DEVELOPMENT OF LAND FALLOWING-WATER LEASING IN THE LOWER ARKANSAS VALLEY

(2002 through mid-2011)


Sugar City (2011)


La Junta (2011)

Lower Arkansas Valley WATER CONSERVANCY DISTRICT
Serving Bent, Crowley, Otero, Prowers and Pueblo counties

JUNE 30, 2011

REPORT FOR THE COLORADO WATER CONSERVATION BOARD


Formerly irrigated land below Colorado Canal (2011)

Currently irrigated land on the Ft. Lyon Canal

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for
TROUT, RALEY, MONTAÑO,
WITWER & FREEMAN, PC

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1. INTRODUCTION

The following pages and appendices report on the development from 2002 through mid-2011 of rotational land fallowing-water leasing (fallowing-leasing) in the Lower Arkansas Valley of Colorado (Lower Valley) by the Lower Arkansas Valley Water Conservancy District (Lower Ark District) and the Lower Arkansas Valley Super Ditch Company, Inc. (Super Ditch).[1] The goal of fallowing-leasing is to provide an alternative to historical "buy-and-dry" transfers of agricultural water rights to meet municipal water needs to avoid further harm to the agricultural economy and communities of the Lower Valley.

The concept behind the Super Ditch is the creation of a negotiating agent that can act on behalf of water ditch shareholders who are interested in leasing water on a rotational basis to cities. Farmers believe they will have greater bargaining power to receive the best price from municipalities when acting together, while retaining ownership of their water rights.

The report begins with an overview of the Arkansas River Basin, including its hydrology, water development history, economy, and future water needs. With that background, it is easy to understand how voters created the Lower District in less than a year to respond to on-going municipal buy-and-dry of the Lower Valley's irrigated land. Fallowing-leasing was one of the District's first priorities, which led to the creation of the Super Ditch in a few short years.

The Report then reviews the various issues and technical investigations the Lower Ark District undertook to foster fallowing-leasing and the Super Ditch. Both the Lower Ark District and the farmers paid particular attention to the economics of fallowing-leasing, not only for irrigated agriculture but also for the cities who may lease water. This has facilitated negotiated terms sheets and pilot programs with municipalities that are moving fallowing-leasing from concept to reality.

2. THE ARKANSAS RIVER BASIN

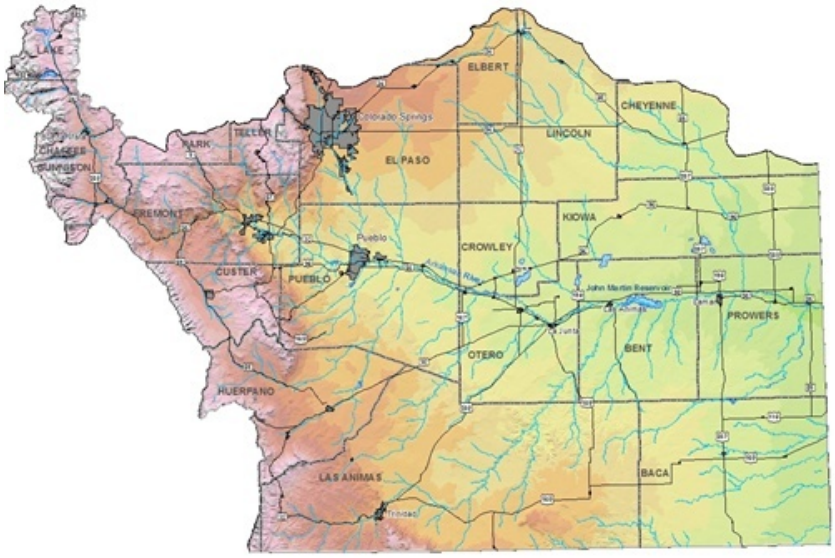
2.1 BASIN OVERVIEW

The Arkansas River arises in one of the six major river basins of Colorado before flowing out of the state. The Arkansas River is the longest tributary in the Mississippi-

[1] This "Comprehensive Report" is also in satisfaction of Task H, CWCB Alternative Agricultural Transfers Methods Grant Contract C150427 to the Lower Ark District.

Missouri River System, flowing 1,450 miles from its source near Leadville, Colorado to its confluence with the Mississippi River southeast of Little Rock, Arkansas.[2] The Arkansas River basin is also geographically the largest in Colorado, covering over one-third of the state's surface area.[3] (Figure 1) The basin houses nearly one fifth of the state's population,[4] while its annual average yield is only 6% of the annual water supply of the state.[5] Moreover, a substantial portion of the basin's native water is owed to Kansas by Interstate Compact.[6] Accordingly, native water supplies are inadequate to meet the Arkansas River Basin's needs, and supplemental trans-basin supplies from the Colorado River Basin are necessary to meet those needs.

Figure 1. Arkansas River Basin of Colorado.



Mountain runoff provides the overwhelming majority of the water supply for the Arkansas River, the headwaters receiving approximately 30 to 40 inches of precipitation

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[2] ARKANSAS RIVER HISTORICAL SOCIETY; *Available at*: http://www.tulsaweb.com/port/history.htm.

[3] COLO. WATER CONSERVATION BD., COLO. DEP'T OF NATURAL RES., THE STATEWIDE WATER SUPPLY INITIATIVE: PHASE 3 (SWSI), CONSUMPTIVE NEEDS ASSESSMENTS §1.14 (2010) [hereinafter SWSI 2010]; *See also* Jayla Poppleton, *Arkansas River Basin*, HEADWATERS, Spring 2009, at 23.

[4] U.S. CENSUS BUREAU, 2010 Census (2010) (18.61% of Colorado's population).

[5] DAVID H. GETCHES, *Meeting Colorado's Water Requirements: An overview of the Issues*, TRADITION, INNOVATION, AND CONFLICT: PERSPECTIVES ON COLORADO WATER LAW, (L. MacDonnell ed., 1986). [hereinafter GETCHES].

[6] Arkansas River Compact, COLO. REV. STAT. (1990), § 37-69-101 to § 37-69-106 (1990); KAN. STAT. ANN. (1989), § 82a-520.

in an average water year, primarily coming in the winter as snow.[7] Over 60% of runoff into the river's mainstem occurs between the months of April and July.[8] In contrast, the Lower Arkansas Valley between Pueblo, Colorado, and Garden City, Kansas, is semiarid, with rainfall ranging from only 12 to 18 inches per year.[9] Hence, the streams of the rolling plains east of the city of Pueblo, such as Fountain, Adobe, Horse and Big Sandy Creeks, are intermittent and do not provide a dependable water supply to ditches on the Arkansas River.[10] When transmountain imports are excluded, the flow of the river at Canon City averaged 499,200 acre-feet per year from 1908 to 1984 and ranged from a low of 217,200 acre-feet in 1940 to a high of 896,600 acre-feet in 1957.[11] The largest tributary of the Arkansas River, the Purgatoire River, only averaged 61,659 acre-feet per year from 1950 to 1985 and ranged from a low of 4,571 acre-feet in 1975 to a high of 271,256 acre-feet in 1965.[12]

2.1.1 Water Development Before 1950

Thousands of gold seekers came to Colorado in the late 1850's, passing through the Arkansas River Valley on their way to Pike's Peak.[13] Many disappointed miners and westward migrants settled in the Lower Arkansas Valley, Denver, and the Northern Front Range to live, establishing the Territory of Colorado in 1861.[14]

2.1.1.1 Native Water

Permanent irrigation development within the Lower Valley can be traced to the period from 1861 to 1869. During this time, thirty-one separate appropriations were made by seventeen claimants between Canon City and Nepesta for purposes of

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[7] U.S. GEOLOGICAL SURVEY, HYDROGEOLOGY AND QUALITY OF GROUND WATER IN THE UPPER ARKANSAS RIVER BASIN FROM BUENA VISTA TO SALIDA, COLORADO, 2000–2003, SCIENTIFIC INVESTIGATIONS REPORT 2005–5179 at 2 (2005).

[8] GETCHES; Arkansas River Compact, COLO. REV. STAT. (1990), §37-69-101 to § 37-69-106 (1990); KAN. STAT., ANN. (1989).

[9] David W. Robbins & Dennis M. Montgomery, *The Arkansas River Compact*, 5 U. DENV. WATER L. REV. 58, 60 (2001) [hereinafter Robbins & Montgomery].

[10] *Id*. at 60.

[11] *Id*.

[12] *Id*.

[13] LAWRENCE J. MACDONNELL & THE NATURAL RESOURCES LAW CENTER, FROM RECLAMATION TO SUSTAINABILITY: WATER, AGRICULTURE, AND THE ENVIRONMENT IN THE AMERICAN WEST 18 (Univ. Press of Colo., 1999) [hereinafter MACDONNELL].

[14] *Id*. at 19.

irrigation.[15] Through the 1870's most irrigation occurred around Pueblo and the majority of the appropriations up to this point were relatively small. In 1874, large scale irrigation began in the Lower Valley with George Swink building the Rocky Ford Ditch.[16] The ditch extended 10 miles from Swink's lands to Timpas Creek, diverted 111 cubic feet of water per second and cost $20,000 to dig.[17] Water diverted for irrigation from the ditch returned to the river through canal seepage and applied irrigation water, providing water for diversions later in the season by ditches downstream.[18] Swink introduced successful cultivation of cantaloupes, watermelon, and sugar beets with the careful use of irrigation. A large number of farmers followed suit and began to cultivate sugar beets in the 1890's. Soon thereafter, sugar beet production was booming and supported the construction of an American Crystal Sugar Company factory in Rocky Ford in 1900.

Irrigation continued to develop throughout the 1880's with the establishment of the Arkansas River Land Town and Canal Company in 1884.[19] Irrigation water supply companies became prominent shortly thereafter, with investors expecting to realize profits through shares of the company or lands made arable by the available water. Often these private companies transformed into "mutual" companies, which are owned cooperatively by people served with water from a main ditch or canal.[20] By 1893, T.C. Henry completed the Fort Lyon Canal from near La Junta to its junction with Big Sandy creek, 110 miles.[21] Today, there are approximately 20 major ditch systems in the Lower Valley from Pueblo to the Kansas state line.[22] The largest is the Fort Lyon Canal which currently delivers water to more than 90,000 acres on the north side of the Arkansas from La Junta to Lamar.[23] Today, the High Line appropriation is the last in the Lower Valley to have a reliable water supply from the natural flow of the river during the summer irrigation season.[24]

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[15] *Id*. at 26.
[16] Robbins & Montgomery at 60.
[17] MACDONNELL at 23.
[18] *Id*.
[19] *Id*. at 29-31.
[20] In 1897, shareholders in the Fort Lyon canal organized a nonprofit mutual corporation that is still in operation today.
[21] MACDONNELL at 29.
[22] Robbins & Montgomery at 62.
[23] *Id*. at 63.
[24] MACDONNELL at 26.

The extreme drought of 1889 and 1890 established the need for water storage within the Arkansas River Basin. Between 1890 and 1910, three reservoirs were constructed in the headwaters of the basin and eleven more were constructed off-stream, adding 576,000 acre-feet of storage capacity to the system.[25] The water storage capacity of these reservoirs allowed for the further development of large-scale irrigation, and agriculture, enabling the population of the Lower Valley to grow. Sugar City, for example, developed around a factory built by the National Beet Sugar Company. To ensure the factory's success, the company acquired 12,000 acres of land within the Colorado Canal development, together with associated water rights. Other beet-sugar factories were built in Rocky Ford, Lamar, Holly, Swink, and Las Animas. By 1911, the population of the Arkansas Valley and its sugar industry were growing. Both were highly dependent on irrigation and water resources.[26] The drought of the 1930s was an unwelcome message that the Lower Valley lacked adequate native water to meet its growing needs.

2.1.1.2 Trans-Basin Diversions

Independence Pass is the site of one of the first trans-basin diversion projects on the Arkansas River, the Twin Lakes System, which has operated since 1935, first by the Colorado Canal and later expanded as part of the Fry-Ark Project.[27] The Twin Lakes Project was built to take water from the Roaring Fork River Basin to the Arkansas River Basin. The project diverts an average of 41,000 acre-feet per year through Grizzly Tunnel, which goes under the Continental Divide from the headwaters of Lincoln Creek, a tributary to the Roaring Fork River.[28]

Table 1. Major Trans-basin Diversions.[29]

Name	Stream	Annual Flow (af)	Receiving Stream
Boudstead Tunnel	Fryingpan River	50,061	Lake Fork Creek
Twin Lakes Tunnel (Grizzly & Lost Man Reservoirs)	Roaring Fork River	41,854	N. Fork Lake Creek
Busk-Ivanhoe Tunnel	Fryingpan River	5,208	Lake Fork Creek

[25] *Id.* at 32.

[26] *Id*. at 34.

[27] JEDEDIAH ROGERS, UNITED STATES BUREAU OF RECLAMATION, FRYINGPAN-ARKANSAS PROJECT 6 (2006); *Available at* http://www.usbr.gov/projects//ImageServer?imgName=Doc_1305042036789.pdf . [hereinafter ROGERS].

[28] RUEDI WATER AND POWER AUTHORITY, FACTS AND FIGURES (June 2011); *Available at* http://www.rwapa.org/facts_figures.html.

[29] *Id*.

2.1.1.3 John Martin Reservoir

In response to Kansas's demands for Arkansas River water,[30] Colorado began to search for opportunities to stabilize existing supplies and to bring in new water supplies to the Arkansas River Valley. The Federal Flood Control Act of 1936 authorized construction of the John Martin Dam and Reservoir, which was completed in 1943 by the US Army Corps of Engineers.[31] In 1949, Kansas and Colorado signed the Arkansas River Compact, which provides operating criteria for that reservoir.[32]

2.1.2 Water Development 1950 to 2010

2.1.2.1 The Fryingpan-Arkansas Project

The Lower Valley also secured additional supplemental supplies by importing water from the Colorado River Basin, the primary source of trans-basin supplies to the

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[30] Intense water development in the Colorado portion of the Basin led Kansas to sue Colorado in the U.S. Supreme Court in 1901 seeking an order to prohibit Colorado from additional water development within the Arkansas River Basin. *Kansas v. Colorado,* 206 U.S. 46 (1907). The case turned on the conflicting legal doctrines used by the neighboring states: Kansas followed the Riparian doctrine, which gave the owner of land bordering a water body certain rights to use the water; Colorado followed the Prior Appropriation doctrine that awarded superior rights to those who first put the water to a beneficial use. The Federal Government intervened, asserting the amount of the flow of the river was subject to the authority and supervisory control of the United States. In its ruling, the Supreme Court developed the principle of "equitable apportionment" where "equality of right," not equality of amounts apportioned, should govern. (*Id*.). Because the states stand "on the same level ... under our constitutional system," the laws of the individual states do not bind the Supreme Court and equitable apportionment ensures that the actual use of water between the states is equitable reasonable depending on a variety of factors. (*Id*.) The Court held that although Colorado's development caused "perceptible injury" to Kansas, the injury was not sufficient to warrant the intervention of the Court. (*Id*.) However, the Court made clear that the time might come when "Kansas may justly say that there is no longer an equitable division of benefits, and may rightfully call for relief." (*Id*.)

[31] During the winter storage season (November 1 - March 31), Colorado may demand releases of water equivalent to the river flow, but not to exceed 100 cubic feet per second. During the summer storage season (April 1 - October 31), Colorado may demand releases of water equivalent to the river flow up to 500 cubic feet per second. Kansas may demand releases of water equivalent to the portion of the river flow between 500 and 750 cubic feet per second. During the summer storage season, water being held in storage may be released upon demand by both states concurrently or separately in amounts dependent upon the magnitude of the storage. With concurrent demand, Colorado is entitled to 60 percent of the release and Kansas 40 percent. MACDONNELL *supra* note 13, at 40.

[32] Arkansas River Compact, COLO. REV. STAT. §§ 37-69-101 -106 (1990); KAN. STAT. ANN. § 82a-520 (1989); *See also*, http://waterknowledge.colostate.edu/1948_ark.htm.

Lower Valley.[33] In 1962, Congress authorized the Fryingpan-Arkansas (Fry-Ark) Project, a Bureau of Reclamation (Reclamation) project that diverts water from the Colorado River Basin across the Continental Divide.[34] The Fry-Ark Project is a multipurpose transmountain/trans-basin water diversion and delivery project that is operated by Reclamation in conjunction with the Southeastern Colorado Conservancy District (SECWCD). Its waters were first available for use in the Arkansas River Basin in 1975.[35] The source of diversion is the Fryingpan River and other tributaries of the Roaring Fork River in the Colorado River Basin. The Project diverts an average of 69,200 acre-feet per year, with a limit of 120,000 acre-feet in a single year. The Fry-Ark system yields approximately 80,400 acre-feet per year with storage capacity of 305,401 acre-feet.

An early feature of the Fry-Ark's collection system was the Charles H. Boustead Tunnel, finished in 1971.[36] The five-mile-long Boustead Tunnel currently conveys about 50,000 acre-feet of water per year from the North and South Collection Systems under the Continental Divide to Turquoise Lake.[37]

Five dams and reservoirs exist in the Fry-Ark Project: Ruedi Dam and Reservoir on the Western Slope and Sugar Loaf Dam and Turquoise Lake, Mt. Elbert Forebay Dam and Reservoir, Twin Lakes Dam and Reservoir, and Pueblo Dam and Reservoir (the East Slope Reservoirs) on the East Slope. The Twin Lakes Dam and Reservoir is located in Lake County and has a total capacity of 141,000 acre-feet. The Pueblo Dam and Reservoir is the terminal storage facility for the Fry-Ark Project (located in Pueblo County) and has a total storage capacity of 357,678 acre-feet.[38] The Fountain Valley Conduit extends from the Pueblo Dam to Colorado Springs and conveys 20,100 acre-feet of Fry-Ark Project water annually to Stratmoor Hills, Widefield, Security, and Fountain.

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[33] Robbins & Montgomery at 63.

[34] Public Law 87-590; 77 Stat. 393 (1962).

[35] Congress authorized the project under 87 Stat. 590 (1962); *See also* http://www.secwcd.com/History and Description.htm.

[36] ROGERS.

[37] SE. COLO. WATER CONSERVANCY DISTRICT AND ENTERPRISE BOARD, HISTORY AND DESCRIPTION (2011); *Available at* http://www.secwcd.org/History%20and%20Description.htm.

[38] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM ENGINEERING AND ECONOMIC FEASIBILITY ANALYSIS, FINAL REPORT, at 7 (Nov. 2007) (The Pueblo Reservoir contains 30,355 acre-feet of dead and inactive capacity; 234,347 acre-feet of conservation capacity; 65,952 acre-feet of joint-use capacity and 27,024 acre-feet of exclusive flood control capacity.). **Appendix 6.**

2.1.2.1.1 The Southeastern Colorado Water Conservancy District

The SECWCD was established in 1958 as the administrative body of the Fry-Ark Project. The district is responsible for repaying reimbursable costs of the project and allocating supplemental Fry-Ark Project water to its 600,000 constituents.[39] SECWCD retains control over Fry-Ark return flows, which it makes available to eligible entities within the district boundaries for augmentation purposes.[40]

SECWCD holds all of the water rights of the Fry-Ark Project facilities except those in Ruedi Reservoir. (Table 2) The Colorado River Water Conservation District holds the decree for compensatory storage in Ruedi Reservoir, although Reclamation has the contracting authority. The total active storage within the East Slope Reservoirs is 417,223 acre-feet. Of that East Slope storage, 111,822 acre-feet is allotted to non-project water stored in "long-term contract space." The other 305,401 acre-feet is Fry-Ark Project water storage. Reclamation will contract to store non-project water in project storage space under "if-and-when" contracts.[41]

Table 2. Water Rights of the Fryingpan-Arkansas Project.

Fry-Ark Facility	Civil Action No.	District Court	Decree Date	Appropriation Date	Decreed Uses
North and South Side Collection Systems (incl. Charles H. Boustead Tunnel)	4613	Garfield	August 3, 1959	July 29, 1957	Irrigation, domestic, municipal, power, manufacturing and other beneficial purposes
East Slope Facilities: Turquoise Lake, Twin Lakes Reservoir, Mt. Elbert Forebay, Mt. Elbert Conduit and Halfmoon Diversion Dam	5141	Chaffee	July 9, 1969	February 10, 1939	"As to water rights heretofore adjudicated in this district [11], priorities for purposes other than irrigation granted by this decree shall be enforceable only as of December 15, 1942."

[39] *Id.* at 9.

[40] SE. COLO. WATER CONSERVATION DIST., ENTERPRISE POLICY CONCERNING SALE OF RETURN FLOWS FROM FRYINGPAN-ARKANSAS PROJECT WATER 1¶1 (April 15, 2004); *Available at* http://www.secwcd.org/Allocation/8Allocation.htm .

[41] Whether reclamation can contract with entities outside the Arkansas Basin to use Fry-Ark facilities is in litigation. *Lower Arkansas Valley Water Conservancy Dist. v. Salazar et al.*, Case No. 07cv2244 (Colo. Dist).

Fry-Ark Facility	Civil Action No.	District Court	Decree Date	Appropriation Date	Decreed Uses
East Slope Facilities: Pueblo Reservoir	B-42135	Pueblo	June 24, 1962	February 10, 1939	Irrigation and municipal use. East slope rights allow the project to store native water during periods when the conservation pool at John Martin Reservoir is spilling and the east slope decrees are in priority.
Ruedi Reservoir	4613	Garfield	May 12, 1958	July 29, 1957	Provides storage for replacement purposes and regulation of water for western slope users. Irrigation, municipal, industrial, recreation, fish and wildlife purposes

The Fry-Ark Project makes 80,400 acre-feet per year available for allocation. Under the SECWCD's Allocation Principles and Policies, the district must allocate a minimum of 51% of that water to various municipalities throughout the Arkansas River Valley and the remaining water to irrigated agriculture.[42] According to the SECWCD, 146,401 acre-feet of unallocated storage currently exists in the project.[43]

There are approximately 280,600 acres of irrigated lands within the SECWCD boundaries. The Fry-Ark Project makes water available to these lands through the ditch companies. Although many of the irrigable acres within the SECWCD have senior decreed water rights and the ditches have not requested supplemental water, requests for supplemental water for irrigation purposes often exceed the available supply from the project.

2.1.2.2 The Winter Water Storage Program

The Winter Water Storage Program (WWSP) was originally established as a voluntary program by the SECWCD in 1974; it allowed waters typically diverted in the winter to be stored and released during the following irrigation season. The SECWCD

[42] SE. COLO. WATER CONSERVATION DIST. ALLOCATION PRINCIPLES; *Available at* http://www.secwcd.org/Allocation/8Allocation.htm.

[43] GEI CONSULTANTS, INC., SOUTHEASTERN COLORADO WATER AND STORAGE NEEDS ASSESSMENT ENTERPRISE - PREFERRED STORAGE OPTIONS PLAN at 30 (Sept. 21, 2011).

promoted and operated the voluntary WWSP from 1975-1987 (with the exception of 1977-1978, when participants could not reach unanimous agreement).[44] In 1984, program participants filed a petition with the Division 2 Water Court for a permanent decree. The Division 2 Water Court entered an interlocutory decree on November 10, 1987 and a final decree on November 10, 1990.[45]

The final WWSP decree provides that river flows in excess of the amount necessary to supply senior priorities not being utilized may be stored in Pueblo Reservoir, John Martin Reservoir, and off-channel storage facilities from November 15 to March 15.[46] It further states that storage in any storage vessel must be with the permission of the owner and that stored winter water will be released from Pueblo Reservoir if it is not used by May 1 of the calendar year following the calendar year in which the storage period ends.[47]

The completion of Pueblo Dam in 1974 made the WWSP possible. In an effort to match supply with demand, the WWSP provided a more efficient alternative to the once common practice of winter flood irrigation.[48] The program allows ditches to store water in various reservoirs, including the Pueblo Reservoir, during the winter for release in the early irrigation season. Charles Thomson of the SECWCD negotiated with ditch companies in the Lower Valley to ensure unanimous agreement for winter water storage, allowing more water for the irrigation season.[49] A special master appointed by the Supreme Court has determined that the water court's decree did not violate the 1949 Arkansas River Compact.[50]

2.1.2.3 The Homestake System

The Homestake Water Collection and Storage System was constructed from 1963 to 1967 and is operated by Aurora and Colorado Springs, which share equally in the

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[44] SE. COLO. WATER CONSERVANCY DISTRICT AND ENTERPRISE BD., WINTER WATER PROJECT (2009); *Available at* http://www.secwcd.com/WinterWtr.htm.

[45] *Id*.

[46] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT, at 11. **Appendix 6.**

[47] *Id*.

[48] MACDONNELL at 45.

[49] *Id.*

[50] *See Purgatoire River Water Conservancy Dist. v. Kuiper*, 593 P.2d 333 (Colo. 1979); *Kansas v. Colorado* 514 U.S. 675 (1995).

costs and water yield.[51] The project consists of collection and diversion structures in the headwaters of the Eagle River, including the Homestake Reservoir, the Homestake Tunnel and the Otero Pump Station and Pipeline.[52] The project also uses facilities constructed by Reclamation as part of the Fry-Ark Project. The entire system retains 72,882 acre-feet of storage space with 42,882 acre-feet in the Homestake Reservoir and 30,000 acre-feet in the Turquoise Reservoir.

Aurora's share of the usable capacity of Homestake Reservoir is 21,441 acre-feet. Water is delivered from the Homestake Reservoir through the Homestake Tunnel into the Turquoise Reservoir. Although decrees allow tunnel flows up to 700 cfs, the current carrying capacity of the structure is only 300 cfs. The Otero Pump Station was built in 1967 and delivers Arkansas River water to the South Platte River Basin over Trout Creek Pass. The station's capacity is 161 cfs. Aurora's water from the station is pumped into Spinney Mountain Reservoir for storage and Colorado Springs' water is delivered to Rampart Reservoir. The two cities share the water and costs of the facilities equally.

2.1.3 Ground Water Development

In addition to storage and transmountain diversions, alluvial groundwater supplemented irrigators' surface supplies throughout the twentieth century.[53] In 1999, the alluvial aquifer downstream from Pueblo was estimated to contain 2 million acre-feet of water. Groundwater pumping grew in the region from an estimated 16 irrigation wells in 1940 to 186 in 1950, 822 in 1960 and 1,466 in 1970.[54] The expanded groundwater pumping for irrigation began to affect ditch system priority rights dating back to the 1880s.

Colorado water law recognizes that groundwater and surface water are connected, unlike some western prior-appropriation states.[55] In 1965, the Colorado legislature ordered the state engineer to administer groundwater use under the same priority system as surface water.[56] Under this scheme, senior surface water right holders have a right to seek an injunction against groundwater rights holders if pumping

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[51] U.S. GEOLOGICAL SURVEY, DEP'T OF INTERIOR, WATER RESOURCES OF THE UPPER ARKANSAS RIVER BASIN; *Available at* http://co.water.usgs.gov/projects/TurqLake/html/homestake_reservoir.htm.
[52] *Id*.
[53] Robbins & Montgomery at 63.
[54] MACDONNELL at 41.
[55] *See Colo. Groundwater Comm'n v. N. Kiowa-Bijou Groundwater Mgmt. Dist.*, 77 P.3d 62 (Colo. 2003).
[56] Water Right Determination and Administration Act of 1969, COLO. REV. STAT. §§ 37-92-101 *et seq*.

prevents the surface water right holders from diverting their full appropriation.[57] Rather than simply shutting down wells near rivers, the Colorado Supreme Court ordered the state engineer to develop a plan for the administration of surface and ground water for the maximum utilization of water.[58] In 1969, Colorado's General Assembly responded with legislation that made it possible for groundwater pumping to continue as long as any water taken from another user was replaced from another source.[59]

Kansas sued Colorado in 1985, asserting that Colorado's groundwater pumping from wells installed between 1948 and 1969 was materially depleting water in the Arkansas River that should be available to Kansas.[60] In 1995, the U.S. Supreme Court decided that all those engaging in large-scale groundwater pumping (100 gallons per minute or greater) in the Lower Arkansas River Basin were required to account for and replace their depletions to the river.[61] This requirement has forced some groundwater pumping to cease in the Lower Valley. According to a 1990 Colorado study, there were 717 large capacity irrigation wells along the mainstem of the river with appropriation dates earlier than 1950, while in 1985 there were 2,062 large-capacity irrigation wells actually in place, although not all were active.[62]

2.1.4 Recreational and Environmental Flows

There are no Colorado Water Conservation Board (CWCB) instream flow rights on the mainstem of the Arkansas River.[63] However, above the Pueblo Reservoir there are a number of non-consumptive uses that are considered in the river's management. First, there is a minimum flow of 66 cfs under the Fryingpan-Arkansas Project operating plan, which was established for the Arkansas River at Granite and is the only legal minimum flow requirement on the mainstem of the Arkansas.[64] Second, there is a Memorandum of Understanding (MOU) that was executed with the United States Forest Service (USFS) on July 1, 1976, which concerns the transfer of lands acquired by the Bureau of Reclamation (Reclamation) to USFS at Sugar Loaf Dam and Turquoise

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[57] *See Fellhauer v. People*, 447 P.2d 986 (Colo. 1968).
[58] *See Safronek v. Lemon*, 228 P.2d 975 (Colo. 1951).
[59] Water Right Determination and Administration Act of 1969, COLO. REV. STAT. §§ 37-92-101 *et seq*.
[60] *Kansas v. Colorado*, 106 S.Ct. 1454 (1986).
[61] *Kansas v. Colorado*, 524 U.S. 675 (1995).
[62] Robbins & Montgomery at 63.
[63] COLO. WATER CONSERVATION BD., COLO. DEP'T OF NATURAL RES., ARKANSAS BASIN WATER SUPPLY AND NEEDS REPORT 6-1 § 6.2.1 (2006); *Available at* http://cwcb.state.co.us/isf/Downloads/Index.htm [Hereinafter Supply and Needs Report].
[64] *Id.*

Lake.[65] The MOU recognizes a need for a minimum pool elevation on Turquoise Lake for recreational values, fish habitat, and aesthetic values. It provides that a minimum pool elevation of 9,835 feet during June 15 through September 15 will be maintained for recreational values (reservoir contents of 72,505 acre-feet), while the remainder of the year a minimum pool elevation of 9,776 feet will be maintained for fish habitat and aesthetic values (reservoir contents of 9,348 acre-feet).[66] Third, Colorado's Voluntary Flow Management Program is an agreement between Reclamation and Colorado under which Reclamation attempts to provide flows, which will better support natural resource values. The program does not legally oblige Reclamation to provide flows, and the program is operated within legally required storage and delivery parameters to protect water users. The Colorado Department of Natural Resources (CDNR) makes flow recommendations by a letter to Reclamation each spring. Fourth, the Arkansas Basin Roundtable has been working since 2009 with the CWCB to identify and map the environmental and recreational nonconsumptive needs of the Arkansas River Basin and to develop projects and methods for meeting those needs.[67] Finally, water exchanges for municipal water supplies also have restrictions on their effects on stream flow between diversion and input, which restrictions vary with the specific exchange.

2.2 ECONOMIC PROFILE OF THE ARKANSAS RIVER BASIN

The Arkansas River Basin in Colorado is comprised of 16 counties, including Baca, Bent, Chaffee, Cheyenne, Crowley, Custer, El Paso, Fremont, Huerfano, Kiowa, Lake, Las Animas, Lincoln, Otero, Prowers, and Pueblo. The eastern half of the basin—the Lower Valley—includes Baca, Bent, Cheyenne, Crowley, Kiowa, Otero and Prowers counties.

The Arkansas Basin accounted for 17% of Colorado's total employment in 2000.[68, 69] The largest source of employment in the Arkansas River basin occurs in the education, health, and social services sectors, at 19% of the Basin's total employment. Manufacturing and professional sectors follow, each with 10% of the Basin's work force. However, the agriculture, forestry, hunting, and mining sectors combined make-up approximately 2% of the total employment within the Arkansas River Basin. As of 2002, the annual value of sales and services in the Arkansas River Basin was $45.2 billion,

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[65] SWSI UPDATE at 6-1, §6.2.1.

[66] *Id.*

[67] Supply and Needs Report, at 2-2 § 2.1.2.

[68] As of May 2011, Colorado had not compiled this information from the 2010 census.

[69] Supply and Needs Report at 2-2.

with agricultural industries comprising $770 million or 1.7% of this value (Table 3).[70] In the Lower Valley however, agriculture comprises 30% of the sales and services. Unfortunately, the Lower Valley has few economic alternatives to agriculture and is heavily dependent upon it.[71]

Table 3. Economic Demographics for Arkansas River Basin (2002). Source: Economic Report. December 2006.

Industry	Value of Sales (Million $)	Percent of Total
Total	**45,189**	**100**
Notable Contributors (Sectors)		
Government and Non-NAICs	7,970	17.64
Manufacturing	7,151	15.82
Construction	3,857	8.54
Information	2,957	6.54
Retail Trade	2,865	6.34
Finance and Insurance	2,813	6.22
Other Services	2,690	5.95
Health and Social Services	2,686	5.94
Professional-Scientific and Tech. Services	2,527	5.59
Real Estate and Rental	2,222	4.92

2.2.1 The Central Role of Agriculture

Approximately 538,100 acres are irrigated in the Arkansas River Basin.[72] The average total gross diversions during 1999-2001 to service these agricultural demands were calculated at 1,769,900 acre-feet/year, including alluvial groundwater pumping. The total land area of the seven eastern Colorado counties in the Arkansas River Basin is 17,481,536 acres, and 30% of that land is in ranching and farming uses.[73] Of that agricultural land, 45.26% is dedicated to crops, with 9.92% (235,500 acres) of the agricultural acreage being irrigated.

Cropping patterns in the Arkansas River Basin reflect salinity levels of the water used for irrigation. Salt-tolerant crops, including alfalfa, grain sorghum, and barley grow downstream, while low-tolerant crops like corn, onions, and beans grow upstream.[74] The most common irrigation methods in the area are flood and furrow

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[70] JENNY THORVALDSON & JAMES PRITCHETT, LEAFLET NO. EDR 05-06, ECONOMIC DEVELOPMENT REPORT: PROFILE OF THE ARKANSAS RIVER BASIN 1 (2005). [hereinafter THORVALDSON & PRITCHETT].

[71] *Id.* at 2.

[72] COLORADO WATER CONSERVATION BOARD, UPDATE ON STATEWIDE WATER SUPPLY INITIATIVE- ARKANSAS BASIN, 3 (2004).

[73] THORALDSON & PRITCHETT at 2-3.

[74] MACDONNELL at 49.

irrigation, using open ditches with siphon tubes or gated pipe.[75] Currently, farmers irrigate less than 5% of the irrigated lands with sprinkler and drip irrigation systems, although that is starting to increase significantly with NRCS financial help.[76]

2.2.2 Historical Agricultural Water Transfers

Agricultural to urban water transfers in the Arkansas River Basin became common during the growth of Colorado's major urban areas in the 1950s. Cities such as Aurora, Colorado Springs, and Pueblo required more water, and agricultural users controlled most of the water rights.

The first transfer occurred in 1955, when Pueblo purchased the Clear Creek Reservoir and its storage rights from the Otero Ditch Company.[77] Pueblo continued to increase its water supply by trading diversion rights with the Rocky Ford Highline Ditch Company in 1971, purchasing the Booth Orchard Grove Ditch in 1972,[78] and purchasing 27% of the Bessemer Ditch in 2009.[79]

Private investors, such as the Crowley Land and Development Company (CLADCO), were also involved in agricultural to urban water transactions. CLADCO bought land and its associated water rights for $380 per acre (claiming that it intended to operate Christmas-tree farms and produce lettuce) shortly after the National Sugar Manufacturing Company closed its Sugar City mill. By 1970, CLADCO owned 23% of all Twin Lakes Reservoir and Canal Company stock; two years later it owned 55%.[80] After the acquisitions, CLADCO negotiated the sale of its Twin Lakes shares to Aurora, Colorado Springs, and Pueblo, which paid $1,075 per share.[81] Many farmers who did not sell to CLADCO organized themselves and sold their Twin Lakes shares directly to

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[75] TIMOTHY GATES, LUIS GARCIA, & JOHN LABADIE, COLO. STATE UNIV. COLO. WATER RES. RESEARCH INST., TECHNICAL REPORT TR06-10, TOWARD OPTIMAL WATER MANAGEMENT IN COLORADO'S LOWER ARKANSAS RIVER VALLEY: MONITORING AND MODELING TO ENHANCE AGRICULTURE AND ENVIRONMENT 5 (2006). [hereinafter GATES ET AL.].

[76] The data concerning drip irrigation in the Basin is currently being processed by the Division 2 State Engineers office (June 15, 2011).

[77] MACDONNELL at 51.

[78] *Id*.

[79] WATER STRATEGIST, November 2009, at 5; (Additionally Pueblo will have the option to buy more shares in the Bessemer ditch as they are offered for sale); *See also* (Alan Hamel, *Smooth Selling on the Bessemer Ditch: Pueblo Water Board's Purchase making Few Waves one year later*, PUEBLO CHIEFTAIN, Sept. 8, 2010; *Available at* http://chieftain.com/local/article_78ab4542-bb0d-11df-9ee3-001cc4c03286.html).

[80] MACDONNELL at 51-52.

[81] *Id*.

the cities for the same price of $1,075 per share. By 1980, CLADCO went out of business and the four cities owned 94% of Twin Lakes Shares.

Historically low economic returns to farming during the 1960s and 1970s, combined with the demise of the local beet-sugar industry and the debt-fueled "farm crisis" of the mid-1980s, contributed to a large number of acres being retired from irrigation in the Lower Valley. At the time, prices paid for senior irrigation water rights by fast growing municipal and industrial purchasers were far in excess of what their value appeared to be in farming, and sales resulted in windfall gains for a few in the Lower Valley and adverse third-party economic impacts for the Lower Valley's rural communities.

For example, the last beet-sugar factory in the Lower Valley located in Rocky Ford closed in the 1970s. It sold its land and water rights to private investors in the 1980s. With these rights, Resource Investment Group, Ltd. became the majority shareholder of the Rocky Ford Ditch Company and transferred half of the ditch company's shares to Aurora for $2,200 per acre-foot. Aurora had an option on the other half of shares for $2,300 per acre-foot. Aurora finally agreed to a transfer of 8,250 acre-feet of water per year from the Rocky Ford Ditch, drying up four thousand acres of land. By 1991, agricultural water right sales took 56,000 of the 320,000 irrigated acres between Pueblo and the Kansas state line out of production.[82]

Table 4. Historical Losses of Irrigated Agriculture from Lower Valley Water Sales.[83]

Date	Seller	Buyer	Affected irrigated acres (approximate)	Acre-feet of consumptive use (approximate)
1955	Otero Ditch	Pueblo Board of Water Works (PBWW)	4,500	9,000
1971	Las Animas Town Ditch	Pueblo West	1,900	5,800
1971	Highline Canal	PBWW	1,200	2,600
1971	Colorado Canal Twin Lakes	PBWW, Colorado Springs Utilities, and Aurora	12,659	57,000
1972	Booth Orchard Grove	PBWW	1,447	2,894
1973	Hobson Ditch	PBWW	275	1,488
1984	Las Animas Consolidated Extension	Public Service Company (Excel)	5,000	10,186
1985	Colorado Canal	PBWW, CSU, Aurora	42,197	11,890
1987, 1999	Highline Canal (Busk-Ivanhoe)	Aurora	360	2,250
1987	Rocky Ford I (majority)	Aurora	4,100	8,270
1988	John Flood Ditch	Trinidad	1,257	3,894
2002	Fort Lyons Canal	High Plains / Pure Cycle Corp.	17,500	23,000
2004	Rocky Ford II (minority)	Aurora	2,482	5,100
2004, 2009	Bessemer Ditch	St. Charles Mesa Water District	2,243	2,737
2009	Bessemer Ditch	PBWW	5,330	7,500
			102,450	153,609

[82] *Id*. at 70.

