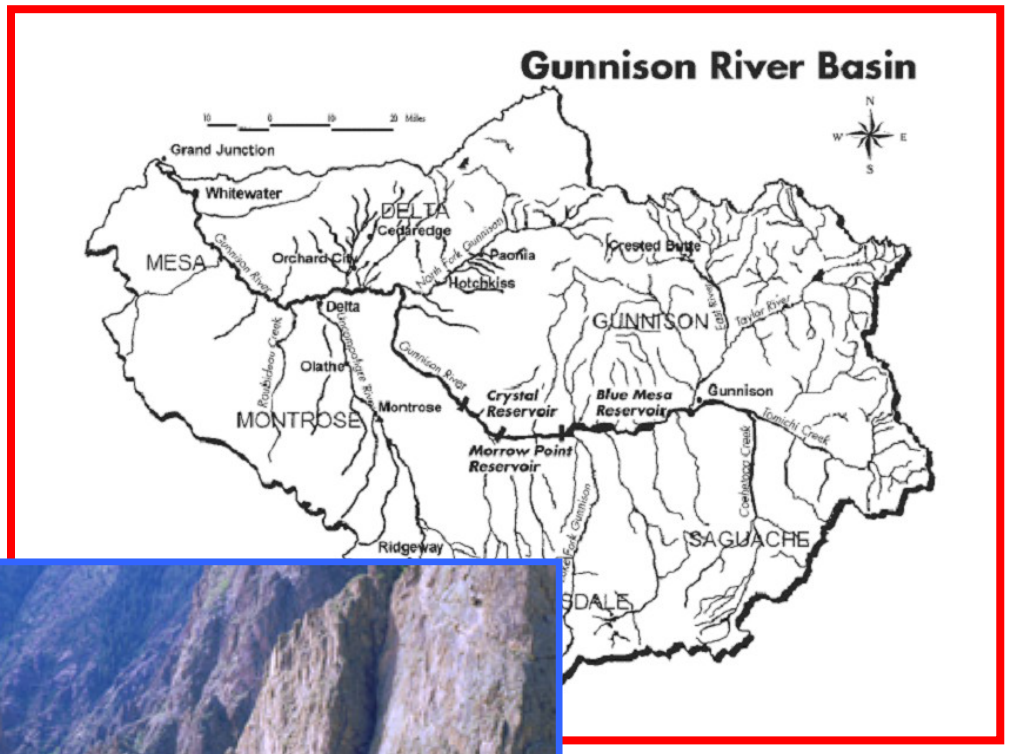
Gunnison River Basin Information



July 2004

COLORADO'S DECISION SUPPORT SYSTEMS

COLORADO WATER CONSERVATION BOARD
STATE OF COLORADO
1876
1937

Table of Contents

Figures and Tables

1. The Gunnison River Basin

The Gunnison River basin extends from the Continental Divide to Grand Junction, where it joins the Colorado River. The basin encompasses all of Gunnison, Delta, and Ouray counties, and parts of Montrose, Saguache, Hinsdale, and Mesa counties in Colorado. Figure 1.1 is a map of the basin. The Gunnison River and its largest tributary, the Uncompahgre River, flow through forested mountains and rural irrigated valleys.

1.1. Physical Geography

The Gunnison River basin is approximately 7,800 square miles in size, ranging in elevation from 14,000 feet in the headwaters to 4,550 feet at Grand Junction. Across this expanse, average annual rainfall varies from more than 40 inches in the high mountains to as little as 8 inches in the Uncompaghre Valley near the Town of Delta. Temperatures generally vary inversely with elevation, and variations in the growing season follow a similar trend. The Town of Gunnison has an average growing season of 144 days, while the growing season at Grand Junction has been estimated at approximately 228 days.

The Gunnison River begins at the confluence of the East and Taylor Rivers, about 10 miles upstream from the Town of Gunnison. The flow increases as Cochetopa and Tomichi Creeks join the river near the Town of Gunnison. Just downstream, the river has carved through Precambrian rocks to form the Black Canyon of the Gunnison. Annual flow through the Town of Gunnison is 547,000 acre-feet per year (United States Geological Survey [USGS] gage near Gunnison).

Gunnison River at Black Canyon National Park

The Uncompahgre River is the largest tributary to the Gunnison River, entering from the south near the Town of Delta. Average annual flow of the Uncompahgre near the confluence is 220,000 acre-feet (USGS gage at Delta). The average annual flow of the Gunnison River near Grand Junction is over 1.8 million acre-feet (USGS gage near Grand Junction). Approximately 60 percent of this flow is attributable to snowmelt runoff in May, June, and July.

1.2. Human and Economic Factors

The first permanent populations of white settlers came to the upper Gunnison basin in the 1800s to mine for silver. With the exception of continued mining of coal in the basin, the mineral industry is no longer a key economic sector. Farming and ranching, as well as recreation and tourism, are the primary activities in the basin today.

The area remains relatively sparsely populated, with the 2001 census estimates placing the combined populations of Gunnison, Delta, and Ouray Counties at approximately 46,250. Montrose and Delta are the major population centers in the basin, with approximately 12,300 and 6,400 residents respectively. Gunnison and Delta Counties grew by just over 30 percent from 1990 to 2000, and Ouray County grew by over 60 percent in the same time period. Growth is concentrated in the lower Gunnison Valley near Grand Junction and along the Uncompahgre River near Montrose. This growth attests to the importance of recreation-based activities, as the ski area and other outdoor recreation opportunities draw people to the basin and increase tourism within the basin. Tourism serves as an important part of the basin's economy.

Much of the upper basin is predominately forest and rangeland, with irrigation becoming the principle consumptive use of water in the lower Gunnison basin. Irrigation is used for various crops including pasture, hay, fruit, corn, alfalfa, and small grains. The total irrigated acreage in the basin is estimated to be approximately 336,000 acres for the year 2000, according to the Colorado Water Conservation Board (CWCB). While diversions from many of the small irrigation ditches average one or two thousand acre-feet per year, the Gunnison Tunnel diverts approximately 320,000 acre-feet per year to supply large irrigators in the Uncompahgre River Basin.

Primary use of surface water throughout the entire basin is for hydropower generation, which has historically diverted over approximately 3 million acre-feet per year, according to the CWCB. Note that this use is non-consumptive. The Aspinall Unit of the Colorado River Storage Project encompasses the major power plants within the basin. Hydroelectric power plants are located in series at the dams of the Blue Mesa, Morrow Point, and Crystal reservoirs. The three power plants have the capability to generate up to 208,000 kilowatts of power for the basin and surrounding areas.

There are also diversions for municipal and industrial use in Delta and Montrose, as well as in a number of smaller towns. One major transbasin diversion, the Redlands Canal, exports water from the Gunnison River basin to the Colorado Mainstem basin. The diversion's senior water rights account for 750 cfs, which can be used for irrigation and power generation. There are also a number of smaller transbasin diversions from one tributary drainage basin to another.

In addition to the direct ditch diversions, there are eleven major reservoirs (greater than 4,000 acre-feet in capacity) in the Gunnison River basin. Three of the largest reservoirs, Blue Mesa, Morrow Point, and Crystal, were constructed pursuant to the Colorado River Storage Project, which was enacted in 1956. The reservoirs, with normal capacities of 940,800 acre-feet, 117,190 acre-feet, and 26,000 acre-feet respectively, were constructed to normalize and maintain the delivery of Colorado River Compact water to the lower basin in years of limited precipitation. Two reservoirs, Taylor Park and Ridgway, are predominately used to store water for supplemental irrigation water supply and release for fish flows. The remaining reservoirs include Paonia, Crawford, Silverjack, Gould, Overland, and Fruitgrowers Reservoirs, which are predominantly used for irrigation.

Figure 1.1 – Gunnison River Basin

1.3. Water Resources Development

The Gunnison River basin has seen substantial water resources developments in the form of private irrigation systems, municipal and industrial diversions, and federal projects. Table 1.1 summarizes key development and agreements within the basin over time.

Table 1.1 – Key Water Resources Developments

Date	Description
1908	Gunnison Tunnel and Diversion Dam
1937	Taylor Park Reservoir
1962	Paonia and Crawford Reservoirs
1966	Blue Mesa Reservoir
1968	Morrow Point Reservoir
1971	Silverjack Reservoir

Date	Description
1973	Vader Right Adjudicated
1975	Taylor Park Exchange Agreement
1976	Crystal Reservoir
1986	Taylor Park Refill
1987	Ridgway Reservoir

1.4. Water Rights Administration and Operations

Historical water rights administration in the Gunnison River basin can be divided into three distinct time periods. The first time period was from 1902 through 1937 when the Gunnison Tunnel dominated administration. Prior to the construction of Taylor Park Reservoir, water rights were administrated on the basis of direct flow priorities. The senior direct flow rights of the Uncompahgre Valley Water User's Association (UVWUA) on the Uncompahgre and Gunnison Rivers regularly called out junior diverters in both basins in the summer months. Late season irrigation shortages in the Uncompahgre River basin were still relatively common even for those with senior water rights.

The second significant time period was from 1937 through 1966 when the Taylor Park Reservoir dominated administration. Prior to the Aspinall Unit, yet with the construction of Taylor Park Reservoir, junior diverters were still subjected to senior river calls by UVWUA. However, UVWUA typically had late season water that effectively eliminated the late summer shortages in the Uncompahgre River basin, except in the extreme dry year 2002.

The final significant time period is from 1966 to present time, whereby the Aspinall Unit was constructed and currently dominates flows in the Gunnison River and water rights administration in the basin. The Aspinall Unit gave the UVWUA the ability to draw its Taylor Park storage water from Blue Mesa Reservoir. This resulted in three major impacts on water rights administration. First, it eliminated the need to "shepard" Taylor Park releases past intervening upper basin headgates to the Gunnison Tunnel. Second, subordination of the Aspinall water rights to 60,000 acre-feet of upstream junior depletions (a condition of the transfer of the project's water rights from the Colorado River Water Conservation District to the United States) meant that the Aspinall Unit could not call out water users above Blue Mesa. Lastly, Aspinall Unit releases for power generation created substantial amounts of

"free water" which effectively eliminated the large senior downstream calls by the Austin and Redlands water rights.

Future administration of the Gunnison may be affected by the National Park Service (NPS) decreed reserved water right for instream flow purposes on the Gunnison River through the Black Canyon of the Gunnison. In addition to this reserved water right, the U.S. Fish and Wildlife Service have also adopted flow recommendations for the Gunnison River that could potentially affect administration.

Future administration and/or reservoir operations in the Gunnison may also be affected by activities and projects in the Recovery Program for Endangered Fish. Under the Endangered Species Act, four Colorado River native fish species are listed as endangered: Colorado pikeminnow (a.k.a. Colorado squawfish), humpback chub, bonytail chub, and razorback sucker. In 1988, the States of Colorado, Utah, and Wyoming, water users, hydropower customers, environmental organizations, and federal agencies developed a program to recover these species while allowing water use to continue and up to 50,000 acre-feet/year of new consumptive use to be developed.

As part of the recovery efforts, the U.S. Bureau of Reclamation has altered the timing and releases from the Aspinall Unit dams to help researchers refine habitat requirements of the endangered fish. The result of this research will help in preparing new biological opinions on current reservoir operations and, potentially, determine future revisions to operations.

The Colorado River Salinity Control Program is an ongoing effort to decrease salinity levels from the upper Colorado River basin mainstem and tributaries. The Bureau of Reclamation and the Natural Resources Conservation Service have recommended a variety of salinity control measures in the lower Gunnison basin, including the Uncompahgre River, that could affect future irrigation methods and basin operations.

2. Gunnison River Projects and Special Operations

This section contains information that was gathered during initial data collection efforts for the CDSS project. It was assembled after interviewing Division 4 personnel, as well as project owners and operators. This section summarizes the following projects:

Subsection	Description
• 2.1.	Austin Area Water Rights
• 2.2.	Bostwick Park Project – Cimarron River Water Rights
• 2.3.	Dallas Creek Project (Ridgway Reservoir) – Project 7 Water Authority
• 2.4.	Taylor Park & Blue Mesa Reservoirs
• 2.5.	Fruitland Mesa Area Water Rights
• 2.6.	Paonia Project
• 2.7.	Smith Fork Area Water Rights – Crawford Water Conservancy District
• 2.8.	Uncompahgre Project
• 2.9.	City of Grand Junction

2.1. Austin Area Water Rights

This section describes the Austin Area water rights. Several relatively large senior water rights are located near the Town of Austin in Water District No. 40. These senior water rights divert water from the Gunnison River mainstem. Other relatively small water rights located in the Austin area also divert water from the Gunnison River mainstem and its tributaries.

