversion from the Western Slope composed of a large arterial network of canals and a reservoir collection terminus on the Western Slope that diverts through in a five mile long tunnel under the continental divide to Twin Lakes Reservoir on the Eastern Slope. Along with native water rights the trans-mountain water finds its way to the 50 mile long Colorado Canal with a head gate at

Boone, Colorado downstream of Pueblo, Colorado. The present company was organized in 1913 and was the successor to a series of companies formed for primarily irrigation of lands in the Lower Arkansas Valley. It had its start in 1889. The company holds decrees for native water in Chaffee County, water division 2, with priorities of December 15, 1896 and March 25, 1897, and in Garfield County, water division 5, with priorities from August 23, 1930. In 1930, the company developed its West Slope Diversion, Tunnel and storage rights in Twin Lakes Reservoir. By the 1970's much of the water was being used for municipal needs. On average the annual fully consumable yield of the total system is 47,000 acre feet. The major owners of the shares are Pueblo Board of Water Works, Colorado Springs Utilities, and the City of Aurora. The Upper Arkansas Water Conservancy District's extensive umbrella augmentation plans utilize a large percentage of Twin Lakes water in its portfolio of water rights.

The Frying Pan-Arkansas Project is celebrating its 50th year. During the late 1940's and early 1950's gold colored aluminum frying pans were sold in the Arkansas Valley to finance the lobbying for federal authorization to construction a trans-mountain diversion to bring water to the Arkansas Valley for irrigation, domestic and recreational uses. In 1962, the project was authorized and dedicated in a ceremony by then President John F. Kennedy at the Pueblo Municipal Airport. By 1974 the primary part of the project was completed with its terminus at Pueblo Reservoir. The project takes its diversion from the Frying-Pan River in Pitkin County and crosses under the divide through the Boustead Tunnel into Turquoise Reservoir in Lake County. This Project water travels through the Mount Elbert Conduit to nearby Twin Lakes Reservoir. From there Frying Pan Project water reaches the Arkansas River with terminal storage at Pueblo Reservoir. Project water is used by most major towns, cities, water conservancy districts, well associations, and irrigators. The project is managed by the Bureau of Reclamation. The South Eastern Colorado Water Conservancy District was formed to repay the project and allocate the average diversion of approximately 54,000 acre feet of fully consumable water.

Built from 1963 to 1967 the Homestake project was conceived by the City of Aurora in 1950. It is jointly operated by Aurora and Colorado Springs Utilities. It diverts water from the Eagle River through the Homestake Tunnel into Lake County at Turquoise Reservoir delivering approximately 25,000 acre feet of fully consumable water annually to the Arkansas Basin. The project shares Bureau of Reclamation facilities for storage. Homestake water is pumped from the headwaters of the Arkansas through the Otero Pipe line to Aurora in the South Platte Basin and to Colorado Springs in Arkansas Basin.

Agricultural water uses still remain a significant factor in the basin. In the Lower Arkansas Valley row crops and hay crops are a major economic driver. In the Upper Basin, which extends upstream from Pueblo Reservoir, ranching is the major agricultural use with alfalfa and native hay being the primary crops. In the past 30 years major pressure has been placed upon water use due in part to the decisions reached in *Kansas v. Colorado Compact* law suit. In the 1985 law suit Kansas alleged that Colorado had violated the 1948 Compact by allowing post-compact wells constructed along the

Arkansas River to pump causing material depletions to Stateline flows. The Supreme Court decision resulted in the State's adoption of the Amended Rules and Regulations on well pumping in 1994. Entities such as the Upper Arkansas Water Conservancy District developed umbrella augmentation plans to serve the public with an affordable method of obtaining a court decreed augmentation plan to replace out-of-priority depletions for all uses. Other well associations were formed in the Lower Arkansas Valley to provide replacement water for large irrigation wells. More recently the State of Colorado mandated replacement plans be undertaken by farmers and ranchers, primarily in the Lower Arkansas Valley, who changed irrigation methods to more modern means from traditional flood and furrow irrigation to sprinkler and drip systems. Unfortunately these efficiencies translated into more consumptive use of the water diverted. The State now requires replacement plans be in place or acreage taken out of production to offset the increase in consumption from more efficient irrigation. This has recently been streamlined into an administrative system with the Lower Arkansas Valley Water Conservancy District taking the lead in providing replacement water to those affected by the new Efficiency Rules.

Today, the major contender of water rights acquisition is for municipal and industrial uses. The Statewide Water Supply needs assessment for the basin estimates a gap between water supply and demand for municipal and industrial uses to reach as high as 170,000 acre feet by 2050. Projects have been identified to meet some of this need. These include reservoir enlargements and delivery systems, water right acquisitions, conservation, and alternative agricultural transfers, such as lease fallowing, as well as more efficient operations. If all the planned projects are 100 percent successful with maximum yields attained, as much as 82,000 acre feet of demand will remain unsatisfied. None of the above estimates include yields lost to inefficiencies or mitigation for non-consumptive uses such as environmental or recreational needs.

One of the benefits of the trans-mountain projects are the storage vessels built at the headwaters and lower downstream at critical terminal points such as Pueblo. In recent years Upper Arkansas River flows became contentious as recreational activities such as boating and fishing developed into a major economic force. Water entities became involved and agreed to a Voluntary Flow Program to provide consistent and dependable minimum river flows to sustain boating through August 15th and maintain even flow in the critical Fall period to assist the fishery with spawning. With reservoir storage at both the upper and lower ends of the Arkansas River, releases and exchanges can be timed to coincide with these recreational and environmental events.

As we move ahead in the next 30 or 40 years new projects need to develop to meet the challenges of balancing the needs of an expanding population for all uses. Over 100 years ago irrigators developed the systems we rely on today to meet these uses. Our challenge is to continue this legacy by developing innovative solutions to meet the increasing demands.