[83] Howe, Charles W. *The Regional Impacts of Transfers of Water from Irrigated Agriculture in the Arkansas Valley of Colorado to In-Basin and Out-of-Basin Non-Agricultural Uses.* Unpublished. University of Colorado, Boulder. December, 2002 [updated]. [hereinafter HOWE].

Transfers from the Colorado Canal to Pueblo, Colorado Springs, and Aurora have accounted for the large majority of the activity shown, about 70% of the total. The bulk of this impact occurred in Crowley County, due east of Pueblo, which experienced an 80% reduction in irrigated acreage as a result of the transfers.

Additional permanent transfers are looming in the future for the Arkansas River Basin. In 2003, High Plains A & M, LLC,[84] applied to the Division 2 Water Court for a change in use of significant portions of the 20,000 shares it had bought from the Fort Lyon Canal Company.[85] The Division 2 Water Court denied High Plain's application for a change in use because its uses and end users were speculative.[86] The Colorado Supreme Court upheld the water court on appeal, substantially tightening the legal standard for anti-speculation in its decision.[87] Pure Cycle, a corporation based in Thornton, acquired the rights from High Plains in August 2006 and may pursue a permanent transfer once it definitively identifies its customers.[88] Transfers like these could contribute to what SWSI 2010 estimates could be an additional 73,000 irrigated acres dried up to meet municipal demands by 2050.[89]

There exists no single study or source that has estimated the cumulative economic impacts to communities directly resulting from these transfers, although several studies have focused either on portions of this overall impact or on the incremental impacts of additional out-of-region transfers from the Lower Valley. However, few would argue that these transfers have not had significant adverse economic impacts, as best illustrated by Crowley County. Nearly 50,000 acres of the 102,000+ acres identified in Table 4 were lost to agriculture there, with corresponding drops in population and employment growth. Although jobs at prison facilities constructed in 1990 have partially mitigated the economic loss of irrigated farmland, the county has irreversibly changed at both cultural and economic levels.

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[84] These rights were later acquired by Pure Cycle Corporation.

[85] *High Plains A & M, LLC v. Southeastern Colorado Water Conservancy District*, 120 P.2d 710, 714 (Colo. 2005) [hereinafter *High Plains A & M*].

[86] *Id*. at 716.

[87] *Id*. at 717.

[88] Chris Woodka, *Water Developer Takes it Slowly*, THE PUEBLO CHIEFTAIN, Dec. 4, 2006; *Available at* http://www.chieftain.com/metro/water-developer-takes-it-slowly/article_4778e8aa-e547-5591-b255-4a4a7dd6245c.html.

[89] SWSI 2010 at § 4.27.

2.3 CURRENT AND FUTURE WATER DEMAND

The population of the Colorado portion of the Arkansas River Basin increased 8.71% after 2000, from 815,939 to 935,940, and currently accounts for 18.61% of the total state population.[90] That Basin population is anticipated to grow 78% by 2050.[91]

Of all of Colorado's basins, SWSI 2010 projects the Arkansas River Basin to have one of the largest increases in municipal and industrial water demand by 2050. Municipal and industrial uses are calculated to comprise 12% of demands within the Arkansas basin and self-supplied industrial uses are calculated to comprise 2%.[92] The projections were based on the total estimated gross demand for Municipal and Industrial (M&I) and Self-Supplied Industrial (SSI) in 2008, which was 254,400 acre-feet/year.[93] The projected gross demand for 2050, even with passive conservation savings, could be as high as 432,500 acre-feet/year with an increase in gross demand of 178,100 acre-feet/year.[94]

Table 5. Arkansas Basin M&I and SSI Gaps (2050).[95]

				Estimated Yield of Identified Projects and Processes (AFY)			Estimated Remaining M&I and SSI Gap after Identified Projects and Processes (AFY)		
	Increase in M&I and SSI Demand (AFY)			100% IPP Success Rate	Alternative IPP Success Rate (90%)	Status Quo IPP Success Rate (75%)	Gap at 100% IPP Success Rate	Gap at Alternative IPP Success Rate (90%)	Gap at Status Quo IPP Success Rate (75%)
Region or County	Low	Med	High	Low	Med	High	Low	Med	High
Eastern Plains	2,300	2,700	3,200	1,700	1,600	1,500	600	1,100	1,700
Lower Arkansas	900	1,400	2,100	800	1,200	1,500	100	200	600
Southwestern Arkansas	3,000	3,700	4,600	1,900	1,700	1,400	1,100	2,000	3,200
Upper Arkansas	19,000	22,100	25,900	11,900	10,700	8,900	7,200	11,500	17,000
Urban Counties[1]	85,200	105,500	135,000	71,500	70,100	62,300	27,200	48,900	86,200
Total[2]	**110,000**	**140,000**	**170,000**	**88,000**	**85,000**	**76,000**	**36,000**	**64,000**	**110,000**

[1] Urban Counties Gap includes an additional 13,500 AF for replacement of nonrenewable groundwater.
[2] Aggregated basin total values rounded to two significant digits to reflect increased uncertainty at larger geographic scales.

In the SWSI 2010 report, the CWCB estimated agricultural water demand using irrigation water requirement (IWR) values developed from the State of Colorado's

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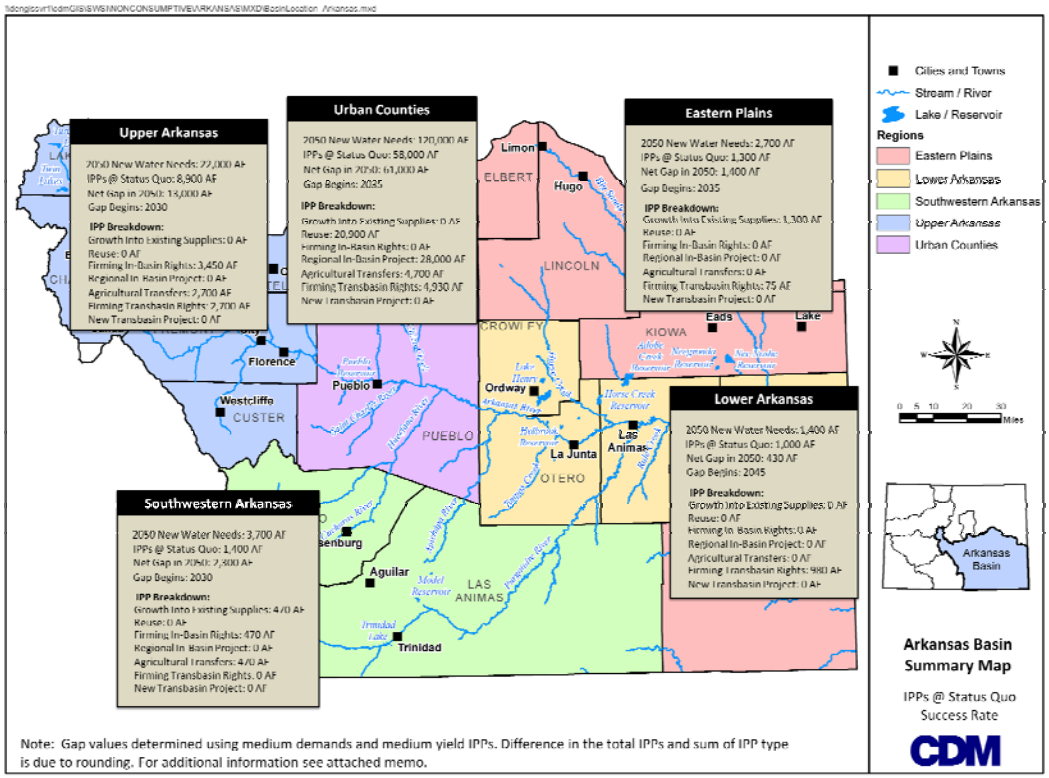
[90] U.S. CENSUS BUREAU.
[91] SWSI 2010 at § 4.2.1.2.
[92] COLO. INTERBASIN COMPACT COMMITTEE, COLO. WATER CONSERVATION BD., MAJOR WATER ISSUES §1.2 (2009); *Available at* http://ibcc.state.co.us/Basins/Arkansas/MajorWaterIssues/ [hereinafter IBCC MAJOR ISSUES].
[93] SWSI 2010, at § 4.17.
[94] *Id*.
[95] *Id*. at 5-33.

Hydrologic Institutional (H-I) model and irrigated acreages estimated from information provided by the CWCB and the Colorado Department of Agriculture. The report found that in 2008 there were 428,000 irrigated acres requiring 995,000 acre-feet/year of water.[96] The 2000 gross agricultural diversions were calculated at 1,770,000 acre-feet/year, including irrigation water requirement, water supply limited, incidental losses and stock pond evaporation. Agricultural water demands are anticipated to decrease in the Arkansas River Basin by 2050 due to increased urbanization and planned agricultural to M&I transfers.[97] However, agricultural use is still expected to account for the majority of water use within the Arkansas River Basin at 86%[98] (Table 5).

To analyze population growth and water supply gaps, CWCB has divided the Colorado portion of the Arkansas River Basin into five subbasins, being the Upper Arkansas, the Southwestern Arkansas, the Urban counties, the Lower Arkansas and the Eastern Plains. (Figure 2)

Figure 2. Arkansas River Basin Water Supply Gap.



[96] *Id.* at § 4.29.

[97] *Id.* at § 4.26.

[98] IBCC MAJOR ISSUES at 5-10 § 5.3.

Due to the anticipated influx of people, the Arkansas River Basin is projected to experience one of the largest increases in M&I and SSI water demand by 2050 in Colorado. This demand is anticipated to increase 170,000 acre-feet/year (AFY).[99] The majority of this demand will be met through existing supplies, existing water rights, and the implementation of proposed projects and processes.[100] (Table 5) Unfortunately, the Arkansas River is fully appropriated by private water users and municipalities.[101] A hydrologic study performed by the SECWCD in 2000 found that native flows of the Arkansas were only available for junior water right holders 3 of 30 evaluated years.[102] The study and Arkansas Basin Roundtable technical meetings confirmed that there are no reliable supplies available for development in the basin.[103] It has also been asserted that the number of acre-feet of conditional water storage rights within the basin far exceed the available supplies.[104] Not surprisingly, SWSI 2010, the IBCC, and the Arkansas Basin Roundtable all predict that there will be shortfalls, especially in urban parts of the Arkansas River Basin.[105] These areas will require additional supplies, primarily transfers from irrigation.[106]

Increasingly, however, water leaders in Colorado are recognizing the need to include active conservation and reuse as well as new supplies and agricultural transfers in any water-planning portfolio. For example, SWSI Phase 3 noted that

> [a]fter examining the trade-offs associated with the status quo portfolio, which relies mostly on traditional transfers of agricultural water to municipal uses ... the [Colorado Water Conservation Board] and [Interbasin Compact Committee] found that it is clear that no one strategy can meet Colorado's growing water needs without harming values important to all Coloradoans. Therefore, a mix of solutions is

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[99] SWSI 2010 at §4.
[100] *Id*.
[101] THORVALDSON AND PRITCHETT at 4.
[102] RICHARD A. WESTMORE, SE. COLO. WATER CONSERVANCY DISTRICT AND ENTERPRISE BD, SOUTHEASTERN COLORADO WATER AND STORAGE NEEDS ASSESSMENT ENTERPRISE PREFERRED STORAGE OPTIONS PLAN 12 (2000).
[103] SWSI 2010 at § 7.
[104] IBCC MAJOR ISSUES at § 7 ¶ 9.
[105] ARKANSAS RIVER BASIN ROUNDTABLE PROJECTS AND METHODS FINAL REPORT, Nov. 1, 2009 at 9; SWSI 2010 at §5-1.
[106] *Id*. at IV.

needed...conservation, [identified projects and processes], agricultural transfers, and new supply development ....[107]

2.4 WATER DEVELOPMENT AND MANAGEMENT

2.4.1 Projects 2010 to 2030

Most water providers indicate they will acquire additional agricultural rights to meet future demands rather than engage in additional water conservation. The SWSI estimates that the Front Range M&I demand will displace up to 73,000 irrigated acres in the Arkansas River Basin.[108] Obviously, this could cause negative economic and environmental impacts for rural communities.

2.4.1.1 Colorado Springs' Southern Delivery System

Colorado Springs has developed a variety of solutions to its persistent increase in water demand. First, Colorado Springs and Aurora continue to proceed with plans for further development of the Homestake Project through the Eagle River Project, which will develop Homestake's remaining conditional water rights.[109] Second, Colorado Springs developed a water resource plan in 1996 that prepares for Colorado Springs' water needs up to 2040. The plan consists of four major strategies: conservation, nonpotable water development, existing system improvements, and a major delivery system.[110]

On July 22, 2009, the Colorado Springs Utilities Board approved moving forward with implementation of the Southern Delivery System (SDS).[111] The Southern Delivery System will deliver existing and unutilized water rights from the Pueblo Reservoir to Colorado Springs by moving the water 1,500 feet uphill. The project will cost Colorado Springs approximately $7.4 million per year to operate when the pipeline reaches its capacity.[112] The plan anticipates construction of the Pueblo Dam connection, dredging of

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[107] SWSI 2010 at ES-30.
[108] *Id*. at § 4.27.
[109] COLORADO SPRINGS UTILITIES, THE HISTORY OF COLORADO SPRINGS' WATER COLLECTION SYSTEM (2010); *Available at* http://www.sdswater.org/springs.asp.
[110] COLORADO SPRINGS UTILITIES, FUTURE WATER DEVELOPMENT (2010); *Available at* http://www.csu.org/residential/services/water/system%20tour/item2862.html.
[111] COLORADO SPRINGS UTILITIES, SOUTHERN DELIVERY SYSTEM: OUR FUTURE DEPENDS ON IT (2010); *Available at* http://www.csu.org/residential/services/water/system%20tour/item2862.html.
[112] R. Scott Rappold, *Like a duck to water, city always looking for more*, THE GAZETTE, Apr. 4, 2009.

Fountain Creek to restore the 100-year flood capacity and construction of a treated water pipeline along Marksheffel Road beginning in 2010. The year 2011 should mark the beginning of construction of the Pueblo West Pipeline, and the remaining pipelines, pump stations and water treatment plants will be built from 2010-2016. Water delivery from the new system should begin in the spring of 2016.

2.4.1.2 Arkansas Valley Conduit

The SECWCD is the primary sponsor for the Arkansas Valley Conduit (AVC), a 135-mile pipeline extending from Pueblo Reservoir to Lamar, Colorado.[113] The Conduit is to provide drinking water to 50,000 people in approximately 40 communities east of Pueblo and was authorized as a project under the 1962 Fryingpan-Arkansas Act.[114] However, the Conduit was not previously constructed as authorized because the Federal government required the benefitting communities to pay all of the constructions costs.[115] In 2010, the Conduit was authorized for Federal funding, with a 65:35 federal match.[116] The Conduit received $5 million dollars in 2010, and that funding is to be repaid through excess-capacity contracts in the Fry-Ark Project.

Reclamation is currently conducting investigations and environmental impact statements (EIS) for two projects: the Arkansas Valley Conduit and a master contract for excess-capacity storage in Fry-Ark Project reservoirs.[117] The SECWCD decided to combine the Conduit and storage contract studies to save expenses.[118] The EIS for the Conduit is expected to be completed in about two years.[119] The Conduit is predicted to provide the benefitting communities with all of their water supply needs through 2070.[120]

Community participants in the Arkansas Valley Conduit include: (1) St. Charles Mesa Water District, Avondale, Boone in Pueblo County; (2) Olney Springs, Crowley, Ordway, Sugar City, 96 Pipeline, Crowley County, and the Crowley County Water Association in Crowley County; (3) Fowler, Manzanola, Rocky Ford, Swink, La Junta,

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[113] APPLEGATE GROUP, INC., INVESTIGATION LEADING TO THE PRELIMINARY DESIGN OF THE ARKANSAS VALLEY CONDUIT, REPORT TO THE SOUTHEASTERN COLORADO WATER CONSERVATION DISTRICT 1-1 (2006).
[114] Chris Woodka, *Conduit, storage contract under federal scrutiny*, THE PUEBLO CHIEFTAIN, Aug. 15, 2010.
[115] APPLEGATE GROUP, INC., INVESTIGATION LEADING TO THE PRELIMINARY DESIGN OF THE ARKANSAS VALLEY CONDUIT, REPORT TO THE SOUTHEASTERN COLORADO WATER CONSERVATION DISTRICT 1-1 (2006).
[116] Chris Woodka, *Conduit, storage contract under federal scrutiny*, THE PUEBLO CHIEFTAIN, Aug. 15, 2010.
[117] *Id*.
[118] Specifically, a study is being conducted on a master contract for storage in Lake Pueblo.
[119] Chris Woodka, *Fowler rejoins Ark Valley Conduit Study*, THE PUEBLO CHIEFTAIN, May 13, 2011.
[120] *Id*.

Cheraw and 18 private water companies in Otero County; (4) Las Animas, McClave Water Association, and Hasty Water Co. in Bent County; (5) Wiley, Lamar and May Valley Water Association in Prowers County; and (6) Eads of Kiowa County.

2.5 CURRENT WATER MANAGEMENT ISSUES

Colorado's State Water Supply Initiative (SWSI) identified a number of water management issues that will affect the Arkansas River Basin over the next 30 to 40 years.[121] These issues include the following:

- Arkansas River Compact requirements and existing uses and water rights mean that little or no water is available for new uses.
- Growth in the headwaters region presents challenges in obtaining augmentation water for new demands.
- Concerns over agricultural transfers and their impact on rural economies are significant in the Lower Valley downstream of Pueblo Reservoir.
- "Recreational In-channel Diversions" or water rights for recreation will have an impact on the development of augmentation plans for agricultural transfers.
- Concern over water quality and suitable drinking water are key concerns in the Lower Valley.
- The success of two major projects, the SDS and the Arkansas Valley Conduit, are key to meeting future water needs.
- The urban landscape is very important to the economy and an important component to quality of life in the Lower Valley.
- Problems for agriculture include shallow ground water tables [waterlogging], excessive salt build-up and high selenium concentrations on land in the larger river ecosystem.[122]

3. CREATION OF THE LOWER ARKANSAS VALLEY WATER CONSERVANCY DISTRICT

From the mid-1950's to the end of the Twentieth Century, municipalities on the Front Range transferred and exchanged the agricultural water rights from over 100,000

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[121] IBCC MAJOR ISSUES at § 1.2

[122] GATES *ET AL.* at note 74.

acres in the Arkansas River Basin.[123] The closure of the sugar mills and resulting loss of the sugar beet crop cost many local jobs and demonstrated that water rights are important not just to farmers but to communities' economic health.[124] By the turn of the century, the economic viability of the Lower Valley was declining; it was apparent that irrigated agriculture was the economic core of these communities.[125]

A drought began in 2000. Afterwards, there were years of low commodity prices, more drought, and a salmonella scare that hurt the cantaloupe market. Farmers were in a financial bind. Many had to sell their water rights to pay their bills, and those sales had a devastating financial impact on the Lower Valley. Aurora bought half of the Rocky Ford Ditch water rights at this time.[126] During an extreme drought in 2002, municipal water needs on the Front Range became dire, and cities began to search anew for additional supplies of water. The 2002 drought caused the Fort Lyon Canal to run dry and the High Line Canal to call its 1874 senior water rights. The High Plains A & M LLC (High Plains) investment group began to buy Fort Lyon Canal shares with the intention of gaining control and changing the canal's agricultural rights to municipal use along the Front Range.[127] Moreover, there was a general concern that droughts, economic recessions, and low commodity prices would keep recurring, with devastating effects on farm income.[128] And the cities serving the Lower Valley realized the domino effect of failing rural communities offered little opposition to municipal purchases of irrigation water rights.[129] Farmers would continue to be picked off by cities one-by-one in times of financial stress. And the cities would buy the prime land, with the best water, and ignore the bad land. "Rural America was literally dying," in the words of Jay Winner, the General Manager of the Lower Ark District.[130]

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[123] HOWE at note 82.

[124] Telephone interview with H. Barton Mendenhall, Esq., Mendenhall & Malouf, General Counsel, Lower Arkansas Valley water Conservancy District (June 3, 2011).

[125] *Id*.

[126] Telephone interview with Bill Hancock, Conservation Program Manager, Lower Arkansas Valley water Conservancy District (June 13, 2011).

[127] LOWER ARK DISTRICT, History; *Available at* http://www.lavwcd.org/history.html.

[128] Interview with H. Barton Mendenhall.

[129] Telephone interview with Lynden Gill, Vice Chair, Lower Arkansas Valley Water Conservancy District; Bent County Commissioner (June 13, 2011).

[130] Telephone interview with Jay Winner, General Manager, Lower Arkansas Valley water Conservancy District (June 6, 2011).

3.1 2002 ELECTION

With the experience of the 2002 drought, farmers and others realized that the cities were going to take most of southeastern Colorado's water unless the Lower Valley fought back.[131] About a dozen individuals who were concerned about the loss of agricultural water met periodically as the "Valley Water Protective Association" to develop ways to prevent hostile takeovers of Lower Valley ditches by water speculators.[132] Lynden Gill, a Bent County Commissioner and crop duster, recalls, "We started talking about how High Plans had sought to buy large numbers of shares in the Fort Lyon Canal. The Lower Valley's future was in decline, it was a speculator's dream. We asked, 'what are we doing [to stop this]?'"[133] Steve Arveschoug, then General Manager of the Southeastern Colorado Water Conservancy District, arranged a meeting between Leroy Mauch, a Prowers County Commissioner and farmer, and Jake Klein and Kevin Karney, Otero County Commissioners, with the author of a recent study of water and growth issues in Colorado to discuss possible responses to municipal predation on economically-stressed farmers.[134] Their conclusion was inescapable: If the Lower Valley did not unite and fight water purchases for municipal use, the transfers would only accelerate.[135] Leroy Mauch chaired a committee under the auspices of the Otero County Commissioners that met weekly for six months in early 2002 to develop a response.[136] The engineering firm of Brown & Caldwell, assisted by Larry MacDonnell, formulated a plan to unify the Lower Valley in a water conservancy district.[137]

People in the Lower Valley had become aware of the significance of water; they realized what would occur if more water were to leave the Lower Valley.[138] The Valley Water Protective Association consequently put together a ballot initiative to create the Lower Arkansas Valley Water Conservancy District.[139]

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[131] Telephone interview with Dale Mauch, founding Board member and Vice President, Lower Arkansas Valley Super Ditch Company, Inc. (June 3, 2011).
[132] Interview with Lynden Gill.
[133] *Id*.
[134] PETER D. NICHOLS, *ET AL*., WATER AND GROWTH IN COLORADO, University of Colorado School of Law, Natural Resources Law Center (2001).
[135] Telephone interview with Leroy Mauch, founding board member and first chair, Lower Arkansas Valley Water Conservancy District (June 1, 2011).
[136] *Id*.
[137] Interview with H. Barton Mendenhall.
[138] Interview with Lynden Gill.
[139] Interview with Lynden Gill. Leroy Mauch, John Singletary, Loretta Kennedy (Pueblo County Commissioner), Bill Long (Bent County Commissioner), Bob Bauserman, Kevin Karney and Jake Klein

Although there were already six conservancy districts within the Arkansas River Basin,[140] concern over the "buy-and-dry" approach utilized by municipalities convinced 64% of the of voters in Pueblo, Otero, Crowley, Bent and Prowers to approve the initiative forming the Lower Ark District in 2002.[141] The District's mission is to assure the continued availability of water resources for the long-term economic viability of the Lower Valley[142]—a mission that contrasts with that of most conservancy districts, which are formed in order to develop water resources.

3.2 The LOWER ARK DISTRICT

Creation of the Lower Ark District reflected a sense of urgency about the future of southeastern Colorado, which was facing the same fate as Crowley County, a county that had lost its rural community, businesses and irrigated agriculture following municipal purchases of the Colorado Canal.[143] The Lower Ark District Board of Directors hit the ground running in 2002, in the throes of the deepest drought in 300 years, working to protect agricultural/irrigation water from permanent transfers to municipalities.[144] The Lower Ark District Board initially focused its attention on purchasing farms that had shares in mutual ditch companies as those properties came on the market, in order to give the selling farmers an alternative to selling their water rights to thirsty municipalities and leaving their lands dry.[145] The Board, however, also recognized that thirsty municipalities had deeper pockets than it did and that the Lower Ark District could not compete with the cities over the long haul.[146] The Board

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(Otero County Commissioners) Ollie Ridley, and H. Barton Mendenhall among others were instrumental in the creation of the Lower Ark District.

[140] ARKANSAS RIVER, NORTH LA JUNTA, UPPER ARKANSAS, SOUTHEASTERN COLORADO, HUERFANO COUNTY, PURGATOIRE RIVER AND THE CROOKED ARROYO, STATEWIDE WATER SUPPLY INITIATIVE FACT SHEET. ARKANSAS BASIN. FEBRUARY 2006; *Available at* http://www.cwcb.state.co.us.

[141] In the matter of the Lower Arkansas Valley Water Conservancy District, Case No. 02CV793 (Pueblo County Dist. Ct. Nov. 21, 2002).

[142] *Id*. *See also* LOWER ARK DISTRICT, Mission; *Available at* http://www.lavwcd.org/mission.html (The Lower Ark District's Mission Statement declares that the its purpose is "To acquire, retain and conserve water resources within the Lower Arkansas River Valley, To encourage the use of such water for the socio-economic benefit of the District citizens. To participate in water-related projects that will embody thoughtful conservation, responsible growth, and beneficial water usage within the Lower Arkansas Valley, including the acceptance of conservation easements, with or without water.").

[143] Telephone interview with Loretta Kennedy, founding Board member, Lower Arkansas Valley Water Conservancy District (June 2, 2011).

[144] *Id*.

[145] Interview with Leroy Mauch.

[146] Interview with Lynden Gill.

embarked on acquiring conservation easements on irrigated land to preserve the Lower Valley's important agricultural base in perpetuity.[147] And it began investigating alternatives to buy-and-dry that would maintain the ownership and long-term use of the Lower Valley's water in the Lower Valley, while slaking the growing municipal thirst for water by some means other than buy-and-dry purchases. Water leasing looked the most promising, particularly after Colorado Springs proposed to end buy-and-dry in favor of fallowing-leasing in 2004,[148] and many farmers saw water leasing as a favorable alternative to buy-and-dry.[149]

From its inception, the Lower Ark District's primary goal has been to sustain the economic viability of the Lower Valley. As Loretta Kennedy, a founding Lower Ark District Board member phrased it, "We had two choices. We could let the northern municipalities dry up the whole Valley and destroy the rural communities or we could give farmers an alternative so they would not sell …This wasn't about saving the farmers. It was about saving the rural communities that would be economically devastated. We couldn't just allow the northern cities to wipe out all of southeastern Colorado."[150] The Lower Ark District and its supporters hope that revenues from water leasing will help farmers stay on their land and result in long-term economic benefit for the region.[151]

3.3 PSOP (PREFERRED STORAGE OPERATIONS PLAN)

Prior to the formation of the Lower Ark District, the SECWCD developed its Preferred Storage Operations Plan (PSOP) in 1999—2001 in response to an identified need for additional reservoir storage space within the Arkansas River Basin to meet the long-term water supply needs of municipal, industrial, and agricultural water users within the District.[152] PSOP included plans to reoperate Fry-Ark storage capacity, as well as to expand the Pueblo and Turquoise Reservoirs.[153] PSOP, however, needed

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[147] Telephone interview with John Singletary, founding Board member and former Chair of the Board of the Lower Ark District (Aug. 13, 2009).
[148] *Id*.
[149] Telephone interview with Burt Heckman, Secretary, Super Ditch (June 3, 2011).
[150] Interview with Loretta Kennedy.
[151] Interview with Leroy Mauch.
[152] GEI CONSULTANTS, INC., PREFERRED STORAGE OPERATIONS PLAN (Sept. 21, 2000); FINAL PSOP IMPLEMENTATION COMMITTEE REPORT (Apr. 19, 2001).
[153] *Id.*

Congressional authorization in the form of amendments to the Fry-Ark authorizing legislation.[154]

With the support of others who would benefit from PSOP—primarily the Pueblo Board of Water Works (PBWW), Colorado Springs, and Aurora—SECWCD effectively pursued that legislation, which was poised to pass in late 2004 when Colorado Senator Allard asked the Lower Ark District Board if it supported PSOP. The Board responded in the negative, not having been involved in the implementation of PSOP subsequent to the creation of the Lower Ark District.[155] That response stopped legislative movement in Congress, much to the consternation of SECWCD and PSOP participants like PBWW and Aurora. The PSOP parties and the Lower Ark District, prodded by newly-elected Senator Ken Salazar and Congressman John Salazar, subsequently embarked on protracted negotiations to resolve a number of issues regarding the future of water in the Lower Valley that the Lower Ark District Board felt required resolution before it could support PSOP legislation.[156] Principal among those issues was future municipal acquisitions of agricultural water rights.

Two years of intense negotiations by counsel for the five principal parties[157] produced a tentative agreement, one that required municipalities to forgo future permanent dry up of irrigation water in favor of leasing water from the farmers through a fallowing-leasing program. Although SECWCD balked, in early 2007, at Aurora's request to relax the limits on Aurora's water leasing negotiated in 2003,[158] negotiations continued for a few months until PBWW pulled out of the talks in late spring 2007, saying it was unwilling to forgo permanent purchases of agricultural water in favor of leasing.[159]

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[154] *Id*.; The Fryingpan-Arkansas Project authorization is the Act of August 16, 1962, PUB. L. 87-590, 76 STAT. 389.

[155] Interview with Jay Winner.

[156] *Id*.

[157] Lee Miller for SECWCD, William A. Paddock for PBWW, David W. Robbins of Hill & Robbins, P.C. for Colorado Springs, Mark T. Pifher for Aurora, and Peter D. Nichols for the Lower Ark District.

[158] IGA between SECWCD and Aurora (October 3, 2003).

[159] Two years later PBWW attempted to purchase 51 percent of the Bessemer Ditch, an effort that failed because the $6,500 price it offered was well below the net present value of the $500 per acre-foot lease price that the Pikes Peak Regional Water Authority offered the Super Ditch about the same time. Before PBWW revised their offer and consummated their purchase, the Super Ditch demonstrated that PBWW could meet its future water supply needs more cheaply with water leases. (George Oamek estimated that PBWW could realize a net present value savings of $24 million over 80 years, given that PBWW's projected need was far in the future.) PBWW, however, revised its Bessemer offer upwards by nearly

Lower Valley irrigators had their own concerns about historical and future municipal purchases. Cities had shown that they could put immense pressure on targeted ditches and offer large sums of money for water to induce many financially-strapped farmers to sell their water rights.[160] Aurora, for example, gained control of the Rocky Ford Ditch in 1987, and then came back to buy out the holdouts in 2004, after the 2002 drought.[161] As this history demonstrated, the farmers were of two minds, on one hand not wanting their neighbors to sell because it would make it harder for them to continue farming, while on the other hand wanting to be able to sell their own water for the highest price when their time came to do so.[162] "Leasing is the best way to keep farming because once the cities get 51% of a canal, they don't care what farmers think about it," in the view of Dale Mauch, Vice President of the Super Ditch.[163]

With Aurora's completion of its purchase of shares of the Rocky Ford Ditch, Colorado's Supreme Court's rejection of High Plains' plan to market Ft. Lyon water to Front Range municipalities,[164] and the post-2002 drought refilling of municipal reservoirs, the Board of the Lower Ark District recognized a potential window of opportunity to develop an alternative before municipalities returned to aggressive purchases of agricultural water.[165] As Bart Mendenhall, General Counsel for the Lower Ark District, put it: "We knew the cities were coming, we knew they will get the water they need because they have more money, and the Valley is going to lose unless it unites."[166] The Lower Ark District thus began to engage local irrigators in discussions about water transfers and possible alternatives to the sale of water rights.[167]

4. THE EMERGENCE OF THE SUPER DITCH COMPANY

Although academia was long intrigued with fallowing-leasing, the notion did not begin to gain traction in Colorado until the Lower Ark District took up the cause as an alternative to municipal buy-and-dry.

$4,000 per share, and secured 5,330 shares (27 percent) of the Ditch, concluding that the present cost of purchasing shares compared to the future value of the shares favored purchase over lease.

[160] Interview with H. Barton Mendenhall.

[161] *See* Table p. 17.

[162] Interview with H. Barton Mendenhall.

[163] Interview with Dale Mauch.

[164] *High Plains A & M, LLC v. Southeastern Colorado Water Conservancy Dist.*, 120 P.3d 710, 714 (Colo. 2005).

[165] Interview with Loretta Kennedy.

[166] Interview with H. Barton Mendenhall.

[167] Interview with Jay Winner.

4.1 INVESTIGATION AND EDUCATION

In April of 2006, the Lower Ark District held a workshop in La Junta on "Innovative Approaches to Water Leasing and Canal Company Cooperation in the Face of Municipal Demands for Agricultural Water Supplies."[168] The Colorado State University's Sociology Water Lab organized the workshop, and the Lower Ark District invited a variety of speakers, including Ed Smith, General Manager of the Palo Verde Irrigation District (PVID).[169] At the workshop, irrigators learned about PVID's innovative long-term fallowing-leasing program and its contract with the Metropolitan Water District of Southern California (MWD) that supplies water to 27 Southern California coastal communities, from Los Angeles to Riverside to San Diego. Over the program's 35-year term, PVID estimates that it will provide cities with 3.63 million acre-feet of water.[170]

With positive farmer reaction to the fallowing-leasing ideas discussed at the workshop, the Lower Ark District moved quickly to commission HDR Engineering, Inc. to provide a technical proof-of-concept of a fallowing-leasing program in the Arkansas Basin. The study analyzed natural stream flow data and diversion data from 1950 through 2004.[171] The study made preliminary estimates of the quantity of water available for leasing and potential ditches that could participate in the program.[172]

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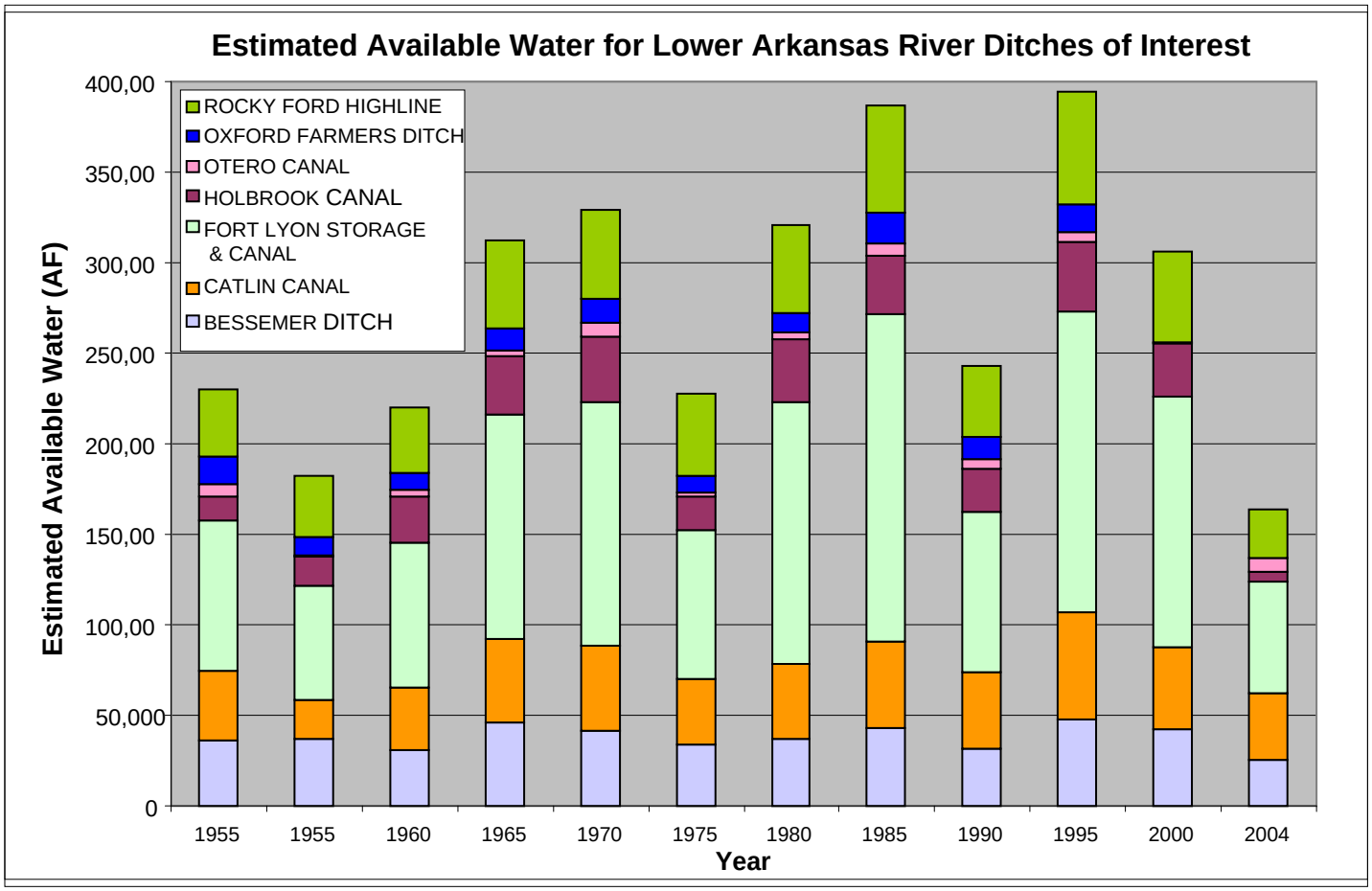
[168] JAY WINNER AND MARYLOU SMITH, UNITED STATES COMMITTEE ON IRRIGATION AND DRAINAGE, COLORADO'S "SUPER DITCH": CAN FARMERS COOPERATE TO MAKE LEMONADE OUT OF LEMONS? (Mar. 30, 2008) [hereinafter WINNER & SMITH].

[169] Telephone interview with John Schweizer, President, Super Ditch (June 13, 2011).