The large senior water rights in the Austin Area are summarized as follows:

Structure ID	Ditch	Appropriation Date	Administration Number	Decreed Amount (cfs)
863	Bonafide	11/30/1881	18729.11657	65.000
879	Hartland	12/31/1881	18729.11688	41.000
879	Hartland	1/31/1881	18729.11719	2.830
900	Relief	3/15/1890	18729.14684	50.000
900	Relief	8/16/1896	18729.17030	1.000
891	North Delta	2/24/1901	21263.18682	49.675
Total				209.505

cfs = cubic feet per second

The other relatively small water rights in the Austin Area are decreed for an accumulated amount of approximately 75 cfs. Total irrigated acreage under the Austin area water rights is estimated to be approximately 8,530 acres.

The "Austin Area Water Rights" represent a number of large irrigation structures with relatively senior priorities which divert from the Gunnison River near the Town of Austin. Based on inspection of GIS mapping of the irrigated acreage situated under the canals in this vicinity. These irrigation structures were modeled explicitly without any special operating rules.

2.2. Bostwick Park Project - Cimarron River Water Rights

This section describes the operation of the Bostwick Park Project and the major water rights that divert water from the Cimarron River and the Little Cimarron River, tributaries of the Gunnison River at Morrow Point Dam. The operations involve transbasin diversions, deliveries to the Project 7 Water Authority, and a federal storage project to provide supplemental irrigation supplies.

2.2.1. General Description of Cimarron River Water Rights and Diversions

Most of the water rights in the Cimarron and Little Cimarron drainages are used to irrigate alfalfa and meadow hay on lands adjacent to the streams and the area where the two streams join. The Cimarron Canal is a major irrigation ditch that diverts from the Cimarron River and delivers the water to Uncompahgre River basin where the water is used for irrigation in the Cedar Creek and Bostwick Park areas. The Cimarron Canal holds direct flow water rights in the amount of 185 cubic feet per second (cfs) as summarized in the following.

Cimarron Canal Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Amount
Cimarron Canal	560	4-01-1903	19448.00000	60 cfs
Cimarron Canal	560	3-28-1905	20393.20175	39 cfs
Cimarron Canal	560	6-01-1925	28497.27545	86 cfs
Silver Jack Reservoir	3548	7-01-1955	38532.00000	14,000 acre-feet
Silver Jack Reservoir	3548	7-01-1955	38532.00000	30,600 acre-feet (Cond.)

According to the Water Commissioner, the capacity of the canal is approximately 145 cfs. Using mapping of irrigated acreage provided by the U.S. Bureau of Reclamation (USBR) and the Division of Water Resources (DWR), the total acreage served by the Cimarron Canal is estimated to be approximately 7,390 acres, which consists of approximately 1,740 acres under the canal between its head gate and Cerro Summit (return flows accruing to the Gunnison River), 3,775 acres in the Bostwick Park area (return flows accruing to the Uncompahgre drainage), and 1,875 acres under the Hairpin Ditch in the Cedar Creek drainage, also tributary to the Uncompahgre.

There are 600 shares in the Cimarron Canal Company, 80 of which (13 percent) are owned by the City of Montrose. Montrose takes delivery of its shares at a turnout structure into Montrose Reservoir (aka Cerro Reservoir) on the basis of its pro rata entitlement to water diverted pursuant to the Canal's direct flow water rights. Montrose's water is then conveyed to Fairview Reservoir for treatment by the Project 7 Water Authority.

Irrigation from the Cimarron Canal generally begins around the first of May and continues until early September. Many of the shareholders will continue to divert small amounts of irrigation water until the first of October, and small amounts of irrigation and stock water are run until late October. The principle crops under the system are alfalfa, grass hay, and small grains.

2.2.2. General Description of Bostwick Park Project

Water supplies in the Cimarron River drainage are generally abundant until the middle of the irrigation season, at which time the supplies are severely reduced. For this reason, the Bostwick Park Water Conservancy District (BWCD) was formed in 1962 for the general purpose of supplying supplemental irrigation water to the Bostwick Park area. The Bostwick Park Project was authorized as a participating project of the Colorado River Storage Project (CRSP). The USBR turned over the operation of the project to the BWCD in 1976.

The key component of the Bostwick Park Project is Silver Jack Reservoir, which was completed in 1971 and is located on Cimarron River approximately 20 miles above its confluence with the Gunnison River. The reservoir has a total capacity of 13,520 acre-feet, including 12,820 acre-feet of active capacity and 700 acre-feet of inactive capacity, including dead storage. Elevation, area, and capacity data are summarized in the following table.

Silver Jack Reservoir Elevation-Capacity-Area

Elevation (feet)	Area (acres)	Capacity (acre-feet)
8802	1	0
8810	5	25
8820	14	113
8830	29	324
8840 (Inactive ±)	43	683
8850	62	1,200
8860	83	1,930
8870	107	2,870
8880	133	4,070
8990	164	5,560
8900	195	7,350
8910	229	9,470
8920	268	11,950
8926 (Normal WSE ±)	293	13,520
8930	314	14,860
8950	367	18,270
8950	417	22,190

The reservoir outlet works to Cimarron River has a capacity ranging from 160 to 280 cfs, depending on the reservoir elevation. The surface area at the normal maximum water level is 293 acres. The reservoir holds an absolute storage right for 14,000 acre-feet and a conditional right for an additional 30,600 acre-feet. Other project features include the 3.6-mile Bostwick Lateral and several miles of drains.

The Cimarron Canal is used to deliver supplemental irrigation water from Silver Jack Reservoir to project lands situated under the canal, the Bostwick Park area, and the Cedar Creek area under the Hairpin Lateral. Most of the shareholders in the Cimarron Canal Company own contract rights to project water from Silver Jack Reservoir. One exception is the City of Montrose, which does not receive reservoir storage water because municipal use is not authorized for the project.

Because of its high elevation, Silver Jack Reservoir is inaccessible during the winter months. During these months, the outlet valve is set to release at a rate of 17 cfs, which is the approximate rate of inflow during the mid-winter months. This continuous release maintains a minimum streamflow on the Cimarron and limits the accumulation of storage during the winter. By late spring, the inflows increase and the reservoir is usually filled by mid May. In late July, when the natural flow of Cimarron Creek begins to drop off such that the Cimarron Canal cannot satisfy the irrigation demands using its direct flow water rights, storage water is released from Silver Jack to supplement the direct flow diversions. During the summer months, Silver Jack is operated such that a minimum streamflow of 25 cfs below the head gate of the Cimarron Canal is maintained, if possible. There is also a general understanding that 1,500 acre-feet of the active storage capacity has been reserved by the USBR to assist in meeting this instream flow objective. The right to this storage may have been conveyed to the Colorado Division of Wildlife. It is also uncertain whether the project participants can encroach upon this 1,500 acre-feet

for supplemental irrigation water, if needed. Documentation supporting this storage allocation or its use was unavailable.

2.2.3. Operation of Cimarron Water Rights in the WRPM

This discussion has been updated to reflect the StateMod Phase IIIa model. From a modeling point of view, Cimarron Canal is a direct irrigation structure, a carrier of reservoir water, and a reservoir feeder canal. The irrigation portion of the Cimarron Canal is represented in the model by a structure named "IrrCim". The IrrCim demand was created by reducing historical diversions for Cimarron Canal by 650 acre-feet, the capacity of Cerro Reservoir, during the high runoff months. This approach is consistent with our understanding of Project 7's operation, which was developed through several conversations with the provider's operators. The reservoir is filled once in the spring, then drawn down over the next four or five months.

IrrCim demand is satisfied by operating rules that permit diversion by the Cimarron Canal under its three direct flow rights, and conveyance by the Cimarron Canal to IrrCim. To the extent that demand is not satisfied by the direct flow rights, operating rules permit releases from Silverjack Reservoir to be conveyed to IrrCim via Cimarron Canal. Cerro Reservoir is filled by the direct flow rights only, since Montrose does not own any storage water. Operating rules allow Cerro Reservoir to release to Project 7 demand.

2.3. Dallas Creek Project (Ridgway Reservoir) - Project 7 Water Authority

This section describes the operation of the Dallas Creek Project and its principal component, Ridgway Reservoir, constructed on the mainstem of the Uncompahgre River near the Town of Ridgway. The purpose of this project is to provide supplemental water supplies for municipal, industrial, and irrigation uses in the Uncompahgre valley. This section also describes the operation of the Project 7 Water Authority, which was formed to provide domestic/municipal water treatment capabilities for its participants, each of which is responsible for providing raw water to the Project 7 treatment plant. These supplies derive, in large part, from municipal allocations in Ridgway Reservoir.

The repayment of the Dallas Creek Project and the normal operation and maintenance of Ridgway Reservoir is the responsibility of the Tri-County Water Conservancy District (TCWCD). TCWCD also provides management services to the Project 7 Water Authority, which, in turn, provides the majority of treated domestic and municipal water supplies to the residents of the Uncompahgre River Valley.

2.3.1. General Description of Dallas Creek Project

Ridgway Reservoir was constructed by the U. S. Bureau of Reclamation (USBR) as a participating project in the Colorado River Storage Project (CRSP). Construction of Ridgway Dam and Reservoir was completed in 1987. The total capacity of the reservoir is 84,410 acre-feet, 25,000 acre-feet of which are inactive (including dead storage). The

following tables provide information regarding the physical features and water rights of Ridgway Reservoir.

Ridgway Reservoir Physical Features

Feature	Water Right
Outlet Works Capacity	500 cfs
Active Capacity	59,396 ac-ft
Dead and Inactive Capacity	25,014 ac-ft
Total Capacity	84,410 ac-ft

Ridgway Reservoir Area – Capacity Table

Area (acre)	Capacity (acre-feet)
85	1,430
203	4,150
345	9,657
457	17,637
572	27,841
684	40,315
815	55,283
971	73,146
1,063	84,271

Ridgway Reservoir Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Decreed Amount (acre-feet)	
				Absolute	Conditional
Ridgway	3679	6/01/1890	20269.14762	14.9	
Reservoir	3675	11/16/1956	39036.00000		223,046

The active capacity of the reservoir includes approximately 20,000 acre-feet for recreational and conservation purposes, and 39,400 acre-feet for municipal and industrial uses and supplemental irrigation uses in the Uncompahgre Valley. The project will provide up to 28,100 acre-feet of municipal and industrial water and up to 11,200 acre-feet of supplemental irrigation water. The Uncompahgre Valley Water Users Association (UVWUA) has subscribed for 10,300 acre-feet of the supplemental irrigation water and the remaining 900 acre-feet has yet to be allotted.

The municipal and industrial water is allocated to the water users listed below

Ridgway Reservoir Account Allocation

Account		Allocation (acre-feet)
1. Municipal and Industrial:		
City of Montrose		10,000
City of Delta		3,700
Town of Olathe		300
Menoken Water Co.		640
Chipeta Water Co.		600
TCWCD		12,860
Recreation Areas		100
	Sub-total	28,200
2. Irrigation:		
UVWUA		10,300
Un-allocated		900
	Sub-total	11,200
3. Total		39,400

Hydrologic studies indicate that Ridgway Reservoir will fill in every year except extreme drought years, even when project deliveries ultimately reach the full allocation levels shown in the previous table. It is noted that between the joint-use pool and the active conservation pool, there is approximately 59,400 acre-feet of storage. According to TCWCD staff, in any year that the reservoir might not completely fill, the municipal and industrial and irrigation pools are essentially assured a complete fill, even if it comes at the expense of a complete fill of the 20,000 acre-foot conservation pool in that year. At the end of the water year (October 31), all water in any of the subaccounts reverts to a common pool, where it is reallocated to the various accounts in the following year. It is therefore in the UVWUA's interest to fully utilize their Ridgway irrigation allocation every year, since it does not carry over.

TCWCD and the USBR have coordinated a "no spill" policy for the reservoir in order to prevent a fishery loss over the spillway. The USBR provides estimates of the projected runoff above the reservoir, and then the TCWCD makes releases through the outlet works to draw the reservoir down to storage levels sufficient to accommodate the predicted runoff without a spill. Winter release rates for this program will typically be less than 100 cfs during the mid-winter months and in the range of 450 to 575 cfs during the early spring runoff months. Target storage levels are discussed later in the Key Assumptions section.

2.3.2. General Description of Project 7 Water Authority

Project 7 was formed to provide domestic and municipal water treatment for its members, each of which is responsible for providing its own raw water supply. Project 7 owns no water rights. The treatment facility is the old City of Montrose plant near Fairview Reservoir, rehabilitated and enlarged to a design capacity of 27 million gallons per day (MGD) for Project 7 purposes. Presently, the average peak daily rate and the average daily rate are approximately 14 MGD and 11 MGD, respectively. During the recent water year 1994, Project 7 treated a total of 7,940 acre-feet, 42 percent of which (3,350

acre-feet) was delivered to the City of Montrose. Treated water deliveries have doubled in the last 4 years.

A portion of the Project 7 supply is delivered from the City of Montrose's 13 percent ownership interest in the Cimarron Canal. During the irrigation season, this canal diverts water out of Cimarron Creek, a tributary of the Gunnison River near Blue Mesa Reservoir, and delivers it to Montrose Reservoir near Cerro Summit. Typically this right will yield from 500 to 1,800 acre-feet per year. Note that Montrose's entitlement to Cimarron Creek water does not include storage releases from Silver Jack Reservoir, a component of the Bostwick Park Project. The Cimarron rights are discussed in more detail in Section 2.2.

2.3.3. Ridgway Reservoir Exchange Agreement

TCWCD owns the water storage rights in Ridgway Reservoir, as described above. Each of the six water users contract with the TCWCD for municipal and industrial water from the reservoir. In order for Ridgway water to be deliverable to the Project 7 treatment facility, the TCWCD negotiated the Ridgway Exchange Agreement (June 1991) with the UVWUA and the United States. Pursuant to this exchange agreement, high-quality water imported to the Uncompahgre Valley by the UVWUA via the Gunnison Tunnel is delivered through the South Canal to Fairview Reservoir for use by Project 7. Concurrently, and on an acre-foot for acre-foot basis, TCWCD credits a like amount of water in Ridgway Reservoir in an "exchange account" for the benefit of the UVWUA, where it is available for subsequent release and use for irrigation purposes. The result of the exchange is to effectively exchange high-quality water imported from the Gunnison River for lesser-quality water in the Uncompahgre River, while at the same time making physical deliveries of domestic water to the water treatment facility possible. Under the terms of the Exchange Agreement, the UVWUA is entitled to accrue credits of up to 23,000 acre-feet annually, but is limited to no more than 15,000 acre-feet of capacity in Ridgway Reservoir (to accommodate the exchange credits) at any one time.

2.3.4. Key Assumptions Incorporated into the WRPM

The following describes the key assumptions used in the CRDSS water resources planning model to simulate the operation of Ridgway Reservoir, Project 7, and the Ridgway Exchange.

- Project 7 demand was developed from annual delivery figures for 1980-1981, supplied by Project 7. Annual demand for 1975-1979 was set to the average annual value for 1980-1986. The entire data set was not used to estimate the early years of the study period because the demand appeared to change significantly in about 1987. The following monthly factors were used to distribute annual values to monthly:

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
.08	.06	.06	.06	.06	.06	.06	.085	.11	.15	.13	.085

- Project 7 is allowed to take UVWUA's water stored in Blue Mesa Reservoir in exchange for water stored in Ridgway Reservoir.

- Cerro Reservoir (650 acre-feet) and Fairview Reservoir (350 acre-feet) are operated as re-regulating storage facilities for Project 7 water delivered via the Cimarron Canal and from the UVWUA's South Canal.

- For each acre-foot of water delivered to Project 7 at Fairview Reservoir from the South Canal, an acre-foot is credited to the UVWUA's exchange account in Ridgway Reservoir.

2.3.5. Conclusions and Recommendations

The Gunnison River water resource planning model was developed to simulate the operations of Ridgway Reservoir and the various sub-accounts for allocating and using the stored water. The WRPM is designed to simulate the Ridgway exchange that enables high-quality water imported by the UVWUA from the Gunnison River basin to be used by the Project 7 water authority in exchange for a transfer of water from the municipal and industrial account in the reservoir to the irrigation account of the UVWUA. The model is structured to represent individual accounts in Ridgway in accordance with the agreements.

2.4. Operations of Taylor Park and Blue Mesa Reservoirs

This section describes the Taylor Park/Blue Mesa exchange agreement. Taylor Park Reservoir is operated and maintained by the Uncompahgre Valley Water Users Association (UVWUA). Blue Mesa Reservoir is owned by the United States, operated and maintained by the U. S. Bureau of Reclamation (USBR), and is part of the Aspinall Unit. Pursuant to a 1975 exchange agreement, cooperative operation of Taylor Park Reservoir and Blue Mesa Reservoir has provided stabilization of the Taylor and Gunnison River streamflows for enhanced fishing and recreation interests; it has also mitigated destructive icing problems at Blue Mesa.

2.4.1. General Description of Taylor Park Reservoir

Taylor Park Reservoir was constructed by the USBR as part of the Uncompahgre Project to store and deliver supplemental irrigation water to irrigable lands in the Uncompahgre Valley. The reservoir was decreed in 1941, with a priority date of August 3, 1904, for irrigation and other purposes. The decreed capacity of Taylor Park Reservoir is 111,260 acre-feet, with an active capacity of 106,230 acre-feet. The reservoir is owned by the United States and is operated by the UVWUA. Historically, releases were made from Taylor Park Reservoir to provide a supplemental supply for the Gunnison Tunnel when its direct flow right was not fully satisfied. Water rights for Taylor Park Reservoir are shown below:

Taylor Park Reservoir Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Decreed Amount (acre-feet) Absolute	Conditional
Taylor Park Reservoir	3666	8/03/1904	30667.19938	111,260	
		8/28/1975	49673.45895	44,700	61,530

The Upper Gunnison River Conservancy District obtained a decree in Case No. 86CW203 for the right to refill Taylor Park Reservoir for a total amount of 106,230 acre-feet with the appropriation date of August 28, 1975. Water is typically stored pursuant to the refill decree after the UVWUA has satisfied its annual fill on the senior storage right. The following summarizes the adjudication of the refill decree.

Taylor Park Reservoir Refill Decrees

Use	Absolute	Conditional	Total
Irrigation	13,777	5,423	19,200
Fish and Recreation	30,923	56,107	87,030
Total	44,700	61,530	106,230

2.4.2. General Operation of Taylor Park Reservoir

In order to fill Taylor Park Reservoir without spilling, releases during the winter and spring months are based, in part, on forecasts provided by the USBR. Annually, the various Taylor Park water users reach agreement regarding a summer release schedule that will provide a stable flow hydrograph below the reservoir for improved recreational and fishery purposes. As part of this release program, the users have adopted an objective of having approximately 90,000 acre-feet of stored water in Taylor Park Reservoir by late August. Because of this practice, the one annual fill of the UVWUA's senior storage right is generally achieved by early December.

The following tables provide a summary of the physical features of Taylor Park Reservoir.

Taylor Park Reservoir Physical Features

Features	Capacity
Outlet Works Capacity	1,500 cfs
Total Capacity	106,225 ac-ft
Active Capacity	15 ac-ft
Dead and Inactive Capacity	106,210 ac-ft

Taylor Park Reservoir Area-Capacity Table

Elevation (feet - MSL)	Area (Acres)	Capacity (acre-feet)
7,385	0	0
7,393	639	20,000
7,404	846	30,000
7,421	1,061	40,000
7,435	1,274	50,000
7,449	1,451	60,000
7,463	1,603	70,000
7,477	1,742	80,000
7,501	1,870	90,000
7,519	2,023	106,200

2.4.3. General Description of Wayne N. Aspinall Storage Unit

The Aspinall Unit was constructed as part of the Colorado River Storage Project (CRSP) and is operated by the USBR. The unit is located along the mainstem of the Gunnison River between the Black Canyon of the Gunnison National Monument and the City of Gunnison. Three reservoirs form the Aspinall Unit: 1) Blue Mesa, 2) Morrow Point, and 3) Crystal. Construction of the unit was authorized on April 11, 1956, and was originally known as the Curecanti Unit. Blue Mesa Dam was completed in 1966, followed by Morrow Point in 1968, and Crystal in 1976.

The primary function of the CRSP is to regulate streamflow so that water commitments to the Lower Colorado River Basin can be met in dry periods without curtailing the development of water uses allotted to the Upper Basin. Generating hydroelectric power at the three dams is also a key feature of the project. Currently, there is active discussion between the United States and the Colorado Water Conservation Board in regards to reserving an account in Blue Mesa Reservoir that would provide for releases for endangered fish species in the lower Colorado River basin. The parties are considering storing approximately 148,000 acre-feet for this purpose, which is apparently based on a demand below the Redlands Canal of 300 cfs from July through October.

The flows of the Gunnison River are largely controlled by the operation of Blue Mesa Reservoir, the largest of the three Aspinall Unit reservoirs. Water released through the Blue Mesa power plant receives short-term re-regulation by Morrow Point and Crystal Reservoirs located immediately downstream. Water releases from Morrow Point are primarily for peaking power, while releases through the Crystal power plant are more uniform to satisfy the requirements of downstream water rights and to maintain a viable instream flow through the Black Canyon of the Gunnison National Monument. Except for a few water users that have entered into water service contracts with the United States, the Aspinall Unit is not operated to formally provide releases from storage directly to irrigated lands and municipal and industrial users.

Power revenues in excess of operating costs and reimbursable construction costs are available to repay other CRSP participating projects. Transmission of the electric power

to load centers is a cooperative effort of existing public and private utilities and the USBR. The combined power system of the Aspinall Unit and participating projects is operated jointly by the Department of Energy's Western Area Power Administration and the USBR's Power Operations Center in Montrose. The three Aspinall Unit power plants have a total installed capacity of 208,000 kilowatts (KW) and produce an average of 775 million KW hours of electric energy annually.

Pursuant to a 1975 exchange agreement (discussed later), releases from storage are made to the UVWUA's Uncompahgre Project as part of an exchange with Taylor Park Reservoir. There is also an implied understanding that the United States will subordinate the storage decrees for the Aspinall Unit reservoirs to additional development of water resources in the Upper Gunnison River basin above Blue Mesa Reservoir to the extent of 60,000 acre-feet of annual consumptive use.

The following tables summarize the Aspinall Unit physical facilities and water rights.

Aspinall Unit Physical Features

Reservoir Name	Power Capacity (kW)	Reservoir Storage (acre-feet)	
		Capacity	Active
Blue Mesa	60,000	940,700	748,430
Morrow Point	120,000	117,165	42,090
Crystal	28,000	25,236	12,891

Aspinall Unit Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Decreed Amounts (acre-feet)	
				Absolute	Conditional
Blue Mesa:					
Storage, ac-ft	3532	11/13/1957	39398.00000	125,192.204	815,562.796
Power, cfs	533		39398.00000	2,500	
Storage, ac-ft	3532		40266.39398		122,702
Morrow Point:					
Storage, ac-ft	3545	11/13/1957	39398.00000	119,053	
Power, cfs	692		39398.00000	2,500	
Crystal:					
Storage, ac-ft	3578	11/13/1957	39398.00000	30,000	
Power, cfs	578		39398.00000	3,000	

2.4.4. General Operation of Aspinall Storage Unit

In addition to allowing for sufficient storage capacity to accommodate spring runoff, the winter operation of Blue Mesa Reservoir is intended to keep the storage levels sufficiently low to minimize icing problems at the upper end of Blue Mesa Reservoir. Accordingly, the releases from Blue Mesa are regulated in order to draw the storage

down to approximately 581,000 acre-feet by January 1 of each year, and then to fill the reservoir by the end of July. Power demands generally control the release and fill patterns in the Aspinall Unit reservoirs. Typically, the schedule for increasing and decreasing release rates is linear, increasing in increments of 50 cfs/day for releases less than 2,000 cfs, and in increments of 250 cfs for releases greater than 2,000 cfs.

During the storage period when inflows to Blue Mesa are greater than the releases, including the bypass of inflow to the downstream Gunnison Tunnel, water can be stored pursuant to the Blue Mesa decrees. If, at this time, releases (such as for power generation) are greater than the Gunnison Tunnel demand that is being bypassed through the reservoirs, the releases that are in excess of the Gunnison Tunnel demand are counted against the United States' first fill decree in Blue Mesa Reservoir. When inflows to Blue Mesa decrease to the point that the inflow is less than the Gunnison Tunnel demand (1,135 cfs), additional releases to the tunnel are made from the UVWUA's exchange credit account in Blue Mesa Reservoir. If additional power generation releases are required over and above the tunnel demand, the releases are counted against the United States' storage account in Blue Mesa.