[170] PALO VERDE IRRIGATION DISTRICT, MWD/PVID Program; *Available at* http://www.pvid.org/mwdpvid-program.aspx.

[171] HDR ENGINEERING, INC., LOWER ARKANSAS VALLEY WATER LEASING POTENTIAL PRELIMINARY FEASIBILITY INVESTIGATION (Aug. 2006). **Appendix 4.**

[172] *Id*.



After considering 16 ditches between Pueblo and John Martin Reservoirs for participation in the program, engineers eliminated many for various reasons, such as negligible potential yield from existing transfers and limited water rights; extreme exchange concerns with facilities, absence of head gates, and existing plans for extensive water supply augmentation.[173] The potential ditches that fit the qualities necessary for participation in the program were the Bessemer Ditch, Catlin Canal, Fort Lyon Canal, Fort Lyon Storage Canal, Holbrook Canal, Otero Canal, Oxford Farmers Ditch, and Rocky Ford Highline Canal. The study concluded "that significant amounts of water are potentially available for leasing through a fallowing-leasing program. Moreover, the potential demand (25,000 AF/year) provides an opportunity for 40% of irrigators to participate assuming a 3 out of 10 year crop rotation."[174]

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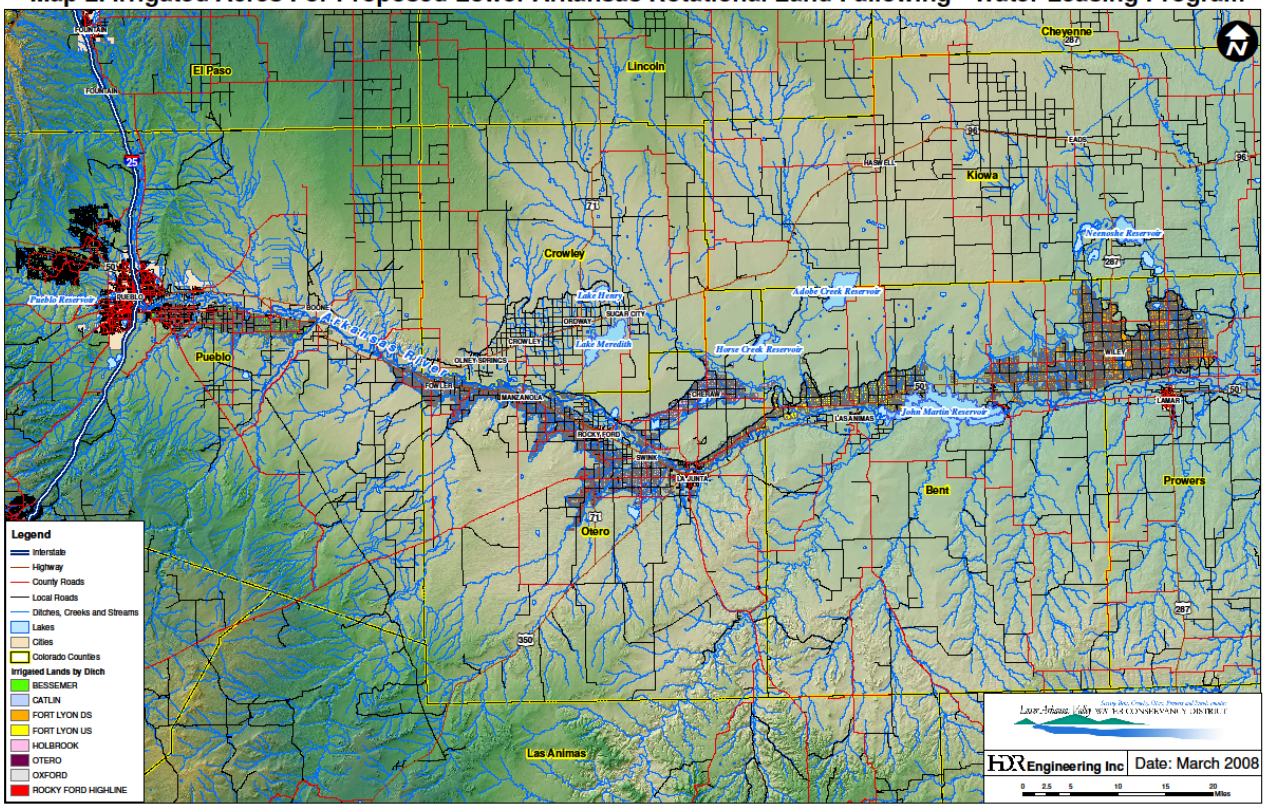
[173] *Id.*

[174] *Id.* at 5.

Map 2. Irrigated Acres For Proposed Lower Arkansas Rotational Land Fallowing - Water Leasing Program



Buoyed by the results of the technical proof-of-concept, the Lower Ark District hired HDR to prepare a preliminary engineering feasibility study in November 2006 to look into a fallowing-leasing program in more depth.[175]

4.2 ORGANIZING THE SUPER DITCH

The 2002 drought not only set the stage for creation of the Lower Ark District, it primed the pump for creation of the Super Ditch. That drought drove home to the farmers what it is like when water is so scarce as to make irrigation impossible.[176]

The Lower Ark District publicized the results of the fallowing-leasing technical proof-of-concept at its Board meetings in the latter half of 2006.[177] The Lower Ark District staff also made presentations on water leasing to the ditch company boards of directors at their winter 2006-2007 annual meetings, and discussed the concept with

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[175] *Id.*

[176] Interview with Dale Mauch.

[177] *Id.*

individual shareholders and water right owners in the Lower Valley.[178] The farmers were ready to talk about an alternative to municipal buy-and-dry. Dale Mauch explained that his time on the Fort Lyon Canal board of directors during High Plains' attempt to gain control of the ditch opened his eyes to the fact that if farmers were unable to find a way to meet the cities' water needs, the cities would eventually succeed in taking over the ditches. "When they wanted the water, they were going to get it."[179] And the experiences associated with the 2002 drought demonstrated that the cities could tell the farmers what their water was worth even in times of drought.[180]

Having generated substantial farmer interest in water leasing, in early 2007 the Lower Ark District sponsored a trip to Blythe, California for representatives of seven ditch companies so they could investigate the PVID–MWD leasing program first hand.[181] The success California irrigators found under the program spurred interest and enthusiasm among the farmers in the Lower Valley.[182] Important differences between PVID and the Lower Ark District were evident, however, and posed challenges to development of a fallowing-leasing program in the Lower Valley. First and foremost, the PVID–MWD agreement consists of one ditch and one water right supplying water to one water entity.[183] In contrast, a fallowing-leasing program in the Lower Valley would involve up to seven ditch companies with multitudes of water rights, supplying water to numerous municipalities, water districts, and developer districts. Nonetheless, the foundational experience with water leasing was in California, where the PVID–MWD leases were very successful and accepted by both farmers and municipalities.[184] While multiple water-user demands foster a sellers' market where farmers can lease to anyone who needs water within the basin, water leasing by farmers in the Lower Valley would require more complex transfers and operations than were encompassed in the PVID-MWD agreement.[185]

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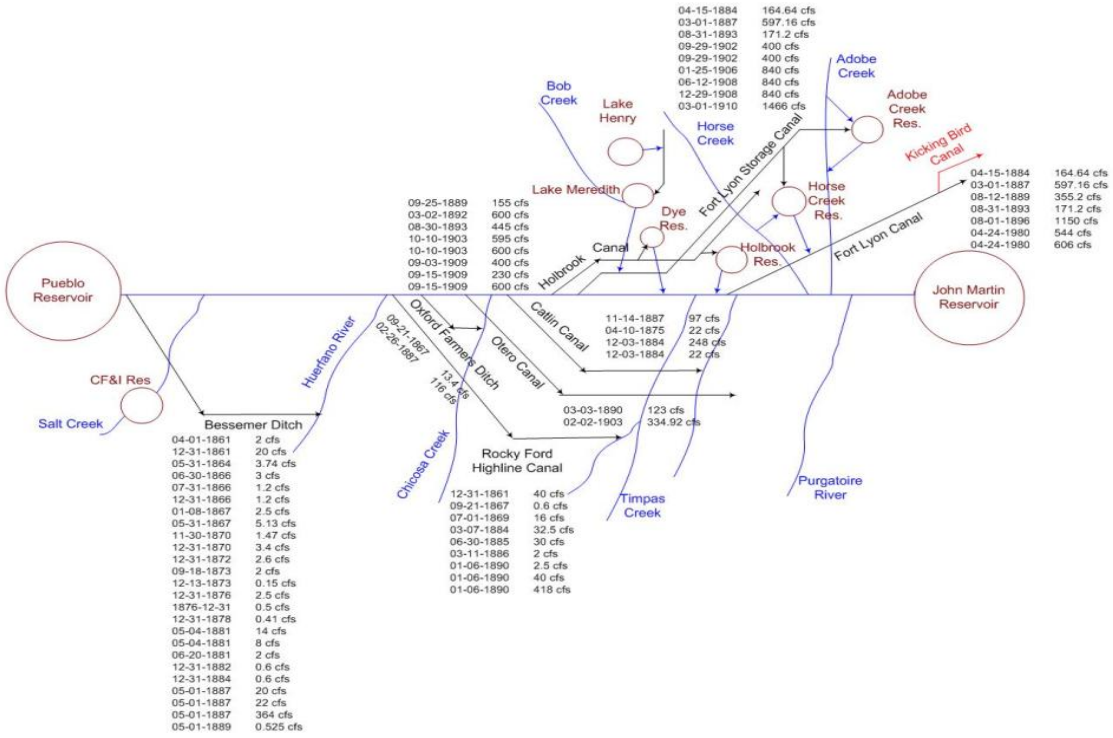
[178] Interview with Bart Mendenhall.
[179] Interview with Dale Mauch.
[180] *Id*.
[181] Interview with Jay Winner.
[182] Interview with Lynden Gill.
[183] Interview with Bill Hancock.
[184] Interview with Burt Heckman.
[185] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT, at 84-85. **Appendix 6.**

Figure 3. Principal Lower Valley Ditches and Their Water Rights.



After returning from California, the Lower Ark District convened a steering committee composed of two representatives from each of the seven ditch companies that had been identified by HDR's technical proof-of-concept study to investigate the possibility of a cooperative fallowing-leasing effort in the Lower Valley.[186] The steering committee began meeting soon after the trip and met about once a month thereafter.[187] Other questions began to emerge as the Lower Ark District and the steering committee discussed water leasing:

- How to provide equity among shareholders on different ditches when the point of diversion, decree date, yield and exchange potential to Pueblo Reservoir all affect the relative value of water to be provided by those shareholders from their various ditches?[188]
- Could ditch companies not known for having a tradition of cooperation put aside their differences to make this work?

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[186] Interview with Bill Hancock.

[187] *Id*.

[188] WINNER & SMITH at 6.

- Were farmers willing to commit to leases as long as 40 years?
- Were municipalities willing to commit to leases as short as 40 years?[189]
- Would ditch companies permit their shareholders to participate in a water leasing program, given that many restricted the use of water to below the ditch?[190]
- How would county "1041" land use permitting requirements apply to water leasing?[191]
- What alternative forms of a company would facilitate water leasing?[192]
- What were the alternatives and costs to deliver leased water to users—specifically, a pipeline or pipelines from the Arkansas River near Boone and/or near the Ft. Lyon Canal headgate to NE El Paso County?[193]
- Should leases be limited to the Arkansas River Basin?
- What would be the basis and the price for leased water?

The steering committee had substantial support from the Lower Ark District staff, as well as engineering and economic consultants, legal counsel, and facilitators provided by the Lower Ark District.[194] The Lower Ark District's support initially came entirely from its local property tax levy, although the Arkansas Basin Roundtable and Colorado Water Conservation Board later awarded grants to study fallowing-leasing.[195] In total, the Lower Ark District committed nearly $650,000 in a couple of years to investigate water leasing and help the farmers establish the Super Ditch.[196] Through 2010, the Lower Ark District, CWCB and Arkansas Basin Roundtable have invested approximately $2 million to develop fallowing-leasing.[197]

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[189] *Id*.

[190] TROUT, RALEY, MONTAÑO, WITWER & FREEMAN, P.C., LAND FALLOWING - WATER LEASING PROGRAM, FEASIBILITY INVESTIGATION, ARTICLES OF INCORPORATION AND BYLAW REVIEW (ANALYSIS OF BESSEMER DITCH, ROCKY FORD HIGHLINE CANAL, OXFORD FARMERS DITCH, OTERO CANAL, CATLIN CANAL, HOLBROOK CANAL, FORT LYON CANAL ARTICLES AND BYLAWS) (June 17, 2011). **Appendix 25.**

[191] TROUT, RALEY, MONTAÑO, WITWER & FREEMAN, P.C., THIRD REVISED LAND FALLOWING-WATER LEASING PROGRAM, FEASIBILITY INVESTIGATION, 1041 COUNTY REGULATIONS (June 28, 2011). **Appendix 26.**

[192] ANTHONY VAN WESTRUM, LLC, NOTES REGARDING STRUCTURE OF A SUPER DITCH (Jan. 2007). **Appendix 29.**

[193] BOYLE ENGINEERING, PRELIMINARY ENGINEERING REPORT FOR PIPELINE FROM LOWER ARKANSAS VALLEY TO NORTHEAST EL PASO COUNTY (2008).

[194] Jay Winner, General Manager, Bill Hancock, Conservation Specialist, Carla Quesada, Office Manager, H. Barton Mendenhall, General Counsel, and Peter D. Nichols, Special Water Counsel.

[195] Interview with John Singletary.

[196] Interview with Jay Winner.

[197] *Id*.

4.2.1 Organizational Challenges

The Lower Ark District encountered a variety of legal, logistical and political difficulties in organizing the Super Ditch. Although the Lower Ark District played and plays an important role in establishing the Company, it never planned to manage it. Rather, some describe the Lower Ark District as the "midwife" for the Super Ditch. The Lower Ark District foresaw the management of the Super Ditch to be in the hands of the individual irrigators who utilize its services to put their water rights into leases.[198]

Organizers had a chicken-or-egg problem to contend with, for it was difficult for potential participants to envision a fallowing-leasing program that would be facilitated by a Super Ditch that had itself not yet been delineated.[199] John Schweizer, President of the Super Ditch, remembers "When the Super Ditch effort first started, dissenters stated it could not be done because these seven ditches had rarely agreed on anything. Now [representatives of] those same ditches have been working together for years."[200] Burt Heckman, Secretary of the Company, remembers "economics as a big driver. In 2008, crops' cost outweighed revenue."[201]

The steering committee found that many details, such as the price per acre-foot of water, the length of leases and the means of water delivery, depended on who the lessors and the lessees would be. To overcome those hurdles, organizers of the Super Ditch compromised with potential participants by allowing them to first pledge a willingness to participate contingent upon the final details.[202]

Organizers faced other challenges as well. While some potential lessees like Colorado Springs were committed to finding an alternative to buy-and-dry, the organization of the Super Ditch further challenged the established municipal influence in the Arkansas River Basin. For example, the Pueblo Board of Water Works, Southeastern Colorado Water Conservancy District, Colorado Springs Utilities and Aurora had a long history of working together for their mutual benefit as water consumers. The creation of the Lower Ark District complicated their plans, and the formation of the Super Ditch posed a similar threat. For example, the cities historically had the upper hand when negotiating to acquire agricultural water rights in the Lower Valley, and they had worked together to buy up the Colorado Canal and Twin Lakes

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[198] Chris Woodka, *Different farms face same threat*, THE PUEBLO CHIEFTAIN, Mar. 11, 2007.
[199] Chris Woodka, *Roundtable supports study of Super Ditch*, THE PUEBLO CHIEFTAIN, Sept. 13, 2007.
[200] Interview with John Schweizer.
[201] Interview with Burt Heckman.
[202] WINNER & SMITH at 7.

water when the beet sugar industry collapsed in the 1970s.[203] And, while the cities had effectively set the price they would pay for water from individual farmers, the prospect of the farmers banding together for negotiations over the price was not welcome. Predictably, there were early, loud, and repeated assertions that the Super Ditch would violate antitrust laws.[204] Moreover, the prospect of having to lease rather than being able to purchase water was anathema to the Pueblo Board of Water Works, which had its eyes on Bessemer Ditch shares after the 2002 drought. Aurora, too, was slow to embrace the Super Ditch despite—or perhaps because of—its successful leases from the High Line Canal in 2004 and 2005. It had a working relationship with a ditch with senior rights, and saw no reason to change how it was doing business in the Lower Valley. The High Line also liked its relationship with Aurora, and its board and superintendent were generally hostile to the Super Ditch, although its shareholders were not so disposed.

Cities that were potential lessees also expressed deep skepticism about the Super Ditch and about its ability to make large-scale water leasing, involving multiple shareholders on multiple ditches, work. They particularly questioned whether the Super Ditch could get enough farmer participation to supply the water they needed. HDR's proof-of-concept assumed 65% farmer participation, although most farmers thought the number would be above 80% based on the PVID-MWD and High Line—Aurora leases. Some cities also questioned whether they would get the water they leased when they needed it, fearing the farmers would simply refuse to deliver water when supplies were tight and most needed by everyone.[205] What is more, every city that expressed an interest in leasing worried that some other city would buy up the water rights it was leasing over the lease term so that it would find itself dry at the end of its lease. And, of course, the cities were as concerned about price as the farmers, albeit from the opposite perspective.

Finally, for years, THE PUEBLO CHIEFTAIN newspaper refused to comprehend the notion of leasing, insisting on terming it a water "sale," and vehemently opposing it with all of the paper's notorious rhetorical skills.[206] But even the CHIEFTAIN came around, eventually, and endorsed water leasing as the best way to preserve water and

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[203] Interview with H. Barton Mendenhall.

[204] Aurora voiced this concern the most frequently and strongly. *See* the discussion of the application of antitrust law below.

[205] Rod Kuharich, Executive Director, South Metro Water Authority, was particularly outspoken about this.

[206] *See, e.g.,* Editorial, *Protect Our Water,* THE PUEBLO CHIEFTAIN, Apr. 12, 2009; Editorial, *Save our farms ,* THE PUEBLO CHIEFTAIN, Sept. 29, 2009; and Editorial, *Public property,* THE PUEBLO CHIEFTAIN, Oct. 4, 2009.

agriculture for the future health of the Lower Valley.[207] Unfortunately, beyond the press, there is still an "education problem," as many farmers simply do not understand the difference between leasing water and selling water rights.[208]

4.2.2 Economic Issues

The steering committee devoted significant time with the assistance of George Oamek, an agricultural economist,[209] to developing and reviewing various fallowing-leasing scenarios. Concerns focused (1) how irrigator participation in a fallowing-leasing program would compare, financially, to historical farming or to selling the water rights and investing the proceeds; and (2) whether collective action involving shareholders from multiple ditch companies could result in greater revenues to participants compared to bilateral leases between individual irrigators (or ditch companies) and municipalities.

Fortunately, interest was high and information was readily available to make good evaluations. The steering committee twice looked at a comparison of selling a water right, using the right on a fallowing-leasing basis, or continuing to irrigate was during the investigation. Early in the process, a relatively simple 1-in-4 year fallowing strategy was examined to gauge its competitiveness against the other strategies. This comparison was particularly relevant because municipal purchases of local irrigation water had recently occurred, resulting in good sales data, and the Pikes Peak Regional Water Authority (PPRWA) had recently put an offer of $500 per acre-foot "on the table" for leased water to be delivered on an annual basis. In addition, Aurora had recently concluded its short-term fallowing-leasing arrangement with Rocky Ford High Line shareholders, an arrangement that had created a relatively high lease price expectation among potential participants. A second look at the sell-lease-or-continue-farming decision was later taken in the context of a multi-ditch/multi-shareholder/multi-lessee framework.

4.2.2.1 On-farm Economics[210]

George Oamek's initial comparison between selling, leasing, and farming examined the present values and the future value of the different strategies over a 40-

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[207] Editorial, *A message from the Publisher,* THE PUEBLO CHIEFTAIN, Nov. 28, 2010.
[208] Interview with Burt Heckman.
[209] George Oamek, Ph.D., Honey Creek Resources.
[210] GEORGE OAMEK, HONEY CREEK RESOURCES, SELL, LEASE, OR CONTINUE FARMING: COMPARISON OF THE NET RETURNS (Nov. 13, 2007). **Appendix 14.**

year period. One particular example involved the Fort Lyon Canal Company, where water rights had recently been sold to High Plains for $1,750 per share, or $1,733 per acre (1 share = .99 acre), or $1,699 per acre-foot (1 share = 1.03 acre-feet).

Table 6 shows that the present value of a fallowing-leasing strategy is considerably higher than the other strategies over 40 years: $8,670 (rounded) per participating acre for rotating fallow leasing against $3,110 per acre under the sell strategy and $3,900 (rounded) per acre for continued farming. When considering future values, the fallowing-leasing strategy is also the most valuable. An explanation of the lease strategy's higher return compared to selling the water lies in the relatively high lease price. The price for an outright purchase would need to be in the range of $5,000 per acre-foot—roughly three times the market-price—to make the "sell" strategy competitive with the lease strategy. This disproportionate relationship between the water purchase price and the lease price is explained by the Super Ditch's ability to assemble a large volume of senior water rights over a long lease term and its ability to negotiate the lease price collectively for a multitude of farmers. Similarly, farm returns would need to be in the neighborhood of $500 per acre to make the continue-to-irrigate decision preferable. Despite current high levels of commodity prices, it is unlikely returns to field crops could be maintained at this level over a 40-year period. As a point of reference, historical commodity prices have never remained at their short-term spiked levels for more than 2 to 3 years in any decade.[211]

[211] *See, e.g.*, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN FARMDOC; *Available at* http://www.farmdoc.illinois.edu/manage/uspricehistory/USPrice.asp .

Table 6. Comparison of Selling, Leasing, or Continuing Farming.

Rate of return on savings/invest	6.00%
Escalation rate for farm returns	3.00%
Escalation rate for lease contract	4.00%

$	1,750	/share for a permanent transfer	
$	1,733	/acre for permanent transfer	
$	500	/acre-foot lease value	
	1.03	transferable yield per acre (acre-	
$	100	/acre pre-tax return to irrigation	

	Sell water right ($/acre)		**Rotational fallow program ($/acre)**		**Continuing farming ($/acre)**
	Water right	*Interest on water right proceeds*	*Annual return w/o escalation*	*Annual return w/ 3% escalationon farm returns and 4% on leased water*	*w/ 3% annual escalation in farm returns*
2008	$ 1,733	$ 104	$ 100	100	$ 100
2009		$ 104	$ 485	505	$ 103
2010		$ 104	$ 100	106	$ 106
2011		$ 104	$ 100	109	$ 109
2012		$ 104	$ 100	113	$ 113
2013		$ 104	$ 485	591	$ 116
2014		$ 104	$ 100	119	$ 119
2015		$ 104	$ 100	123	$ 123
2016		$ 104	$ 100	127	$ 127
2017		$ 104	$ 485	691	$ 130
2018		$ 104	$ 100	134	$ 134
2019		$ 104	$ 100	138	$ 138
2020		$ 104	$ 100	143	$ 143
2021		$ 104	$ 485	808	$ 147
2022		$ 104	$ 100	151	$ 151
2023		$ 104	$ 100	156	$ 156
2024		$ 104	$ 100	160	$ 160
2025		$ 104	$ 485	946	$ 165
2026		$ 104	$ 100	170	$ 170
2027		$ 104	$ 100	175	$ 175
2028		$ 104	$ 100	181	$ 181
2029		$ 104	$ 485	1,106	$ 186
2030		$ 104	$ 100	192	$ 192
2031		$ 104	$ 100	197	$ 197
2032		$ 104	$ 100	203	$ 203
2033		$ 104	$ 485	1,294	$ 209
2034		$ 104	$ 100	216	$ 216
2035		$ 104	$ 100	222	$ 222
2036		$ 104	$ 120	275	$ 229
2037		$ 104	$ 485	1,514	$ 236
2038		$ 104	$ 100	243	$ 243
2039		$ 104	$ 100	250	$ 250
2040		$ 104	$ 120	309	$ 258
2041		$ 104	$ 485	1,771	$ 265
2042		$ 104	$ 100	273	$ 273
2043		$ 104	$ 100	281	$ 281
2044		$ 104	$ 120	348	$ 290
2045		$ 104	$ 485	2,072	$ 299
2046		$ 104	$ 100	307	$ 307
2047		$ 104	$ 100	317	$ 317
Present value		$ 3,110		$ 8,669	$ 3,883
Future value					
Value of annual payments		$ 31,988		$ 28,277	$ 12,668
Value of water right in 2047		$ -		$ 8,567	$ 8,567
Total future value		$ 31,988		$ 36,844	$ 21,235

Moreover, as Burt Heckman, Secretary of the Super Ditch, explained, agricultural economics have been in decline while the average age of farmers continues to increase nationally. The next generation of individual owner-farmers will be unable to take over all of the farms, and that gap will be filled by large corporate farms. By leasing their water, older farmers who have become unable to farm can continue producing a crop: lease water. Additionally, by leasing their water, these older farmers will not have to give up their most valuable asset, their long-term rights, to that water.[212]

4.2.2.2 Ditch Cooperation[213]

The second look at the sell-lease-or-continue-farming decision was facilitated by the development of a spreadsheet-based fallowing-leasing model that considered participation by shareholders from several ditch companies and multiple types of delivery contracts with multiple municipalities. The model's water balance was driven by user-specified demands and historical diversions made from the Arkansas River (or Pueblo Reservoir) by the ditches. System storage and exchange factors relative to various diversion points were considered. This second look confirmed that the lease strategy was the most profitable, for the same reasons as obtained for the simpler analysis. Importantly, every reasonable scenario showed that, over 40 years, water leasing would be more profitable than continued farming-as-usual, and substantially more valuable to the farmer than selling his water rights and living off the investment return. That disparity was, of course, magnified by the 2008 economic downturn and plunging interest rates.

The farm level analyses highlighted the potential of irrigators' collective action to increase revenue for all participants above that of unilateral action. This increase has two components. First, coordinated operations among irrigators and companies can increase the total deliveries and their reliability compared to going it alone, making those operations more valuable to the lessees. Second, as indicated above, the collective negotiation by the irrigators should result in higher lease prices than they could secure if they negotiated individually. To demonstrate these components, sets of hypothetical, yet realistic, lease contracts between ditch company shareholders and municipal users were developed and examined, singly and in successive combinations.

Table 7 shows the benefits to cooperating irrigators. It shows that in single lessee-lessor transactions, total discounted lease revenues are approximately $5.53 million

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[212] Interview with Burt Heckman.

[213] GEORGE OAMEK, HONEY CREEK RESOURCES, POTENTIAL BENEFITS OF COLLECTIVE ACTION BY SUPER DITCH PARTICIPANTS (July 25, 2007). **Appendix 11.**

over a period having a hydrology similar to that of the 1976-2004 period. However, if one assumes that shareholders of Rocky Ford High Line Canal and Fort Lyon Canal combine their operations and negotiate collectively, their combined revenues could increase by $130,000 per year due to improved operations alone and by $860,000 per year due to the combination of improved operation and better lease prices. Incrementally, adding Bessemer and Catlin shareholders into the arrangement further increases operational benefits and prices over unilateral actions. In this example, total revenues could potentially be increased by nearly 5% just through coordinated operations and nearly 60% through coordinated operations and price negotiations as shown on Table 7.

Table 7. Example of the Benefits of Cooperation Among Ditches.

	Individual, one-to-one transactions	Rocky Ford Highline and Fort Lyons work cooperatively	Rocky Ford Highline, Fort Lyons, and Bessemver work cooperatively	The four ditch companies work cooperatively
Total discounted revenues over the hydrologic period 1976-2004 (million)				
One-to-one transactions				
Rocky Ford Highline	$1.10			
Fort Lyons	$2.35			
Bessemer	$0.86			
Catlin	$1.21			
Baseline lease revenues	$5.53			
Potential benefit of improved operations				
Additional revenues to be allocated among cooperators	$0.00	$0.13	$0.21	$0.26
Total lease revenues	$5.53	$5.66	$5.74	$5.79
% revenue increase resulting from cooperation		2.3%	3.9%	4.7%
Potential benefit of improved operations and collective price negotiation				
Additional revenues to be allocated among cooperators		$0.86	$1.57	$3.28
Total lease revenues	$5.53	$6.39	$7.10	$8.81
% revenue increase resulting from cooperation		15.5%	28.3%	59.4%

5. FORMATION AND ORGANIZATION OF THE SUPER DITCH

The steering committee devoted a number of meetings, with the assistance of Anthony van Westrum, a corporate attorney,[214] and MaryLou Smith, a facilitator,[215] to

[214] Of Anthony van Westrum LLC, Denver, Colorado.

the structure and governance of a formal entity to facilitate water leasing in the Lower Valley. There were three key issues. First, the farmers wanted assurance of their independence and their perpetual control of the Company. That is, they wanted to create a new organization separate from the Lower Ark District that would be secure from takeover by the municipalities who purchased shares in Lower Valley ditches in the future.[216] Second, they wanted a vehicle that could serve them to maximize both the short-term and the long-term value of their water. Third, they wanted assurance they could fallow some land continuously for the length of the lease, as well as fallow land in a one-in-three or one-in-four year rotation.

From the beginning, it was understood that there needed to be some mechanism by which the individual farmers in the Lower Valley—the persons who hold shares in the ditches that serve the Lower Valley and put the subject water to beneficial use—could act in concert in negotiating with municipalities for water leasing. No individual farmer would have the wherewithal to do that; and, likely, most of the Lower Valley ditch companies themselves would not have the ability to do that even if all of their shareholders were in accord. In short, there needed to be an agency through which individual shareholders, from several or all of the ditch companies, could act in concert in dealing with the municipalities. And, as indicated above, it quickly appeared that such an agency ought to be some kind of legal entity that would be under the control of those whom it would represent as its principals.[217]

5.1 LEGAL FORM OF SUPER DITCH

It was clear that this entity, promptly dubbed the "Super Ditch," would not actually be a ditch company, an entity formed under and subject to the Colorado statute governing ditch and reservoir companies,[218] because, unlike the entities that are subject to that statute, the Super Ditch would not own any ditch. While the thought that the entity might be "tax-free" as a nonprofit corporation was appealing, that did not fit well

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[215] Of Aqua Engineering, Ft. Collins, Colorado.

[216] In addition, the Lower Ark District lacks legal authority to lease the farmers' water for use outside the District. COLO. REV. STAT. § 37-45-118(1)(b)(I)(B) and (C).

[217] As structured, the Super Ditch actually acts as an agent for *anticipated* principals, because irrigators become its shareholders only upon accepting the terms of leases it negotiates. It is, one might say, on the model that if you build it [negotiate a lease], they will come. *See also*, Appendix 7.

[218] Article 42 of Title 7, COLO. REV. STAT., requires that the incorporators set forth the "stream, channel, or source from which the water is to be taken; the pint or place at or near which the water is to be taken; the location … of any reservoir intended to be constructed; the line … of any ditch or pipeline intended to be constructed and the use to which the water is intended to be applied."

into Colorado's statutory scheme either: It was anticipated that any assets that might accrue to the entity would, ultimately, be returned to its owners, but that is not permitted to a Colorado nonprofit corporation[219] nor generally to nonprofit corporations formed under other law.[220] Use of a pass-through entity such as a limited liability company could leave owners liable for significant taxes while perhaps shorting them of the distributions that would enable them to pay those taxes.

Farmers are familiar with being members of cooperative corporations, and, at the time, the Colorado Cooperative Act provided a good legal foundation for agricultural cooperatives.[221] But, fatally, the Cooperative Act restricted the voting power of its respective members to one vote each, subject to certain "proportional" voting rights that could not be adapted to the needs of the Super Ditch.[222] It was assumed from the beginning of the analysis that the votes of Super Ditch equity owners would be proportional, by some measurement, to the value of the water rights they made available for leasing through its agency and that evidently would not be compatible with the voting constrictions of the Cooperative Act.

5.2 INCORPORATION[223]

With these other available forms of entities being set aside, the steering committee determined to form the Super Ditch as a Colorado business corporation—a for-profit entity—under the Colorado Business Corporation Act (CBCA). The steering committee incorporated the Super Ditch as the "Lower Arkansas Valley Super Ditch

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[219] Part 133 of the Colorado Nonprofit Corporation Act, (CRNCA, Articles 121 through Article 137 of Title 7, COLO. REV. STAT.) prohibits most distributions by a nonprofit corporation to its members prior to its dissolution, and Part 134 of the CRNCA similarly prohibits post-dissolution distribution to its members, except, in either case, to members which are themselves nonprofit corporations or otherwise permitted recipients of such distributions. The farmers who would own and control the Super Ditch would not be permitted recipients of its distributions if it were a nonprofit corporation.

[220] *See also* the discussion of the tax consequences of entity choice, below in Part 5.3."

[221] Article 58 of Title 7, COLO. REV. STAT. The Colorado Cooperative Associations Act, enacted in 2011, was not available for consideration in 2008 when the Super Ditch was formed.

[222] Section 7-56-305(2), COLO. REV. STAT., generally restricts votes to one per member; § 7-56-305(3) provides that "[a]ny cooperative formed under this article may provide in its articles for proportional voting rights allowing members more than one vote based upon the patronage of a member with the cooperative, the amount of patronage equity held in the cooperative, or any combination of these methods . . . . In no event shall any member have less than one vote and no member may have more than two and one-half percent of the total votes of members of the cooperative." In 2011, Colorado adopted its version of the Uniform Limited Cooperative Association Act, Article 58 of Title 7, COLO. REV. STAT.; that act provides for great flexibility in the allocation of voting rights to association members.

[223] Anthony von Westrum, Anthony van Westrum, LLC.

Company," on May 8, 2008, in a well-attended meeting at the Lower Ark District's office in Rocky Ford, utilizing the online filing facility made available to the public by the Colorado Secretary of State[224] to accomplish that task "live." The initial articles of incorporation provided for the leasing of water from six named Lower Valley ditch companies,[225] and shareholders from those ditch companies, acting as the incorporators, attended to the incorporation and elected the initial board of directors of the Super Ditch, which in turn appointed the initial corporate officers.[226] A seventh ditch company[227] was added to the list a year later.[228]

The articles of incorporation and bylaws of the Super Ditch—which are attached as Appendix 27[229] and Appendix 28, respectively—have a number of unusual features crafted to meet the needs of this unique entity, including:

1. The incorporators envisioned that the corporation's shareholders would be those farmers who subjected the water they owned to water leases negotiated by the Super Ditch with municipalities,[230] but they did not expect those farmers to provide cash resources to the Super Ditch by way of monetary contributions. What, then, would be their equity contributions to the capital of the corporation to support the issuance of shares to them? The CBCA permits the board of directors to authorize the issuance of shares "for consideration consisting of any

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[224] *See* http://www.sos.state.co.us/pubs/business/ and follow the links on the website.

[225] The Catlin Canal Company, The Fort Lyon Canal Company, the High Line Canal Company, the Holbrook Mutual Irrigating Company, the Otero Ditch Company and The Oxford Farmers Ditch Company.

[226] The following were named as directors and officers: John Schweizer, Jr., Catlin, President; Dale Mauch, classified Director for The Fort Lyon Canal Company, Vice President; Burt Heckman, at-large Director, Secretary; Frank Milenski, at-large Director, Treasurer; The following were names as additional classified directors:, Ray Smith for The Oxford Farmers Ditch Company; Joel Lundquist for High Line Canal Company; Donny Hansen for the Holbrook Mutual Irrigating Company; and Lee Schweizer for the Otero Ditch Company.

[227] The Bessemer Irrigating Ditch Company,

[228] *See* ANTHONY VAN WESTRUM, LLC, BYLAWS OF THE LOWER ARKANSAS VALLEY SUPER DITCH COMPANY (June 20, 2011). **Appendix 28**.

[229] ANTHONY VAN WESTRUM, LLC, ADDITIONAL INFORMATION INCLUDED IN [UNOFFICIAL RESTATED] ARTICLES OF INCORPORATION OF LOWER ARKANSAS VALLEY SUPER DITCH COMPANY (June 20, 2011). (The articles of incorporation have been presented in an unofficial restatement to reflect two amendments that have been adopted since the incorporation). **Appendix 27**.

[230] As adopted, the articles of incorporation of the Super Ditch permit the issuance of shares not only to shareholders of Valley Ditch Companies who make their water available for leasing pursuant to its "Water Services," but also to others who contribute capital to enable it to acquire delivery facilities, etc.

tangible or intangible property or benefit to the corporation."[231] The principle purpose of the Company will be to serve as the negotiator of water leases that will be used by participating farmers to lease their water rights to municipalities—thus, the participating farmers' making of their water available for such leasing would be a "benefit to the corporation," enabling it to pursue its purpose and fulfilling the statutory requirements of a contribution for shares.[232]

2. The inherent values of the water rights that are represented by shares in the various Lower Valley ditches differ in accordance with differences in points of diversion, decree dates, yields and exchange potentials to Pueblo Reservoir. Section 3.2 of the articles of incorporation provides that:

> Except as provided in Section 3.8, the Company shall only issue its shares pursuant to these Articles of Incorporation and Rules adopted in accordance with the following principles:
>
> (a) A person may acquire the Company's shares only if that person is a Valley Ditch Company Shareholder who agrees to make Valley Water available to Water Users through the Company's Water Services.
>
> (b) The number of shares to be issued by the Company to a shareholder shall be calculated pursuant to Rules that take into account such factors as the yield, quantity, and point of diversion of the Valley Water the holder of such shares agrees to make available to Water Users through the Company's Water Services.[233]

The bylaws build on that by providing that—

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[231] COLO. REV. STAT. § 7-106-202(2)

[232] VAN WESTRUM, BYLAWS (Detailed provisions for the issuance of shares to irrigators farmers who make their water available for leasing using the Super Ditch Company's "Water Services" are set forth in Article VIII of the Bylaws; the "benefit" principle is specifically recognized in Article VIII, 8.4 of the Bylaws.). **Appendix 28.**

[233] VAN WESTRUM, [UNOFFICIAL RESTATED] ARTICLES OF INCORPORATION at § 3.2. Exception to this limitation on the issuance of shares is provided in § 3.8 for the issuance of shares "for such consideration as the Board determines and use the proceeds of such issuances for the Company's acquisition or construction of facilities, or rights to facilities, for the storage and delivery of water or to acquire other capital assets in furtherance of its purpose." Such shares would not be classified under the classification regime that is described further in the text of this article. **Appendix 27.**

> Prior to the issuance of the first Company Share, the Board shall, from engineering reports and other information it deems sufficient, determine the number of shares issued by each Valley Ditch Company respectively, upon which one Company Share shall be issuable, such determination being carried out as contemplated in Section 3.2(b) of the Articles of Incorporation.

Thus, while each lease negotiated by the Super Ditch may aggregate water rights from up to seven Lower Valley ditch companies, all of differing water yields, etc., the Super Ditch Board will determine the relative values of those rights and cause those values, as well as the length of time and fallowing cycle for which each leasing farmer is willing to encumber his water rights, to be taken into account in issuing Super Ditch shares to participating farmers.