2.4.5. Taylor Park/Blue Mesa Exchange Agreement

Before Blue Mesa Reservoir was constructed, the streamflow in the Gunnison and Taylor Rivers below Taylor Park Reservoir changed abruptly and fluctuated widely depending upon the availability of water and calls for delivery of water by the UVWUA. This fluctuation in the streamflow was detrimental to fishing and recreation on the Taylor and Gunnison Rivers. After the reservoir was constructed, the water users in the Upper Gunnison negotiated with the United States and the UVWUA to use storage in Blue Mesa to alleviate these impacts. As a result of several meetings, which included input from the Sierra Club, the United States Forest Service, the USBR, the Division of Wildlife, and the National Park Service, the Taylor Park Reservoir Operation and Storage Exchange Agreement was established in 1975. The following summarizes the key goals and operating criteria of the 1975 agreement:

- The overall purpose of the agreement was to authorize exchanges of water stored in Taylor Park Reservoir and in the Aspinall Unit to promote conservation and better use and management of available water supplies under the decreed water rights.

- The agreement contemplated coordinated releases of water from Taylor Park Reservoir, with regulation of the releases at the Aspinall reservoirs. The operating goal of Taylor Park Reservoir releases is to stabilize the Taylor and Gunnison River flows throughout the year, to provide flood control and irrigation uses, and to eliminate abrupt changes that would adversely affect fisheries and recreation uses, as much as possible.

- The agreement recognizes that the UVWUA physically controls the releases of water from Taylor Park, but that the UVWUA releases stored water at the request of the United States or the Upper Gunnison River District. Water released from Taylor Park is stored by the United States in the Aspinall Units for the credit of the UVWUA. All

credits created under this agreement are canceled on October 31 of each year (this statement was stricken from an amendment to the agreement in 1979 for the purpose of allowing "for a more normal operation of Taylor Park Reservoir releases based upon the historical operations of the reservoir by the UVWUA").

- When Taylor Park Reservoir spills and the United States has credits in the reservoir, then the first water spilled is charged against the credits of the United States. UVWUA's credits in the Aspinall reservoirs, when added to the UVWUA's water stored in Taylor Park Reservoir, cannot exceed the active capacity of Taylor Park Reservoir (106,230 acre-feet).

Reference is made to the following agreements and decrees concerning the operation of the Taylor Park/Blue Mesa Exchange Agreement:

- August 21, 1972, contract agreement between the United States and the UVWUA.

- August 28, 1975, contract agreement between the United States, the UVWUA, the Upper Gunnison River Water Conservancy District, and the Colorado River Water Conservation District.

- April 16, 1990, contract agreement between the United States, the UVWUA, the Upper Gunnison River Water Conservancy District, and the Colorado River Water Conservation District. This agreement amended some of the terms of the 1975 agreement.

- The final Water Court decree in Case No. 86CW203 concerning the application of the Upper Gunnison River Water Conservancy District for the right to refill Taylor Park Reservoir. This document provides a comprehensive history and interpretation of the reservoir operations and agreements.

The managed operation of the storage in Taylor Park Reservoir pursuant to the 1975 exchange agreement has resulted in significant fishery benefits. Releases within the flow ranges shown in the table below have been beneficial for fishery conditions and recreational uses in the Taylor and Gunnison Rivers downstream from Taylor Park Reservoir (Case No. 86CW203, paragraph 22).

Beneficial Flow Ranges for Releases

Period	Optimum Flow (cfs)
October 16-31	100 - 150
November	100 - 150
December	100 - 150
January	100 - 150
February	100 - 150
March	100 - 150
April	300 - 500
May	300 - 500
June	300 - 500
July	500
August	500
September	500
October 1-15	500

In the decree for Case No. 86CW203, a list of accounting conditions are given that summarizes the Taylor Park and Blue Mesa exchange agreement.

- The administration and accounting of the refill storage right in Case No. 86CW203 and the senior UVWUA storage decree shall be performed on the basis of a water year that begins on November 1 and extends through the following October 31.

- The rates and patterns of release of water from Taylor Park Reservoir shall continue to be made to accomplish fishery and recreational purposes and other purposes of the storage exchange agreement as provided in the August 28, 1975, and April 16, 1990, contracts.

- Water physically in storage in Taylor Park Reservoir and accumulated UVWUA credits in Blue Mesa Reservoir at the end of any water year shall be charged against the one annual fill of the UVWUA water storage right in the next year.

- The first water flowing into Taylor Park Reservoir during the water year (water that is available under the priority of the UVWUA water storage right), shall be charged against the one annual filling of the UVWUA water storage up to the extent of the one annual filling.

- The next water flowing into Taylor Park Reservoir during the water year (water that is available under the priority of the Upper Gunnison River Water Conservancy District water storage right decreed in Case No. 86CW203 for the refilling of Taylor Park Reservoir), shall be charged against the one annual filling of the Upper Gunnison District water storage right up to the extent of the one annual filling.

- Outflows that occur from Taylor Park Reservoir that exceed patterns set forth in paragraph 22 of the decree in Case No. 86CW203 shall not be considered releases from water stored under either the UVWUA's or the Upper Gunnison District's water storage rights.

- Releases that are made from the Taylor Park Reservoir shall be charged first against the water stored under the UVWUA's water storage right, and shall be considered as having been used pursuant to UVWUA's obligations and the Upper Gunnison District's rights under the 1975 agreement. Such releases shall establish credits in Blue Mesa Reservoir pursuant to the above-mentioned contracts. In the event that such releases exceed the water stored under the UVWUA's water storage right in Taylor Park Reservoir, the deficiency shall be charged against the water stored under the Upper Gunnison District's water storage right under Case No. 86CW203. Any water belonging to the Gunnison District that is in storage on October 31 shall, on that date, become part of the UVWUA's water storage right according to paragraph 5 of the April 16, 1990, contract.

- Water delivered to and diverted into the Gunnison Tunnel from the UVWUA's storage supplies shall be first charged against the UVWUA's credit water in Blue Mesa Reservoir.

- When additional water supplies are needed by the Upper Gunnison District for irrigation purposes, and when such water is available from Taylor Park Reservoir under the water right in Case No. 86CW203, releases of such water shall be made. These releases will be charged against the water stored under the Upper Gunnison District water storage right, and shall be limited to not more than 19,200 acre-feet of water in any one year.

- If, and when, the Division Engineer determines that it is necessary to charge evaporation against the reservoirs in the Gunnison River Basin, the accounting conditions shall be modified appropriately to accommodate evaporation.

2.4.6. Operation of the Taylor Park/Blue Mesa Exchange in the WRPM

The following describes the key assumptions used in the CRDSS water resouces planning model to simulate the operations of Taylor Park Reservoir and the Aspinall Unit.

- Taylor Park Reservoir is simulated using two storage accounts: 1) UVWUA's senior decree for 111,260 acre-feet, limited to the actual capacity of 106,230 acre-feet; and 2) the Upper Gunnison District's refill decree for up to 106,230 acre-feet.

- The UVWUA has the ability to meet the irrigation demand for the Uncompahgre Project canals using its exchange credits in Blue Mesa in addition to the amount of water in storage in Taylor Park Reservoir under the UVWUA's senior decree. This is limited to the available capacity in the Gunnison Tunnel (1,135 cfs) after exercising the tunnel's direct flow water right to its full extent.

- The maximum releases from Taylor Park Reservoir are limited to the values given in paragraph 22 of Case No. 86CW203. The releases from Taylor Park Reservoir are credited directly into the UVWUA's credit account in Blue Mesa Reservoir, and are

also available to satisfy instream flow water rights located between Blue Mesa Reservoir and Taylor Park Reservoir.

- Any water remaining in the Upper Gunnison District's account in Taylor Park Reservoir at the end of any water year (October) is booked into the UVWUA's Taylor Park Reservoir account. Remaining water in storage in Taylor Park Reservoir, together with any accumulated credits in Blue Mesa Reservoir at the end of the water year, is charged against the one annual fill of the UVWUA's senior water storage right in the next year.

2.4.7. Conclusions and Recommendations

The integrated operation of Taylor Park and Blue Mesa Reservoirs is complex and is dependent upon a number of considerations that have varied widely on a historic basis, including changing patterns of release from Taylor Park Reservoir to sustain a fishery on the Taylor and Upper Gunnison Rivers, varied use of storage water by the UVWUA (strict administration versus "good neighbor" policies), and the USBR's policies with respect to power generation and minimum streamflows below the Aspinall Unit reservoirs. These factors make it difficult to establish a set of monthly storage targets to simulate future operations of these reservoirs.

The model structure has been designed to replicate the current methods of operation of these reservoirs. Target storage levels were determined through analysis of historic end-of-month contents and are presented as a set of three targets for each month of the year, depending on the nature of the annual runoff. It is recommended for future CRDSS efforts, that, in conjunction with the USBR, additional work be devoted to development of more reliable targets based on stream forecasting methodologies. It is also recommended that the State and the CRDSS consultant continue to evaluate the effects of the informal agreements with the UVWUA regarding the "good neighbor" operations.

2.5. Fruitland Mesa Area Water Rights

This section describes the operation of a number of direct flow water rights and one reservoir storage right (Gould Reservoir) that are used for irrigation purposes in the Fruitland Mesa area south of Crawford, Colorado. These operations involve significant transbasin diversions from the Crystal Creek drainage to the Smith Fork drainage and storage in an 8,100 acre-foot reservoir (Gould). Information summarized in this section was obtained from a review of the State's tabulation of water rights, review of the U.S. Bureau of Reclamation's (USBR's) Definite Plan Report for the Fruitland Mesa Project, and through interviews with Bill Mugsford, a director of the Fruitland Mesa Water Conservancy District (FMWCD).

2.5.1. General Description of the Water Rights in the Fruitland Mesa Area

There are four major irrigation systems that are considered in the CRDSS water resources planning model. The water rights associated with these systems are summarized in the following table.

Fruitland Mesa Area Water Rights

Ditch Name	Structure ID	Source	Approp. Date	Admin. Number	Decreed Amount
Cattlemens Ditch (aka Cedar Canon Iron Spring Ditch)	504	Crystal Creek	10-24-1883	12350.00000	49.588 cfs
			5-15-1882	31924.11823	5.000 cfs
Crystal Valley Ditch	533	Crystal Creek	5-10-1888	21263.14010	13.35 cfs
			5-10-1888	31924.14010	1.00 cfs
Dyer Fork Ditch	543	Crystal Creek	5-15-1901	21263.18762	13.25 cfs
Fruitland Canal	549	Crystal Creek	5-17-1901	21263.18764	67.44 cfs
			5-17-1901	25807.18764	300.00 cfs
			7-01-1914	25807.23557	74.70 cfs
			5-17-1901	31924.18764	95.00 cfs
			11-13-1957	39398.00000	600.00 cfs
Fruitland Res. (Gould Res.)	3395	Crystal Creek	5-17-1901	21263.18764	2,800.00 AF
			5-17-1901	25807.18764	6,397.95 AF
			9-01-1949	36403.00000	1,000.00 AF

All of these systems obtain the majority of their water supplies from Crystal Creek, a tributary of the Gunnison River at Crystal Reservoir. The Crystal Valley Irrigation Ditch irrigates lands riparian to Crystal Creek. The other ditches (the Cattlemens Ditch, the Dyers Fork Ditch, and the Fruitland Mesa Canal) transport the water over a small divide into the Iron Creek basin, a tributary of the Smith Fork. Return flows from this transbasin irrigation all return to the Smith Fork.

The senior right on Crystal Creek is the 50 cfs water right owned by the Cattlemens Ditch Company (note that the right is listed in the State's tabulation as the Cedar Canon-Iron Spring Ditch). This ditch irrigates approximately 2,960 acres of irrigated hayland situated generally to the north of Gould Reservoir, east of Iron Creek, and adjacent to the Muddy Creek and Alkali Creek drainages. Return flows accrue to Iron Creek above Crawford Reservoir. This right is the controlling right on Crystal Creek, and the availability of divertible water for the other rights on Crystal Creek is dependent on flows generally being greater than 50 cfs.

The next major senior right on Crystal Creek is the Crystal Valley Irrigation Ditch (13.35 cfs), which is used to irrigate approximately 500 acres of hay adjacent to Crystal Creek. The owner of this right (Meeks) also owns several junior rights that are located to divert any flows not needed by the larger ditches as well as irrigation return flows from the Crystal Creek Ditch.

The Dyer Fork Ditch holds the next major priority (13.25 cfs) and is used to irrigate approximately 650 acres of hayland in the upper reaches of the Iron Creek basin on the east side of the stream. The majority of the irrigation return flows are intercepted by the Cattlemens Ditch in the area above Gould Reservoir. This transbasin ditch actually diverts from Dyers Fork, a tributary of Crystal Creek, upstream of the Cattlemens Ditch head gate.

The largest irrigation system in the Fruitland Mesa area is operated by the Fruitland Irrigation Company (FIC), the owner of the Fruitland Canal. The canal is used to irrigate approximately 7,400 acres on the mesa west of Iron Creek. Irrigation return flows from the Fruitland system generally accrue to the Smith Fork, downstream of the Town of Crawford. The FIC also owns and operates Gould Reservoir (aka Fruitland Reservoir), which has an estimated usable capacity of approximately 8,100 acre-feet (Mugsford). The FIC holds a number of direct flow decrees, which cumulatively total approximately 537 cfs, not including a junior, conditional water right for 600 cfs that was decreed as part of the Fruitland Mesa Project. The Fruitland Canal rights are junior to the Cattlemens, Dyers Fork, and Crystal Valley water rights, and generally will divert all of the remaining Crystal Creek flows available at its head gate after the senior diversions except for flood flows that would exceed the physical capacity of the canal at its inlet (400 cfs). The main canal that diverts from Crystal Creek is known as the Highline Ditch and serves as a delivery ditch for a small number of the FIC shareholders with lands located physically above Gould Reservoir; it is also the feeder ditch for the reservoir. Downstream of the turnout on the Highline Ditch that is used to convey water to the reservoir, the physical capacity is approximately 60 cfs. The second ditch (the Lowline Ditch or the Gould Canal) also has a capacity of approximately 60 cfs and delivers storage water from Gould Reservoir to the service area. The two ditches join at a location approximately three miles northwest of the reservoir into a single supply ditch that has an estimated combined capacity of about 120 cfs.

2.5.2. Fruitland Mesa Water Conservancy District

The FMWCD was formed in 1960 as the sponsoring agency for the Fruitland Mesa Project, which at that time was authorized as a participating project in the Colorado River Storage Project (CRSP). The project was eventually cut from federal funding. The project, as proposed, was intended to provide supplemental irrigation water to the Fruitland Mesa area by constructing a 51,000 acre-foot storage reservoir on Soap Creek, a tributary of the Gunnison River at Blue Mesa Reservoir. The new reservoir would be used in conjunction with a system of transbasin canals and tunnels to deliver the water to Crystal Creek. The FMWCD acquired and still maintains conditional decrees for the Soap Park Reservoir (87,000 acre-feet), the Crystal Creek Tunnel (330 cfs), and the Soap Park Bench Flume (300 cfs). Future operation of these conditional water rights is not included in the model.

2.5.3. Historic Operation of the Fruitland Mesa Area Water Rights

Irrigation in the Fruitland Mesa area generally begins around the first of May. If, at that time, there is insufficient water available from Crystal Creek, the FIC may make a nominal release of storage water from Gould Reservoir. As the runoff starts to increase in late May and early June, there is generally streamflow in excess of the senior direct demands of the Cattlemens Ditch (50 cfs), the Dyers Fork Ditch (13.25 cfs), the Crystal Valley Irrigation Ditch (13.35 cfs), and the direct irrigation demand of the FIC (estimated by Mugsford to be approximately 120 cfs). In this situation, the FIC will attempt to fill Gould Reservoir using any unused portion of the ditch capacity of the Highline Ditch by diverting from Crystal Creek. Accordingly, there would need to be nearly 200 cfs of

flow in Crystal Creek before diversions to storage in Gould Reservoir could occur (unless a portion of the senior rights are not calling for water).

In mid-June, the flow of Crystal Creek begins to decrease to rates ranging from 115 to 125 cfs, and it becomes difficult to maintain sufficient head in the FIC system for delivery to all of its shareholders. At this time, the FIC would typically be diverting less than one-half of its demand from Crystal Creek because of the demands of the other senior water rights. From an operational standpoint, this rate of flow (60 cfs±) is inadequate to operate the Highline Ditch for irrigation deliveries. Therefore, the FIC modifies its operation to deliver all of the available transbasin diversion from Crystal Creek to Gould Reservoir, where it is bypassed through to the Lowline Ditch for delivery, supplemented with storage water as necessary. The storage in Gould Reservoir is generally emptied by the first of August, at which time there is only minimal water available in Crystal Creek. This time frame coincides with the second cutting of the alfalfa hay crop. There is very little irrigation after the middle of August.

2.5.4. Operation of Fruitland Mesa Rights in the WRPM

The following discussion describes the key assumptions used in the CRDSS water resources planning model to simulate the operations of the principal water rights in the Fruitland Mesa area

- Irrigation return flows from the Cattlemens Ditch will accrue to Crawford Reservoir, return flows from the Dyers Fork Ditch will be intercepted by the Cattlemens Ditch, and returns from the FIC will accrue to the Smith Fork.

- For modeling purposes, the FIC system (Highline and Lowline ditches) is treated as a single system in which all shareholders can benefit from storage in Gould Reservoir and is modeled as Fruitl. It is acknowledged that only the Lowline Ditch can physically receive water from Gould Reservoir. However, the acreage that is exclusively served via the Highline Ditch is relatively small, and the FIC operates its system in a manner to equalize its shareholder deliveries. It does this by allowing the Highline shareholders an increased allotment from the direct flow diversions from Crystal Creek in comparison to the Lowline shareholders.

- Below Gould Reservoir on Iron Creek there are other agricultural demands. The water rights for these demands are aggregated into one demand node on Iron Creek below Gould Reservoir. Return flows for these other agricultural demands return to Iron Creek above Crawford Reservoir.

2.5.5. Conclusions and Recommendations

It was necessary to add Fruitl modeling node to more closely represent the operation in this area.

2.6. Paonia Project

This section describes the Paonia Project, which provides full and supplemental irrigation water for 15,300 acres of land near Paonia and Hotchkiss. The Paonia Project consists of the Paonia Reservoir and the Fire Mountain Canal, which diverts water from the North Fork of the Gunnison River downstream of the reservoir. The project was completed in 1962, and the North Fork Water Conservancy District (District) assumed responsibilities for operation and maintenance. By contract, the District transferred the physical operation and maintenance of the project to the Fire Mountain Canal and Reservoir Company.

Pursuant to the Ragged Mountain Exchange Agreement, the project provides supplemental irrigation water for 2,400 acres of land upstream of Paonia Reservoir along East and West Muddy Creeks.

2.6.1. General Description of the Paonia Project

Paonia Reservoir stores the flows of Muddy Creek upstream of its confluence with the North Fork of the Gunnison River. Downstream, direct diversions by the Fire Mountain Canal are supplemented with storage releases from the reservoir during the late irrigation season. The drainage area tributary to Paonia Reservoir is approximately 250 square miles, and the average annual discharge at the reservoir is approximately 90,000 acre-feet.

When originally constructed, Paonia Reservoir had a capacity of 20,950 acre-feet. Because of sedimentation, 3,489 acre-feet of its capacity has been lost, resulting in a total present capacity of 17,461 acre-feet. The projected rate of capacity loss from sedimentation is approximately 100 acre-feet per year. In the contract agreement dated June 11, 1947, (amended 1957, 1964, and 1968), between the United States and the District, the United States reserved the capacity of Paonia Reservoir over and above 11,000 acre-feet for the following purposes: 1) flood control, 2) dead storage, 3) sedimentation, and 4) incidental releases to maintain fish life. This reserved capacity, when not used by the United States, may be used by the District.

The District has agreed to operate the entire reservoir, filling and content, in accordance with operating criteria established by the United States to obtain maximum flood control benefits and to assure the storage pool is filled. Based upon forecasts, flood control operations generally draw the reservoir down in late winter to reduce spills during spring runoff.

The following tables summarize the physical features and water rights of Paonia Reservoir.

Paonia Reservoir Physical Features

Outlet Works Capacity (at maximum surface elevation)	1,130 cfs
Active Capacity Dead and Inactive Capacity Total Capacity	16,527 ac-ft 934 ac-ft 17,461 ac-ft
Reserved United States Pool (flood control, sedimentation, fish, etc.)	6,510 ac-ft

Paonia Reservoir Elevation-Area-Capacity Table

Elevation (feet MSL)	Area (acres)	Capacity (acre-feet)
6,330	0	0
6,340	23	184
6,360	44	843
6,380	89	2,071
6,400	177	4,877
6,410	227	6,896
6,420	258	9,319
6,430	289	12,053
6,440	311	15,052
6,448	333	17,461

Paonia Reservoir Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Decreed Amount (acre-feet) Absolute	Conditional
Paonia Reservoir	3416	6/01/1935	31924.31197	18,000	
		4/05/1949	38064.36254	3,000	
		11/30/1969	43829.43798	7,424	2,576
		3/30/1983	48666.00000		3,500

Pursuant to the contract dated May 12, 1967, between the United States, the District, and the Fire Mountain Canal and Reservoir Company, the Fire Mountain Canal and Reservoir Company obtained the perpetual right to use 12,650 acre-feet of Paonia Project storage water and any additional water that may be available from year to year.

According to Ken Knox, the Division Engineer for Water Division 4, an account of 1,500 acre-feet of storage water is reserved for endangered species. Releases from the endangered species account are not shepherded downstream to specific locations and are subjective as to when they occur (generally during the spring runoff). The water supply for the endangered species account comes from the capacity of the sediment pool of Paonia Reservoir.

Fire Mountain Canal diverts water from the North Fork of the Gunnison River near Somerset and extends approximately 35 miles along the north side of the valley. It has an initial capacity of 180 cubic feet per second (cfs) that is reduced to 100 cfs at the Leroux Creek crossing. The following table summarizes the water rights for the Fire Mountain Canal on the North Fork of the Gunnison River (Fire Mountain Canal has water rights on tributaries of the North Fork that are not summarized in this table).

Fire Mountain Canal Water Rights

Structure Name	Structure ID	Appropriation Date	Administration Number	Decreed Amount (acre-feet)	
				Absolute	Conditional
Fire Mountain Canal	1133	9/14/1896	19415.17509	50.0	
		6/01/1906	21701.00000	44.5	
		6/24/1914	25807.23550	30.0	
		6/01/1935	31924.31197	106.0	

2.6.2. Ragged Mountain Exchange

Pursuant to the contract dated August 6, 1991, between the United States, the District, and the Ragged Mountain Water Users' Association (Association), the Association obtained the right, commencing June 1, 1991, to divert up to 2,000 acre-feet of Paonia Project storage water annually. At the end of 5 years, the contract may be renewed for an additional 5 years.

Under the contract agreement, the Association may divert a maximum of 2,000 acre-feet annually at its various head gates upstream of Paonia Reservoir. The District, as required by the Division Engineer, will make releases from the reservoir to satisfy downstream senior water rights. The exchange water can only be used by the Association for supplemental irrigation of 2,368 acres of land.

The water supply for the Ragged Mountain Exchange comes primarily from the capacity of the sediment pool of Paonia Reservoir. The United States may terminate the contract agreement if it is found that the sediment pool would fill at an earlier projected date. It has been projected that the sediment pool would fill by the year 2053.

2.6.3. Summary of Paonia Reservoir Accounts

The following table provides a summary of the accounts in Paonia Reservoir.

Paonia Reservoir Accounts

Accounts	Amount (acre-feet)
Total Capacity	17,461
Active Capacity	16,527
1. Fire Mountain Canal and Reservoir Company	12,650
2. Reserved United States Pool (6,510 af)	2,000
a) Ragged Mountain Exchange Agreement	1,500
b) Endangered Species	

2.6.4. Operation of the Paonia Project in the WRPM

The following paragraphs describe the key assumptions used in the CRDSS water resources planning model to simulate the operations of the Paonia Project.

- Paonia Reservoir is simulated using three storage accounts representing the three water rights that are decreed absolute: 1) 18,000 acre-feet; 2) 3,000 acre-feet; and 3) 7,424 acre-feet (refill decree).

- Direct diversions under the Fire Mountain Canal water rights are supplemented by releases of storage water from Paonia Reservoir and are limited to 12,650 acre-feet per year.

- Releases are made from Paonia Reservoir pursuant to the Ragged Mountain Exchange to allow supplemental junior upstream diversions to irrigate 2,368 acres of land along West and East Muddy creeks. The Ragged Mountain Exchange is limited to 2,000 acre-feet per year.