3. "The beauty of the Super Ditch is you don't have to join it if you don't want to," explains John Schweizer, Super Ditch President. Individual irrigators make individual decisions to participate, or not, in the leases that the Super Ditch negotiates with water users. None is obligated to do so, and each makes his or her own determination—within the available parameters of the negotiated leases—about how much water to tie up in a lease and for how long. As noted above, the shares the irrigator takes in the Super Ditch Company for participation in a lease will be based on the value of the water rights, taken over the term of the lease that the irrigator chooses to put under the lease. Those shares will enable the irrigator to participate as a shareholder in the governance of the Super Ditch for so long as the water rights are subject to the lease—including the right to a classified vote for one director who holds shares in the same Lower Valley ditch company. Depending upon the specific rights and preferences of the shares that the board of directors provides from time to time in accordance with the CBCA,[234] and to terms that may be fixed in connection with particular leases, the irrigator's shares may be retired when the lease term ends and the irrigator's water rights are no longer encumbered.

4. This allocation of governance of the Super Ditch Company entirely to the irrigators who chose to utilize its Water Services means that it will not be controlled by the Lower Ark District, by the various ditch companies within the Lower Valley, or by municipalities.

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[234] VAN WESTRUM, [UNOFFICIAL RESTATED] ARTICLES OF INCORPORATION at § 3.6. **Appendix 27.**

5. Unusually for a for-profit corporation, Section 3.7 of the articles of incorporation grants to the Board "the power to make [assessments of stock] if the Board deems it necessary to raise funds by such assessment to further the purpose of the Company or to pay any indebtedness contracted by the Company in the furtherance of its purpose or to pay interest thereon;" although no class of stock can be assessed unless and until a majority of the shares of that class has voted to accept assessment.

The reader is directed to Appendices 8A and 8B, which are annotated to provide further description of the features described above, as well as a number of other unusual or unique features.

5.3 TAX CONSIDERATIONS[235]

When the concept of a Super Ditch Company was first discussed, it was thought that it would be desirable to form a company which was exempt from income tax. Section 501(c)(12) of the Internal Revenue Code[236] provides that mutual ditch or irrigation companies or like organizations are exempt from tax "but only if 85 percent or more of the income consists of amounts collected from members for the sole purpose of meeting losses and expenses." The Super Ditch Company could not meet this test because most revenue will come from non-members. Another method of qualifying as tax exempt would have been to incorporate in Colorado using the Colorado Revised Nonprofit Corporation Act and Sections 7-42-101 *et seq*., which apply to ditch and reservoir companies.[237] However, as noted above, the Super Ditch Company is a ditch company in name only—it will not own any ditches or reservoirs—and thus it cannot qualify as a not-for-profit "ditch company" under the statute. Moreover, a tax exempt corporation must transfer its assets to another non-profit organization or governmental unit upon dissolution. That requirement is inconsistent with the goal of the Company, which is to foster the financial well being of its members; any assets it acquires should therefore be distributed to its members upon dissolution. The farmers therefore opted to form a for-profit corporation under Subchapter C of the Internal Revenue Code.[238]

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[235] Denis B. Clanahan, Esq., Clanahan, Beck & Bean, Denver, CO. *See also* DENNIS B. CLANAHAN, KRIS BOYLE P.C., LOWER ARKANSAS VALLEY SUPER DITCH COMPANY – CONTRIBUTIONS TO CAPITAL (Feb. 18, 2008); DENNIS B. CLANAHAN, KRIS BOYLE P.C., [TAX CONSEQUENCES FOR] LOWER ARKANSAS VALLEY SUPER DITCH COMPANY (Feb. 13, 2008). **Appendix 2, 3.**

[236] 26 U.S.C. § 501(c)(12) (2010).

[237] COLO. REV. STAT. § 7-42-101 *et seq*.

[238] 26 U.S.C. § 901 *et seq*.

The formation of a for-profit C corporation under the CBCA simply means that the income to the corporation will be taxable income, and that it will be offset by ordinary and necessary expenses incurred in the operation of the company. It was anticipated that, as the income will pretty much match the expenses, the tax burden will not be significant.

As discussed above, the Lower Valley ditch company shareholders who are willing to participate in the Super Ditch water leasing program will do so by directly entering into leases, with water user lessees that the Super Ditch has negotiated. Thus, the actual revenues to be received with respect to the water leases will flow directly to the lessors, not the Company (although, as noted elsewhere in this report, the terms of particular lease arrangements may provide for management fees or other payments to the Company for its services). The revenues to the lessors will not be taxable income to the Company.

As noted above under the caption "Formation and Organization of the Super Ditch Company," the contributions to the capital of the Company that participating Lower Valley ditch company shareholders are deemed to have made to support the issuance of Super Ditch shares to them will be the benefit that they have brought to the Company, and to the furtherance of its purpose, by that very participation. Although those shares will be fundamental in establishing their relative rights to participate as shareholders in the governance of the Super Ditch, those shares need not be assigned more than a nominal monetary value in the Company's capitalization, and the values actually assigned can be stated by the Company's board of directors in the course of share issuance and under the "Rules" for share issuances that are contemplated in the bylaws. Accordingly, gain or loss to those shareholders on the acquisition and redemption of their Super Ditch shares can be minimized.

Organizers also discussed the need for grants to get the Super Ditch Company and water leasing up and running, and the tax impact of such grants. Such a grant would either be a gift to the Super Ditch Company, contribution to the capital, or income to the corporation. The characterization would, of course, depend on the facts, but Section 118 of the Internal Revenue Code provides that gross income of a corporation does not include a contribution to the capital of the corporation.[239] The question of what constitutes a capital contribution goes back to the seminal case of Edwards v. Cuba Railroad, where it was held that subsidy payments made to a

[239] 26 U.S.C. § 118.

corporation by the government of Cuba in order to stimulate development of a railroad did not constitute gross income to the corporation.[240]

If the Company obtains any grants, for example to construct a pipeline, it will have to look at the facts and conditions at the time to determine if the grant is a capital contribution or is income to the corporation.

As an alternative to grants, the Company may assess outstanding shares.[241] In this event, the assessments would probably be taxable to the company, as an assessment would generally not be bargained for and would thus not qualify as a contribution to the capital of the corporation.

5.4 ANTICIPATED OPERATION OF THE SUPER DITCH

The Super Ditch's *raison d'être* is to negotiate with individual municipalities or other water users the terms and conditions under which they are willing to enter into form, long-term (*i.e.*, perhaps 40-50 years, with a right to renew) leases for water rights, doing so with a view to maximizing the attractiveness of those leases to irrigators who would become lessors. The water is to be provided by shareholders in any of the named seven Lower Valley ditch companies. The essential goal of the Super Ditch's activities is that, rather than using the water for irrigation every year, some of those shareholders will make some or all of their water rights available periodically for other uses through the negotiated leases. "The Super Ditch will allow a farmer to sell water like you would sell a crop," in the words of the Company's President, John Schweizer.

The Super Ditch plans is to act as a facilitator for the collective leasing of water rights between municipalities in southeastern Colorado and individual shareholders of a number of different ditch companies in the Lower Valley. First, the Super Ditch is negotiating the terms and conditions of blanket, long-term leases of water rights with the individual municipalities. Then irrigating farmers, holders of shares in the Lower Valley ditch companies, will—if they choose, individually, to do so—accept the terms of those leases as lessors, providing water from those ditch companies to the municipalities, under the terms of the leases.[242] If an insufficient amount of water is pledged toward a negotiated lease, the Super Ditch will re-open negotiations and seek to improve the terms for the lessors. Throughout this process, and until they commit their water to a particular lease, the irrigating farmers will remain free to deal with their

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[240] *Edwards v. Cuba Railroad*, 268 U.S. 628 (1925).

[241] VAN WESTRUM, [UNOFFICIAL RESTATED] ARTICLES OF INCORPORATION at § 3.7. **Appendix 27.**

[242] THOMAS P. MCMAHON, JONES & KELLER, P.C., ANTITRUST IMPLICATIONS OF PLAN BY LOWER ARKANSAS VALLEY SUPER DITCH COMPANY TO COLLECTIVELY LEASE WATER RIGHTS (July 15, 2008). **Appendix 7.**

individual water rights as they chose, independently seeking out other leases or selling their water rights outright or, instead, continuing to use the water in the farming operations and foregoing its use or a return on its use during the periods they fallow their fields.[243] One of the reasons for the successful formation of the Super Ditch is that it was based on cooperation between different groups of irrigators, and also between farmers and cities.[244] Its activities will facilitate individual choices while providing for concerted action by the holders of the Lower Valley's water.

When Lower Valley ditch company shareholders enter into a negotiated water lease, they will become shareholders in the Super Ditch. Depending on the terms of the leases to which they agree and the terms governing the specific issuances of Super Ditch shares to them, the shareholders may be paid annual reservation fees and receive additional money in years when portions of their water are used by the lessees under the leases, to make up for the lack of production on their fallowed land.[245] The number of shares received will be calculated upon the amount of water each shareholder subjects to lease and will be adjusted for the value of the water coming from his respective ditch as determined by engineering studies. The Lower Valley ditch company shareholder will remain a shareholder in the Super Ditch Company at least as long as he provides water under lease, depending on the specific terms of the Super Ditch shares he holds.

Any water in excess of a crop's consumptive use will be returned to the river and would be used to satisfy other existing water rights.[246] It is important to stress that participation by irrigators will be entirely voluntary, and each irrigator may choose the extent to which he wishes to commit his water, and the land it irrigates, to the program—none, some, or all thereof.[247] By the terms of the leases and the terms governing the issuance of the Super Ditch shares, participating irrigators will be responsible for weed and erosion control on their fallowed land.[248]

It is expected that each lease that is negotiated by the Super Ditch will contain a condition that the lessee will not transfer irrigation water rights out of the Lower Valley

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[243] *Id.*

[244] Interview with Burt Heckman.

[245] Chris Woodka, *Lower Ark takes hard look at "Super Ditch*," THE PUEBLO CHIEFTAIN, Jan. 18, 2007.

[246] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT. **Appendix 6.**

[247] PETER D. NICHOLS, THE SUPER DITCH: A TEMPORARY WATER LEASING ALTERNATIVE TO HISTORICAL PERMANENT 'BY AND DRY' OF IRRIGATED LAND IN THE LOWER ARKANSAS VALLEY (July 7, 2008).

[248] *Id.*

during the lease term.[249] However, it is not envisioned that lessees will forgo the purchase of water rights while under a lease relationship, because they are not likely to participate in a lease if they were made subject to a no-purchase obligation and thereby placed at a disadvantage with respect to non-leasing municipalities who continue to purchase water rights. The Super Ditch will require lessees to make the water rights they do purchase available for lease through the program, rather than using that water themselves—and thus undermining the Super Ditch.[250] This is to ensure that every water owner would participate on like terms.

6. EXTERNAL CHALLENGES

The adage that nothing is simple when it comes to water understates the challenges facing fallowing-leasing. For example, the success of fallowing-leasing depends on a number of factors beyond the willingness of farmers to fallow their land and lease their water. These include the willingness of municipalities to lease water, county land use (1041) permitting requirements applicable to water leasing, ditch company operating and administrative requirements, and Colorado water law protections afforded other water rights.

6.1 MUNICIPALITIES

Fallowing-leasing cannot succeed without municipal demand for water leases. But municipal interest and ability in leasing water is not necessarily a simply a question of supply and demand, as the Lower Ark District and Super Ditch have discovered and explored for the past several years.

6.1.1 Market for Water Leases

The two largest communities in the Arkansas River Basin are Pueblo and Colorado Springs. Pueblo has an adequate water supply well past 2050.[251] Colorado Springs, which has embarked on a long-term water development project to meet its normal requirements (SDS), anticipates needing additional supplies to recover from drought, cope with a Colorado River Compact call, or respond to a catastrophic problem with its northern supply system. Aurora, located outside the Arkansas River

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[249] *Id.*

[250] *Id.*

[251] *See e.g.*, APPLEGATE GROUP, INC., ARKANSAS BASIN CONSUMPTIVE USE WATER NEEDS ASSESSMENT: 2030 at Appendix 25 (July 2008).

basin, has historically obtained a significant portion of its municipal supply from Arkansas irrigation rights, and it recently leased water to recover from the 2002 drought. Hence, the primary municipal customers of the Super Ditch Company will include groundwater-dependent members of the PPRWA (which represents a collection of small municipalities in the developing areas primarily east of I-25 in El Paso County).[252] Colorado Springs, and Aurora.

Whether lease water will be attractive to these potential customers will depend in part on the comparative cost of their other water supply alternatives to the price the Super Ditch Company seeks. If the former is significantly greater, especially when comparing the development of similar volumes of water to drinking water quality, there is bargaining room for the Super Ditch and potential demand for lease water from the Lower Valley. The costs of alternative water supply sources for the PPRWA were compared using the concept of "avoided cost," discussed in greater detail below (section 6.1.4 (Avoided Costs)).[253] Avoided costs for Aurora were also considered on the basis that they represented a potential market for lease water during drought years and years immediately following droughts.[254] Finally, Colorado Springs' planned Southern Delivery System was estimated to cost about $1,200 per acre-foot, including water treatment.[255]

The short-term agreement between Aurora and the High Line Canal gave the economists additional information on which to forecast the pricing that leasing irrigators may expect. In that lease, the ditch had relatively senior, good quality water rights that were available for exchange at a location accessible by Aurora. Aurora paid the irrigators approximately $300 per acre-foot for the leased water. However, when re-vegetation and administrative costs imposed on the Aurora were included, the engineers estimated the effective price of the leased water to be nearly $500 per acre-foot. In fact, some potential customers of Lower Valley water showed an interest in Super Ditch-negotiated leases at a price of $500 acre-foot per year, with periodic adjustments for inflation and market conditions.[256] But promoters of three power plants planned for construction on the Arkansas River and seeking a reliable water supply for

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[252] *Id.*

[253] GEORGE OAMEK, HONEY CREEK RESOURCES, AVOIDED WATER SUPPLY COSTS FOR PPRWA (DRAFT) (Nov. 3, 2009). **Appendix 9.**

[254] GEORGE OAMEK, HONEY CREEK RESOURCES, AVOIDED WATER SUPPLY COSTS FOR AURORA (Nov. 11, 2009). **Appendix 8.**

[255] *Id.*

[256] *Id.*

cooling their back-up gas turbines indicated that they would be unwilling to pay a lease price in excess of $300 per acre-foot per year.

The success of the Super Ditch depends on its ability to meet the timing and nature of municipal water demands at a price they are willing to pay. Irrigators' expectations about the price of water have been in the $500 per acre-foot range since discussions about water leasing began in the Lower Valley. In fact, the Company has negotiated terms sheets with two municipal interests at this price.[257] As a result, a current (2011) price of $500 per acre-foot at the delivery point appears established. The principal remaining uncertainties in the Company's future involve the estimates of the volume and timing of future contracts.

Potential municipal demand for Super Ditch supplies is reflected in estimates of future lease volumes. Estimated lease volumes are based upon two sources:

1. The Arkansas River Basin portion of the Statewide Water Supply Initiative (SWSI) Phase 1 Report (2004) and its 2008 update (the Applegate Report).[258]
2. Existing agreements between the Super Ditch Company (SDC) with regional water providers for drought recovery supplies (Aurora) and for firm annual supply (PPRWA).

6.1.1.1 Basin Roundtable Water Supply Gap

The Applegate Report estimated the 2030 annual supply "gaps" for each significant municipal and industrial (M&I) water provider in the Arkansas River Basin, defined as the difference between new consumptive use demand between the years 2008 and 2030 minus reasonably foreseeable water supplies that would be developed between those years. (Reasonably foreseeable new water supplies or water development plans are termed "identified projects and processes" (IP&P).)

For 2030, the Arkansas River basin's annual water supply gap is estimated to range between 28,600 acre-feet and 28,752 acre-feet per year. Nearly all of this, approximately 27,750 acre-feet, is accounted for within non-metropolitan El Paso County outside of Colorado Springs, but including the PPRWA and the counties along the Arkansas River main stem with or without potential access to the Arkansas Valley Conduit (AVC) (Table 8). Without IP&Ps—consisting of the Southern Delivery System

[257] Appendix 23, 24.

[258] APPLEGATE GROUP, ARKANSAS BASIN CONSUMPTIVE USE WATER NEEDS ASSESSMENT: 2030 (July 2008).

(SDS), the AVC, and water right purchases—the 2030 supply gap could be as large as 73,000 acre-feet per year for these counties (Table 8).

Either through direct delivery or through exchange, a large portion of the gap for El Paso County and Arkansas River main stem providers is reachable by Super Ditch supplies, representing actual and potential M&I lessees within the Arkansas basin. Without the IP&P's in place, the Company could potentially fulfill a significant portion of the larger gap, although ultimately limited by transmission capacity, exchange capacity, and total available supplies.

Table 8. Arkansas River Basin Water Annual Supply Gap (2030).

	Water Supply Gap (acre-feet per year)	Potential additions to Gap if identified projects and processes are not completed (acre-feet per year)	Maximum Potential Gap (acre-feet per year)
El Paso County			
Non-metro areas	22,600	-	22,600
Fountain Valley Authority, inc.			
Colorado Springs Utilities		39,500	39,500
Subtotal	22,600	39,500	62,100
Arkansas River main stem counties and Conduit service area			
Bent	-	282	282
Chaffee	700	-	700
Crowley	-	-	-
Fremont	1,300	400	1,700
Kiowa	-	-	-
Lake	1,950	500	2,450
Las Animas	500	2,500	3,000
Otero	600	1,205	1,805
Prowers	100	300	400
Pueblo	-	500	500
Subtotal	5,150	5,687	10,837
Total for El Paso County and Arkansas main stem counties	27,750	45,187	72,937
Other Arkansas Basin counties			
Custer	350	-	350
Teller	600	-	600
Subtotal	950	-	950
Totals	28,700	45,187	73,887

For purposes of market analysis, baseline demand for water leases was assumed to be driven by the following:

- The existing agreements with PPRWA and Aurora;
- The likelihood that a water user with a drought-recovery need or a short-notice emergency will come to terms on a lease with the Company; and
- The use of Super Ditch supplies to fulfill the remaining water supply gaps in non-metropolitan El Paso County and along the Arkansas River main stem

6.1.1.2 *Arkansas River Basin Demand Over Time*

Although several of the El Paso County entities and mainstem communities are currently seeking water supplies, portions of their future supply options will depend on completion of the SDS and development of the Arkansas Valley Conduit. These projects have a high degree of certainty of being completed but may be as far as 5 years (SDS) to 10 years (AVC) from being fully implemented. Therefore, a ramp-up period for these supply options would be expected.

Specific delivery terms for the Super Ditch-PPRWA agreement have not been set, but the PPRWA has proposed a delivery ramp-up schedule increasing to 8,020 per year by 2029. There is not yet a specific timeframe for filling the gaps elsewhere in unincorporated El Paso County or the Arkansas main stem, other than the estimated gap in year 2030, which will presumably develop relatively continuously over time. In response to the lack of specifics, it was estimated that the remainder of the Arkansas River Basin gap is fulfilled with Super Ditch supplies in a straight line manner between 2011 and 2030, beginning with 1,800 acre-feet to PPRWA in 2011 and steadily extrapolating over time to 27,750 acre-feet across all entities by 2030 (Figure 1).

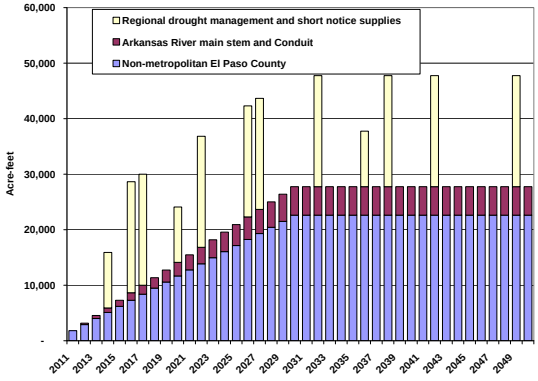
6.1.1.3 *Regional Drought Recovery and Short Notice Demand*

Drought recovery demands are assumed to occur at random intervals and, in some cases, in back-to-back years, consistent with the frequency of historical dry years and the need to refill reservoirs. Constraining this frequency is the term of the SECWCD-Aurora Intergovernmental Agreement (IGA) limiting deliveries to no more than 3 years in every 10, with a maximum of 10,000 acre-feet per year.

It is also assumed that a second drought recovery agreement will evolve with another M&I water supplier, similar in terms to the Super Ditch-Aurora agreement. In addition, that additional agreement is also assumed to contain a short notice component that allows the municipality to tap 10,000 acre-feet in case of emergencies.

The drought recovery demands to be filled under these multiple agreements are assumed to occur concurrently. The short-notice component for the second agreement, in contrast, is assumed to be exercised in random years, i.e., twice between 2011 and 2030. Figure 1 shows the drought recovery and short notice demands assumed for the baseline analysis, stacked upon the Arkansas River Basin demands.

Figure 4. Super Ditch Deliveries to Meet Arkansas River Basin Water Supply Gap and Potential Regional Drought Management.



6.1.1.4 Potential Fallowing-Leasing Revenues

The Super Ditch Company's conceptual market for leasing water is based on a three-tiered approach. Instead of modeling a market in which the lease provides for an entire water supply to customers at a fixed price per unit, this approach consists of three markets for water with unique prices corresponding to dry, average and wet hydrologic conditions. As described above, HDR's engineering analysis estimated the water transfer exchange potential for each ditch company based on dry, average and wet years.[259] There are examples of similar tiered markets in Colorado developed by the Northern Colorado Water Conservancy District (NCWCD) and the Pueblo Board of Water Works. Considering the exchange potential of each of the seven named Lower Valley ditches, an assumed shareholder participation rate of 65% and a 25% rate of fallowing, the engineers calculated the yield of the seven ditches in each hydrologic category. Leases in all three markets would have some form of "take or pay" reservation provisions, where the lessee would pay either for water received or for the right to use water during drought periods or during emergencies.

The potential dry-year yield for the seven ditches is estimated to be 14,020 acre-feet. When analyzing the hydrologic conditions between 1976 and 2004, there were only two years where all dry-year leases were not satisfied without carryover storage. Even so, nearly 65% of the planned supply could be delivered, leading the engineers to conclude that the dry-year yield is highly reliable. For the dry market, an effective price of $550–$850 per acre-foot per year appears reasonable due to the reliability of the

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[259] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT. **Appendix 6.**

supply under the lease and comparing the municipal cost of raw water.[260] At full development, the estimated annual revenues from dry-market leases could total approximately $9.8 million for nearly all years due to its great reliability.

Similarly calculated, the minimum yield available for the average-year market is estimated to be 14,610 acre-feet.[261] Since there would be a greater variability in yield compared to the dry market, average year leases will be offered at a lower price to consumers and would be more attractive to consumers who possess alternative water sources or raw water storage. The average-year market could make full deliveries 16 out of 29 years and make partial deliveries 27 out of 29 years. A price ranging from $400– $600 per acre-foot per year is reasonably expected from an average-market lease.[262] The estimated annual revenues from average-market leases would total approximately $7.3 million, realized in 16 out of 29 years.

Finally, approximately 16,770 acre-feet would be available to lease in the wet-year market.[263] These deliveries are more inconsistent than the average-year market, but the engineers believe that deliveries would occur with "some regularity." A price ranging from $50–$250 per acre-foot is expected from a wet-market lease. The estimated annual revenues from wet-market leases could reach a potential of $2.5 million, albeit on an infrequent basis.

Analyzing hypothetical revenues Super Ditch-negotiated leases utilizing the historic data from the 1976-2004 period, the engineers found the mean annual lease revenue to be $15.3 million, although the level varies substantially from year to year. This figure is equal to approximately 5–6% of the total value of crop production for the four counties of Crowley, Bent, Otero and Pueblo.[264] Based on these figures, the potential average lease revenues classified by ditch company are represented in Table 9.[265] These numbers assume that there will be no additional storage in the system beyond that already possessed by the ditch companies.[266] Any benefit of additional

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[260] *Id*. at 77. In practice, the dry-year customer may pay a fixed annual charge from year-to-year in the form of a stand-by charge, plus pay per-acre charge for water actually delivered. The effective price assumed here combined both types of charges on a per acre-foot basis.

[261] *Id*. at 75. This assumes that customers leasing from the dry-year market take delivery every year and the average-year market customers leasing the remainder.

[262] *Id*. at 77.

[263] *Id*. at 75.

[264] *Id.* at 79.

[265] *Id*. at 80.

[266] *Id*. at 82.

storage must be weighed against its incremental costs to determine any increase in value for the Super Ditch.

The Lower Ark District and the Super Ditch have continued to refine the market analyses for the leasing program. A January 2010 study by Honey Creek Resources compared price escalators for adjusting lease prices over time to determine the benefits of using similar models in Super Ditch transactions.[267] These price escalators include a market-based escalator, like one used in the Colorado-Big Thompson units; an escalator based on average municipal water impact fee increases over time; an escalator based upon average municipal water rate increases over time; and a cost-based escalator, as measure by the Consumer Price Index (CPI) and the Producer Price Index (PPI).[268]

Table 9. Potential Average Lease Revenues by Ditch (65% Participation).

Ditch	Potential annual revenue (mill $)	Effective price per unit ($/acre-foot)	Effective price per acre ($/acre)	Effective price per share ($/share)
Bessemer Ditch	3.58	595	1,075	1,075
Rocky Ford High Line	3.18	525	1,015	10,150
Oxford Farmers	.78	590	1,130	5,680
Otero	.21	440	240	245
Catlin Canal	2.18	500	1,140	1,140
Holbrook	1.08	435	630	630
Fort Lyon Storage and Canal	4.29	465	480	470
Total	15.30			

6.1.2 Antitrust[269]

Municipalities interested in supplementing their water supplies with leased or purchased agricultural water strongly asserted that a multi-ditch water leasing program would violate Federal antitrust laws, as soon as the notion entered the public discussion in the Lower Valley. Staff of the Colorado Water Conservation Board (CWCB) raised similar concerns.[270] This issue came to the fore when the Lower Ark District received $340,000 from the CWCB's Alternative Agricultural Transfer Methods (ATM) Grant

[267] HONEY CREEK RESOURCES, AVOIDED WATER SUPPLY COSTS: PIKES PEAK REGIONAL WATER AUTHORITY (Nov. 3, 2009).

[268] GEORGE OAMEK, HONEY CREEK RESOURCES, PRICE ESCALATORS FOR ADJUSTING LEASE PRICES OVER TIME (DRAFT) (June 30, 2011). **Appendix 13.**

[269] Thomas P. McMahon, Esq., Jones & Keller, P.C., Denver, CO.

[270] TODD DOHERTY, MEMORANDUM TO CWCB BOARD RE: AGENDA ITEM 11—JULY 22-23, 2008 BOARD MEETING, INTRASTATE WATER MANAGEMENT AND DEVELOPMENT—ALTERNATIVE AGRICULTURAL WATER TRANSFER METHODS GRANT PROGRAM (July 12, 2008).

Program to further investigate the economics of the Super Ditch and to answer engineering questions related water quality and possible pipelines to deliver leased water. The CWCB requested that the Lower Ark District prepare an analysis of the antitrust consequences of the Super Ditch's proposed fallowing-leasing program, as a condition of the grant.[271]

The Super Ditch's water leasing program actually involves collective action among potential competitors on both sides, *i.e.*, among potentially competing lessors of water rights on the one hand and among potentially competing lessees of such rights on the other. Thus, it implicates antitrust concerns in both respects. In fact, lessees have talked among themselves to coordinate their negotiating strategies, particularly with respect to lease prices.[272] Their doing so is, of course, itself fraught with antitrust implications.

Section 1 of the Federal Sherman Antitrust Act provides that "[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal."[273] There are multiple, distinct aspects to this prohibition:

- As a jurisdictional predicate, the activity in question must either be "in" or "affect" interstate commerce.[274] This requirement is satisfied by a "not insubstantial effect" on interstate commerce,[275] even if the restraint is local and the effect indirect.[276] Since various Colorado waterways flow out-of-state in amounts pursuant to interstate compacts and Supreme Court apportionments, the leasing of water rights is likely to be found to be within interstate commerce or, at least, to have the requisite impact on such commerce.[277]

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[271] *Id*.

[272] Interview with Jay Winner.

[273] 15 U.S.C. § 1. The Colorado Antitrust Act of 1992, COLO. REV. STAT. §§ 6-4-101 *et seq.*, contains a similar prohibition. *See* COLO. REV. STAT. § 6-4-104. Assuming the requisite nexus with interstate commerce, *see* nn. 2-5 and accompanying text, federal as well as state antitrust laws are applicable here. However, courts construing the Colorado Act are to be guided by federal court interpretations of comparable federal antitrust provisions. COLO. REV. STAT. § 6-4-119; *see People v. N. Ave. Furn. & App., Inc.*, 645 P.2d 1291, 1295-96 (Colo. 1982) (construing prior statute). Given that, and the existence of vastly more federal precedent, this analysis is couched in terms of federal antitrust law.

[274] *See, e.g., Summit Health v. Pinhas*, 500 U.S. 322, 332 (1991).

[275] *McLain v. Real Estate Bd. of New Orleans*, 444 U.S. 232, 241-42 (1980).

[276] *Hosp. Bldg. Co. v. Trustees of Rex Hosp.*, 425 U.S. 738, 744 (1976).

[277] For example, out-of-state revenues, financing or insurance can suffice to satisfy the requirement. *See,*

- Next, there must be collective or joint, rather than individual, action.[278] That condition is clearly satisfied here, with multiple actual or potential competitors acting together as lessors or lessees.
- Finally, because all business arrangements restrain trade to some extent, the statute has been interpreted to proscribe only *unreasonable* restraints of trade.[279] That, in turn, is evaluated under either a *per se* or a rule-of-reason analytical standard.

Certain categories of restraints, which have been determined to always, or almost always, have anticompetitive effects, are conclusively presumed to be unreasonable and thus have been declared unlawful *per se*. These basically consist of horizontal (*i.e.*, involving actual or potential competitors at the same level of commerce) price-fixing, market allocation, and certain group boycotts/concerted refusals to deal and tying arrangements.[280]

The prevailing analytical standard, though, is the rule of reason,[281] which seeks to determine whether the challenged anticompetitive conduct promotes, regulates or hampers competition.[282] The rule of reason requires proof of overall actual or probable anticompetitive effects before declaring that a joint arrangement or collective action is unlawful.[283] Indeed, courts must have considerable case-by-case experience evaluating the impact of a particular type of arrangement or business relationship on competition

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e.g., Summit Health v. Pinhas, 500 U.S. at 329-30 (out-of-state revenue sources); *McLain v. Real Estate Bd. of New Orleans*, 444 U.S. at 246 (interstate demand for financing, insurance); *Hosp. Bldg. Co. v. Trustees of Rex Hosp.*, 425 U.S. at 744 (out-of-state revenues, fee payments, financing).

[278] Section Two of the Sherman Act addresses unilateral conduct by prohibiting any "person" from monopolizing or attempting to monopolize any part of trade or commerce. 15 U.S.C. § 2.

[279] *Standard Oil Co. v. United States*, 221 U.S. 1, 58, 60 (1911).

[280] *N. Pac. Ry. v. United States*, 356 U.S. 1, 5 (1958) (Collecting cases).

[281] *Bus. Elecs. Corp. v. Sharp Elecs. Corp.*, 485 U.S. 717, 723, 726 (1988).

[282] *Chicago Bd. of Trade v. United States*, 246 U.S. 231, 238 (1918).

[283] *FTC v. Ind. Fed'n of Dentists*, 476 U.S. 447, 460-61 (1986) ("Full-blown" rule of reason analysis requires an exhaustive examination); *See, e.g., Chicago Bd. of Trade v. United States*, 246 U.S. at 238 (Relevant considerations include facts peculiar to business to which restraint is applied, and conditions before and after restraint imposed; nature, history and actual or probable effect of restraint; evil believed to exist, reason for adopting particular remedy, and purpose or end sought to be attained). Alternatively, an abbreviated or "quick-look" rule of reason analysis may be applied in situations where "an observer with even a rudimentary understanding of economics could conclude that the arrangements in question would have an anticompetitive effect on customers and markets ... [such that] the great likelihood of anticompetitive effects can easily be ascertained." *Calif. Dental Ass'n v. FTC*, 526 U.S. 756, 770 (1999). That should not be the case here.

under the rule of reason before they will conclude that it is to be conclusively presumed to be unlawful under the *per se* standard.[284] But, importantly, where collective action is essential in order that a product can be made available to the marketplace at all, a rule-of-reason analysis is applied,[285] in such a case, if the joint arrangement achieves otherwise unattainable efficiencies and enables increased output, it can be pro-competitive and pass muster under the rule of reason.[286]

Three Supreme Court decisions thus stand for the proposition that horizontal restraints among competitors that normally would be subject to *per se* treatment are instead analyzed under the rule of reason if they are necessary in order for the product to be offered at all.[287] The Company's model appears to introduce an entirely new product into the Colorado marketplace—the leasing, rather than sale, of water rights over a long-term and on a broad scale by aggregating rights from multiple water-rights owners over multiple ditches at once, rather than just a single owner one ditch at a time. Apparently, this has never been done before, in Colorado or elsewhere. By aggregating water rights from multiple shareholders from multiple ditches over long terms via blanket leases, the Company's plan will achieve hitherto-unattained economies of scale, in part because it will justify the expense of an exchange case in water court.

Because this is a matter of first impression, it is not certain how a court might rule. That said:

- The very fact that courts have no experience with this type of collective fallowing-leasing arrangement means that the *per se* standard should not be applied. Moreover, the arrangement should be evaluated under the rule-of-reason because the collective action is necessary in order to enable the Company to bring to market what appears to be a new product the long-term leasing, on an unprecedented geographic and quantity scale, of water rights from multiple ditches at once.
- Additionally, the proposed arrangement should be found lawful under the rule of reason. That is because the collective action will enable the achievement of otherwise-unattainable economies of scale regarding the engineering and legal expenses inherent in pursuing an exchange case in water court necessary to

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[284] *Arizona v. Maricopa Cty. Med. Soc'y*, 457 U.S. 332, 344 (1982); *White Motor Co. v. United States*, 372 U.S. 253, 263 (1963); *United States v. Topco Assocs*., 405 U.S. 596, 607-08 (1972).
[285] *NCAA v. Bd. of Regents*, 468 U.S. 85, 101, 109-110 (1984).
[286] *Id*. at 103 (*citing Broadcast Music, Inc. v. CBS*, 441 U.S. 1, 18-23 (1979)).
[287] *Arizona v. Maricopa Cty. Med. Soc'y, Broadcast Music, Inc. v. CBS, Broadcast Music, Inc. v. CBS*, 468 U.S. 85 (1984).

implement long-term leases. That, in turn, should pro-competitively increase output by dramatically expanding the quantity of water rights potentially available for use by municipalities.

6.1.3 Municipal Participation in Super Ditch

While farmers embraced the notion of fallowing-leasing relatively quickly, municipalities – the potential lessees of the farmers' water – were cautious about this proposed change in historical practices. The Lower Ark District and Super Ditch have encountered numerous municipal issues and obstacles to fallowing-leasing over the years. Through it all, they steadfastly pursued the vision of a healthy Lower Valley far into the future, and have been able to make regular, if sometimes fitful, progress with the municipalities and skeptical water buffaloes.

Voters created the Lower Ark District to conserve the Lower Valley's water resources.[288] The Lower Ark District Board, accordingly, committed itself to ending historical buy-and-dry practices by municipalities. Nonetheless, the Board recognized that the municipalities had growing populations, future unmet water demands, and the resources to continue their historical purchases of the Lower Valley's water rights.[289] The Board understood "just say no" wasn't going to work to keep irrigation water rights in the Lower Valley.[290]

The Lower Ark District also recognized that some farmers would either want to or have to sell their water rights and would not want anyone to interfere with their disposition of that private property right. Moreover, the Lower Ark District, Lower Valley farmers, and potential municipal lessees all realized that some farmers would sell their rights during the term of a municipal lease, particularly during a 40-year term such as the municipalities want. For example, a farmer who had put his water under lease might subsequently want to retire, "cash out" his largest investment, and move away. Or, a farmer might die, leaving the land and water to absent children who would not want to return and farm to preserve their inheritance.

The Lower Ark District also recognized that a concomitant issue for virtually every potential municipal lessee would be its concern that another municipality would buy up the water rights it has taken under a lease during the term of the lease when those water rights came up for sale, leaving the municipality without further access to

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[288] Interview with Dale Mauch.
[289] Interview with Lynden Gill.
[290] Interview with Loretta Kennedy.

that water at the end of the lease.[291] Without assurances that they would not forego their future access to water by leasing in lieu of purchase, the municipalities simply could not consider leases.

This issue was a major topic of serious discussions between the Lower Ark District, Colorado Springs, PBWW, and Aurora from 2005 to 2007 as the parties attempted to reach a "global" settlement of the Lower Ark District's various issues in exchange for their support of the stalled federal PSOP legislation. The parties recognized and respected the farmers' right to sell their private water rights when they chose. And the Lower Ark District realized that, although it opposed sales, it could not stop them, and freezing municipal lessees out of the water purchase market would depress water prices, hurting the farmers. Rather than prohibit municipalities from purchasing water rights as a condition of leasing—as attractive as that was to the Lower Ark District—the parties to discussions concluded that everyone's objectives could be met if each municipality was allowed to purchase water rights as they came on the market but was required to put those water rights into lease, as a lessor, during the remaining term of the principal lease. In this manner, municipalities could participate in the water market for the long-term, while supporting and not undermining water leasing in the shorter term. This concept became a generally accepted term and condition of all subsequent negotiations and agreements.

The solution of this one issue—as often the situation with pioneering a new form of transaction—raised others. If municipalities could buy water rights as they came on the market, the cities would eventually take over any organization set up by the farmers to lease water as their share ownership increased over time. Moreover, could cities even be equity owners with private farmers of the Super Ditch under the Colorado Continuation, Article XI § 2, which prohibits joint ownership of corporations by the State and its political subdivisions? Colorado Springs was especially interested in helping figure out how water leasing might work, and their in-house and outside counsel[292] worked with counsel for the Lower District on a solution. Mary Mead (Moey) Hammond suggested that the constitutional issue could be solved by leaving the municipalities out of the equity ownership of the corporation.[293] Mark Shea and Kelly McMullin then came up with the notion of putting the water rights purchased by a municipality into a trust.[294] The trustee would contract with the Super Ditch to

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[291] David W. Robbins, Esq., Special Counsel, Colorado Springs Utilities, was an especially articulate advocate on this concern.

[292] Kelly McMullin, Esq., Colorado Springs, Mary Mead Hammond, Esq., and William Paddock, Esq., Carlson, Hammond & Paddock LLC; and, David Robbins, Esq., Hill & Robbins.

[293] Meeting with Anthony van Westrum, David Robbins and Peter Nichols (May 30, 2007).

[294] Meeting with Mary Mead Hammond, David Robbins and Peter Nichols (June 20, 2007).

"manage" the property, lease out the water, collect the lease payments, and remit the proceeds to the city.[295] Finally, David Robbins reminded everyone that Colorado Springs could not support a program that leased water for export out of the Arkansas River basin because of various intergovernmental agreements to which it was a party, with the limited exception of Aurora.[296]

6.1.4 Avoided Cost[297]

"Avoided cost" refers to the price a municipality has recently paid, or intends to pay, for its next increment of water supply, expressed on a dollar per acre-foot basis. Alternatively termed "next least expensive alternative," avoided cost is important because it establishes an upper bound on willingness-to-pay for additional supply, such as that being offered through alternative agricultural transfer programs like the Super Ditch. From the latter's perspective, as a water rights provider, the lessee's upper bound would be balanced by the provider's lower bound, which is equal to water's value for irrigating crops—the lease price must be at least as high as the water's irrigation value to be attractive.

Avoided costs are usually expressed relative to specific municipalities because each is generally unique with respect to geographic location, available water supply options, and demand trends. However, since Front Range municipalities tend to have common, finite sources of potential new supply, examples from two municipalities can provide good comparative avoided costs from two major basins. These marker municipalities include the PPRWA, representing rapidly growing northern El Paso County, and Aurora Water, representing the Denver metropolitan area, as set forth in the analyses attached as Appendices 17 and 18.[298] Both have recently been acquiring water rights and developing new water supplies and thus provide relatively good data. Coincidently, both entities have also entered into agreements with the Super Ditch discussed in greater detail in the Municipal Leases section below.

6.1.4.1 Pikes Peak Regional Water Authority

Municipalities that are included within the Pikes Peak Regional Water Authority are facing high costs for renewable water supplies needed to relieve their groundwater

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[295] Kelly McMullin, Revocable Trust Agreement (Oct. 24, 2010).

[296] David Robbins (Sept. 6, 2007); *see also, e.g.*, INTERGOVERNMENTAL AGREEMENT AMONG THE CITY OF PUEBLO, THE CITY OF COLORADO SPRINGS, AND THE BOARD OF WATER WORKS OF PUEBLO, COLORADO at IV.E (Mar. 1, 2004).

[297] GEORGE OAMEK,HONEY CREEK RESOURCES.

[298] GEORGE OAMEK, AVOIDED WATER SUPPLY COSTS FOR PPRWA (DRAFT). **Appendix 9.**

dependence. They were not included in the Southern Delivery System (SDS) project, and their options appear limited. For purposes of the PPRWA analysis, five water supply alternatives were compared, three of which used Super Ditch supplies:

1. Continued use of groundwater, such as that offered for sale at the Greenland Ranch, near the Palmer Divide;
2. Super Ditch supplies delivered and treated at Stonewall Springs, and then piped to the Monument area for distribution within the PPRWA;
3. Super Ditch supplies delivered and treated near Las Animas, and then piped to the Monument area for distribution within the PPRWA;
4. Super Ditch supplies delivered to Pueblo Reservoir, treated and delivered through the SDS, provided sufficient Arkansas River exchange capacity and reasonable Colorado Springs transmission agreements;
5. Purchase of Upper Arkansas River Basin water rights, with treatment and delivery through the SDS.

For all of these alternatives, local distribution facilities within the PPRWA would need to be constructed, representing an additional cost that would be equal across alternatives. Water treatment is included in the avoided cost estimates because of the varied nature of water quality in the Arkansas River Basin and because it represents a major cost differentiator between alternatives. In all cases, Super Ditch supplies of raw water are assumed to cost $500 per acre-foot per year before treatment.

In the analysis, estimated capital and operation and maintenance (O&M) costs for use of the SDS system were proportionately assigned to the PPRWA based on water usage and a total cost of SDS of approximately $800 million. For capital facilities, a 10% return on Colorado Springs investment was assumed; for O&M, proportionate costs were used.

Table 10 summarizes the five water acquisition alternatives and their avoided cost components. The dedicated pipelines from the Lower Arkansas Valley are clearly the most expensive options due to their long distance, high lifts, and high levels of water treatment. Groundwater is the least expensive option, but is probably not acceptable to the PPRWA because it is not a renewable, sustainable supply. Options involving surface water supplies delivered through the SDS appear to be the least expensive options of obtaining renewable supplies, provided PPRWA can reach an agreement with Colorado Springs.

6.1.4.2 Aurora

For the Aurora analysis, four water acquisition alternatives were considered for Aurora:

1. Full development of the Prairie Waters Project;
2. Additional purchases of water rights from the Upper Arkansas River, when available;
3. Water leases from the Pueblo Board of Water Works; and
4. Water leases from the Rocky Ford Highline Canal Co.

These alternatives are not necessarily consistent comparisons because one—Prairie Water Project—contains treatment costs while the others do not. In addition, available supplies differ with each. However, for comparison purposes, each alternative results in relatively high quality water and each reflects actions actually taken by Aurora.

Table 10 shows that the two lease alternatives have been considerably less expensive, but they are limited by term length and water availability. Aurora and PBWW recently examined a second lease but could not come to terms on the price. The Rocky Ford Highline lease is not currently active but could potentially be re-initiated.

6.1.4.3 Avoided Costs Conclusions

- At a delivery price of $500 per acre-foot, it appears that Super Ditch supplies are competitive with other water supply options. Aside from continued use of finite groundwater, the least costly alternative for the PPRWA appears to be taking Super Ditch supplied through the SDS. Use of dedicated pipelines to convey Super Ditch supplies appears to be cost prohibitive.
- Despite the level of investment that Aurora has made in the Prairie Waters Project, it appears that Super Ditch supplies at $500 per acre-foot are economically competitive as long as they can be delivered through exchange. These supplies would not compete with the Prairie Waters Project but would help the City with added drought protection and diversified supply.

Table 10. Summary of Municipal Avoided Costs.

	Northern El Paso County, as represented by Pikes Peak Regional Water Authority					Aurora Water			
	Continued use of groundwater, eg. Greenland Ranch	Super Ditch, diversion and treatment at Stonewall Springs	Super Ditch, diversion and treatment near Las Animas	Super Ditch using SDS pipeline and treatment	Upper Arkansas water purchases using SDS pipeline and treatment	Prairie Waters Project	Columbine Ditch purchase	Lease from PBWW	Lease from Rocky Ford Highline Canal Co.
Annual yield	Not est.	7,000 - 50,000 acre-feet	30,000 - 60,000 acre-feet	Not est.	Not est.	50,000 acre-feet at full development	Approx. 1,250 acre-feet per year	5,000 acre-feet per year	Approx. 12,500 acre-feet
Purchase or lease	Purchase	Lease raw water from Super Ditch shareholders	Lease raw water from Super Ditch shareholders	Lease raw water from Super Ditch shareholders	Purchase	Self-developed	Purchase	Lease	Lease
Terms	Raw water component of cost is cost is estimated to be $230 per acre-foot per year; wellhead treatment included	$500 per acre-foot to Super Ditch at diversion point; municipality bears all other cost	$500 per acre-foot to Super Ditch at diversion point; municipality bears all other cost	$500 per acre-foot to Super Ditch at diversion point; SDS is used to treat and convey water to PPRA service area	Approximately $950 per acre-foot for water acquisition, SDS pipeline is used to convey water to PPWRA service area			15 years, 1999-2013, option to 25; price per acre-foot is indexed to PBWW's retail water charge	For 2003-04 only; $350-400/acre-foot to irrigators considering all contract terms; $500+/acre-foot total cost to Aurora
Annual equivalent cost per acre-foot, capital and O&M	$ 1,590	$ 5,440	$ 4,962	$ 2,163	$ 2,613	$ 2,120	$ 1,600	$ 165	$ 550
Annual equivalent cost, $/1,000 gallons	$ 4.88	$ 16.69	$ 15.23	$ 6.64	$ 8.02	$ 6.51	$ 4.91	$ 0.51	$ 1.69

6.1.5 Price Escalators[299]

Water lease contracts commonly use price escalators, or indices, to protect the seller against inflation and changing market conditions. Like typical inflation escalators, these escalators are usually expressed in annual percentage terms. Prior to opening negotiations with municipalities, the Super Ditch conducted a survey of alternative price escalation methods. The survey compared the conceptual basis and potential for practical use of four types of price escalators in Super Ditch leases. These four types of escalators included—

1. A market-based escalator, assumed for illustration to be represented by the price of Colorado-Big Thompson units (C-BT);
2. An escalator based upon average municipal water impact fee increases over time;
3. An escalator based upon average municipal water rate increases over time; and
4. A cost-based escalator, as measured by the Consumer Price Index (CPI) and the Producer Price Index (PPI).

Available data does not allow for comparisons of the indices over a consistent 40-year period, representative of a possible lease term. However, common data is available for the period 1980–2006. Figure 5 shows the comparison of indices over this time.

It is interesting to note that during this particular period, the impact fee method would have yielded the highest index and the highest adjusted lease price. In 1980, the

[299] GEORGE OAMEK, PRICE ESCALATORS FOR ADJUSTING LEASE PRICES OVER TIME (DRAFT). **Appendix 13.**

price of C-BT units was at its highest level to date and then dropped substantially during the 1980's prior to rebounding in the 1990's. It is also interesting to note that during this period, the CPI index exceeded the water rate index.

Figure 5. Comparative Price Escalators.

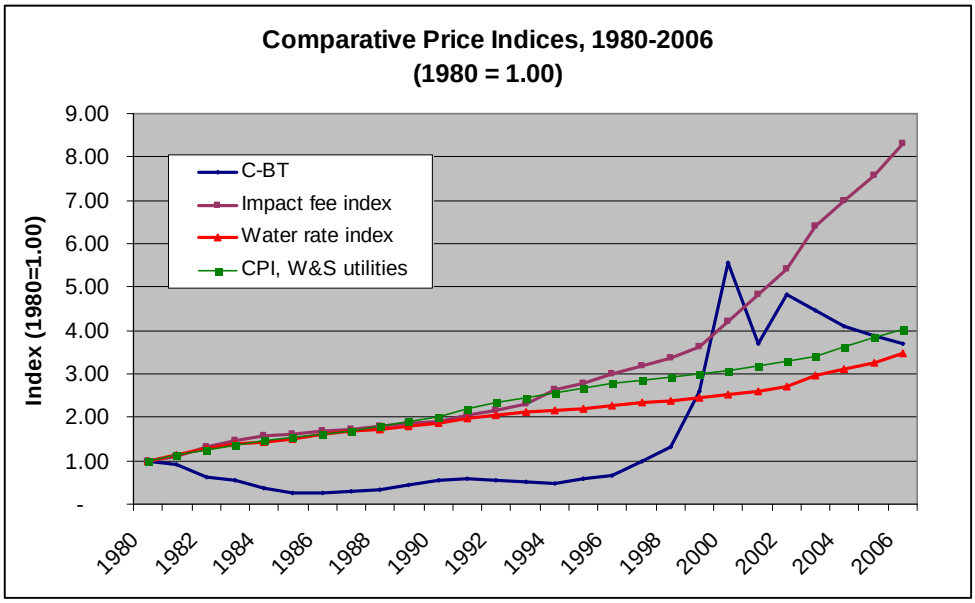

Table 11 summarizes the different price escalators that have been considered.

6.1.5.1 Price Escalators Currently Used in Water Transfers

Examples of different price escalation methods used in contemporary water sales illustrate how they have been applied in practice.

- In leases with Aurora and other municipalities, the Pueblo Board of Water Works (PBWW) uses their own water rates as an escalator for leased water.
- The Metropolitan Water District of Southern California (MWD) and Palo Verde Irrigation District (PVID) escalated at a constant rate of 2.5% though 2014, but will use the Consumer Price Index (CPI) to adjust future prices, with minimum and maximum rates of 2.5% and 5%, respectively.[300]
- As part of a larger Quantification Settlement Agreement (QSA) pertaining to the Colorado River, Imperial Irrigation District (IID) and the San Diego County Water Authority (SDCWA) entered into a 45-year (initial term) agreement that uses percentage changes in MWD's "Full Water Rate" as the escalator.

[300] Interview with Fadi Kamand, MWD Program Manager (July 22, 2009).

Table 11. Summary of Price Escalators.

Type of index	Underlying rationale	Examples of use	Accessibility of data	Benefits	Shortcomings
Front Range water market index	Generally captures "scarcity" value of water through free market transactions	None currently. After 2013, IID and SDCWA contract has the option for a "Price Redeterminati on Phase" that may use existing water transfer prices as an index	Poor. Consistent criteria and methodologies would have to be established to develop "apples to apples" water transfer comparisons	Captures "true" market value of water, incorporating scarcity, expectations, etc.	Difficulties in: (1) collecting reliable primary data; (2) developing consistent comparisons; (3) defining bona fide sales; (4) sufficient number of transactions for comparison
Colorado-Big Thompson Units (C-BT)	With some restrictions, more or less represents a market for municipal water supply in Northeast Colorado; most aggressive and variable growth rate among all indices considered: 10–11% per year increase over last 40 years.	None	Good. Transactions are public record	Captures market value of water in N. Colorado;	Most applicable to Northern Front Range, less so to Metro area and Southern Front Range; its high growth rate may not be acceptable to municipalities considering leases; its variability may not be acceptable to Super Ditch participants

Type of index	Underlying rationale	Examples of use	Accessibility of data	Benefits	Shortcomings
Region-wide average water impact fees	Captures scarcity value of potable water; over the last 30 years, state-wide impact fees have increased at a rate of about 7.5% per year	None	Good. Impact fees are public record. The sample communities to consider in developing the index would have to be negotiated	A strong underlying rationale; easily accessible data	Impact fees also include transmission and treatment facilities, as well as raw water supply; impact fees are subject to political influence
Region-wide average water rates	At the margin, captures scarcity value of potable water; over the last 30 years, state-wide water rates have increased at a rate of about 5.0% per year	Pueblo Board of Water Works (PBWW) and Aurora use their own rates to index their leases; IID and SDCWA use MWD's wheeling rates as a price escalator	Good. Water rates are public record. The sample communities to consider in developing the index would have to be negotiated	A strong rationale, but less so than impact fees; easily accessible data	Rates also include all other utility costs, "averaging down" the effects of changes in the value of raw water supplies; generally not subject to political influence.
Cost-based indices: various versions of the Consumer Price Index (CPI) and Producer Price Index (PPI); Engineering News Record indices	Well-known and accepted escalators for consumer and producer costs; have historically ranged between 3–5% depending on time frame considered	PVID-MWD rotational fallow program; IID transfer to CVWD and MWD;	CPI and PPI indices are regularly published by Bureau of Labor Statistics;	Well-know and accepted indices; escalation rates can be bracketed with minimums and maximum changes	These indices probably capture the opportunity cost of capital better than the scarcity value of water; with the exception of pumping costs, a weak rationale for water supply

6.1.6 Super Ditch–Municipal Lease Agreements

The Super Ditch Board invited potential municipal and state lessees to discuss leasing immediately following its incorporation. Invitees included municipal water

agencies from Colorado Springs, Pueblo, Aurora, Fountain, and Parker, communities with recognized needs for additional water supplies. In addition, the Board invited several water authorities, composed of smaller municipal and water district members, dependant upon non-renewable ground water, including Pikes Peak, El Paso County, Douglas County and South Metro water authorities. The Board also invited the Colorado Department of Natural Resources, including the CWCB, State Engineer, Wildlife Commission, and Parks Commission to discuss their needs with regard to deliveries to Kansas under the Arkansas River Compact and various recreational reservoirs in southeast Colorado. Finally, the Board invited a number of private companies that had expressed interest in water leasing, including The Morley Companies, INVEnergy, Squirrel Creek Energy, and Pure Cycle.

Colorado Springs and Fountain expressed interest in water leasing, while Aurora declined to discuss leasing so long as the Lower Ark District continued its litigation over the city's contract with Reclamation to use the Fry-Ark facilities to store and exchange the agricultural water it had purchased in the Lower Valley.[301] Parker, which is dependant upon depleting Denver Basin groundwater, was surprisingly not interested in talking, saying "The costs are to [sic] high and the water quality untenable not to mention the politics.[302] This was before any discussion of prices, although the local media reported a lease price of $300 to $500 per acre-foot per year.[303]

The PPRWA, composed of 17 groundwater-dependent small municipalities and water districts, expressed interest in immediate leases to supply a pipeline from the Lower Arkansas River to northeast El Paso County that it was investigating. The membership, leadership and management of the PPRWA and the El Paso County Water Authority overlapped to a such great extent that there was no reason for separate meetings. The South Metro Water Authority declined invitations to discuss leasing, saying the leases were too expensive without any actual conversation about the price. Later, South Metro expressed its general unwillingness to lease water, saying it needed permanent supplies to meet its health, safety and welfare legal obligations to its customers.[304] The Douglas County Water Authority did not respond.

The State was very interested in supporting water leasing, but, as the economy and tax revenues declined with the 2008 financial crisis and ensuing recession, lacked the resources to move forward with direct leases of water. Nevertheless, the State's

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[301] Case No. 02cv2244 (D. Colo.).

[302] E-mail from Frank Jaeger, Manager, Parker Water & Sanitation District, to Peter Nichols (Sept. 24, 2008).

[303] Chris Woodka, *Farmers would rather lease rights than sell,* THE PUEBLO CHIEFTAIN, Mar. 2, 2008.

[304] Rod Kuharich, General Manager, South Metro Water Supply Authority.

enthusiasm for water leases as an alternative to buy-and-dry grew, if anything, with the formation of the Super Ditch. This manifested itself in various ways, including invitations to the Super Ditch Board to make presentations to the CWCB and the joint House and Senate water committees in 2007 and 2008, the General Assembly's creation of the alternative agricultural transfer methods grant program,[305] CWCB grants awarded in 2009 and 2011, and the work of the Interbasin Compact Committee (IBCC) and its subcommittees to find alternatives to agricultural dry up to meet the State's future water needs.[306]

Pure Cycle, which purchased High Plains' shares in the Ft. Lyon Canal after the Supreme Court rejected High Plains' plan to market Fort Lyon water to Front Range municipalities,[307] was interested in participating as a lessor, since they had not been able to find lessees or figure out how to move their water north to meet demands on their own. The other private companies who had expressed an interest turned out to be pursuing aspirational, rather than real plans, and none has been able to develop a project as hoped, which would have required water they did not have, and would have had to acquire (lease).

Following these introductory meetings in June and July 2008, the Super Ditch Board identified the PPRWA and Colorado Springs as the most promising short-term prospects for leasing. The Board appointed a team, and instructed them to begin negotiations.[308] Aurora, after entering into a Settlement Agreement with the Lower Ark District over its lawsuit, entered into negotiations in 2009.

Negotiations proceeded slowly, with potential municipal lessees wanting answers to a myriad of questions that the Super Ditch simply did not yet have the information to answer, although its engineers, consultants and lawyers were working on them with the financial support of the Lower Ark District, Arkansas Basin Roundtable, and CWCB. These questions included the yields of the water rights to be leased, the delivery of leased water into Pueblo Reservoir, the reliability of supply under varying hydrological conditions, and the locus of responsibility for engineering, permitting and adjudicating the leases. In addition, the potential lessees wanted to know which irrigators on which ditches were committed to lease their water so they could do their own evaluations of yield and reliability under varying hydrological

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[305] S.B. 09-125, 2009 COLO. SESS. LAWS, Ch. 32B, § 4; *See also* http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx.

[306] *See, e.g.*, INTERBASIN COMPACT COMMITTEE, REPORT TO GOVERNOR RITTER AND GOVERNOR-ELECT HICKENLOOPER (Dec. 15, 2010)

[307] *See* Table 4, p.16.

[308] Interview with John Schweizer.

conditions. PBWW in particular wanted answers before talking.[309] All of these were chicken and egg kinds of questions, e.g., farmers wouldn't commit to leases without knowing the lease price, while municipalities wouldn't commit to a price without knowing their total cost of leasing water delivered to their water treatment plant. Ultimately, the Super Ditch realized it would have to shoulder much of the risk to move forward, agreeing to be responsible for permitting, adjudicating, and delivering the water to Pueblo Reservoir. The municipalities for their part realized that they would have to be responsible for getting the water from Pueblo Reservoir to their service areas. But, while this made conceptual sense, potential lessees were reluctant to sign an enforceable lease. Jay Winner, General Manager of the Lower Ark District, broke the log jam by suggesting non-binding "terms sheets" that set out the key terms that would be included in leases, while committing the parties to work in good faith to put actual leases into place.

6.1.6.1 Terms Sheets

The Super Ditch entered into two "terms sheets" for water leases in 2010, one with the PPRWA and another with Aurora. Negotiations continue with Colorado Springs. The Super Ditch has also embarked on two pilot programs to demonstrate the operation of leases and the delivery of water to municipal lessees, one with Fountain and other members of Pikes Peak, and another with Colorado Springs.

6.1.6.1.1 Pikes Peak Regional Water Authority

The Super Ditch inked a Terms Sheet with Pikes Peak concerning water leases in June 2010, after a year and half of negotiations.[310] The key provisions are:

- 8,020 acre-feet per year;
- $500 per acre-foot, to be adjusted every five years by the change in the Colorado Municipal League's index of Colorado utility costs;
- Lease terms of up to 40 years;
- Super Ditch to engineer and adjudicate necessary changes of water rights;
- Super Ditch to provide storage to ensure delivery; and
- Delivery point to be Pueblo Reservoir.

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[309] E-mail from Alan Hamel, Executive Director, Pueblo Board of Water Works, to Peter Nichols (June 3, 2008).

[310] TERMS SHEET FOR SUPER DITCH/AURORA AGREEMENT (Oct. 20, 2010). **Appendix 23.**

The terms sheet contained several contingencies, most importantly an acceptable agreement with Colorado Springs to deliver water from Pueblo Reservoir through the City's proposed Southern Delivery System pipeline to PPRWA members in northeast El Paso County. Other contingencies related to lessor commitments, transferable yield, Federal and local permitting, judicial or administrative proceedings to change the type and place of use of the leased water, and member system ties into the delivery system.

Finally, the terms sheet allowed lessees to purchase irrigation water rights in the Lower Valley and adjudicate changes to allow their use by the municipalities. In this concession—seemingly at odds with promoting temporary leases over permanent transfers—the Super Ditch recognized the reality that other municipalities might purchase water rights in the Lower Valley and that PPRWA could not accept the risk that at the end of its lease, another city would own the rights and PPRWA would be left high and dry.

6.1.6.1.2 Aurora

The Lower Ark District and Aurora reached an agreement in March 2009 to settle the Lower Ark District's lawsuit over Aurora's contract to use Fry-Ark facilities to store and exchange irrigation rights it purchased in the Lower Valley in the 1990s.[311] The settlement addressed many issues, one of which was Aurora's commitment to lease water from "an operational Super Ditch Company that can provide a like amount of water [as the High Line Canal Company] on a similarly reliable basis at fair market value . . ."[312] The Super Ditch and Aurora ultimately reached agreement on a terms sheet in October 2010, following negotiations that reflected strongly differing opinions about Aurora's commitment under its settlement with the Lower Ark District and the fair market value of water.

The key provisions of the Aurora terms sheet mirrored the PPRWA terms sheet, although Aurora committed to lease up to 10,000 acre-feet per year for up to three years in any ten-year period, up to a total of 133,197 acre-feet through 2048.[313] In addition, Aurora, rather than the Super Ditch, took responsibility for storing water once it was delivered to Pueblo Reservoir.

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[311] Stipulation for Stay and Settlement between Lower Arkansas Valley Water Conservancy District and the City of Aurora, Acting by and through its Utility Enterprise, Case No. 07CW2244 (D. Colo.) (Mar. 18, 2009).

[312] *Id.* at VI.B.d.f.

[313] TERMS SHEET FOR SUPER DITCH/AURORA AGREEMENT (Oct. 20, 2010). **Appendix 23.**

6.1.6.2 Pilot Programs

The Lower Ark District supported 2011 legislation developed for the Department of Natural Resources and the CWCB to allow for administrative approvals by the State Engineer to implement water leases, as contemplated by the terms sheets signed by the Super Ditch with PPRWA and Aurora.[314] The legislation was an attempt to address the high cost of water court change cases to implement water leases, which costs had been identified by the Department of Natural Resources and CWCB's March 2010 conference on alternative agricultural transfers methods as an impediment to water leasing[315] and confirmed by engineering modifications of the Super Ditch.[316] Unfortunately, SECWCD, PBWW and the Upper Arkansas Water Conservancy District were surprised by the legislative proposal, although it had been openly discussed for a year. They, along with THE PUEBLO CHIEFTAIN newspaper, objected to the legislation,[317] possibly because it would move water leasing along faster than they anticipated. After the sponsor killed the legislation at the request of the Lower Ark District, Jay Winner, General Manager of the Lower Ark District, conceived a two-phased pilot program to allay fears about how leases would work.[318]

6.1.6.2.1 Fountain Creek Entities

The first phase will involve the lease and delivery in 2012 and 2013 of 600 to 750 acre-feet of water to members of the Fountain Valley Authority (FVA) (the members being Fountain, Security, Widefield, and Stratmoor Hills), Cherokee Metro District, and Donala Water & Sanitation District. The participating lessors will probably be shareholders on the Catlin Canal. The lessees will take leased water delivered from Pueblo Reservoir to their service areas via existing infrastructure of the FVA and Colorado Springs (Cherokee and Donala have delivery agreements with Colorado Springs). The FVA entities and Cherokee will get 500 acre-feet, while Donala will lease 100 to 250 acre-feet. The pilot program could extend indefinitely year-to-year, or morph into the 8,020 acre-foot per year lease contemplated by the PPRWA terms sheet.[319]

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[314] H.B. 11-1068 (Fisher, Schwartz).

[315] E-mail from Todd Doherty to Matt Lindberg, Brown & Caldwell, *et al*. (Apr. 23, 2010).

[316] GREGG TEN EYCK, LEONARD RICE ENGINEERING, INC., PHASE 4 TASK D FINAL MEMORANDUM (June 15, 2011). **Appendix 22.**

[317] Editorial, *Water Bill Flawed*, PUEBLO CHIEFTAIN, Jan. 23, 2011.

[318] Interview with Jay Winner.

[319] *Id.*

6.1.6.2.2 Colorado Springs

The second phase will involve the lease and delivery of 2,500 acre-feet of water to Colorado Springs in 2013. The participating lessors will probably be shareholders on the Catlin and Ft. Lyon ditches. Colorado Springs will use its own facilities to move leased water delivered to Pueblo Reservoir to the city. Like the first phase with the FVA entities, the pilot program could extend indefinitely year-to-year or morph into a long-term contract with Colorado Springs to meet the city's drought and drought-recovery demands, as well as an alternate emergency water supply in the event of a catastrophic failure of the city's northern water supply system (the Otero Pipeline).[320]

6.2 COUNTIES

6.2.1 1041 Permits[321]

The Lower Ark District conducted a preliminary investigation into the 1041 Regulations for Pueblo, Otero, Bent, and Prowers counties as part of the identification of county permitting requirements that might apply to the use of water in its proposed water leasing program.[322] The statutory scheme for "1041" regulations and permits was established by House Bill 1041 of the 1974 General Assembly and is now found in C.R.S. § 24-65.1-101, *et seq*. Under that legislation, once a county designates an activity as a matter of "state interest," any person desiring to conduct that activity must file a permit application with the local government in which the activity is to take place. The local government may approve or deny the application based on whether the proposed activity complies with the local government's regulations and guidelines, and it may enjoin any person who does not obtain a permit from conducting the activity. Activities of state interest may include the "[e]fficient use of municipal and industrial water projects."[323] This provision allows counties to scrutinize "municipal and industrial water projects" and to require that the project "emphasize the most efficient use of water." Counties define "municipal and industrial water projects" differently, but the definitions are broad enough to include agricultural-to-municipal leasing projects such as the Super Ditch fallowing-leasing program. Furthermore, a county's authority to

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[320] *Id.*

[321] **Appendix 26.**

[322] HDR ENGINEERING, INC., LOWER ARKANSAS VALLEY WATER LEASING POTENTIAL PRELIMINARY FEASIBILITY INVESTIGATION (Aug. 2006). **Appendix 4.**

[323] COLO. REV. STAT. § 24-65.1-203

regulate development of water projects extends to projects within the county even when end users of the water are outside the county.[324]

The Super Ditch's water leasing program potentially includes shareholders under the Bessemer Ditch, the Catlin Canal, the Fort Lyon Canal, the Fort Lyon Storage Canal, the Rocky Ford High Line Canal, the Holbrook Canal, the Otero Ditch, and the Oxford Farmers Ditch. These ditches are located between Pueblo and John Martin Reservoirs in Pueblo, Otero, Bent, and Prowers County. Each of these four counties has promulgated 1041 regulations and has designated the "efficient utilization of municipal and industrial water projects" as a matter of state interest.

In Pueblo County, the Super Ditch's water leasing may fall within the definition of a regulated "water project" when leases exceed 500 acre-feet per year. Thus, the Super Ditch leases are likely to be subject to the County's 1041 Regulations under the "Efficient Utilization of Municipal and Industrial Water Projects" regulations located in Chapter 17 of the Pueblo County Code.[325]

In Otero County, water leasing likely falls within the definition of a regulated "municipal and industrial water project" if irrigation of more than three acres of land ceases for three or more consecutive years.[326] Initial leasing discussions focused on fallowing no more than two or three consecutive years, but, in the course of establishing the Super Ditch, participating farmers soon expressed a desire to be able individually to choose what land to fallow and for how long. For example, some would rather fallow a fixed amount of land for the length of the lease rather than fallow on a rotational basis. Thus, Otero County would likely require a 1041 permit prior to implementing a water lease.

The "Guidelines and Regulations for Areas and Activities of State Interest in Bent County" designate the "efficient utilization of municipal and industrial water projects" as a matter of state interest, and require any person developing a "municipal or industrial water project" wholly or partially within Bent County to obtaining a 1041 permit.[327] The county's definition requires a 1041 Permit when water rights, historically used to irrigate more than ten acres, are leased for three consecutive years or more. The County's regulations also apply to "development in areas containing or having

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[324] *Colorado Springs v. Eagle County Bd. of County Comm'rs*, 895 P.2d 1105 (Colo. App. 1994).
[325] Pueblo County Code, Chapter 17 Land Use, Division II. Areas and Activities of State and Local Interest; *Available at* http://www.codes.co.pueblo.co.us/maintoc.htm.
[326] Otero County Board of County Commissioners, Resolution No. 2006-013, revised sec. 4.103(3) and sec. 5.104(1)
[327] Bent County Board of County Commissioners , Guidelines and Regulations for Areas and Activities of State Interest in Bent County, Chapter 3.302.

significant impact upon natural resources of statewide importance," which includes the lease, sale, or other cessation of irrigation for three consecutive years or more. Accordingly, water leasing as envisioned by the Super Ditch would likely require a 1041 Permit from Bent County.

The "Guidelines and Regulations for Areas and Activities of State Interest of County of Prowers" (as Amended August 17, 2006) also designate the "efficient utilization of municipal and industrial water projects" as a matter of state interest. Similar to Bent and Otero Counties, Prowers County requires a 1041 Permit when water rights historically used to irrigate more than five acres of land are leased for three consecutive years or more. Moreover, Prowers County's regulations define "development in areas containing or having significant impact upon natural resources of statewide importance" virtually the same as Bent County and requires a 1041 permit when the lease of the water rights results in the cessations of irrigation for a period of three consecutive years or more.

The 1041 permit review and approval process generally takes up to six months after submittal of the application in any county. Steps to obtain a permit are commonly (a) pre-application meeting with the county, (b) submittal of permit application, (c) publication of public hearing (notice must be 30 days prior to hearing), (d) permit hearing, and lastly, (e) county decision. The permit hearing may be suspended and extended by 60 days if the county requests additional information county. The 1041 application is very similar to a NEPA-type environmental analysis or environmental impact statement and includes an alternatives analysis and impact study.

6.3 DITCH COMPANIES[328]

The board of directors, managers, and counsel for the various Lower Valley ditch companies were interested but skeptical about water leasing when the discussions about forming the Super Ditch began. After the trip to Palo Verde in 2007, many embraced the notion of leasing as the best opportunity to sustain irrigated agriculture in the Lower Valley. But, while the companies' shareholders generally liked water leasing and the concept of a Super Ditch, some of the companies' boards, managers, and attorneys largely remained skeptical or even hostile towards the Super Ditch.[329] This managerial attitude has changed somewhat over time, perhaps by necessity given that (as shown by the Super Ditch's 2010–2011 survey) the ditch company shareholders favor water leasing by a four to one margin (81.3%). The management of the High Line,

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[328] **Appendix 25.**

[329] Interview with H. Barton Mendenhall.

Oxford Farmers and Holbrook appear to remain hostile to the Super Ditch to this day, however.[330]

6.3.1 Restrictions in Articles of Incorporation and Bylaws

In a response to earlier buy-and-dry deals, many Lower Valley ditch companies added clauses to their articles of incorporation or bylaws that restrict the use of water to lands served directly by the ditch.[331] Ditches with these clauses are said to be "Catlinized," since the Catlin Canal was the first company to enact this type of restriction. Because only three ditch companies in the Lower Valley were not Catlinized when the Lower Ark District embarked on water leasing, the restrictions were thought to be significant obstacles for the Super Ditch because many Catlinized ditch companies did not seem to be receptive to changing their bylaws to allow their shareholders to participate, at least until the Lower Ark District finalized the details of the project.[332] The Pueblo Board of Water Works' purchase of approximately 30% of the Bessemer Canal for future use led shareholders in that company to de-Catlinize its articles of incorporation and bylaws in 2009.[333] The amendment removes the restriction in Article Second limiting use in Pueblo County and allows "stockholders who do not take delivery of water through the main canal to use such water for lawful beneficial purposes." The amendment also changes Article Seventh, which previously restricted the place of use to "the lands along the line of the said main ditch and lateral thereto," and now allows the Bessemer water rights to be applied to "any lawful beneficial use by the stockholders of the Company, and may be diverted by them at such points of diversions as are now or are hereafter lawfully decreed." The bylaw amendments similarly allow the shareholders to change the point of diversion, or type or place of use, out of the main ditch subject to approval by the Board as discussed below.

Shareholder interest in water leasing also resulted in the namesake company—the Catlin Canal Company—to amend its articles and bylaws in 2010 to expressly allow water leasing outside the ditch's service area.[334] Catlin's articles and bylaws now state that if land irrigated with Catlin water rights is rotationally fallowed under a plan approved by the shareholders, the consumptive use credits may be used for any beneficial purpose within or outside of Otero County. The Highline Canal Company

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[330] *Id*.

[331] WINNER & SMITH at 7.

[332] *Id*.

[333] ARTICLES OF AMENDMENT TO ARTICLES OF INCORPORATION OF BESSEMER IRRIGATING DITCH COMPANY (May 11, 2009).

[334] AMENDMENT TO THE ARTICLES OF INCORPORATION OF THE CATLIN CANAL COMPANY, (Dec. 6, 2010); BYLAWS OF CATLIN CANAL COMPANY (December 6, 2010).

also expressly allows stockholders to lease water for any purpose or use as approved by the Board.

The Oxford Farmer Ditch Company's articles impliedly allow for changes of the company shares to any points on the Arkansas River, but it does not more broadly allow for leasing of shares for municipal purposes. The Oxford bylaws state that stockholders are entitled to receive water delivered through the ditch system, and does not expressly allow for temporary leasing for municipal leasing. Due to the potentially restrictive language in the articles and bylaws, shareholders may need to amend the articles and bylaws to participate in water leasing.

For the Otero Ditch Company, the articles impliedly restrict use of the water to within Otero County. The Bylaws restrict location of water use to lands under the canal and to the land specified on stock certificates. Shareholders will likely need to amend the bylaws and possibly the articles to participate in water leasing.

For Holbrook Mutual Irrigating Company, the articles impliedly restrict diversions to Otero and Crowley Counties. However, it is our understanding that the Holbrook Board does not interpret the Article as a place of use limitation. Therefore, it is likely not necessary to amend the articles. The bylaws allow for a change in point of diversion upon written approval of the Board. Since the bylaws allow for changing the point of diversion and type and place of use, it may not be necessary for shareholders to amend the company's bylaws to participate in water leasing.

Lastly, the Fort Lyon Canal Company /Fort Lyon Storage Canal's articles do not include any restrictions on place of use. Similar to the Holbrook Mutual Irrigating Company bylaws, the canal company bylaws allow for a change in water right upon the written approval of the Board. Since the place of diversion and use were not an issue during High Plains' effort to obtain a change of water right decree from the water court to permit the use of this water for any purpose along the entire Front Range, it is thought that the existing articles of incorporation and bylaws provide sufficient flexibility to permit shareholders to participate in water leasing.

At present, six of the eight ditches in the Lower Valley impliedly now permit the change of water rights for lease of the water for other uses and at other places of use, such as is proposed by the Super Ditch.[335]

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[335] TROUT, RALEY, MONTAÑO, WITWER & FREEMAN, P.C., LAND FALLOWING - WATER LEASING PROGRAM, FEASIBILITY INVESTIGATION (June 17, 2011). **Appendix 25.**

6.3.2 Approval of Leases

Most of the ditches in the Lower Valley require Board approval and the payment of the associated legal and engineering expenses, prior to allowing the change in point of diversion or type and place of use. The Bessemer bylaws state that any stockholder seeking a change of water right must demonstrate to the Board that the change will not result in (1) increased conveyance losses to stockholders who continue to take delivery of water through the main ditch; (2) increased cost of operating and maintaining the main ditch and related structures; (3) increased delivery lateral conveyance losses to shares historically delivered through the lateral from which shares are proposed to be removed; (4) increased cost of operating and maintaining a delivery lateral from which shares are proposed to be removed; and (5) any other material injury to the water rights owned by and historically diverted and used by the Company. Additionally, not only is the stockholder responsible for the legal and engineering fees associated with the Board's review of the requested change, the stockholder is also responsible for the "the reasonable costs of the Company's participation in the water court proceeding to the extent necessary to ensure the decree entered by the water court is consistent with the terms and conditions imposed by the Company." Thus, the cost to obtain a change in water rights approval from the Bessemer Board may be high.

The High Line Canal Company, Catlin Canal Company, Holbrook Mutual Irrigating Company, and the Fort Lyon Canal Company/Fort Lyon Storage Canal also have bylaws that require the written approval of the Board and payment of the associated legal and engineering expenses. The ditch company bylaws each state that if the change can be made without injury to the canal, the Company, or other stockholders, then the change will be allowed with such terms and conditions as may be necessary to prevent injury. Only the Bessemer bylaws expressly require the stockholder to pay the Company's Water Court costs.

As discussed above, the Oxford Farmers Ditch and the Otero Canal do not expressly allow for changes in ditch shares for use outside of the ditch system, and thus the bylaws and articles will likely need to be amended.