- The following table provides the end-of-month storage targets that will allow the reservoir to be drawn down during the late winter months and, as a result, provide available capacity to capture spring runoff.

Paonia Reservoir End-of-Month Storage Targets

Month	End-of-Month Target (acre-feet)
Jan	6,500
Feb	1,500
Mar	1,500
Apr	1,500
May	1,500
Jun	17,500
Jul	17,500
Aug	17,500
Sep	17,500
Oct	6,500
Nov	6,500
Dec	6,500

2.6.5. Conclusions and Recommendations

The historical and future operations of Paonia Reservoir were evaluated through review of the storage decrees and the storage allocation agreements between the United States and the two water user groups. The reservoir element was structured to account for the practice of releasing water from storage in anticipation of high runoff and spills as well as the operational releases for supplemental irrigation under the Fire Mountain Canal and Ragged Mountain exchanges. The reservoir element closely replicates the historic and intended future operation of the reservoir.

2.7. Smith Fork Area Water Rights - Crawford Water Conservancy District

This section describes the operation of the major irrigation water rights that divert from the Smith Fork of the Gunnison and that are used to irrigate lands in the vicinity of Crawford, Colorado. Most of these major water rights also benefit from storage releases from Crawford Reservoir, operated by the Crawford Water Conservancy District (CWCD).

2.7.1. General Description of Smith Fork Water Rights

The CWCD was formed as the sponsoring agency for operation and repayment of the Smith Fork Project, which consists of Crawford Reservoir and other ditch improvements that provide for supplemental irrigation water supplies to lands historically served by six senior ditches diverting from the Smith Fork: (1) the Crawford Clipper, (2) the Grandview Ditch (Aspen Ditch), (3) the Needle Rock Ditch, (4) the Saddle Mountain Ditch, (5) the Virginia Ditch, and (6) the Daisy Ditch. Water rights for these senior ditches are summarized in Table 2.1. The water rights for the Crawford Reservoir and the Aspen Canal, constructed as part of the Smith Fork Project, are also shown in Table 2.1. Information contained in this section was obtained from a review of the State's tabulation of water rights, a review of the U.S. Bureau of Reclamation's (USBR's)

Definite Plan Report for the Crawford Project, and through interviews with John Cunningham, the Manager of the CWCD.

Prior to the construction of Crawford Reservoir in 1962, irrigation diversions were made pursuant to the respective direct flow water rights out of the Smith Fork, and the available supplies were generally inadequate for a full irrigation supply to all of the serviceable lands. Storage of surplus water in the reservoir during the winter months and the spring runoff enabled a full supply to most of the historic acreage. Mr. Cunningham reported that a recent crop census indicated approximately 9,800 acres served by the project. Irrigated acreage data obtained from the CRDSS consumptive use group indicates a total of approximately 10,300 acres.

2.7.2. Crawford Reservoir

The key component of the Smith Fork Project is the 14,064 acre-foot Crawford Reservoir. This reservoir is filled in part by non-irrigation season inflows on Iron Creek, which include not only the native flow of the drainage but also irrigation return flows from a number of ditches that import water from the Crystal Creek watershed (Cattlemens Ditch, Dyers Fork Ditch, and the Fruitland Canal). These transbasin ditch systems are described in Section 2.5. The majority of the reservoir inflows are supplied from the Smith Fork Feeder Canal with a decreed and physical capacity of approximately 150 cubic feet per second (cfs). The Feeder Canal is an enlargement of the senior Daisy Ditch.

Table 2.1.
Smith Fork Project Water Rights

Structure Name	Structure ID	Source	Appropriation Date	Administration Number	Decreed Amount (ac-ft)
Aspen Ditch	508	Iron Creek	8/13/1900 7/01/1914 8/13/1900	21263.18487 25807.23557 31924.18487	30.000 20.000 7.500
Aspen Canal	509	Iron Creek	9/03/1946	38064.35309	150.000
Crawford Reservoir	3553	Iron Creek	9/03/1946 9/03/1946	38064.35309 41668.35309	13,650 AF 745 AF
Crawford Clipper Ditch	500	Smith Fork	10/19/1885 4/10/1884 4/01/1891 4/01/1892 4/01/1893 4/01/1894 4/01/1895 4/01/1896 4/01/1897 4/01/1898 4/01/1899 4/01/1900	13076.00000 19413.12519 19413.15066 19413.15432 19413.15797 19413.16162 19413.16527 19413.16893 19413.17258 19413.17623 19413.17988 19413.18353	12.500 12.243 1.034 2.531 1.275 3.187 3.393 4.088 1.894 1.987 3.806 3.638

Table 2.1.
Smith Fork Project Water Rights

Needle Rock Ditch	501	Smith Fork	7/16/1888	14077.00000	4.200
			4/20/1888	19413.13990	6.281
			4/01/1895	19413.16527	1.651
			4/01/1896	19413.16893	0.563
			4/01/1897	19413.17258	2.906
			4/01/1898	19413.17623	0.563
			4/01/1900	19413.18353	0.881
			3/01/1903	25807.19417	21.370
			7/15/1888	31924.14076	3.000
			2/10/1930	31924.29260	1.500
Saddle Mountain Highline Ditch	502	Smith Fork	5/01/1897	19413.17288	0.600
			6/10/1901	21263.18788	8.125
			7/27/1909	21757.00000	10.625
			8/01/1909	25807.21762	20.370
			6/10/1901	31924.18788	4.000
			2/25/1930	31924.29275	40.000
Daisy Ditch	536	Smith Fork	10/11/1887	13798.00000	2.900
			7/01/1887	19413.13696	4.144
			4/01/1894	19413.16162	0.421
			4/01/1895	19413.16527	0.225
			4/01/1896	19413.16893	0.487
			4/01/1897	19413.17258	0.263
			4/01/1898	19413.17623	0.094
			4/01/1899	19413.17988	1.351
			4/01/1900	19413.18353	0.150
			6/01/1905	25807.20240	6.820
			7/01/1887	31924.13696	2.000
Virginia Ditch	616	Smith Fork	12/19/1887	19413.13867	5.000
			4/01/1891	19413.15066	1.019
			4/01/1892	19413.15432	0.582
			4/01/1893	19413.15797	0.601
			4/01/1894	19413.16162	0.356
			4/01/1895	19413.16527	0.356
			4/01/1896	19413.16893	0.150
			4/01/1897	19413.17258	0.094
			4/01/1898	19413.17623	0.094
			4/01/1899	19413.17988	0.263
			4/01/1900	19413.18353	0.207
			12/19/1887	31924.13867	1.000
Grandview Canal	503	Smith Fork	3/28/1895	21263.16523	40.500
			7/01/1914	25807.23557	42.500
			3/28/1895	31924.16523	7.500

The storage water right in Crawford Reservoir is held by the individuals that have subscribed for project water. Currently, the project is fully subscribed and will generally deliver approximately 10,350 acre-feet to the members. Project water is available "on call" by the subscribing individuals who will place their requests based on the availability of water from other sources, namely the direct flow water rights. The majority of the reservoir capacity in excess of the project water allocation (10,350 acre-feet) is reserved as a permanent recreation and conservation pool. Project water from the reservoir can be

physically delivered to the Crawford Clipper, Grandview, and the Aspen Canal. Project deliveries to the Needle Rock, Saddle Mountain, Virginia, and Daisy ditches (hereafter referred to as the Upper Ditches) must be delivered by an exchange involving the Clipper Ditch.

The following table provides the area/capacity information for Crawford Reservoir (from GUNMOD).

Crawford Reservoir Elevation-Area-Capacity Table

Elevation (feet MSL)	Area (acres)	Capacity (acre-feet)
6,441	0	0
6,480	13	116
6,480	41	602
6,490	65	1,126
6,500	98	1,924
6,510	135	3,087
6,520	193	4,714
6,530	251	6,926
6,540	313	9,745
6,553	406	14,395

2.7.3. Diversions by Upper Project Ditches

Irrigation in the Crawford area begins from April 20 to May 1. During the early part of the season, typically through the end of June, there is sufficient physical streamflow to satisfy most of the irrigation demands of the major ditches. Water availability to the Upper Ditches is influenced by the major senior right on the river – the 12.5 cfs decreed to the Crawford Clipper Ditch. After July 10 (typically), the natural streamflow is insufficient for all of the direct flow rights. At this time, the CWCD and the State Water Commissioner will allow the Upper Ditches to continue to divert even to the point of drying up the river, provided that project water owned by the Upper Ditches can be released, if requested, to the Clipper Ditch to fulfill its demand. It is this exchange that enables the Upper Ditches to receive their storage water. If the Upper Ditches have exhausted their project water in Crawford Reservoir, their diversions from the Smith Fork for the remainder of the season are limited to the amounts of their respective senior direct flow rights, which are subject to priority with respect to other water rights (in particular the Clipper's senior right to 12.5 cfs). According to Mr. Cunningham, irrigation return flows to the Smith Fork from the Upper Ditches will provide approximately 5 cfs of the 12.5 cfs demand at the Clipper head gate.

2.7.4. Grandview Ditch Considerations

The Smith Fork direct flow rights of the Grandview Ditch are relatively junior to other direct flow rights on the mainstem (including the Clipper Ditch and the Upper Ditches). However, the Grandview also owns the Aspen Ditch direct flow rights that historically

diverted out of Iron Creek at the present location of Crawford Reservoir. The Aspen Ditch rights benefited from all of the return flows from irrigation upgradient of the present reservoir location, including the return flows from the transbasin diversions from Crystal Creek. To preserve these historic rights to the direct flow of Iron Creek, the CWCD operates the reservoir during the irrigation season so that all inflow to the reservoir is delivered as "flow through" to the Grandview Canal. This bypass does not count against the Grandview's project water allocation.

2.7.5. Crawford Reservoir Operations

Crawford Reservoir generally fills from November 1 through mid-April, and is often full by mid-March. The reservoir fills via the Smith Fork Feeder Canal, and by storing native flows and irrigation return flows in Iron Creek during the non-irrigation season. During the winter months, the feeder canal will often physically dry up the Smith Fork. The only downstream winter uses are stock water diversions in the Clipper and Grandview Ditches. Most of the stock water demand is satisfied by accretions to the stream below the head gate of the feeder canal. Project water in Crawford Reservoir is released upon request of the individuals owning rights in the reservoir. Water is released as necessary to supplement irrigation demands either directly or by exchange. Releases will often extend into October.

2.7.6. Operation of the Smith Fork Rights in the WRPM

The following paragraphs describe the key assumptions used in the CRDSS water resources planning model to simulate the operations of the Smith Fork water rights.

- The Grandview demand was computed separately so that diversions from Iron Creek, pursuant to the Aspen Ditch water rights, could be properly allocated to demand.

- During the storage period, the model first uses non-irrigation season inflows to the reservoir from Iron Creek if the reservoir storage rights are in priority, and then uses diversions from the Smith Fork via the Feeder Canal.

2.7.7. Conclusions and Recommendations

During the Phase IIa development of the water rights planning model, interviews were held with the Manager of the Crawford Water Conservancy District in order to gain understanding of the operations of the direct flow water rights on the Smith Fork, in conjunction with Crawford Reservoir.

2.8. Uncompahgre Project

This section describes the operations of the Uncompahgre Project, which involves the irrigation of approximately 86,000 acres between Montrose and Delta. The irrigation supplies are obtained from direct flow rights from the Uncompahgre River; transbasin diversions from the Gunnison River via the Gunnison Tunnel; storage in Taylor Park, Blue

Mesa and Ridgway reservoirs; and several water exchange agreements. The Project is operated by the Uncompahgre Valley Water Users Association (UVWUA), and much of the information summarized in this section was obtained through interviews with the UVWUA manager, as well as the Division Engineer and Water Commissioner.

2.8.1. General Description of the Uncompahgre Project

The Uncompahgre Project was one of the first major irrigation projects constructed by the U. S. Bureau of Reclamation (USBR) under the Reclamation Act of 1902. The project was developed to provide supplemental irrigation water supplies for approximately 86,000 acres of land in the Uncompahgre River basin between Montrose and Delta.