6.3.3 Operations with Fallowing-Leasing[336]

Not all irrigators on a ditch will choose to participate in Super Ditch leases or consent to their neighbors doing so. Aqua Engineering, Inc. (Aqua) accordingly

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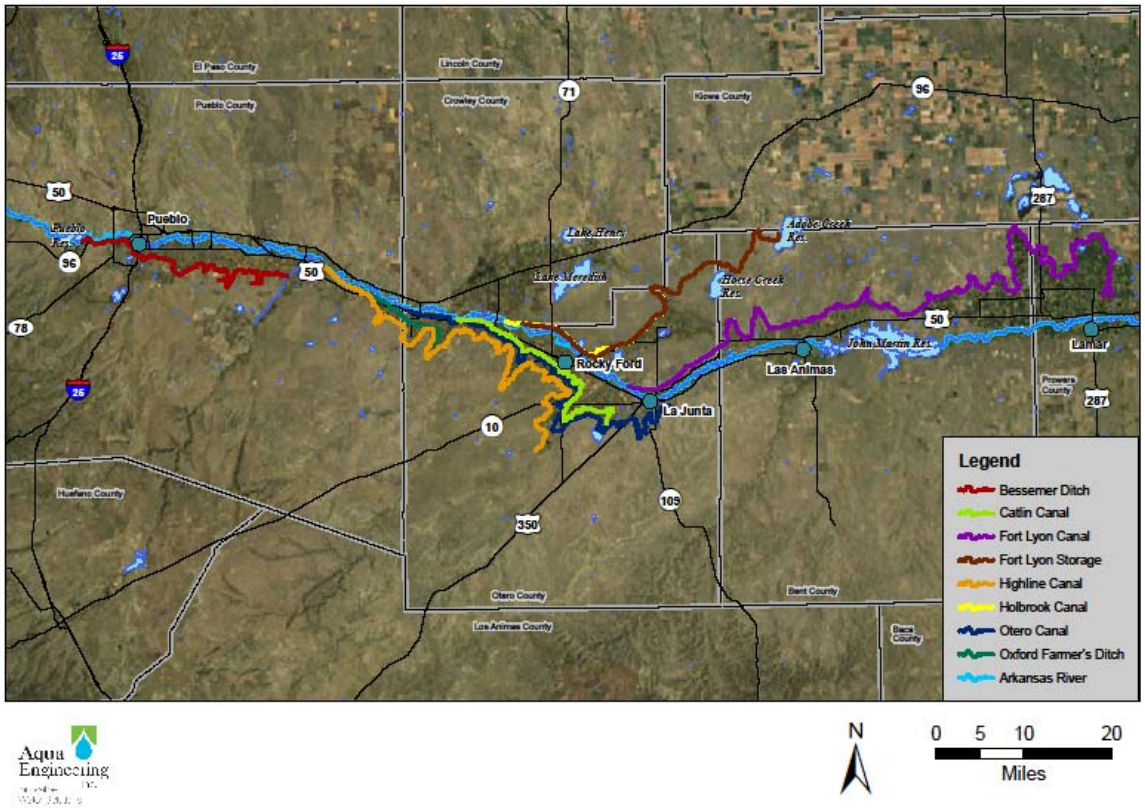
[336] AQUA ENGINEERING, INC., SUPER DITCH ROTATIONAL FALLOWING – WATER LEASING PROGRAM LOWER ARKANSAS VALLEY SUPER DITCH COMPANY, CWCB WATER SUPPLY RESERVE ACCOUNT GRANT – TASK C (Dec. 30, 2010). **Appendix 1.**

investigated the existing infrastructure, operational practices and institutional elements of ditch companies in the Lower Valley to identify opportunities and constraints relative to eventual participation by individual irrigators in the program. This investigation was necessary to develop a program to protect from injury the water rights of irrigators who continue to receive irrigation deliveries from their respective ditch companies. Aqua completed this task through interviews with knowledgeable ditch company personnel, field investigation of existing infrastructure under the participating ditch companies and preparation of GIS inventory, analysis of exchange model data, and follow-up interviews with ditch company personnel. These tasks were completed between June 2009 and May 2010. Potential participants in the rotational-fallowing-leasing program under the Super Ditch are located in the Lower Valley in Pueblo, Otero, Crowley, Bent, and Prowers counties (Figure 6). Identified ditch companies with the potential for shareholder participation in Super Ditch water leasing include Bessemer, Rocky Ford High Line, Oxford Farmer's, Otero, Catlin, Holbrook, and Fort Lyon. The total length of the major ditches under these companies is 338 miles, serving an aggregate area of approximately 255,000 acres. Typical crops grown under the systems include alfalfa, beans, corn, melons, onions, potatoes, small grains, and grass pasture.

Figure 6. Lower Valley Ditches.



6.3.3.1 Ditch Investigation

Ditch companies have evolved a network of interrelated infrastructure, operational practices, and institutional elements over many decades to respond to their unique circumstances and constraints, including water rights, water use patterns, physical setting, shareholder needs, agronomic properties of their service areas, and corresponding characteristics of other water users in their vicinity. It is, therefore, not possible to evaluate the impact of a future change on a particular ditch company without understanding the infrastructure, operational practices, and institutional elements of that company and the interaction of these elements.

Aqua's study accordingly included a basic investigation of existing infrastructure, current practices, challenges, and constraints, and potential impacts and mitigation under some basic assumptions about future Super Ditch Company participation. The initial stage of the investigation was to meet with knowledgeable ditch company personnel, including superintendents, ditchriders, and members of company boards of directors, as appropriate. These individuals were queried regarding typical operations, current challenges and constraints, and concerns about fallowing-leasing that would occur under a future Super Ditch Company. Further, in many cases, these individuals provided a tour of their ditch system to identify infrastructure, operational characteristics, and critical issues. The initial effort was followed by an inventory of the critical structures under each ditch system where possible, including GPS location and assessment.

6.3.3.2 Additional Infrastructure to Accommodate Leasing

Most ditches considered in the Aqua analysis have sufficient infrastructure to enable participation in a fallowing-leasing program—with the exception of the Otero Canal and possibly the Catlin Canal—depending on the level of participation and corresponding reduction in flows. Most ditches, however, will require additional return flow stations and recharge ponds to facilitate replacement of return flow obligations to water rights holders in the vicinity of the affected reach of the Arkansas River to avoid injury to other water rights. Aqua analyzed each of the seven identified ditch systems that could feasibly participate in Super Ditch water leasing to evaluate their ability to participate in a fallowing-leasing program, identify necessary infrastructure to ditch operations with leasing, and identify infrastructure to maintain historical return flows for leased water.

Order-of-magnitude costs were estimated for these structures, based on the assumptions inherent in the preliminary return flow analyses and recent costs to complete similar structures in Colorado.

Table 12. Cost of Additional Ditch Infrastructure for Water Leasing ($000).

	Low Cost*	High Cost*	Highline	Oxford	Otero	Catlin	Holbrook	Ft Lyon	Bessemer
Check Structure			0	0	6 to 10	yes	0	0	unknown
Construction	$50	$75							
Engineering		$10							
Permitting, Legal, Etc.		$3							
Contingency (20%)	$15	$20							
Total	$80	$100	0	0	$480–$1,000	unknown	0	0	unknown
Return Flow Station (small flume)			0	2	3	1	4	3	<86
Construction	$5	$25							
Engineering		$3							
SCADA	$2	$5							
Permitting, Legal, Etc.		$1.5							
Contingency (20%)	$2	$7							
Total	$15	$45	$0	$60	$90	$30	$120	$90	unknown
Return Flow Station (small pond)		*per acre*	24	9	2	35	14	24	unknown
Construction		$20							
Engineering		$2							
SCADA	$2	$5							
Permitting, Legal, Etc.		$1							
Contingency (20%)		$4							
Total		$30	$720	$270	$60	$1,050	$420	$720	unknown

6.3.3.3 Administration of Water Leases

Administration of future operations under the Super Ditch is anticipated to be complex, data intensive, and likely to require real-time availability of raw and processed data to a wide variety of water users and regulatory agencies. At a minimum, real-time data will be required at all relevant stream and reservoir gages (and may be currently available through the State Engineer's Office), diversion of participating and non-participating ditch companies in the affected reaches, river returns and spillways (largely unmeasured presently), existing and future augmentation stations, and

recharge ponds. Given the distances involved and the density of required measurement devices, it is possible that communications could be facilitated by using spread-spectrum radio, particularly if data were centralized to a location in the Lower Valley. More likely, communications will require the Super Ditch to obtain a Federally-licensed radio frequency to facilitate reliable communication in the Lower Valley.

6.3.3.4 Ditch Operation Conclusions

1. The potential participating ditch companies currently have the institutional capability to implement a fallowing-leasing program because they all allow permanent and temporary share transfers between headgates, some for as little as a single-run during the irrigation season.
2. Most of the ditch companies currently have operational practices and infrastructure in place to facilitate deliveries to non-participating shareholders. Exceptions may be as follow:
    a. Depending on the magnitude of leasing under the Catlin ditch and the effects on daily diversions, a relatively high proportion of Catlin headgates are expected to be adversely affected. This could be remedied through additional check structures, headgate replacement/relocation, or both.
    b. Otero Canal does not have sufficient internal control structures to ensure that deliveries continue to be made to irrigators when some of its water is diverted by the participation of other shareholders in Super Ditch leases.
    c. The large number of shareholders and private laterals, and the extensive private lateral infrastructure, under the Bessemer system may complicate implementation of a future fallowing-leasing program on that ditch. There is a spectrum of conditions under each lateral system that may significantly influence the feasibility of recommendations discussed previously.
3. Estimates of conveyance losses were based on interviews with Lower Valley ditch company personnel and are based on operational experience or measurements during "typical" operations. Because future Super Ditch operations are presently unknown, it is not clear whether these losses will be consistent following the implementation of a future leasing program. Under many ditch systems, it is anticipated that conveyance losses are non-linear and range from relatively low at "normal" delivery rates for which the ditches and infrastructure have been sized. As flows are reduced, ditch and the associated infrastructure become oversized for the new flow regime, flow velocities are

reduced, pool residence time may be increased, and the resulting conveyance losses may increase. These losses will likely vary by ditch and within ditches, depending on ditch physical characteristics and soils, and should they be investigated further to prevent injury to non-participating shareholders.

4. Lateral ditches under most systems are private and independent from the serving ditch company, and share deliveries under these systems are commonly made using division boxes. As such, it may be necessary to implement an "all or none" approach to Super Ditch participation by irrigators under these laterals, unless they are willing to implement widespread infrastructure improvement/replacement to facilitate participation. The exception is lateral ditches operated by the Holbrook, which utilize the same headgate/measurement structure approach as the main canal.
5. Additional surface return flow stations will be required under all participating ditch systems. To the extent possible and practical, these stations should be located as far downstream as possible within the respective systems to allow companies to enjoy the conveyance benefit provided by the additional flows. Moreover, where possible, these stations should be provided within current rotational sets to facilitate delivery of return flows in turn under current operational approaches.
6. Recharge ponds may be required under each system to facilitate replacement of subsurface return flow obligations to prevent injury to other water rights. As with surface return flow stations, these ponds should be placed as far downstream as possible within each respective system, and within a rotational set, if applicable.

6.4 INJURY TO OTHER WATER RIGHTS

Leonard Rice Engineers, Inc. (LRE), studied the Super Ditch operation potential and the development of likely scenarios to describe the operation.[337] Scenarios were developed and presented to individuals and groups who were then provided the opportunity to express questions and concerns relating to the presented material. These questions and concerns were considered and addressed by LRE staff, which helped LRE develop potential solutions and alternatives and identify additional research needed to further the Super Ditch project and its goals while preventing injury to other water rights.

[337] GREGG TEN EYCK, PHASE 4 TASK D FINAL MEMORANDUM. **Appendix 22.**

Phase 1 of the injury analysis was to define Super Ditch operation scenarios using the HDR report *Rotational Land Fallowing–Water Leasing Program Engineering and Economic Feasibility Analysis* from November, 2007. Once operation scenarios were conceptualized, a meeting with representatives of the Super Ditch and Lower Ark District was held in order to gather details of their overall conceptualization of the system and potential scenarios to be considered. To gain a better understanding of the system, another meeting was held with multiple representatives of the Division 2 Water Commissioners. Systems operating potential, as well as operational concerns, were discussed during this meeting. From the information gathered, three conceptual level scenarios were developed. The scenarios proposed were (a) direct delivery of the water in the summer, (b) exchange of direct flow water, and (c) delivery of water from storage in the winter. After these conceptual level scenarios were defined, a meeting was held with representatives of the Super Ditch and Lower Ark District to obtain feedback on the proposed scenarios. A task memo was then created summarizing the operation scenarios and a schematic of exchange reach locations was developed.[338]

Phase 2 of the injury analysis consisted of three input meetings to solicit concerns regarding the operational scenarios developed in Phase 1 of Task D for the Super Ditch project. LRE staff presented the operational scenarios at each of these meetings and allowed for questions and concerns to be voiced, and in some cases addressed, at the close of each presentation. Each meeting resulted in a summary memo of all questions and concerns presented at each meeting. These questions were compiled, summarized, and addressed in a memo for Phase 3 of Task D.

6.4.1 Super Ditch Operational Scenarios

The operational scenarios that were used to model exchanges included the following assumptions:

1. Between 65 and 85 percent of all shares of the Catlin Canal, the Fort Lyon Canal, Holbrook Canal, the Otero Canal, the Oxford Farmer's Ditch, and the Rocky Ford High Line Canal will be available for fallowing-leasing;
2. Twenty-five percent of all shares of the Bessemer Ditch will be available for fallowing-leasing;
3. Fallowing-leasing will be on a one-in-three year to a one-in-four schedule;
4. Water will be exchanged from the headgates of the ditches listed above to Pueblo Reservoir; and
5. Lessees will take delivery of their Super Ditch water in Pueblo Reservoir.

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[338] *Id*. at App. A.

Four different annual hydrologic conditions were modeled using historical data and patterns from a wet year, a dry year, an average year and a median year. Data from water year 1985 were used to simulate operations in a wet year, data from water year 1996 were used to simulate a median year, and 2002 data were used for the dry year simulation. A fourth simulation was run using the average conditions over the study period from 1979 through 2008.

The Super Ditch concept includes a rotational schedule such that lands are only fallowed one year in every three or four years. A conservative one-in-four year rotation schedule was adopted for the scenarios presented at public meetings. The results presented at the public meetings were based on an assumed conservative 65% participation level.

To determine the consumptive use for the lands to be fallowed under each ditch and under each of the water year conditions simulated in the model, the H-I assumptions of the Hydrologic-Institutional (H-I) Model used for recent Kansas v. Colorado litigation[339] were used. For example, the assumptions for the Catlin Canal include the acreage amounts listed above, a 10% conveyance loss, and 65% irrigation efficiency. These values were used in conjunction with the monthly diversion information for each ditch from the H-I model.

Consumptive use calculations allowed quantification of both the amount of water transferable from the fallowed lands and the amount of return flows that must be maintained in the stream to prevent injury to downstream water rights. In estimating the locations and timing of the required return flows, the Ground Water Accounting Model (GWAM) was used to quantify how much return flow from a given ditch would be required to be delivered to various reach locations on the Arkansas River.

The estimated annual volumes of water available for lease from the Super Ditch as presented in public meetings are based on an exchange model created for the Lower Arkansas River Basin. This model used daily river flow and diversion data along with other senior exchanges to estimate exchange amounts available to the Super Ditch. The exchanges were modeled daily under each flow condition assumption (wet, dry, etc.) and aggregated monthly. The exchanges were modeled using the participating ditch headgates as the exchange-from point to Pueblo Reservoir as the exchange-to point.

The following table summarizes the results of the exchange model, using a 25% participation rate on the Bessemer and a 65% participation rate on all other ditches and a one-in-four year rotation:

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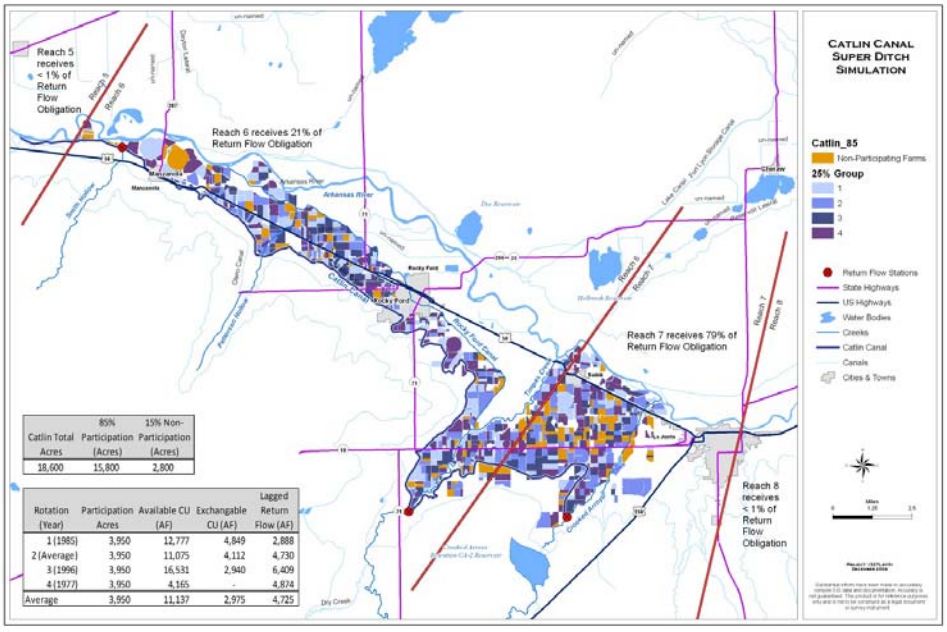
[339] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT, at 16. **Appendix 6.**

Water Year and Condition	Historical CU Available, AF	Exchanged to Pueblo Reservoir, AF
1985: Wet Year	78,000	53,000
1996: Median Year	66,000	22,500
2002: Dry Year	14,500	3,600

A specific conceptual scenario was developed to represent the operations of the Super Ditch for presentation to the Upper Arkansas Water Conservancy District, using the Catlin Canal. Data for the Catlin Canal was taken from the assumptions used in the H-I model, including acreage estimates, diversions, and irrigation efficiencies.

The Catlin Canal has approximately 18,600 acres of total acreage in the H-I model. The estimates from the Super Ditch participation surveys indicate that approximately 65% to 85% of the entire ditch is willing to participate in the Super Ditch, thus using an 85% participation rate, approximately 15,800 acres of the Catlin Canal would participate in the Super Ditch. Approximately 3,950 different acres would be fallowed under the Catlin Canal each year under this assumption, based on a one-in-four fallowing program.

The operational scenario for the Catlin Canal is presented graphically in the following GIS map with inserts for the results of the calculations including the estimated exchangeable flows to Pueblo Reservoir.



6.4.2 Super Ditch Exchange Application

The Lower Ark District and the Super Ditch (Co-Applicants) filed an application for conditional appropriative rights of substitution and exchange on February 10, 2010 in Case No. 10CW4 (Water Court Division No. 2) (Application for Rights of Exchange and Substitution for Lower Ark District and Super Ditch). Pursuant to the application, the Co-Applicants will operate the requested exchanges and substitutions on the Arkansas River between the Fort Lyon Canal, the most downstream exchange-from point, and Pueblo Reservoir, the most upstream exchange-to point.

The exchange application does not seek to adjudicate any changes in the type and place of use of the Lower Valley water rights that lessors (shareholders of Lower Valley ditches) will lease to municipalities or other lessees of the Super Ditch. Rather, as described above for change of water rights, the Co-Applicants anticipate that they, and/or others, will file one or more water court and/or administrative applications in the future to change the type and place of use of the leased water rights.

The conditional appropriative rights of substitution and exchange requested in the exchange application will be used primarily to store the leased water in Pueblo Reservoir, Lake Henry Reservoir, Lake Meredith Reservoir, Holbrook Reservoir, Holbrook Dye Reservoir, Thursten Reservoir, Horse Creek Reservoir, Adobe Creek Reservoir, and Excelsior Ditch storage (Stonewall Springs Reservoir(s)) to facilitate the delivery of the leased water to municipal and other Lessees of the Super Ditch, including irrigators in the Lower Valley for Rule 14 Plans for ground water augmentation and Rule 10 Compact Compliance Plans for improvements to surface irrigation system replacement.

The substitutions and exchanges will generally operate by diversion on a one-to-one basis of upstream water in exchange for providing delivery of substitute supplies at a downstream point on the Arkansas River. The substitute supplies will be delivered by releases through reservoir outlets, ditch augmentation station structures, foregone diversions at ditch headgates, and accretions from recharge projects. Pursuant to Colorado water law, the substitute supplies will be in an amount and of a quality suitable to what would have been available to water users in that location.[340] The substitutions and exchanges may be operated simultaneously or in step-wise fashion to move water up the Arkansas River to Pueblo Reservoir.

[340] COLO. REV. STAT. § 37-80-120.

6.4.3 Outreach Meetings

LRE HELD three input meetings to solicit concerns and questions regarding the operational scenarios developed for the Super Ditch project. A presentation was given at each of these meetings describing the operations which were developed in Phase 1, and at each an opportunity was given for questions and concerns to be voiced and, in some cases, addressed.

On January 14, 2010, a meeting was held with the Upper Arkansas Water Conservancy District where LRE staff presented on the developed operations and scenarios for the Super Ditch project. Questions and comments regarding the operations and scenarios presented were recorded following the meeting and were later addressed by LRE.[341]

On March 25, 2010, a meeting was held with the SECWCD where LRE gave the same presentation on the developed operations and scenarios for the Super Ditch project.

A third and final meeting was held on April 14, 2010, at the Arkansas River Basin Roundtable. Again, LRE presented on the developed operations and scenarios for the Super Ditch project. Questions regarding the operations and scenarios presented arose at this meeting and were later addressed accordingly.

6.4.4 Summary of Key Issues

Attendees raised multiple issues and concerns regarding the operations and scenarios at the three meetings held in early 2010. LRE acknowledged and addressed each. One issue that was brought to light was the expected operation of the Super Ditch during a dry year. During a dry year, there would likely be little to no capacity for water exchange from the Super Ditch participating headgates. It was suggested that, in these dry years, Bessemer may be put into use by Pueblo Board of Water Works, thus not allowing for 25% of Bessemer acres to be fallowed. However, under the 25% assumed participation rate that has been for the Bessemer and the one-in-four year rotation pattern, only 6.25% of acres under Bessemer would be fallowed in any given year, which is possible even with Pueblo and St. Charles Mesa's ownership of shares.

Attendees also expressed concerns regarding how the exchanges were modeled in the analysis of the scenarios. Storage availability was not taken into account when determining exchange numbers; only the exchange potential in the Arkansas River was

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[341] GREGG TEN EYCK, PHASE 4 TASK D FINAL MEMORANDUM. **Appendix 22** at Appendix B (Summary of questions and comments raised at the three meetings).

taken into account. The exchange headgates are operational only from April to October, with the majority of exchange potential occurring during the runoff season in May and June. Availability of water for exchange potential in the Super Ditch was based on an assumed equal level of participation in each ditch, which ranged from 65% to 85%. This value was determined from a survey of Lower Valley farmers who had expressed interest in participating in Super Ditch leases. The upstream exchange point in the Super Ditch exchange would be the Pueblo Reservoir and would be the sole point of delivery of Super Ditch water. Also, it was assumed that more restriction in exchange potential would be expected in the future due to existing conditional rights being made absolute.

Other concerns were expressed relating to where and how water from the Super Ditch would be stored. Excess water available for exchange, but not exchanged, would be either captured and stored or used in other applications, such as augmentation. This "lost yield" might also be leased to other users. To store the excess water, Lower Ark District initially requested, in 2010, a 12,000 acre-feet excess capacity storage contract in Pueblo Reservoir for the use of the Super Ditch.[342]

Finally, concern was expressed as to who is expected to lease Super Ditch water and whether lessees within the Arkansas River Basin should be given priority over those located outside of the Arkansas River Basin.

6.4.5 Additional Research

Based on questions and concerns identified in the public meetings, areas of further research that may help Super Ditch include:

6.4.5.1 Winter Water

How will the winter water rights that are owned by individual shareholder/participants of Super Ditch be used in the fallowing-leasing method of delivering transferable historical consumptive use water to Pueblo Reservoir?

[342] When SECWCD bi-furcated its excess storage capacity contracting process with Reclamation between in-district and out-of-district use, Lower Ark District revised its request to 5,000 acre-feet for in-district use. SECWCD anticipates moving forward with out-of-district use after completing in-district use with Reclamation.

6.4.5.2 Administration

Development of a web-based database to account for and report on operations (diversions, deliveries, credits, and return flows) of the hundreds of individual farms and structures that will be used to supply water for the Super Ditch will be useful.

6.4.5.3 Approval of Exchanges and Changes of Water Rights

Colorado water law protects vested water rights from injury when other water rights are changed or exchanged to other places and types of uses. While these protections are essential elements of the state's water law, they impose such significant uncertainty and costs on the applicants that they can discourage changes, such those required to implement fallowing-leasing. Some alternatives exist in the law to mitigate this burden while protecting vested water rights from injury, although additional options may be appropriate to facilitate fallowing-leasing by the Super Ditch.

6.4.5.3.1 Adjudicated Exchanges

An appropriative right of exchange "allows a strict one-to-one diversion of upstream water in exchange for providing continuity with a source of substitute supply at a point downstream, in an amount and of a quality suitable to what would have been available to water users in that location. The diversions at the upstream point take on the character of the water right used as a source of downstream substitute supply. Therefore, an operating exchange will reduce stream flow only in the exchange reach—i.e., the segment of river between the downstream source of substitute supply and the upstream point of diversion—and will only create a limited potential for injury."[343]

The Colorado Supreme Court has established four essential elements an appropriative right of exchange must include: i) a substitute supply above the calling water right; ii) a substitute supply equivalent in amount and of suitable quality of the diverted water; iii) available natural flow at the point of upstream diversion; and iv) a non-injurious implementation.[344]

In the recent *Centennial Water and Sanitation Dist. v. City and County of Broomfield*, the Colorado Supreme Court held that an application for a conditional appropriative right of exchange is also reviewed under a conditional water right analysis and "supports Colorado water law's general principle of maximum utilization by making water available for as many decreed uses as there is available supply."[345]

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[343] *Centennial Water and Sanitation Dist. v. City and County of Broomfield,* 2011 WL 2449183, 5 (Colo. 2011).
[344] *Id*. at 4 (citing *Empire Lodge Homeowners' Ass'n v. Moyer,* 39 P.3d 1139, 1155 (Colo.2001)).
[345] *Id.* (citing COLO. REV. STAT. § 37-92-102(1)(a)).

A conditional water right is a right to perfect a water right with a certain priority upon the completion with reasonable diligence of the appropriation.[346] "To obtain a conditional water right, an applicant must demonstrate that it has taken a first step toward appropriation of a certain amount of water, that its intent to appropriate is not based upon the speculative sale or transfer of the appropriative right, and that there is a substantial probability that the applicant can and will complete the appropriation with diligence."[347] Ultimately, "a conditional water right allows the appropriation to relate back to the time when the appropriator completed the first step towards appropriation, if the conditional appropriation is diligently pursued to completion."[348]

The exchange decree will likely include terms that require the Super Ditch exchanges to operate in priority with other decreed exchanges, that certain flow conditions and notification procedures be met before an exchange is operated, that describe measurement and accounting, and that require volumetric limits on the exchanges.

6.4.5.3.2 Change of Water Rights

The Lower Ark District and the Super Ditch anticipate that they, and/or others, will file one or more applications in the future to change the type and place of use of Lower Valley water rights to permit leasing for municipal and related uses. Changes in water rights are governed by the provisions of the Water Right Determination and Administration Act of 1969.[349] Pursuant to C.R.S. § 37-92-305(3)(a), change of water rights, including rotational land fallowing (statutorily called "rotational crop management contract"[350]), will be approved only if the change will not injuriously affect other adjudicated water rights.[351] A change of water right may include "a change in the type, place, or time of use, a change in the point of diversion... a change in the means of diversion, a change in the place of storage, or any combination of such changes."[352]

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[346] *Id*. at 5.

[347] Id. at 6. (*citing City of Thornton v. Bijou Irrigation Co.*, 926 P.2d 1, 31 (Colo. 1996).

[348] *Id*. at 5.

[349]*Burlington Ditch Reservoir and Land Co. v. Metro Wastewater Reclamation Dist*. ("FRICO") 2011 WL 2139902, 10, 11 (Colo.) (Colo. 2011).

[350] A rotational crop management contract is "... a written contract in which the owner or groups of owners of irrigation water rights agree to implement a change of the rights to a new use by foregoing irrigation of a portion of the lands historically irrigated and that provides that the water rights owner or groups of owners may rotate the lands that will not be irrigated…." COLO. REV. STAT. § 37-92-103(10.6).

[351] *Id*.

[352] COLO. REV. STAT. § 37-92-103(5).

Under Colorado water law, the Super Ditch cannot change, exchange or store irrigation water leased to municipalities without protecting other water rights from injury. Terms and conditions to prevent injury must be contained in water court decrees, including decrees for change-of-water-rights and a decree for an appropriative right to operate exchanges. Under established legal principles, the water court will only issue a change of water rights decree if it is convinced that injury to other water rights will be avoided.

Terms and conditions to prevent injury specific to a rotational crop management contract may include:

- Separate annual historical consumptive use limits for the parcels to be rotated according to the historical consumptive use of such lands. To the extent that some or all of the water that is the subject of the contract is not utilized at a new place of use in a given year, such water may be utilized on the originally irrigated lands if so provided in the decree and contract and if the election to irrigate is made prior to the beginning of the irrigation season and applies to the entire irrigation season.[353]

The water judge must also make affirmative findings that the implementation of the rotational crop management contract:

- Is capable of administration by the state and division engineers. In order to satisfy this requirement, the water judge may require the applicant to provide signage and mapping of the lands not irrigated on an annual basis.
- Will neither expand the historical use of the original water rights nor change the return flow pattern from the historically irrigated land in a manner that will result in an injurious effect.
- Will comply with paragraph (a) of subsection [C.R.S. 37-92-305](4.5) … with regard to potential soil erosion, revegetation, and weed management.[354]

The rotational crop management contract must be recorded with the clerk and recorder of the county in which the historically irrigated lands are located

Finally, to protect farmers from endangering their consumptive use in a future adjudication, the statute provides that the failure of the contractee to use water

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[353] COLO. REV. STAT. § 37-92-305(4)(a)(IV).

[354] COLO. REV. STAT. § 37-92-305(4)(b).

pursuant to a rotational crop management contract shall not be deemed to reduce the amount of historical consumptive use of the water right.[355]

Several counties in the Lower Ark District exercise "Areas and Activities of State Interest" (1041) review authority. In cases where the 1041 statute is not applicable and a change of water rights results in the transfer of more than one thousand acre-feet of consumptive use of water per year, the water court may impose certain "mitigation payments" to offset the loss of local tax revenue.[356] Bent, Otero, Prowers, and Pueblo all have 1041 authority, therefore this provision would not apply to fallowing-leasing of lands in those counties.[357] Crowley County, however, does not currently exercise 1041 authority. While it is possible that the water court would impose mitigation payments for fallowing-leasing in Crowley County, it is not likely. Because fallowing-leasing avoids permanent buy-and-dry, it should not lead to a reclassification of irrigated lands, which would mean no change in local tax revenues under fallowing leasing.

Colorado statute also allows the water court to impose a term or condition to address decreases in water quality caused by "a *permanent* removal from irrigation of more than one thousand acre-feet of consumptive use per year…."[358] Since fallowing-leasing does not result in the permanent removal of land from irrigation, this provision of the statute will not apply.

As explained by the Colorado Supreme Court in the recent FRICO decision, "[t]he amount of water available for use under the changed right employing the original priority date [] is subject to a calculation of historical beneficial consumptive use lawfully made under the decreed prior appropriation. Historical consumptive use under the adjudicated water right is calculated based upon a pattern of diversion and use over a representative period of time, expressed in acre-feet of water, and is the quantitative measure of the water right."[359]

The amount of water that will thus be available for direct use, storage, or exchange will be based on the net historical depletion resulting from the operation of the water right under the original decree. That net depletion will be calculated as diversion minus returns, and, because the return flows that accrue to the river from most parcels will be lagged for many months or years, the calculations of net depletions will involve diversions from the current month and return flows from previous months and years. It is likely that a monthly "return flow factor" will be calculated for each

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[355] COLO. REV. STAT. § 37-92-305(4)(a)(IV).
[356] COLO. REV. STAT. § 37-92-305(4.5)(b).
[357] COLO. REV. STAT. § 37-92-308(5).
[358] COLO. REV. STAT. § 37-92-305(4)(a)(V) (emphasis added).
[359] *FRICO* (*citing Cent. Colo. Water Conservancy Dist. v. Greeley*, 147 P.3d 9, 14 (Colo. 2006) ("JONES DITCH")).

ditch or for a portion or reach of a ditch. In addition to replacements of return flows in the irrigation season, the LRE engineers expect that in most cases there will be replacement water required in the non-irrigation season.

Replacement of return flows will be made in a manner that will replicate historical return flow patterns associated with farm units that are fallowed. The terms and conditions in the decree will likely describe how the return flow replacement water will be delivered to specific reaches of the river at specific times and at specific rates. This water may be delivered and measured directly from a ditch, or from another source such as releases from storage.

For example, if a 16.25% pro rata interest of a 100 cfs irrigation diversion right is being fallowed (65% participation times a one-in-four rotation), and if the historical consumptive use was 50% of diversions, then on average about 8.1%, or 8.1 cfs would be available for exchange upstream. While the average return-flow factor in this hypothetical example would be 50%, the monthly return flow factor would fluctuate around that average during the irrigation season, depending on such factors as distance from the river and consumptive use needs of that month. For example, the return-flow factor for diversions made in April might be 45% and for diversions made in July might be 55%.

Thus, the quantification of historical consumptive use and the delivery of replacement flows in future Super Ditch change proceedings, along with other applicable terms and conditions in the water court decree, will protect other water users in the Lower Valley from injury to their water rights. Additionally, the anti-speculation doctrine applies to changes of water rights and "prevents unlawful enlargements, as well as curbs the appropriation of water not needed for actual beneficial use."[360]

6.4.5.3.3 Facilitating Exchanges and Changes

Is there a way to reduce the expense of engineering to support the exchange or change of water rights for the Super Ditch? Mostly because of the large number of farms/ditches/laterals that will be involved in the water-rights exchange case, the scope and expense of the detailed engineering will be costly. The cost of engineering a water lease could potentially be reduced by the state engineer adopting rules regarding presumptive consumptive use and return flows.[361]

An administrative alternative is a short-term substitute water supply plan (SSWP), the approach used by the High Line Canal and Aurora for their 2004-2005

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[360] *FRICO*, at 10; *High Plains A&M, LLC v. Se. Colo. Water Conservancy Dist.*, 120 P.3d 710, 713 (Colo. 2005).
[361] COLO. REV. STAT. § 37-92-501.

leases.[362] Another administrative alternative is an interruptible supply agreement (ISA).[363] A water bank might also work when the water could be stored.[364] In addition, H.B. 11-1068 proposed a longer-term administrative approval along the lines of an ISA or SWSP.[365]

Moreover, a task force under the auspices of the Arkansas Basin Roundtable has recently taken up the task of simplifying and reducing the cost of water leases. The task force has undertaken the following:

A. Development of an Administrative Tool based on historic data that protects decreed water rights and return flow patterns within the context of temporary dry-up of irrigated lands. This Administrative Tool will be developed to be completely compatible with the Decision Support System and fully compliant with judicial paradigms.

B. Organization of a Pilot Program to beta-test the Administrative Tool with a volunteer group of irrigators to assess the validity and reliability of the Tool.

C. Sponsorship by the Arkansas Basin Roundtable of a facilitated multi-basin roundtable Public Policy Working Group to investigate and discuss the efficacy of any statutory changes to current water law related to fallowing-leasing.[366]

7. TECHNICAL INVESTIGATIONS

Fallowing-leasing poses numerous technical challenges. The include water available for lease under various hydrologic conditions, storage and exchange capacity to facilitate deliveries, water quality, and economic feasibility.

7.1 WATER RIGHTS AVAILABLE FOR POTENTIAL LEASE

The water that will be leased through the Super Ditch Company is composed of water rights diverted from or stored on the main stem of the Arkansas River and its tributaries (exclusive of Fountain Creek) at or below Pueblo Dam and above John

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[362] COLO. REV. STAT. § 37-92-305 (5).
[363] COLO. REV. STAT. § 37-92-309.
[364] COLO. REV. STAT. §§ 37-80.5-101 *et seq*.
[365] H. B. 11-1068 (Fisher, Schwartz.)
[366] GARY BARBER, CHAIR, ARKANSAS BASIN ROUNDTABLE, MEMO RE: MOVING FORWARD ON STRATEGIES (Mar. 29, 2009).

Martin Reservoir.[367] The exchanged rights will be located so that the leased water can be delivered to municipalities and other water users without prohibitive transit losses.

HDR Engineers estimated the amount of water that was available for lease in the fallowing-leasing program based on historical data sourced from The Colorado Division of Water Resources (DWR) diversion records and the H-I model.[368] The study assumed that only Arkansas River native water supplies would be available, and investigators excluded transmountain water from the analysis. The resulting estimate is a function of hydrologic conditions, water rights, crop consumptive use, exchange considerations, and individuals' choices. Examination of the seven Lower Valley ditch companies' water rights revealed a wide range of priority dates, ranging from 1861 to 1980.[369] This indicated to HDR Engineers that the potential volumes of water available for lease would vary from year to year depending on whether the year is classified as wet, average or dry. However, a large portion of the potential lease volume will be reliable even in dry years because the majority of the rights are relatively senior. Only the volume of water consumptively used for the growing of crops (such as evaporation and transpiration) may be transferred to a non-irrigation use. Therefore, the engineers estimated the amount of transferable consumptive use as a fraction of historical headgate diversions.[370] In addition, the engineers considered any exchange losses that may occur in the analysis and accounted for them against water availability, because Colorado Law requires that any exchange losses be returned to the river to ensure that the program does not materially damage other water right holders. The engineers calculated the amount of water available for lease in each ditch by multiplying the consumptive use factor (approximately 50% for most ditches) by the total historical headgate volume.