The principal development of the Uncompahgre Project began in 1904 with the start of construction for the Gunnison Tunnel which diverts water from the Gunnison River at a location just upstream of the Black Canyon of the Gunnison National Monument for delivery to the Uncompahgre Valley (the tunnel was completed in 1908 and the diversion dam was completed in 1912). Shortly thereafter, the UVWUA and the USBR began acquisition of several of the larger mainstem irrigation canals that had historically been used for irrigation in the valley. The two organizations generally rehabilitated, enlarged, and extended these canals for project purposes. These canal structures and the associated senior direct flow water rights are summarized in Table 2.2. Two new canal structures were also constructed. The South Canal delivers water from the west portal of the Gunnison Tunnel to the Uncompahgre River upstream of the point where it can be rediverted by the mainstem project canals. The West Canal takes water from the South Canal and delivers it to some project lands situated on the west side of the river above the Montrose and Delta Canal. In the early years of the project, the UVWUA also acquired a number of existing senior direct flow rights from several independent ditch systems and transferred the rights to the new project canals, which were being rehabilitated to serve both the historic and proposed project lands. The operation and maintenance of the project was turned over to the UVWUA in 1932. Ownership of the project remains with the United States.

The final major component of the project, Taylor Park Reservoir, was constructed in the upper reaches of the Gunnison River in 1937 and is used to provide additional late-season irrigation supplies to the project. Operation of Taylor Park Reservoir is discussed in Section 2.4. The following general description of the Uncompahgre Project is an excerpt from the USBR Project Data Book:

Table 2.2
Uncompahgre Valley Water Users Association Major Water Rights

Structure Name	Appropriation Date	Administration Number	Decreed Amount (cfs)	
			Absolute	Conditional
Montrose and Delta Canal	11/1/1881	11628.00000	4.98	
	12/8/1881	11665.00000	12.14	
	1/5/1882	11693.00000	6.05	
	1/27/1882	11715.00000	0.65	
	2/11/8882	11730.00000	4.00	
	1/24/1884	12442.00000	17.37	
	4/24/1884	12875.00000	25.00	
	11/14/1888	14198.00000	75.77	
Subtotal			145.96	
	2/16/1981	48212.47894		300
Uncompahgre Canal (M & D Canal)	4/7/1883	12150.00000	100.00	
	4/7/1884	12516.00000	100.00	
	3/31/1885	12874.00000	50.00	
	11/14/1888	14198.00000	231.00	
Subtotal			481.00	
East Canal	5/1/1882	11809.00000	5.50	
	5/10/1882	11818.00000	3.12	
	8/25/1883	12290.00000	25.00	
	11/14/1888	14198.00000	26.82	
Subtotal			60.44	
Ironstone Canal	1/5/1882	11693.00000	4.90	
	10/2/1882	11962.00000	2.50	
	11/7/1882	11999.00000	37.50	
	11/21/1882	12013.00000	1.83	
	8/24/1884	12655.00000	21.00	
	3/31/1886	13239.00000	76.00	
	11/14/1888	14198.00000	59.00	
Subtotal			202.73	
Garnet Ditch	6/18/1883	12222.00000	45.00	
	11/14/1888	14198.00000	48.33	
Subtotal			93.33	
Selig Ditch	1/27/1882	11715.00000	0.95	
	4/30/1882	11808.00000	1.10	
	10/29/1883	12355.00000	14.50	
	2/7/1888	13917.00000	58.10	
	11/14/1888	14198.00000	12.00	
Subtotal			86.64	
Loutsenhizer Canal	11/1/1881	11628.00000	0.54	
	1/27/1882	11715.00000	0.46	
	11/30/1883	12387.00000	7.00	
	7/12/1886	13342.00000	33.33	
	11/14/1888	14198.00000	5.50	
Subtotal			46.83	
Taylor Park Reservoir	8/3/1904	30667.19938	111,260 AF	
Gunnison Tunnel & South Canal	6/1/1901	20393.18779	1,135 cfs	165
	11/13/1957	50403.39398		235

Project lands surround the Town of Montrose and extend 34 miles along both sides of the Uncompahgre River to Delta, Colorado. Project features include Taylor Park Dam and Reservoir, the Gunnison Diversion Dam, Gunnison Tunnel, six diversion dams on the Uncompahgre River, 128 miles of main canals, 438 miles of laterals, and 216 miles of drains. The system diverts water from the Uncompahgre and Gunnison Rivers to irrigate approximately 76,000 acres of project land.

The project plan provides for storage in Taylor Park Reservoir on the Taylor River, which is a part of the Gunnison River Basin, and diversion of water from the Gunnison River by the Gunnison Diversion Dam through the Gunnison Tunnel and the South Canal to the Uncompahgre River.

2.8.2. Historic Operation of the Uncompahgre Project

Information regarding the historic operation of the Uncompahgre Project was obtained through interviews with the Manager of the UVWUA, the Division 4 Engineer, and the Water Commissioner for Water District 41. Prior to construction of the USBR's Aspinall Unit on the Gunnison River, the UVWUA relied upon the senior direct rights decreed for irrigation from the mainstem of the Uncompahgre River (see Table 2.2). The cumulative total of these decrees is in excess of the natural flow of the river except during the peak runoff season. However, because of the physical location of the project canals with respect to each other, the downstream canals rely extensively on return flows from upgradient irrigation to satisfy a large part of their demands. Even so, the UVWUA historically has had to rely heavily on transbasin diversions from the Gunnison River via the Gunnison Tunnel, with a capacity of 1,135 cubic feet per second (cfs).

Administration of the UVWUA system to deliver water to its members is a complex process that is dependent on climatic and hydrologic conditions that can change almost daily. On any given day, the total demands for water at the project canals is determined by the water users calling in their orders for water. The UVWUA accumulates these orders to determine the total delivery requirements to each canal. Irrigation under the UVWUA typically begins around the first of April and for a short time the natural flow of the Uncompahgre River is adequate for the system demands. As the weather warms up, the irrigation demands increase and the UVWUA begins to divert additional water through the Gunnison Tunnel, generally ramping up the diversions in increments of approximately 200 cfs. Once at capacity, the Tunnel will normally flow full for the remainder of the irrigation season, except during periods of peak runoff on the Uncompahgre River when there is sufficient in-basin water available to satisfy the demands.

The UVWUA also owns storage in Taylor Park Reservoir (active capacity of approximately 106,230 acre-feet) and a storage allocation of 10,300 acre-feet of supplemental irrigation water from the Dallas Creek Project (Ridgway Reservoir). These reservoir sources are used when the direct flow rights are incapable of meeting the system irrigation demands.

2.8.3. Administration of a Call by the Gunnison Tunnel

Prior to the construction of the Aspinall Unit, the UVWUA routinely placed a call against junior water rights on the Gunnison River to satisfy the Gunnison Tunnel demand. After Blue Mesa Reservoir came on line, the large reservoir releases that have been made for hydro power production resulted in the equivalent of a "free river" below the Aspinall Unit reservoirs; for the most part, these releases have provided sufficient water to satisfy the tunnel direct flow right (1,135 cfs) for much of the irrigation season. Furthermore, when the United States acquired the water rights for the Aspinall Unit in 1962, it was generally recognized that storage in the Aspinall Unit reservoirs would be subordinated to upstream junior appropriators to the extent of 60,000 acre-feet (consumptive use). The implication of this subordination is that an administrative call by the Gunnison Tunnel would be absorbed, for the most part, by the storage in Blue Mesa Reservoir. When the inflows to Blue Mesa Reservoir fall off and the United States' storage decree is not in priority, the UVWUA must begin to release water from storage in either Taylor Park or Blue Mesa Reservoirs to satisfy the Gunnison Tunnel demand.

In the future, if the United States attempts to administer the hydroelectric power release from the Aspinall Unit reservoirs such that they are required to flow past the Gunnison Tunnel (such as for a delivery to endangered fish on the lower Gunnison and Colorado rivers), this would represent a fundamental change of the current United States policies, and it may be necessary for the UVWUA to strictly enforce its senior direct flow decree at the tunnel against junior water rights on the Gunnison River, including the storage in Blue Mesa. This is noted for consideration in the CRDSS model to ensure that strict administration is an operational option.

2.8.4. Administration of a Call on the Uncompahgre River

Delivery to the project canals is governed by two key control gages on the Uncompahgre River; one at Delta (the downstream end of the system) and one near Olathe, just downstream of the head gate for the East Canal. During the critical months of the irrigation season, the system deliveries are managed in an attempt to keep the flow at the Delta gage as low as possible (in the range of 200 to 300 cfs). The UVWUA also attempts to keep the flow at the Olathe gage at or near zero. (Note that the Garnet Ditch is downstream of the Olathe gage and is supplied primarily from upstream return flows.)

In recent years, the UVWUA has attempted to operate its system to avoid, to the extent possible, the necessity of placing an administrative call against junior rights in the Uncompahgre and Gunnison River basins (the "good neighbor policy"). However, certain climatic and hydrologic conditions could occur that would necessitate a call, even if only for a short time. Based on interviews with the UVWUA Manager, the following scenarios describe conditions that could result in a call by the project canals during the critical summer months (July through September).

- If the Gunnison Tunnel is flowing full with direct flow water, the flow at the Olathe gage is substantially greater than zero, and the irrigation demands are fully satisfied, then the UVWUA will cut back on its diversions through the tunnel, as necessary.

- If the Tunnel is flowing full with direct flow water, the flow at the Olathe gage is near zero, and the irrigation demands are not satisfied, then the UVWUA may elect to either (a) place a call against junior water rights on the Uncompahgre or (b) request a release of its 10,300 acre-feet of Dallas Creek Project water (or its Project 7 Exchange Water) from storage in Ridgway Reservoir.

- Similarly, if the system demand is not satisfied and the yield of the tunnel's direct flow right is less than the tunnel capacity of 1,135 cfs, the UVWUA then must decide whether to begin releasing water from Taylor Park Reservoir to place a call against junior water rights on the Uncompahgre and/or Gunnison Rivers. This is a subjective decision that is made by the UVWUA after considering the amount of water in storage, climatic conditions, and how much of the irrigation season remains. If this situation occurs early in the season and the UVWUA elects to preserve its storage water for use later in the summer, then the UVWUA is likely to place a call against junior rights on the Uncompahgre mainstem. If it is later in the season, the decision will likely be made to release water from storage rather than to place a call on junior rights. It is assumed that the UVWUA will not normally place a call when the tunnel is not flowing full.

The physical capacity of the M & D Canal, the largest and most upstream project canal, is between 550 and 600 cfs; the canal is operated at full capacity for the majority of the irrigation season. If the UVWUA elects to place a call against Uncompahgre junior rights (prior to releasing storage water), the UVWUA and the Division Engineer have an informal agreement about the administration of such a call. Interview information indicates that the UVWUA will only call up to approximately 245 cfs, which will be delivered to the head gate of the M & D Canal. This value is determined as the cumulative sum of the all the senior priorities decreed for diversion at the M & D head gate up through Administration number 12516 (see Table 2.2). It must be noted that all other project demands (including the remaining demand at the M & D head gate) are supplied from the UVWUA's other sources (the Tunnel direct flow diversions, storage releases from Taylor Park [Blue Mesa] and Ridgway, and return flows from upgradient irrigation). Junior water rights that would be impacted by a call on the Uncompahgre River would be those rights with Administration numbers greater than 12516, both upstream and within the project reach of the Uncompahgre River.

The U.S. Geological Survey (USGS) stream gage for the Uncompahgre River at Colona is used to administer the Uncompahgre Project water rights. This gage is upstream of the M & D head gate and the point where the South Canal delivers Gunnison Tunnel water to the river. According to the Division Engineer, the Water Commissioner, and the UVWUA Manager, if the flow at Colona is 800 cfs or greater, there is generally adequate water for all of the downstream diversion demands of the project canals and other non-project water rights. When the flow is less than 800 cfs, it is necessary for the UVWUA to supplement its supply using the Gunnison Tunnel and eventually storage water. Later in the irrigation season (typically around mid-July), the tunnel is typically flowing full (either with direct flow diversions or Taylor Park storage water). Then, if the flow at Colona is still greater than 250 cfs, the UVWUA would not likely place a call against junior water rights on the Uncompahgre, and would draw upon its storage in Ridgway Reservoir. If the flow is less than 250 cfs, the UVWUA would likely place a call up to

the 245 cfs discussed above. The call would normally be in effect for a relatively short period (2 to 3 weeks).

2.8.5. Taylor Park - Blue Mesa Storage Accounting

The release of UVWUA's storage water in Taylor Park Reservoir is subject to an operating and exchange agreement between the UVWUA, the United States, and the Upper Gunnison Water Conservancy District. The Taylor Park-Blue Mesa Reservoir operations are discussed separately in Section 2.4.

2.8.6. Ridgway Reservoir - Project 7 Exchange Accounting

The operation of UVWUA's reservoir storage accounts in Ridgway Reservoir is described separately in Section 2.3.