Under current Winter Water Storage Program operations, transferable consumptive use for each hydrologic classification across the seven Lower Valley ditch companies is estimated at: (1) wet year = 366,000 acre-feet; (2) average year= 268,000 acre-feet; (3) dry year= 148,000 acre-feet and (4) extreme dry year (2002)= 93,000 acre-feet. The actual volume that the engineers expect to be leased through the program will depend on many factors, including participation rates, fallowing frequency and

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[367] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT. **Appendix 6.**

[368] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM ENGINEERING AND ECONOMIC FEASIBILITY ANALYSIS, EXECUTIVE SUMMARY at 2 (Nov. 2007). **Appendix 5.**

[369] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT at 27. **Appendix 6.**

[370] *Id*. at 21.

delivery limitations.[371] Assuming a 25% fallowing rate (1 out of four years), 65% shareholder participation rate, and accounting for transit/exchange losses, HDR's Engineers estimated mean available lease volumes as described in Table 13. These values reflect the mean volumes available during the study period of 1976–2004 and are estimates of available raw water. The values do not account for storage, conveyance, water quality, or treatment, which are additional factors that engineers must consider. Further analysis of these factors in various scenarios may be found in HDR's Engineering and Economic Feasibility Analysis Final Report prepared for the Lower Ark District in November of 2007.[372]

Table 13. Estimated Water Available for Leasing (1976–2004).[373]

Ditch System	Wet Years Mean Annual Water Available for Lease (AF)	Average Years Mean Annual Water Available for Lease (AF)	Dry Years Mean Annual Water Available for Lease (AF)
Bessemer Ditch	7,243	5,929	3,991
Rocky Ford High Line Canal	8,184	5,683	3,308
Oxford Farmers Ditch	2,066	1,515	662
Otero Canal	708	429	139
Catlin Canal	5,573	4,386	1,663
Holbrook Canal	4,069	2,148	868
Fort Lyon Storage Canal and Fort Lyon Canal	14,371	8,539	3,388
TOTAL	**42,215**	**28,629**	**14,020**

7.2 STORAGE

AECOM investigated the types of infrastructure and associated costs that may be available to store water if entities lease water from Lower Valley irrigators through the Super Ditch Company.[374] This analysis focused on existing reservoirs, because the cost and difficulty of constructing new storage was thought to be beyond the capability of the Super Ditch.

River diversion and storage is needed near or on the Arkansas River to provide for cost-effective conveyance facilities. Without storage, the pump stations and pipelines for conveyance of Super Ditch water to lessees would have to be designed for more widely varying flow rates, likely resulting in higher capital costs. Storage, also

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[371] *Id.* at 25.

[372] *Id.*

[373] *Id.*

[374] RACHEL PITTINGER AND STEVE PRICE, AECOM, ALTERNATIVE WATER TRANSFER METHODS – TASK B, STORAGE FACILITIES (Apr. 15, 2010). **Appendix 18.**

needed near the water users systems as their production rates vary daily, was not identified by AECOM because it was assumed that leased water would be delivered in Pueblo Reservoir and water users would therefore be responsible for their own terminal operating storage.

Along the Colorado Front Range, summer drinking water treatment plant production rates are many times greater than winter rates**.** With long-distance water delivery systems, adequate storage is important for the reliability of system operations. These types of storage facilities are typically called operational storage or equalization storage. AECOM therefore focused on storage near or on the Arkansas River to minimize the need for terminal storage, reducing/managing infrastructure size, and cost and to store water when it is available. Carry-over storage for future use in subsequent years is taken into consideration.

7.2.1 Existing Storage

Table 14 summarizes the existing storage reservoir sites along the Arkansas River that could potentially be used to store Super Ditch water. Figure 7 shows the locations and general information for these facilities. AECOM's report provides details as they relate to transferring or exchanging water.[375]

Table 14. Summary of Storage Alternatives.

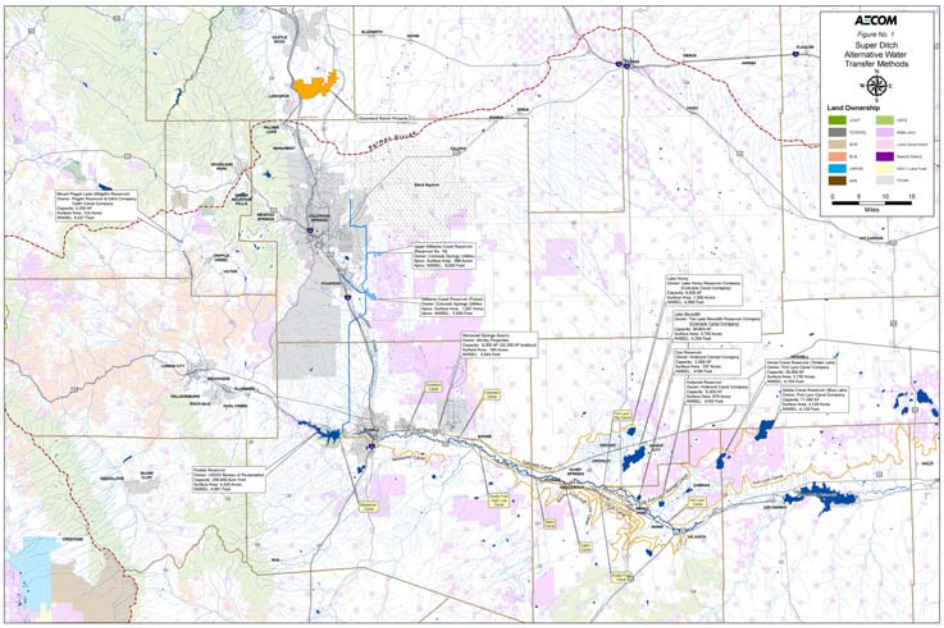
Storage Alternative	Owner/Operator	Decreed Capacity
Pueblo Reservoir	Department of Interior, Bureau of Land Management	481,444 AF
Timber Lake (Horse Creek Reservoir)	Fort Lyon Canal Company	28,000 AF
Gravel Pit (Stonewall Springs)	Morley Properties	6,300 AF[1]
Blue Reservoir (aka Adobe Creek Reservoir)	Fort Lyon Canal Company	71,000 AF
Mount Pisgah Reservoir (aka Wrights Reservoir)	6/7 shares owned by the Catlin Canal Company 1/7 shares owned by Canyon Heights Irrigation Company	2,200AF[2]
Dye Reservoir	Holbrook Mutual Irrigating Company	2,500 AF
Holbrook Reservoir	Holbrook Mutual Irrigating Company	6,300 AF
Lake Meredith Reservoir	Colorado Canal Company	39,804 AF
Lake Henry	Colorado Canal Company	9,500 AF

[1] 25,000 AF at build-out

[2] per District 12 Water Commissioner

[375] *Id*.

Figure 7. Location of Existing Storage Facilities.



7.2.2 Increasing Storage

If it is necessary to increase the capacity of the potential or existing reservoir alternatives presented above, the costs associated with this work should be addressed. For planning purposes, costs generally range between $3,000 and $5,000 per acre foot of additional storage space. The actual costs depend on site-specific needs and conditions.

As an example, the PPRWA Water Infrastructure Planning Study, February 2008 (WIPS) identified 18 potential reservoir sites ranging in capacity from 774 acre-feet (AF) to almost 50,000 AF. The Crowfoot site was used as a representative area-capacity curve to estimate evaporation. The Younger Ranch site was used as a representative site for the termination point for the pipeline from the Lower Arkansas River area. The average of the estimated storage costs in WIPS is approximately $4,500 per acre-foot and this was used in the WIPS report. This construction cost includes construction of an earthen dam, spillway, and outlet facilities. This cost does not include permitting, engineering, administration, legal fees, land acquisition, relocation of existing infrastructure (for example, roads), or contingency. The total costs per acre-foot vary depending on the capital costs and O&M costs to deliver the water. Total estimated capital costs for conveyance facilities range from $20,000 per acre foot to $40,000 per acre foot. O&M costs range from $7 to $10 per 1,000 gallons. Primary components of the annual O&M costs are leasing the water, pumping the water, and advanced treatment.

7.2.3 Demand vs. Supply: Exchange and Storage

AECOM used the water rights for selected Ditch Companies, anticipated to have a large number of Super Ditch members, in a supply and demand simulation to determine the amount of water that can be exchanged to Pueblo Reservoir. The simulation also used the storage contract volumes available in Pueblo Reservoir for these Ditch Companies. Based on surveys done by others to determine potential participation, the water rights and storage volumes were reduced accordingly. The water rights, storage contracts, and participation rates were used in conjunction with the demand scenarios described in the next few paragraphs to simulate how much water is available on a monthly basis.

7.2.3.1 Hypothetical Demand Scenarios

Although water demand is expected to change in accordance with the hydrologic state of the system, three general demand scenarios were used for the simulation. The scenarios are:

1. *Base Demand*: This demand is expected to occur every year regardless the hydrologic state of the system. It was modeled at 10,000 AF per year. Two Base Demand simulations are presented in the following sections; **1a** uses a conservative and **1b** uses an aggressive level of participation from Lower Valley irrigators, respectively.
2. *Drought Recovery Demand*: This demand occurs the year after a dry hydrologic state year and it extends for two consecutive years. This demand is used for additional supply allowing faster recovery of storage withdrawals occurring during dry conditions. This demand is estimated at 20,000 AF per year.
3. *Short Notice (Emergency) Demand*: This demand provides additional supply in case of an unplanned event. Request for this water could be triggered by system failures, repairs, and maintenance of parts of a supply/conveyance system or other unexpected event that limits the normal water supply ability to deliver water. For this analysis, the Short Notice demand is assumed as 28,000 AF per year.

These scenarios are discussed below.

7.2.3.2 Sources of Water Supply

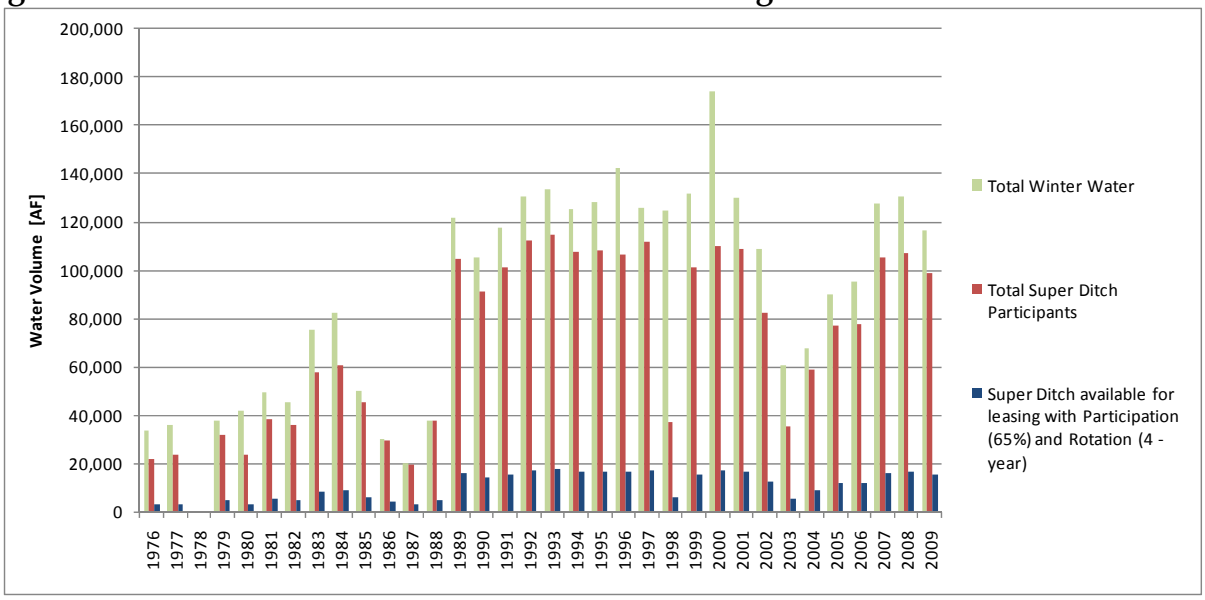
AECOM's simulation program assumed that participating irrigators will lease water on a rotational basis. This agricultural water is available, on an annual basis, as direct diversion at their river head gates and stored in several storage vessels as part of

the Winter Water Storage Program (WWSP).[376] The simulation makes the leased water available only at Pueblo Reservoir. For that purpose, water from the WWSP is assumed to be preferentially stored in Pueblo Reservoir or being available at this point by exchange from other storage locations. In addition, in-priority direct diversion water, available at the ditch head gates, is exchanged upstream to Pueblo Reservoir in the amounts possible based on the hydraulic constraints of the system. Direct diversion water that is exchanged to Pueblo Reservoir and not immediately needed, can be stored at this location. In summary, the simulation includes three sources of water at Pueblo Reservoir: (1) Direct Water Exchange, (2) WWSP Water, and (3) Super Ditch Additional Storage. These three simulated sources are summarized in the next sections.

1. *Diversion Water Exchange***.** The fraction of water that would have been diverted under priority each year by program participants is exchanged upstream to Pueblo Reservoir. For this analysis, a direct exchange between each head gate and the reservoir has been considered. Ultimately but not simulated in the exercise, exchanges to Pueblo Reservoir can be optimized by exchanging water step-wise up the river to take maximum advantage of exchange capacity between intermediate points of diversion, as proposed in Case No. 10 CW4. Therefore, this simulation is somewhat conservative. The monthly direct exchange water available at the reservoir is computed according to the water availability and hydraulic conditions in the river prepared by Leonard Rice Engineers, Inc. exchange analysis and straight-line diagram.
2. *Winter Water Storage Program***.** From the total annual WWSP water, the analysis assumed that the fraction thereof that can be claimed by farmers who participate in the Super Ditch leases will be available. Each year, WWSP water is made available for 15½ months from mid November. Figure 8 shows historical fractions of the total WWSP water that would have been available for 65% irrigator participation with a 4-year fallowing-leasing rotation, including both water stored at Pueblo Reservoir and off-channel storage.

[376] The Winter Water Storage Program might not be available to store water leased to municipalities through the Super Ditch as now decreed and operated, a situation similar to existing irrigation water rights, which may not be available for lease to municipalities without adjudication of appropriate changes in their decrees. The simulation, however, considers WWSP because it is existing storage capacity that is owned by shareholders who may lease water through the Super Ditch.

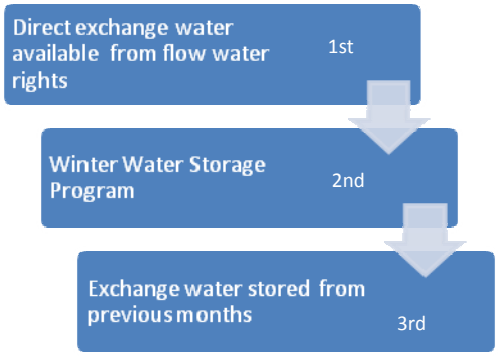
Figure 8. Potential WWSP Water Available for Leasing.



3. *Super Ditch Additional Storage*. Direct exchanged water in excess of the demand is stored in the space available in Pueblo Reservoir. This stored water is carried over year after year until used. The maximum storage available for this purpose in Pueblo Reservoir was assumed to be 11,000 AF.

7.2.3.3 Demand vs. Supply Analysis at Pueblo Reservoir

This analysis illustrates the use of the sources of Super Ditch water to meet the water demand under three demand/supply scenarios: (a) dry hydrologic year with base demand, (b) dry hydrologic year with base demand and drought recovery, (c) normal hydrologic year with base demand, drought recovery, and "Short-Notice" demand.



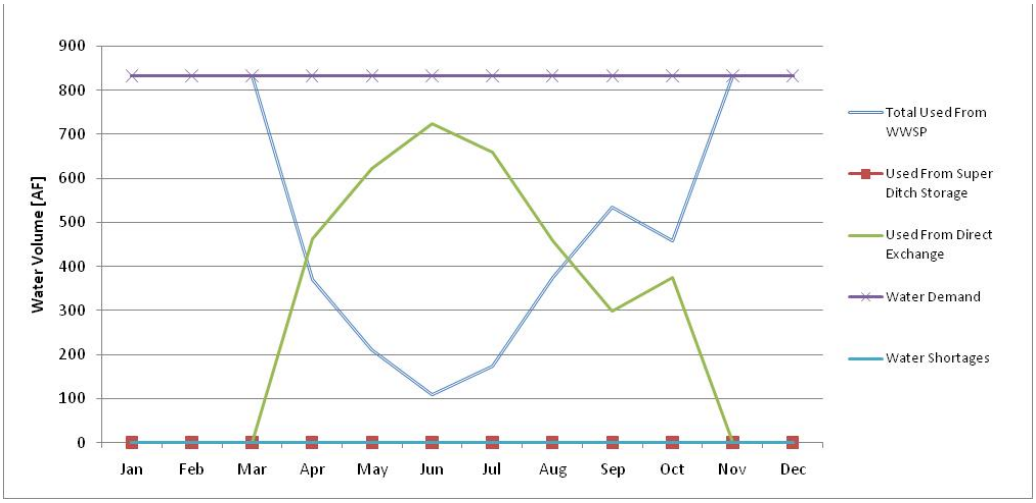
7.2.3.4 Water Use Priorities

Water is taken from the three different sources using a priority system that reflects an assumed economical way to provide water, using, first, water available from direct exchange; using, second, water stored from the WWSP; and finally using water exchanged into and stored in the reservoir.

Scenario Analysis.

This scenario (1a) illustrates the use of Super Ditch water to meet the base water demand with 65% participation on a 4-year rotational basis. Water in years with only the base demand is provided from a combination of WWSP water and direct exchange. Because direct exchange water is only available from March through November even in normal and wet years, WWSP water is always used during the remaining months to satisfy the demand. In dry years, direct exchange water is limited throughout the year, requiring continual supplement with water from WWSP. In such a case, additional Super Ditch storage is not needed to meet the demand. Figure 9 shows the monthly amounts of Super Ditch water to meet the base demand.

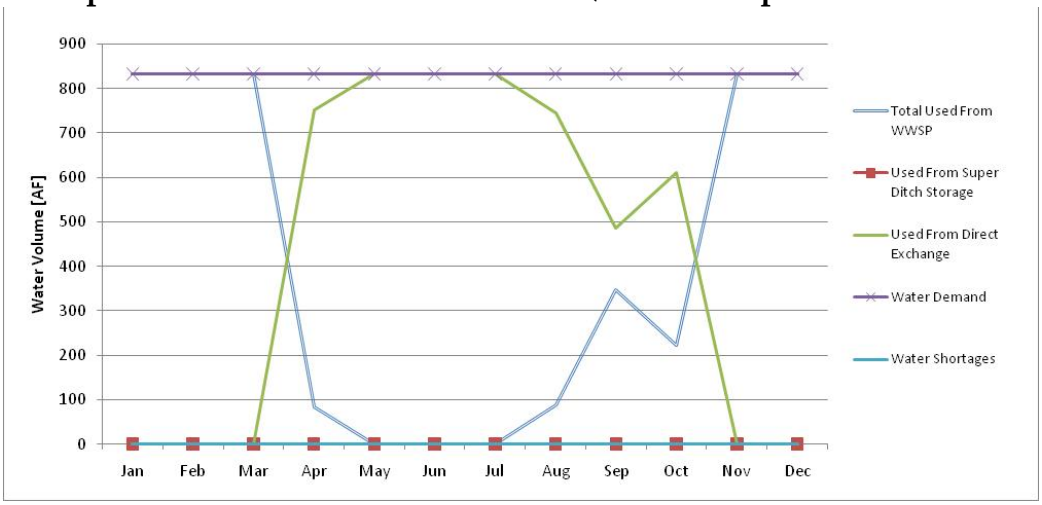
Figure 9. Super Ditch Water for Base Demand (65% Participation/4-Year Rotation).



7.2.3.5 Base Demand

This scenario 1b illustrates the use of Super Ditch water to meet the base water demand with 80% participation on a 3-year rotational basis. This shows that the demand in May, June, and July is provided only from Direct Exchanges. No water is needed in these months from the WWSP or other storage programs. Figure 10 shows the monthly amounts of Super Ditch water to meet the base demand.

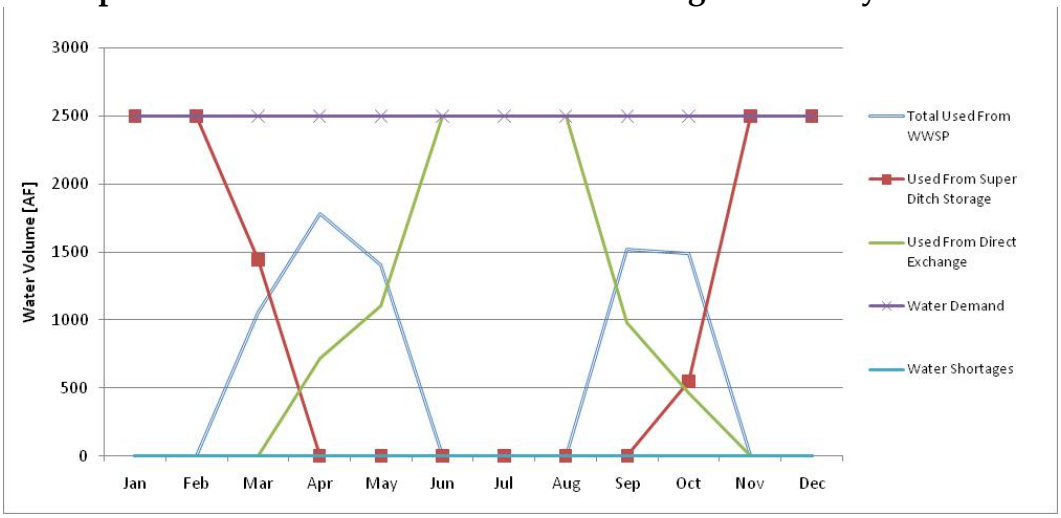
Figure 10. Super Ditch Water for Base Demand (80% Participation/3-Year Rotation).



7.2.3.6 Base Demand and Drought Recovery

Scenario 2 includes the base demand plus the drought recovery demand triggered by dry hydrologic conditions the previous year. This scenario is simulated for a typical dry year following the dry year that triggered the demand, illustrating a less favorable condition for water availability. Results show use of Super Ditch additional storage to supplement lack of WWSP water during the winter months. Direct exchange water is used during the summer months as the primary source of water and the rest of the months are supplied by a combination of the three sources. In this case, a sufficient volume of water is available to meet this demand scenario the entire year. Figure 11 shows the Super Ditch water use for Scenario 2.

Figure 11. Super Ditch Water Base Demand and Drought Recovery.



7.2.3.7 Base Demand, Drought Recovery, and Short Notice

This scenario 3 includes the total of the three types of demands in a normal hydrologic year. For this typical normal year, results show that WWSP water is available to supply the demand during January and February. Direct exchange is used as primary source during May and June and supplemented with WWSP water during the fall. Super Ditch additional storage is required to satisfy the demand, with peak use during April, November, and December. No water shortages are identified in this scenario. Figure 12 shows the Super Ditch monthly water use for this scenario.

Figure 12. Super Ditch Water Base Demand Drought Recovery, and Short Notice.

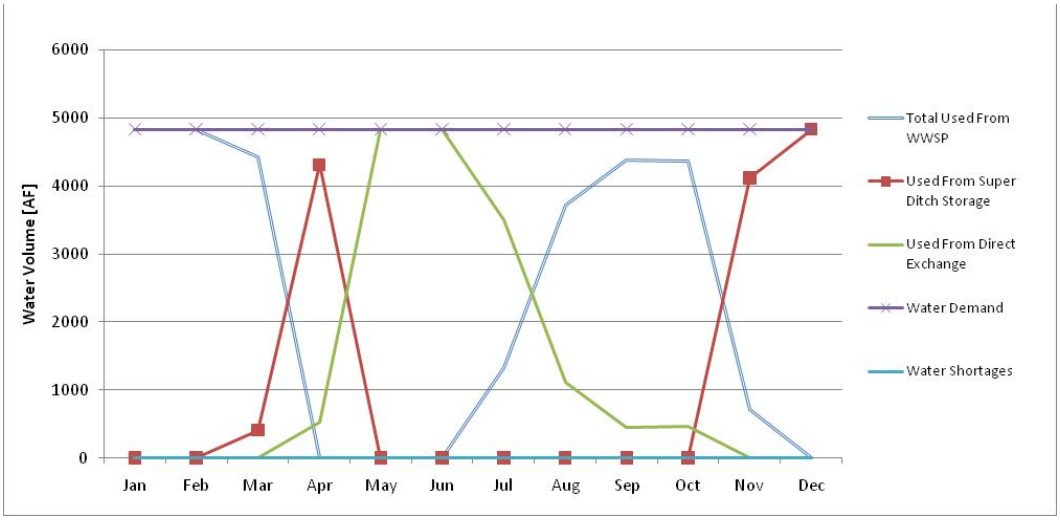


Table 15 summarizes the scenarios and the source of water that is used to satisfy the demands.

Table 15. Summary of Water Supply and Demand Simulation Results.

Scenario	Participation / Rotation	Hydrologic Condition	Summary of Water Used
Base Demand/ Conservative Participation (Scenario 1a)	65% / 1 in 4 year	Normal	Combination of Direct Exchange and WWSP water in March through November
Base Demand/ Aggressive Participation (Scenario1b)	80% / 1 in 3 year	Normal	Direct Exchange water only in May, June, and July Direct Exchange and WWSP in March, April, and August through November
Base Demand + Drought Recovery (Scenario 2)	65% / 1 in 4 year	Dry	Non-Summer Months: WWSP water + Direct Exchange water + storage Summer Months: Direct Exchange water

Scenario	Participation / Rotation	Hydrologic Condition	Summary of Water Used
Base Demand + Drought Recovery + Short Notice (Scenario 3)	65% / 1 in 4 year	Normal	January – February: WWSP water May – June: Direct Exchange water March, April, July – December: Direct Exchange water WWSP water during fall April, November and December: Direct Exchange water + WWSP water + storage

7.3 CONVEYANCE ALTERNATIVES EVALUATION

AECOM prepared a preliminary engineering report for a pipeline from the Lower Arkansas Valley to northeast El Paso County for the Lower Ark District, PPRWA, and private interests in 2008.[377] The Lower Ark District subsequently selected AECOM to do a more detailed analysis for the Super Ditch.[378]

A water delivery system from the Lower Arkansas River to northeastern El Paso County area would require several infrastructure elements, including: 1) river diversion; 2) operational storage; 3) pump stations; 4) pipelines; 5) treatment facilities; 6) consideration of storage near the end users sized for short-term or multi-year storage. AECOM analyzed reasonable alternatives for the pump stations and pipelines needed to convey leased water from potential Super Ditch participants to municipal lessees in northeastern El Paso County. The analysis did not consider sharing a portion of available pipeline capacity with other projects, such as the under-construction Southern Delivery System (SDS) pipeline of Colorado Springs or the existing Fountain Valley Conduit (FVC) of the Fountain Valley Authority.

7.3.1 Alternative Pipeline Alignments

AECOM analyzed three conveyance alternatives that would divert water from different places on the river, each with slightly varying hydraulic characteristics. Table 16, summarizes the key hydraulic factors for the mid-range scenario. AECOM's Report contains profiles for other alignments and scenarios.

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[377] BOYLE ENGINEERING, PRELIMINARY ENGINEERING REPORT FOR PIPELINE FROM LOWER ARKANSAS VALLEY TO NORTHEAST EL PASO COUNTY (2008).

[378] RACHEL PITTINGER AND STEVE PRICE, AECOM, ALTERNATIVE WATER TRANSFER METHODS – TASK F, CONVEYANCE ALTERNATIVES AND TASK G, DELIVERED WATER QUALITY (REVISED) (June 10, 2011). **Appendix 19.**

Table 16. Comparison of Alternative 35 MGD Pipelines.

Comparison Parameter	Conveyance Alternatives, from:		
	Pueblo Reservoir	**Stonewall Springs**	**Fort Lyon Canal headgate**
Total Lift Needed (ft)	2,700	3,000	3,650
Number of Pump Stations Required	4	4	4
Average HP per Pump Station	5,800	6,000	7,600
Pipeline Length (mi)[1]	66	66	125

Evaluation of the hydraulic factors indicated that the Pueblo Reservoir alignment is relatively more direct, traverses smoother terrain, and requires the least pumping energy. This is also evident in the profiles in the follow graphs comparing an alignment from Pueblo Reservoir to another beginning at the Fort Lyon headgate.

Figure 13.Hydraulic Profile for Pipeline from Pueblo Reservoir to PPRWA.

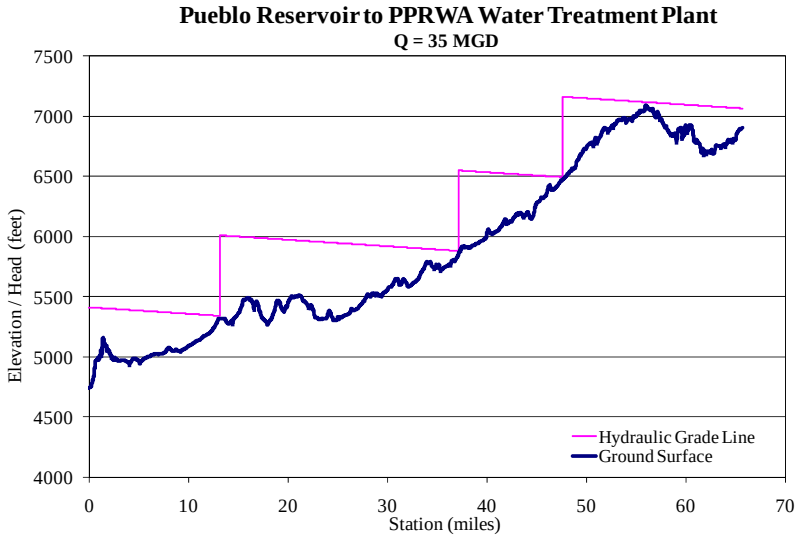
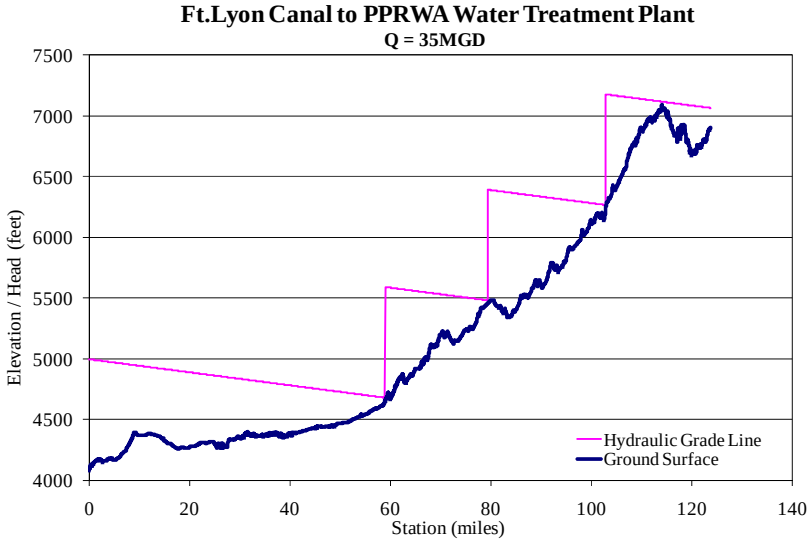


Figure 14. Hydraulic Profile for Pipeline from Ft. Lyon Canal to PPRWA.



7.3.2 Cost Comparison

AECOM performed multiple hydraulic analyses at the identified potential demand rates to determine the most cost effective designs for each of the three conveyance alternatives.[379] Table 17 summarizes the most cost-effective option for each of the alternatives. The highest design flow rate is the least expensive option for each of the alternatives, when coupled with four rather than five pump stations. Moreover, the costs from Pueblo Reservoir and from Stonewall Springs are effectively identical, whereas a pipeline from Ft. Lyon Canal would cost 50% more over 30 years than either of the first two alternatives, as shown below.

Table 17. —Comparison of Pipeline Costs for Alternative Alignments.

Alternative	Flow (MGD)	Diameter (in)	Number of Pump Stations	Total Capital Cost	Total Cost (over 30-year combined)	30-Year Cost per MGD of Capacity
Pueblo	55	54	4	$238,000,000	$699,000,000	$12,710,000
Stonewall Springs	50	54	4	$237,000,000	$680,000,000	$12,360,000
Ft. Lyon	55	60	4	$435,000,000	$1,017,000,000	$18,490,000

[379] *Id*. **Appendix 19.**

7.3.3 Conveyance Conclusions

AECOM's conceptual level study evaluated treatment and conveyance infrastructure needs for participating utilities to use Arkansas River water as a potable source. Conclusions from the study include the following:

- A pipeline that starts at the Fort Lyon Canal head gate would be most expensive, mostly because of the length of the line and the costs associated with additional treatment needed. Pueblo Reservoir would be less expensive than other alternatives both because of the shorter route and because of more desirable water quality conditions.
- Citing storage closer to the users would significantly reduce conveyance costs and provide for more continuous operating of the pipeline.
- Operations storage would permit a water treatment plant of reduced size and would provide cost reductions and continuous operation of the treatment plant.
- Estimated capital costs for conveyance facilities range from $20,000 per acre foot to $40,000 per acre foot.
- O&M costs for all the configurations would be relatively high when benchmarked against current water supplies in the area. Annual O&M costs would range from $7 to $10 per 1,000 gallons. Current consumption costs in the Front Range typically do not exceed $7 per 1,000 gallons at the top tier of an increasing block rate. Primary components of the annual O&M costs would be leasing the water, pumping the water, and providing advanced treatment of the water.
- Obtaining the necessary governmental permits for the project would involve many challenges, albeit challenges that would be similar to those faced by many other water supply projects currently being considered. Each alternative would require more detailed analysis to determine if a Federal environmental impact statement would be required.
- Water quality of the proposed source water is not fully defined at this time. Publicly available water quality data is limited and much is only sampled on an annual basis. Because irrigation ditches operate on a seasonal basis, actual water quality may vary significantly from that used for this evaluation. This variation could impact costs in either a positive or negative manner. The need for advanced treatment will likely remain due to the multiple wastewater discharges upstream of any ditch headgate. However, if desalting and

softening of the water is not needed, advanced treatment could consist of a series of processes that would offer a reduction in O&M cost.

AECOM accordingly concluded that the use of Arkansas River water by utilities in the northeastern El Paso County area is a potentially feasible alternative to non-renewable groundwater.

The Lower Ark District and Super Ditch concluded, on the basis of AECOM's study, that it is not financially feasible to construct a dedicated pipeline to deliver leased water from the Lower Valley to northeast El Paso County at this time or in the foreseeable future. The Lower Ark District and Super Ditch accordingly turned their attention to the use of existing and planned facilities through exchange to deliver water to municipal lessees.

7.4 WATER QUALITY ISSUES

AECOM analyzed raw water quality issues in the portion of the Arkansas River that would likely be included in the Super Ditch fallowing-leasing program, that is, from Pueblo Reservoir downstream to John Martin Reservoir. The analysis included a discussion of applicable stream classifications and water quality standards established by the Colorado Water Quality Control Commission, and the potential Impacts of improved irrigation efficiencies on water quality. AECOM's report also discussed water treatment considerations and how treatment requirements would change with the various storage and conveyance alternatives investigated for the Super Ditch.

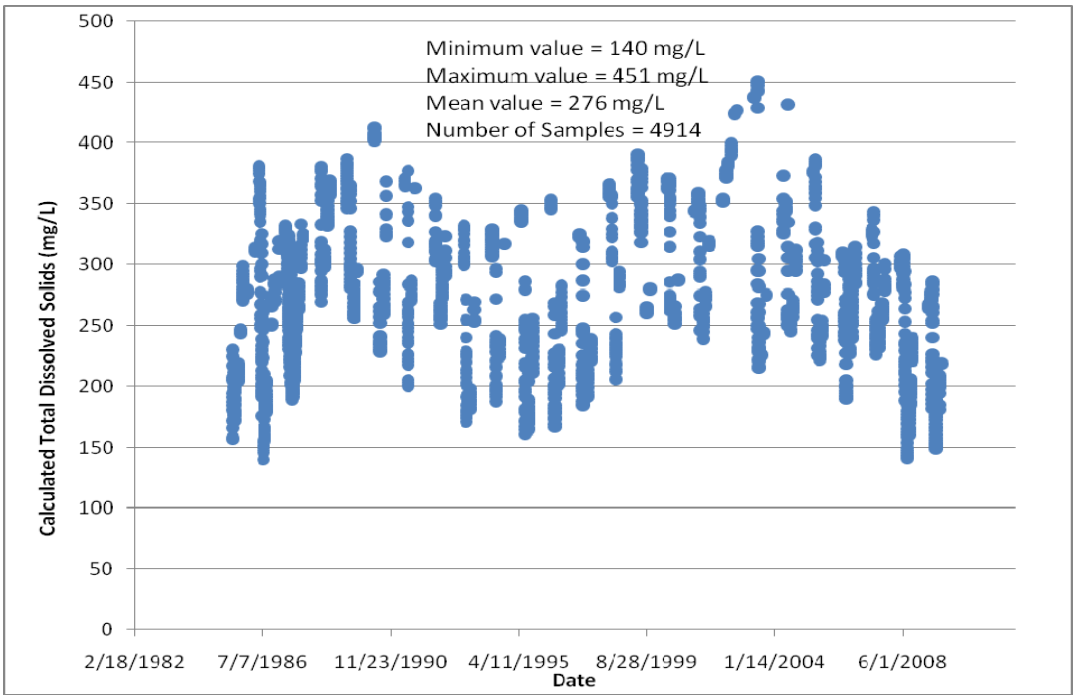
The water quality along the Arkansas River generally degrades as the River moves downstream from Pueblo Reservoir, primarily because of the physical characteristics of this reach and due to the influence of irrigation return flows. For example, salinity, measured as Total Dissolved Solids (TDS), increases as water travels in the Arkansas River downstream from Pueblo Reservoir according to data published by the United State Geological Survey (USGS). Water quality in the river is heavily influenced by return flows from agricultural practices and somewhat influenced by upstream municipal wastewater discharges.

High TDS, even though not necessarily an acute public health concern, is commonly used to characterize the quality and public acceptability of drinking water. High TDS affects the taste of the water, causing a "salty" taste that is not palatable to customers and can be damaging to irrigated landscapes and household appliances such as water heaters. Available treatment processes that remove TDS increase the marginal costs to build and operate WTPs.

7.4.1 Water Quality in Pueblo Reservoir

Pueblo Reservoir is located approximately 6 miles west of Pueblo, Colorado, and stores irrigation, municipal and industrial water for many entities in Southeastern Colorado. Water is released from Pueblo Reservoir into the Arkansas River for downstream use, but it is also conveyed by pipeline to communities north of the Reservoir. Because TDS, hardness, and sulfate concentration are the primary constituents driving the selection of water treatment processes, Figure 15, for example, summarizes TDS data at the USGS sampling location near the dam.

Figure 15. Calculated TDS concentration in Pueblo Reservoir.*



*Calculated TDS based on (0.67 * Spec. Cond. = TDS). Source: Stevens Water Resources Data Book, Sixth Edition, May 1998.

7.4.2 Water Quality Downstream of Pueblo Reservoir.

AECOM based its water quality analyses and simulations on data from the USGS and from Colorado State University. These data include the three parameters (TDS, sulfate, and hardness) that are the primary constituents driving the selection of water treatment processes. Other parameters such as radionuclides, selenium, and nitrates are also parameters of concern in the Lower Valley and would need to be considered in selecting appropriate treatment.

Table 18 uses a period of record from calendar year 2001 through 2008 and take into account measurements taken from the beginning of April to the end of June. The table summarizes the water quality data in the mainstem of the Arkansas River.

Table 18. Total Dissolved Solids (mg/L) in Arkansas River Mainstem.

Statistical Summary	Arkansas River near Avondale	Rocky Ford	Fort Lyon Canal	Arkansas River at La Junta
85th Percentile	749	1,281	1,267	1,077
Minimum	518	585	135	754
Maximum	810	1,479	1,467	1,134
Average	639	957	881	944
Number of Samples	32	19	16	2

AECOM also prepared a simulation at the headgate of the mainstem ditches whose shareholders may participate in water leasing, as shown in Table 19.

Table 19. Simulated Water Quality in Ditches along the Arkansas River.

Canal Name	Average Diverted TDS Concentration (mg/L)*
Holbrook Canal	1,110
Catlin Canal	1,120
Otero Canal	880
Rocky Ford High Line Canal	930
Fort Lyon Canal	1,400
Fort Lyon Storage Canal	1,600

* Modeled in River GeoDSS Baseline scenario [Triana 2008]

7.4.3 Impacts of Improved Irrigation Efficiencies

In 1998, the USGS performed a water quality evaluation in the Arkansas Valley for an approximate 11-mile reach of the Arkansas River that begins near La Junta and continues below the Fort Lyon Canal headgate. This reach was chosen because of its hydrologic framework and water use patterns, available data, and a previously created USGS calibrated model. The analysis separated areas based on land use patterns, irrigation application rates and administration procedures. Specific modeling results for assumed scenarios were presented, but ultimately, the USGS study concluded that the quantity and quality of surface water and groundwater along the studied reach of the river are closely associated with agricultural irrigation practices. The study demonstrated that the nature and magnitude of changes in river flow and salinity responded to changes in irrigation practices (Goff et al., 1998). (The study discussed how future models could better represent local, microscale, water quality characteristics and could include less-simplified assumptions for a macroscale model that allowed

both site-specific and generalized data.) A key finding from the study suggests that with general irrigation reductions, "downstream irrigators could realize some benefit from lower salinity irrigation water [including] crop yields, and the ability to grow crops that are less salt tolerant and have higher cash value." (Goff *et al*., 1998).

Pat Edelmann, Southeast Colorado Chief, USGS Colorado Water Service Center, acknowledges that it is reasonable to anticipate some improved water quality along the Arkansas River from reduced irrigation return flows if some of the results from the simulations made with the model occur on a broad scale in the lower basin. The USGS, in cooperation with the Regional Resource Planning Group, seeks to better define the water-quality conditions, the dominant source areas, and the processes that affect water quality in the Arkansas River basin. The overall goals are to understand the linkages between water-supply, land-use, and water-quality issues and to develop methods and tools needed to simulate the potential effects of changes in land uses and water uses/operations on water quality. In 2011, the USGS will continue efforts to determine the dominant source areas and identifying the stream reaches where substantial changes in constituent loads occur.

7.4.4 Water Treatment Considerations

As the number of parameters of concern about a raw water source increase, the complexity of required treatment and overall system costs tend to rise. To determine the most appropriate treatment level, more data at the specific treatment location is needed (i.e., through a verified and complete sampling program). Table 20 lists several key parameters, measured near the Fort Lyons Ditch headgate, that would affect the treatment processes needed to meet both regulatory requirements and customer requests. Removing both particulate and dissolved solids requires advanced treatment processes, for example. Assuming those these parameters were removed, attention and costs shift to addressing waste-stream disposal issues. Ambient uranium and selenium can be removed to meet drinking water standards, but occasion complex disposal alternatives that cost more and require relatively more permitting and administrative considerations, along with more capital and annual costs.

Table 20. Selected Water Quality Parameters (January 2000 – December 2009).

Parameter	Units	CDPHE Value[1]	Range USGS Site Values[2]	Drinking Water Standard[3]	Water Treatment Plant Goal
Hardness, Ca + Mg	mg/L	800	—	N/A	100–125
Dissolved Iron	µg/L	20.6	—	300	40
Dissolved Manganese	µg/L	27	39–80	50	30
pH	s.u.	8.31	8.38–8.5	6.5–8.5	N/A
Selenium	µg/L	—	13.7–16	50	50
Specific Conductance	µS/cm	2140	2210–3090	N/A	750
Sulfate	mg/L	900	1060–1722	250	200
Total Dissolved Solids[4]	mg/L	1425	1481–2070	500	400
Temperature	Celsius	24.3	26–24.5	N/A	N/A
Uranium	µg/L	23.3	31–32.6	30	10

[1]CDPHE Sampling location: 7530. Source: http://www.epa.gov/storet/dbtop.html

[2]USGS Sampling locations: 07123000 (Arkansas River at La Junta, CO) and 07124000 (Arkansas River at Las Animas, Colorado). Source: http://waterdata.usgs.gov/nwis/qw

[3]USEPA, 2008. Primary and Secondary Drinking Water Standards are listed. Source: http://www.epa.gov

[4]TDS / Specific Conductance conversion factor (0.67 * Spec. Cond. = TDS). Source: Stevens Water Resources Data Book, Sixth Edition, May 1998

Above hardness levels of approximately 150 mg/L, most consumers will install home water softeners. This can lead to additional water quality issues due to the increase in salt discharged back into the environment by the softeners. Therefore, the $CaCO_3$ target for WTP treatment should be 100–125 mg/L. Actual sulfate concentrations vary along points in the river. The blending ratio with water to bring sulfate under the secondary drinking water standard (250 mg/L) was assumed in the AECOM analysis, since the Environmental Protection agency (EPA) may promulgate a primary drinking water standard for sulfate. Table 21 lists the possible treatment methods for the parameters of interest in the Lower Arkansas River. The presented methods are Best Available Treatment Techniques or BATTs (a term used by EPA to guide regulators with site-specific treatment requirements).

Table 21. Possible Water Treatment Methods.

Water Quality Parameter	Best Available Treatment Techniques (BATTs)	Comment
Suspended Solids/ Turbidity	Coagulation/flocculation/sedimentation Microfiltration/Ultrafiltration	Conventional treatment plant is appropriate Coagulation/ flocculation/sedimentation would be required for microfiltration/ultrafiltration.
Biological organisms (i.e., *Cryptosporidium*, *Giardia*, bacteria, protozoa, viruses)	Filtration and disinfection Chlorination (chlorine, chloramines, or chlorine dioxide) Ultraviolet (UV)	Filtration of a surface water supply is required by SDWA. A residual disinfectant in the distribution system is required

Water Quality Parameter	Best Available Treatment Techniques (BATTs)	Comment
	Ozonation*	(chlorine or chloramine). UV is an emerging technology for drinking water.
Arsenic	Coagulation/flocculation/sedimentation Lime softening Reverse osmosis* Adsorption, such as activated alumina	Oxidation state of arsenic affects ability to remove. Pre-oxidation may be needed. Waste disposal may be a regulatory compliance issue due to presence of arsenic.
Radionuclides Uranium Alpha Beta Radium	 Ion exchange*, reverse osmosis*, lime softening, conventional Reverse osmosis* Ion exchange*, reverse osmosis* Ion exchange*, reverse osmosis*, lime softening	Lime softening generates large amounts of residuals. Typical disposal methods are land application, landfill, and permanent sludge lagoons. Waste disposal may be a regulatory compliance issue due to presence of radionuclides.
TDS/Sulfate	Nanofiltration/reverse osmosis* Electrodialysis reversal*	Waste disposal of brine solution can be problematic.
Sodium	Nanofiltration/reverse osmosis* Electrodialysis reversal*	Waste disposal of brine solution can be problematic.
Manganese	Aeration Oxidation followed by greensand filtration	Commonly, only a portion of the total flow is treated and then blended with the remaining flow.
Hardness	Lime softening Nanofiltration/reverse osmosis* Ion-exchange*	Lime softening generates large amounts of residuals. Waste disposal of brine solution can be problematic.

*Considered an advanced treatment technique; more expensive and requires advanced operator knowledge.

In addition, there are several other water constituents that may affect water treatment requirements, and thus municipal preferences for source water.

Hardness Elements—Water hardness measures the level of calcium and magnesium in the water supply. Hardness is considered high if the value exceeds about 150 mg/L as calcium carbonate ($CaCO_3$). The concentration at the 85th percentile at the Avondale USGS monitoring site exceeds 400 mg/L $CaCO_3$. Hardness, although not a public health concern, causes aesthetic concerns for customers. Hardness also impacts the treatment process selection because, if not addressed during treatment homeowners will install point-of-entry devices to remove hardness for in-home use. The most common systems are home water

softeners. As suggested above, extensive use of home-based softeners increases the quantities of TDS that are discharged to sanitary sewers and eventually into the streams to which they discharge.

Selenium—Selenium is a naturally-occurring element. In the Arkansas Valley, agricultural return flows tend to leach naturally-occurring selenium from the soils and transport it to the Arkansas River. Selenium has adverse impacts on both wildlife and humans. In humans, concentrations of selenium greater than the primary drinking water standard can cause hair and fingernail loss, numbness in fingers and toes, circulatory problems, and damage to the liver and kidneys. The primary drinking water maximum contaminant level (MCL) is set at 0.05 mg/L (50 μg/L). Selenium data near the Avondale area are not available. However, selenium concentrations in the Arkansas River tend to increase in the downstream direction based on a review of downstream sampling sites.

Selected Metals—Dissolved and particulate metal constituents of concern include aluminum, iron, and manganese. Left in the potable water, these metals can stain clothes and porcelain appliances. They can also accumulate in conveyance and distribution systems and reduce the overall capacity of pipes and pumps by sclerosis. Several utility systems have experienced significant public relations challenges when they have failed to address removal of iron and manganese. Other metals such as lead, zinc, and silver are monitored and are usually at concentrations below the detection limit. Because of historical and current mining activities, however, these metals could be present at different periods.

Sulfate—Sulfate can adversely affect taste in drinking water (salty taste), and, at higher levels may have a laxative effect. The secondary MCL is set at 250 mg/L for taste issues. The UGSGS' Storet data suggest that this secondary MCL is periodically exceeded in the Lower Valley.

Nitrate—Nitrate is a public health concern, because high concentrations have cause serious health implications for newborn children. Additionally, long-term exposure can cause diuresis and hemorrhaging of the spleen. The primary MCL is 10 mg/L as nitrogen. The concentration at the Avondale site is about 2.5 mg/L. Although this level is below the MCL, future growth in upstream communities, improved changes in upstream wastewater treatment techniques (including nitrification, in particular), and increased wastewater influences may cause this concentration to increase with time.

Emerging Contaminants of Concern (ECCs)—It is possible that emerging contaminates of concern (ECCs), such as endocrine disruptors and pharmaceutical compounds, may be present in minute but measurable levels in

the Arkansas River. ECCs are present in most surface waters downstream of human water use and wastewater discharges, and the same attention to future regulatory requirements and public safety should be applied to this Arkansas River water source as would be applied to similar water sources in other river basins. The EPA and others are conducting ongoing national research into the health risks of these ECCs, which may evolve into future water quality standards.

7.4.5 Water Treatment Alternatives

AECOM also examined the relationship between conveyance, storage and water treatment needs under possible water leasing scenarios for the Super Ditch. Generally, the location where water is physically removed from the Arkansas River system impacts how much water is available, the storage volume required, conveyance system sizing, and treatment requirements. Table 22 summarizes the alternatives for three raw water sources: (1) upstream of the Arkansas River and Fountain Creek confluence, (2) just downstream of this confluence and (3) near La Junta area. Table 23 summarizes the cost of the treatment options.

Table 22. General Water Treatment Infrastructure Configurations.

Raw Water Quality	Possible Storage Location	Conveyance Alternative	Water Treatment Requirement(s)
1. Upstream of Arkansas River and Fountain Creek Confluence	Pueblo Reservoir	Fountain Valley Pipeline and/or Southern Delivery Pipeline	Conventional (coagulation, sedimentation, filtration, disinfection)
2. Downstream of Pueblo on the Arkansas River	Stonewall Springs	New Pipeline from Excelsior Ditch Area	Conventional plus Advanced Disinfection/Oxidation Process (AOP)
3. La Junta Area	Various Agriculture Reservoirs (see Figure 1)	New Pipeline from the La Junta/Fort Lyons Ditch Area	Conventional plus AOP plus Desalination

Table 23. Water Treatment Cost Guidelines.

Water Source	Anticipated Treatment Capital Cost per Gallon of Capacity
Pueblo Reservoir	$2–3
Stonewall Springs Reservoir	$3–5
La Junta Area	$6–10

The following expands on the water treatment needs for the three alternative water intakes investigated for the Super Ditch.

7.4.5.1 Upstream of the Fountain Creek Confluence

As discussed above, the first pipeline configuration investigated by AECOM assumed Super Ditch exchanged leased water in to Pueblo Reservoir. The water quality in Pueblo Reservoir only requires conventional treatment. The Board of Water Works of Pueblo, for example, uses conventional treatment to comply with Colorado and Federal drinking water regulations while meeting customer demands.

7.4.5.2 Downstream of Pueblo

AECOM's second pipeline configuration assumed Super Ditch water is withdrawn at a location downstream of Pueblo and the Arkansas River/Fountain Creek confluence. (One possible source storage location is the Stonewall Springs Reservoir.)

Because of the impact of non-point source urban runoff, wastewater treatment facility discharge, and some agriculture return flows, the water quality at this location is somewhat impaired when compared to Pueblo Reservoir water, and some additional treatment processes would be needed. Previous studies funded by the PPRWA concluded that conventional treatment augmented with Advanced Oxidation Processes (AOP) would be satisfactory for water extracted at the Excelsior Ditch headgate.

7.4.5.3 La Junta Area

AECOM's third pipeline configuration would withdraw water from near the La Junta area. Because the TDS near La Junta exceeds 1,000 mg/L on a regular basis, some type of desalination process, probably Reverse Osmosis (RO) would be needed. To operate efficiently, the RO process would be configured just after a conventional/AOP process. The process might be used to treat only a portion of the overall water stream allowing a blend of the filtered/RO processed water to be transported in the pipeline. Desalination/RO processes located far away from oceans and seas are problematic because of the difficulties faced in disposing of the waste-stream (which are typically discharged into the ocean in Oceanside operations). RO waste-stream—high in TDS or

brine—requires large areas for evaporation or expensive thermal processes to reduce the liquid volume for disposal. There is extensive on-going research into zero liquid discharge (ZLD) processes to determine the most cost-effective waste-stream treatment processes available.

7.4.6 Water Quality Conclusions

AECOM's analysis demonstrates that the water treatment needed for municipal use of water leased through the Super Ditch will become more complex and costly the further downstream from Pueblo Reservoir that the water is diverted. This reinforces the Lower Ark District and Super Ditch's conclusion that it is not financially feasible to construct a dedicated pipeline to deliver leased water from the Lower Valley to northeast El Paso County, either at this time or in the foreseeable future. Efforts should therefore focus on the use of existing and planned facilities through exchange to deliver water to municipal lessees north of the river.

7.5 FINANCIAL PLAN FOR SUPER DITCH[380]

A finance plan assists in determining the level of funds needed to establish and operate an alternative agricultural water transfer method, such as the Super Ditch, and provides insights into its overall financial viability. Although the Super Ditch Company will ultimately be a self-sustaining enterprise, financial assistance will be needed given the high up-front costs associated with the water-rights change process. These water rights change case costs will be high regardless of the procedure used to make the change in water rights, and they certainly would be beyond the financial capabilities of individuals or of entities that did not have the financial capacity to fund them. The purpose of the Finance Plan commissioned by the Lower Ark District was to estimate these up-front costs and determine the level of financial assistance required to establish the Super Ditch.

The change of water rights case costs were examined from two perspectives:

1. A traditional water court procedure (assumes one or more water court change cases) that, based on similar historical cases, could take many years and millions of dollars in legal and engineering fees to complete. The estimated cost and duration of the change cases is shown in Table 2 below.
2. An administrative procedure that focuses upon State Engineer approval, whose estimated cost and duration is shown in Table 3. For analysis

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[380] GEORGE OAMEK, HONEY CREEK RESOURCES, SUPER DITCH FINANCE PLAN, DRAFT (June 30, 2011). **Appendix 15.**

purposes, it was assumed the basis for using an administrative procedure would be established in future legislation.

A spreadsheet-based model of the Company's cash flow was developed for these purposes, which considers sources and uses of fund over a 40-year time period, including impacts to annual cash reserves. The cash-flow model is a projected accounting of the Company's revenues (sources of funds) and costs (uses of funds), with accounting for annual reserve balances. It summarizes major revenue and cost components and the impact of their underlying assumptions. Its framework is shown in Table 24. Individual components of the model are discussed in detail in Appendix 24 (Super Ditch Finance Plan).

Table 24. Framework for Super Ditch Cash Flow Analysis.

Sources of funds	
	Management and operational fee
+	Standby fee
+	Buy-in charge
+	Outside contributions
+	Debt issue proceeds
+	Interest income on reserve balances
	Equals total sources of funds
Uses of funds	
	Up-front costs
	Engineering
	Legal
	Exchange case
	Structures
+	Other capital costs
+	Debt service
+	Annual operating costs
	SDC staff
	Contracted efforts
	Flow-related expenditures ($/acre-foot)
	Equals total uses of funds
Net income	
	Sources of funds - uses of funds
Reserves	
	Beginning year reserve
+	Net income
	Equals ending year reserves

7.5.1 Sources of Funds

The primary sources of funds for the Super Ditch are management fees, paid under the Company's negotiated water leases, intended to cover the Company's operating costs; buy-in charges for late-coming participants; and outside contributions. It is possible that debt financing could be used for transmission facilities, representing another source of funds. Moreover, Section § 3.8 of the Super Ditch articles of incorporation provide for

the issuance of non-classified common stock to persons funding the operations of the Company, as discussed above.[381]

It should be noted that it is currently contemplated that the Super Ditch water leases will actually be contracts between the lessees and individual irrigators, under which the lease revenues will go to the individual lessors rather than to the Company (except as those leases may include provisions for the Company's management fees and the like). As a result, lease revenues are not a line item in the cash flow analysis.

Outside contributions to the Super Ditch are critical and have already included funds and/or in-kind services contributed by other agencies or entities, such as the CWCB, the Lower Ark District, the Natural Resources Conservation Service (NRCS), or other entities. In the future, outside contributions could also include grants for structures necessary to operate the Company. Since 2007, the Lower Ark District has expended approximately $2 million on studies that either directly or indirectly address the feasibility of the Super Ditch concept. In addition, the CWCB has spent nearly $500,000 on engineering, modeling, and economic issues related to the potential implementation of fallowing-leasing in the Lower Arkansas Valley. These levels of expenditures represent sizable investments in this concept that are likely to continue.

Of course, the Company can borrow funds to the extent it can show itself to be creditworthy. However, without real assets or a history of operation, reasonable privately-based financing for the Company's debt would likely be hard to obtain. For this analysis, it was assumed that debt financing could only be obtained from CWCB and then only for the design and construction of transfer-related structures needed to operate the Company.

7.5.2 Uses of Funds

Major cost expenditures include the up-front costs for engineering and legal assistance needed to establish the Super Ditch and annual expenditures for operation and maintenance (O&M). Two scenarios were considered in the estimates of initial expenditures for establishing the Company's water exchanges:

- The first scenario considered one or more traditional water court change cases, and a separate water court exchange case, both involving extensive engineering and legal assistance, plus transfer-related facilities (Table 25).

[381] VAN WESTRUM, [UNOFFICIAL RESTATED] ARTICLES OF INCORPORATION. **Appendix 27.**

Table 25. Initial Expenditures for Establishing Super Ditch Water Transfers–Water Court Process (2011 dollars).

Major Up-Front Expenditures	Total expenditure	Time frame
Change case(s) engineering	$ 7,000,000	10 years, 2011-2020
Change case(s) legal	900,000	10 years, 2011-2020
Exchange case 10CW4	600,000	3 years, 2011-2013
Structures	1,600,000	10 years, 2011-2020
Total, in 2011 dollars	$ 10,100,000	

- The second scenario assumed that the water transfers can be accomplished through an administrative process (Table 26).

Table 26. Initial Expenditures for Establishing Super Ditch Water Transfers–Administrative Process (2011 dollars).

Major Up-Front Expenditures	Total expenditure	Time frame
Application engineering	$ 500,000	2 years, 2011-2012
Application legal	100,000	2 years, 2011-2012
Exchange case 10CW4	600,000	2 years, 2011-2012
Structures	1,600,000	5 years, 2012-2016
Total, in 2011 dollars	$ 2,800,000	

For these scenarios, it was assumed that CWCB funds were available for structures at 3% interest over 30 years, with a 1% origination cost, consistent with CWCB terms for projects heavily weighted towards agriculture.[382] It was also assumed that CWCB funds cannot be use for water court-related engineering and legal expenditures.

Annual O&M expenditure estimates (Table 27) consisted of three components:

1. A fixed charge, dollars per year, covering the wages of a general manager and an administrative person, and an office. This cost was assumed to be $250,000 per year, increasing over time with inflation. These expenditures would be centered in the Lower Arkansas Valley, at the Company's office location.
2. Contracted services, dollars per year, primarily to conduct the water accounting needed to satisfy the State Engineer's likely requirements. It should be noted that there is substantial uncertainty regarding the nature and cost of this accounting because there are few direct examples to follow. If based on the complex augmentation plan and associated costs incurred by Central Colorado Water Conservancy District (CCWCD), for instance, these costs could easily exceed $500,000 per year.[383] For purposes of developing the Finance Plan, contracted services were assumed to be $500,000 per year, increasing with inflation. This is

[382] Interview with Anna Mauss, CWCB, January 18, 2011.

[383] Interview with Tom Cech, General Manager CCWCD, February, 7, 2011.

based upon an estimate that 3 or 4 individuals would be dedicated full-time to this accounting, plus associated overhead costs. It is possible these costs could decrease over time if staff were added to supplant the contractor(s) and as processes were streamlined.

3. A quantity-dependent component, dollars per acre-foot, accounts for quantity-based costs, assumed to be $10 per acre-foot.

The annual O&M costs are assumed to be same whether the water transfers are conducted under a water court process or an administrative process

Table 27. Estimated Annual Super Ditch Operation and Maintenance Expenditures (2011 dollars).

Annual expenditures		
Fixed O&M costs, $/year	$	250,000
Contracted services, $/year	$	500,000
Variable O&M cost ($/acre-foot)	$	10.00

Escalations in prices received for leased water are summarized with the specific leases. For purposes of this analysis, it is assumed that future water lease prices of $500 per acre-foot would escalate at 4% per year, regardless of the index used. For purposes of estimating future engineering, legal, capital, and O&M costs, it is assumed that future costs escalate at 3% per year.

7.5.3 Cash Flow Scenarios

For the administrative scenario, outside contributions of approximately $1.6 million, either up-front or spread over two to three years, provide a positive cash balance through the period 2011–2050, demonstrating financial feasibility (Table 28). This sum is comparable to what has been contributed to date by the Lower Ark District and CWCB for studies that have either directly or indirectly addressed Super Ditch issues.

The water court scenario requires outside contributions of approximately $11.5 million, spread nearly evenly over the 10-year period 2011–2020, to provide a positive cash balance throughout the period of analysis, demonstrating financial feasibility. However, on an annual basis, an average expenditure of $1.5 million is approximately twice what has been contributed by the Lower Ark District and CWCB for studies that have either directly or indirectly addressed Super Ditch issues. It may not be possible for the Lower Ark District and the CWCB to provide this level of annual support for 10 years. However, these costs could be amortized from future revenues if necessary.

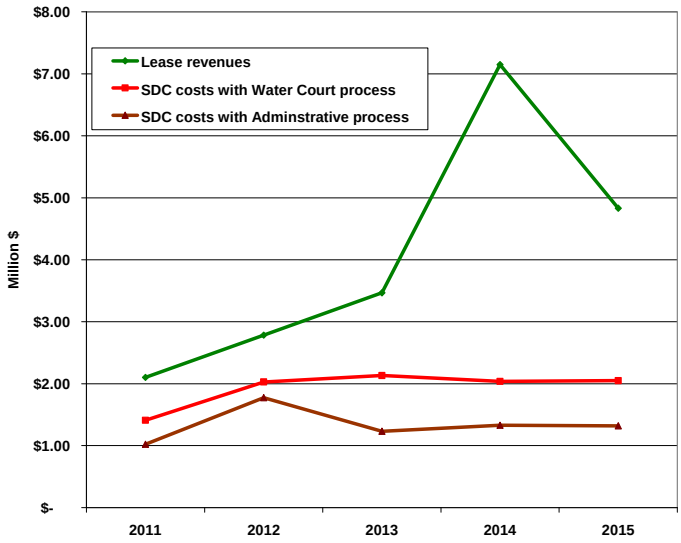
Table 28. Estimates of Front-End Funding Required to Maintain Super Ditch Positive Cash Reserves.

	Administrative Change Scenario	Water Court Change Case Scenario
Debt financing	Assumed two loans of $720,00 each from the CWCB	Assumed two loans of $720,00 each from the CWCB
Needed outside contributions	Approx. $1.6 million over 2 years	Approximately $11.5 million spread evenly over 10-years

7.5.4 Financial Conclusions

- Based on the two alternative scenarios, there appears to be a nearly $10 million difference in cost when considering the Water Court change of water rights process versus the Administrative process and inflation. This difference primarily consists of the incremental engineering and legal costs associated with the water court process and the extended time necessary for its completion.
- Regardless of the change in water rights process, the level of outside contributions needed to establish the Company's financial feasibility, on an average annual basis, are comparable to those made to date. However, for the water court process, these annual expenditures would continue over a much longer period.
- The continued use of outside contributions, either from the Lower Ark District, the CWCB, and other agencies and grant sources, could be reasonably expected to provide a major source of funds to recover the public benefit from implementing the Super Ditch concept.
- As a result of the above, this analysis demonstrates a plan for identifying and acquiring the commitments necessary to complete the project.
- In either scenario, the net return to irrigators was estimated to be approximately $471 per acre-foot, with O&M accounting for the approximately $30 per acre-foot difference between the water's lease price and the net return to the irrigator.
- As a point of interest, Figure 16 maps irrigators' lease revenues and the Company's costs through 2015 under alternative transfer process scenarios. Although irrigator revenues exceed SDC costs in each year, either cost comprised a significant percentage of the revenues, dampening irrigators' net revenues and lowering their incentive to participate in the SDC. This underscores the potential need for some form of up-front financing.

Figure 16. Comparison of Potential Lease Revenues and Estimated Super Ditch Expenditures.



8. ECONOMIC IMPACTS OF WATER LEASING

In response to the limited focus of previous studies, the Lower Ark District and CWCB sponsored studies directly addressing rotational fallow lease programs and cumulative economic impacts.

The Lower Ark District examined a lease-based rotational-fallow program in which irrigators leased all or a portion of their supplies to municipalities or other users on a rotating basis.[384] In the study, it was assumed that a participating parcel would be fallowed or dryland farmed in 1 of every 4 years, with the freed-up consumptive use portion of the water being transferred. A list of factors was initially considered that would influence the degree of regional economic impact the program would have in the Lower Valley. These include: (a) ownership of the participating irrigated cropland; (b) the magnitude of the lease payments themselves; (c) the age and tenure of potential participants; (d) the location of the lessees; (e) the location of the rotational fallowed lands in relation to each other; (f) the structure of the payments form the lessee to the Super Ditch and individual lessees; (g) the re-vegetation requirements associated with fallowed land; (h) the flexibility given to participating irrigators to fallow marginally-productive acres; (i) the impact to agricultural credit markets; (j) the condition and

[384] HDR ENGINEERING, INC., ROTATIONAL LAND FALLOWING - WATER LEASING PROGRAM FINAL REPORT. **Appendix 6.**

diversity of the regional economy; and (k) the construction and operation of water storage and transmission infrastructure.[385]

The analysis portion of the Lower Ark District study used the established IMPLAN-based methodological approach to conclude that such a fallowing-leasing program would essentially maintain rural communities' status quo: Adverse impacts of fallowing a portion of the land would be offset by positive impacts of local expenditures of leasing revenues and maintenance of fallowed lands. This conclusion rests on many assumptions but primarily on the assumption that irrigators participating in the program would be farm owner-operators, resulting in a significant portion of the leasing revenues being spent in nearby rural communities. Based on initial observation of Super Ditch irrigator participants, this assumption appears reasonable.

8.1 TIPPING POINTS IN RURAL COMMUNITIES

The CWCB and the Lower Ark District sponsored the Economic Threshold (or "Tipping Point") Study, Phase 1[386] that developed a new methodology for estimating cumulative economic impacts of major economic changes, in this case retiring of irrigated acreage. This study was in response to the many observations that contended that drying-up of farmland will accelerate hypothetical "tipping points" in which communities or businesses within a community would no longer be viable.[387] Drawing upon traditional economic theory and business location theory, the study hypothesized that there are two rounds of economic impacts: the first round which accounts for the incremental impacts estimated in previous multiplier-based studies, and a second round that accounts for the crossing of economic thresholds of local business viability. Impacts from this second round are due to reductions in employment and population caused by the first round and are additive to the initial impacts. The study concluded that previous studies likely underestimated adverse economic impacts of irrigated land conversion, with the degree of bias depending on the responsiveness of population levels to employment changes.

Economic Threshold ("Tipping Point") Study, Phase 2,[388] developed an operational model to test the first phase's conclusions, the model consisting of

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[385] *Id.* at 86-88.

[386] HONEY CREEK RESOURCES, ET AL., DRAFT REPORT: A PROPOSED METHOD FOR INCORPORATING RURAL POPULATION-BUSINESS THRESHOLDS, OR "TIPPING POINTS," IN WATER TRANSFER EVALUATIONS (May 2010). **Appendix 16.**

[387] *Id.*

[388] HONEY CREEK RESOURCES, ET AL., DRAFT REPORT: INCORPORATING RURAL POPULATION-BUSINESS THRESHOLDS, OR "TIPPING POINTS," IN WATER TRANSFER EVALUATIONS: PHASE 2 (Oct. 2010). **Appendix 17.**

mathematical relationships comparing the number of businesses and employment (by type of business) to local population and to the distance from adjacent communities. A comprehensive historical database provided by the Lowe Foundation supported good statistical fits of the population and distance variables. Two case studies were examined: a historical look at Crowley County and a forward looking analysis of the Lamar area. Despite other rural trends taking place during the test case timeframe, the analysis used time-lagged variables to derive a statistically significant relationship between Crowley County employment and population. Though significant, the estimated response between the variables was low due to demographic influences and the tendency for the newly unemployed to make a long commute to Pueblo for alternative employment. However, in a more distant location, such as Lamar, alternative employment opportunities are fewer and the population is more likely to respond to a diminution of local employment opportunity by moving away from the area. As a result, anticipated second-round impacts resulting from reductions in irrigated acreage in the Lower Valley would be relatively greater than in Crowley County. Regardless, both case studies support the hypothesis of two rounds of impacts and contribute to the development of this new methodological approach. Currently, a professional paper summarizing Phases 1 and 2 of this study is in peer review prior to submission to the *Journal of Regional Science*.[389]

8.2 RURAL ECONOMIC IMPACTS CONCLUSIONS

The regional economic impacts of historical buy-and-dry water acquisition by municipalities were underestimated in the more dated economic studies due to a lack of consideration of the economic threshold impacts. The magnitude of the second round of impact is uncertain because of complex relationships between demographics and mitigating measures such as economic development efforts and water lease backs, but is certainly greater than zero.[390]

- Buy-and-dry hurts rural communities with certainty. Although water sales revenues may partially offset the regional economic loss, the benefit is likely short-lived.[391] Long-term economic adjustments can diminish the impact, but the water resource is likely forever lost and economic opportunities that would utilize it are similarly foregone. Other resources, either natural or commercial, would have to serve as the basis for future economic growth, with no

[389] *Id*.
[390] *Id*. at 36
[391] *Id*. at 18.

opportunity to recover and put the lost water to other productive uses in the community.

- The distance between communities and the diversity of the local economy play roles in determining the impacts resulting from water transfers. As expected, the nearer affected individuals are to alternative sources of employment, the lower the adverse impact. The more diverse the local economy, the greater the probability of absorbing the loss.[392]
- Through collective action by the irrigators, the price received for the rotational-fallow leases can be made competitive with buy-and-dry purchase prices. This has been demonstrated through the existing term sheets between the Super Ditch and Aurora and the Super Ditch and PPRWA, in which the annual price per acre-foot paid, when capitalized, is highly competitive against water sales transactions. To illustrate, capitalizing the $500 per acre-foot price negotiated between the Super Ditch and the municipal entities at 5.5% (the average capitalization rate for farmland in the Midwest and Great Plains over the last 10 years[393]) results in a capitalized value of $9,090 per acre-foot. The Woodmoor Water and Sanitation District No. 1 recently paid approximately $9,300 per acre-foot to purchase agricultural water rights and a small reservoir from a nearby location in El Paso County.[394] Also for comparison, supplies from the Colorado-Big Thompson Project, a benchmark for municipal water prices on the Northern Front Range, have been recently selling in the range of $8,800 to $11,000 per acre-foot, depending on the annual yield of its shares, or units.[395] These comparisons demonstrate that irrigators would not be "leaving money on the table" when leasing water rather than selling, or having to make a choice between their own profit and their local community's welfare.
- The recent studies indicate that fallowing-leasing operated by local irrigators appears to have the best chance of maintaining the region's economic status quo over the long term. Although some of the regional water resource is sacrificed, the economic return to the region offsets the loss. A rotational-fallow program operated by the receiving municipality would be locally preferable to a buy and

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[392] *Id*. at 17.

[393] Henderson, Jason, *Will Farmland Values Keep Booming?*, ECONOMIC REVIEW; KANSAS CITY FEDERAL RESERVE BANK, Second Quarter, 2008; *Available at* http://www.kansascityfed.org/Publicat/ECONREV/PDF/2q08henderson.pdf.

[394] WOODMOOR WATER & SANITATION DISTRICT NO. 1, RENEWABLE WATER PLAN; *Available at* http://www.woodmoorwater.com/water/renewable-water-plan.html.

[395] Jenni Grubbs, *Fort Morgan City Council: CB-T water share prices approved,* THE FORT MORGAN TIMES, Apr. 6, 2011.

dry scenario, but, as practiced to date, less desirable than an irrigator-owned resource because the municipality would ultimately utilize all of water over time, leaving the rural communities in the same condition as buy-and-dry.[396]

9. FALLOWING-LEASING CONCLUSIONS AND CHALLENGES AHEAD

Fallowing-leasing in the Lower Valley has moved towards reality faster than many predicted, although too slowly for others. Municipal acceptance of leasing rather than buying water rights remains the principal challenges to fallowing-leasing, although significant progress is evident:

- The Super Ditch is currently (mid-2011) implementing a pilot program with the City of Fountain, other members of the Fountain Valley Authority, and Donala Water and Sanitation District.[397] And the Super Ditch is working with farmers on the Catlin Canal to fallow land for the program. The Fountain Creek Pilot Program should deliver 600 to 750 acre-feet of water from farmers on the Catlin Canal to the lessees beginning in 2012.

- The Lower Ark District and the Super Ditch anticipate that Colorado Springs and Pikes Peak Regional Water Authority members will continue to work on a carriage agreement(s) for Colorado Springs to deliver leased water from Pueblo Reservoir through the SDS when the pipeline comes on line in 2016. The Pilot Program could, accordingly, morph into a long-term lease involving members of PPRWA

- The Super Ditch is also developing a pilot program with the City of Colorado Springs.[398] The Super Ditch will be working with farmers on the Catlin and Fort Lyon Canals to fallow land for this program. The Colorado Springs Pilot Program should deliver 2,500 acre-feet of water from farmers on the Catlin and Fort Lyon Canals to Colorado Springs Utilities beginning in 2013, and could morph into a long-term drought-recovery and emergency supply lease.

- The Super Ditch has entered into an agreement with Aurora for drought-recovery supplies, which may lead to a formal lease yet this year (2011).[399]

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[396] *Id.*

[397] *See* Section 6.1.6.2.

[398] *Id.*

[399] *Id.*

Requirements of Colorado Water Law to implement fallowing-leasing remain a challenge – primarily because of cost and effort – although the Super Ditch can implement leases under current law.

- The Lower Ark District and Super Ditch are pursuing adjudication of their exchange application, Case No. 2010CW04 (Water Div. No. 2). They recently distributed to objectors a preliminary engineering report and will be submitting a supplemental engineering report. The applicants will be working with objectors over the next several months to reach stipulated settlements to the extent possible prior to the next case management conference with the Water Referee in December 2011. If the applicants cannot reach settlement with all objectors, the case will likely be set for trial in 2012 or 2013 depending on the court's docket and the attorneys' availability—a significant expense and delay.

- The Lower Ark District is also working with the Arkansas River Basin Roundtable Task Force to simplify and reduce the cost of fallowing-leasing.[400] This includes development of an administrative tool to address historic consumptive use and return flows from fallowing-leasing to simplify implementation of water leases, a pilot program, and possible statutory or administrative changes or action to facilitate fallowing-leasing. The Lower Ark District and Super Ditch hope this process will make substantial progress in 2012.

- The Lower Ark District is seeking a severance tax grant from the CWCB to demonstrate system improvements on the Fort Lyon Canal to regulate return flows to avoid injury to other water rights from fallowing-leasing.

The Lower Ark District is diligently pursuing storage capacity to maximize the amount of water Lower Valley farmers could lease.

- Additional Super Ditch Delivery Engineering concerning the Winter Water Storage Program is being prepared by Adaptive Resource, Inc. This is funded by a Water Supply Reserve Account from the Arkansas Basin Roundtable and the CWCB, awarded March 2011.

- The SECWCD is moving forward with in-district excess capacity contracting for storage space in the Fry-Ark Project. The Lower Ark District is participating with a request for 5,000 acre-feet of storage space, all or some of which the District

[400] *See* Section 6.4.5.3.3.

could make available for use by the Super Ditch to facilitate water deliveries. This process may take a few years.

- The Lower Ark District and the Super Ditch anticipate that SECWCD will move forward with out-of-district excess capacity contracting for storage space in the Fry-Ark Project in the future. The District and/or Super Ditch will likely request storage space to facilitate water deliveries from fallowing-leasing. This process may not commence for a few years.

- The Lower Ark District is working with the SECWCD, PBWW and others to support enactment of federal legislation for the SECWCD's Fry-Ark Project PSOP. Implementation of PSOP would increase storage in the Fry-Ark Project and the Arkansas River Basin, which could facilitate additional fallowing-leasing in the future.

Lower Valley farmers recently expressed overwhelming interest in participating in fallowing-leasing.[401] The Lower District and Super Ditch are working with Honey Creek Resources to develop a spreadsheet tool (Farm Budget) to allow farmers to evaluate the economics of fallowing-leasing at a farm level. This effort is funded by an Alternative Agricultural Transfer Methods CWCB Grant, awarded January 2011.

In sum, Super Ditch fallowing-leasing is on the verge of becoming operational (in 2012). Significant challenges remain, although it appears likely that current and planned efforts by the Lower Ark District and the Super Ditch to implement fallowing-leasing will be successful.

[401] *See* Section 4.2.1.