2.8.7. Operation of the Uncompahgre Project in the WRPM

The following discussion summarizes the key assumptions used in the CRDSS water resources planning model to simulate the operations of the Uncompahgre Project.

- The required deliveries of water to the Uncompahgre Project are driven by the irrigation demands under the project canals. These demands are determined using 1993 irrigated acreage, monthly values of net consumptive use, and system irrigation efficiencies.

- Agricultural demands are a function of the assumed system efficiencies and are limited by the physical capacity of the ditches

- The Uncompahgre call described in the previous paragraph will only trigger if the Gunnison Tunnel is flowing full, either with direct flow or storage releases

- If the inflow to Blue Mesa Reservoir is greater than 1,135 cfs, the tunnel's direct flow right will be used to satisfy the agricultural demand from the project canals. To the extent that the inflow to Blue Mesa is less than 1,135 cfs, the UVWUA will call for storage releases from its exchange account in Blue Mesa Reservoir.

- If the tunnel is flowing full (either with direct flow or storage water) the agricultural demand is not fully satisfied, and then storage releases are made from Ridgway Reservoir (first from the exchange account and then from its own allocation of Dallas Creek Project water).

2.8.8. Conclusions and Recommendations

The operations of the Uncompahgre Project and its principal operating entity, the UVWUA, play a major role in the administration of water rights and the delivery of water in the Gunnison-Uncompahgre River basins. During Phase IIa, interviews were held with

the Division Engineer, Water Commissioners, and the UVWUA to gain a better understanding of the operational policies related to diversions from the Gunnison River via the Gunnison Tunnel and the distribution of water to the large Project Canals. The WRPM represents the complex operations associated with the "good neighbor" policies of the UVWUA in which its senior rights are subordinated to junior rights in both the Gunnison and Uncompahgre basins. The model is reasonably flexible to allow the user to modify the assumptions related to the good neighbor policies and the priority of use for the reservoir storage accounts available to the UVWUA

2.9. City of Grand Junction

The majority of Grand Junction's municipal water supply is diverted from sources in the Gunnison River drainage. However, return flows from Grand Junction's municipal use accrues to the Colorado River and, therefore, needs to be represented in the Colorado River model.

The City of Grand Junction (Grand Junction) owns water rights on the Colorado River, Gunnison River, and Kannah Creek. The Grand Junction-Colorado River Pipeline (WDID 720644) is the City's point of diversion on the Colorado River. Several alternate points of diversion have been decreed and the Clifton Water District has made absolute a portion of the water right that it acquired (18.57 cfs out of the 100 cfs decreed to the pipeline). Grand Junction does not rely on this water right as a source of supply and the remainder of the water right is still conditional (81.43 cfs).

Grand Junction will occasionally divert water directly from the Gunnison River using the Grand Junction-Gunnison River Pipeline (WDID 420520). At this time, only 18.6 cfs out of the decreed 120 cfs water right has been made absolute. This Gunnison River source is used as a standby and emergency source of supply.

The primary source of supply is an integrated system of reservoirs and pipelines in the Kannah Creek Basin, a tributary of the Gunnison River (upstream of the USGS stream gage No. 09152500). Principal features of this system include the City Ditch, Hallenbeck Reservoir, Juniata Reservoir, the Purdy Mesa Flow Line, and the Kannah Creek Flow Line. Grand Junction diverts water from the North Fork of Kannah Creek through the City Ditch (WDID 450512). This ditch feeds the Hallenbeck and Juniata Reservoirs. The Purdy Mesa Flow Line is used to convey water from these reservoirs to the Grand Junction's water treatment plant. The Kannah Creek Flow Line (a.k.a. City of Grand Junction Pipeline (WDID 420513)) diverts from the mainstem of Kannah Creek and extends to the water treatment plant. It is not physically connected to Hallenbeck or Juniata Reservoirs. According to Grand Junction personnel, the Kannah Creek source is used to meet most of Grand Junction's municipal demand. However, water from the City Ditch source is desirable because Hallenbeck and Juniata reservoirs provide a level of pre-treatment benefit. Grand Junction tries to keep the reservoirs full year around.

The City of Grand Junction provided monthly records of its treated water production for the entire CRDSS study period, October 1974 through September 1991. These data were compared to the diversion data available from the State database. Although reasonably

similar, there were significant variances in the data in many years. To resolve the issue, it was decided to populate the CRDSS database with the municipal diversion data provided by Grand Junction.

3. Gunnison River Structure Information and Basin Meeting Notes

This section contains information that was gathered during the initial CDSS development phase, regarding specific, individual diversion structures. The objective at the time was to identify which structures should be included explicitly in the water resources planning model of the Gunnison River. The information is historical, reflecting the thinking and conditions at the time. It is valuable, however, for its detail on specific structures from those who have observed the diversions systems and have first-hand familiarity with their operations.

3.1. Annotated Structure Listing

The table in this appendix lists the structures in the database that were considered for modeling explicitly in the Gunnison Model. The initial key structure list was selected in an attempt to explicitly represent 75 percent of the decreed water rights in the river basin. This initial list was further refined through meetings and correspondence with the division engineers and Water Commissioners and examination of data available from the database.

The initial cut-off value for the Gunnison River basin was 9 cfs. Some structures with net absolute decree amounts smaller than this were included in the model because they were deemed important to the administration of the river by the Division Engineer's Office. Table 3.1 lists initial structures in the Gunnison River basin from the database, with comments next to those structures that were unusual or not included in the model.

Table 3.1
Gunnison Basin Diversion Structures with Water Rights ≥ 9 cfs

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
620617	GUNNISON TUNNEL&S CANAL	1135.000	0.05160	Yes	
410545	UNCOMPAHGRE CEDAR CR VD	926.960	0.09375	Yes	
400549	FRUITLAND CANAL	537.138	0.11817	Yes	
590541	CRESTED BUTTE LTD PL	447.366	0.13851	No	Less than cutoff
401133	FIRE MT CANAL	238.000	0.14933	Yes	
410610	DRY CREEK FEEDER D	220.000	0.15933	No	Less than cutoff
410534	IRONSTONE DITCH	202.727	0.16855	Yes	
620560	CIMARRON CANAL	185.000	0.17696	Yes	
590569	GUNNISON&OHIO CR CANAL	169.160	0.18465	Yes	
400500	CRAWFORD CLIPPER DITCH	164.316	0.19212	Yes	
280510	ARCH IRRIGATING DITCH	150.000	0.19894	Yes	
400509	ASPEN CANAL	150.000	0.21940	Yes	
400585	OVERLAND DITCH	150.000	0.20576	Yes	
400605	SMITH FORK FEEDER CANAL	150.000	0.21258	Yes	
591084	ROARING JUDY SPG & SEEP	139.500	0.22575	No	Less than cutoff
590549	EAST RIVER NO 1 DITCH	137.075	0.23198	Yes	
280680	S DAVIDSON&CO FDR D NO 3	120.460	0.23746	Yes	
400661	SURFACE CR D AKA BIG D	116.340	0.24275	Yes	

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
400926	LEROUX CREEK DITCH	109.058	0.24770	No	combined w/401133
400944	OVERLAND DITCH	107.720	0.25260	Yes	
590570	GUNNISON R OHIO CR IRG D	101.072	0.25720	Yes	
410527	GARNET DITCH	93.330	0.26144	Yes	
280651	MESA LATERAL DITCH	93.000	0.26567	Yes	
400503	GRANDVIEW CANAL	90.500	0.26978	Yes	
420529	KANNAH CREEK HIGHLINE D	89.150	0.27384	Yes	
410559	SELIG DITCH	86.642	0.27778	Yes	
400751	ALFALFA DITCH	85.350	0.28166	Yes	
400502	SADDLE MT HIGHLINE D	83.720	0.28546	Yes	
410718	UNCOMPAHGRE D	81.520	0.28917	No	Less than cutoff
401206	STEWART DITCH	77.040	0.29267	Yes	
590572	GUNNISON TOWN DITCH	75.025	0.29608	Yes	
590607	KELMEL OWENS NO 1 DITCH	74.250	0.29946	Yes	
590617	LONE PINE DITCH	71.798	0.30272	Yes	
401809	FIRE MT CANAL	70.000	0.30591	No	Combined w/401133
590501	ACME DITCH	70.000	0.30909	Yes	
590625	MAY BOHM & ENLD M B H P	70.000	0.31227	Yes	
280686	SMITH FORD NO 2 DITCH	66.100	0.31528	Yes	
620528	BIG BLUE DITCH	66.000	0.31828	Yes	
410564	SPRING CREEK VALLEY D	65.100	0.32124	No	Less than cutoff
400863	BONAFIDE DITCH	65.000	0.32419	Yes	
410983	IRONSTONE EXTENSION D	61.200	0.32697	No	Less than cutoff
410520	EAST CANAL	60.440	0.32972	Yes	
400821	TRANSFER DITCH	60.000	0.33518	Yes	
620768	SWANK FISH POND D NO 1	60.000	0.33245	No	Less than cutoff
401020	MINNESOTA CANAL	59.857	0.33790	Yes	
400508	ASPEN DITCH	57.500	0.34051	Yes	
280674	PIONEER DITCH	57.060	0.34311	Yes	
280624	LOCKWOOD MUNDELL DITCH	56.600	0.34568	Yes	
590571	GUNNISON TOMICHI VLY D	56.085	0.34823	No	No acreage
400504	CEDAR CANON IRON SPR D	54.588	0.35071	Yes	
420528	JUNIATA DITCH 1ST ENL	54.000	0.35317	No	Less than cutoff
590608	KELMEL OWENS NO 2 DITCH	53.926	0.35562	Yes	
400923	HIGHLINE DITCH	53.870	0.35807	Yes	
400686	LONE PINE DITCH	53.000	0.36048	Yes	
590578	HARRIS BOHM POTATO DITCH	52.950	0.36289	Yes	
280671	PARLIN QUARTZ CREEK D	51.900	0.36525	Yes	
401426	BIG MONITOR NO 1 DITCH	51.850	0.36760	No	Less than cutoff
400900	RELIEF DITCH	51.000	0.36992	Yes	
621049	LUCKY CHANCE PL & RES	50.297	0.37221	No	Less than cutoff
401631	GUNNISON PIPE LINE	50.000	0.37676	No	Less than cutoff
620561	CIMARRON FEEDER GARNET D	50.000	0.37448	No	Combined w/620560
400754	BUTTES DITCH	49.850	0.37902	Yes	
400891	NORTH DELTA CANAL	49.675	0.38128	Yes	
404657	DIVIDE CR HL FEEDER D	49.560	0.38353	No	Less than cutoff
590563	GLEASON IRRIGATING DITCH	49.323	0.38578	Yes	
590651	PILONI DITCH	49.175	0.38801	Yes	
590668	SEVENTY FIVE DITCH	48.150	0.39020	Yes	
280533	COCHETOPA MEADOWS DITCH	48.000	0.39238	No	No acreage
590691	TEACHOUT DITCH	47.750	0.39456	Yes	
420509	BRANDON DITCH	47.560	0.39672	No	Less than cutoff
410537	LOUTSENHIZER DITCH	46.832	0.39885	Yes	
280568	GOVERNMENT DITCH	46.000	0.40303	Yes	

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
590875	EAST RIVER LABORATORY	46.000	0.40094	No	Less than cutoff
280515	BIEBEL DITCHES NOS 1&2	45.994	0.40512	Yes	
410532	HAIRPIN LTL D	45.000	0.40717	No	combined w/620650
410571	UNCOMPAHGRE CEDAR CR D	44.100	0.40917	No	Less than cutoff
400879	HARTLAND DITCH	43.830	0.41117	Yes	
401196	SHORT DITCH	43.500	0.41314	Yes	
590550	EAST RIVER NO 2 DITCH	43.370	0.41511	Yes	
590546	DILLSWORTH DITCH	43.034	0.41707	Yes	
400501	NEEDLE ROCK DITCH	42.915	0.41902	Yes	
590623	MARSHALL NO 2 DITCH	42.210	0.42094	Yes	
590556	FISHER DITCH ENLARGEMENT	42.200	0.42286	Yes	
590602	JOHN B OUTCULT NO 2 D	41.950	0.42477	Yes	
591198	MESA DITCH	41.600	0.42666	No	Less than cutoff
280668	OWEN REDDEN DITCH	41.510	0.42855	Yes	
401065	WEST RES SUPPLY D EXT	41.000	0.43041	No	Less than cutoff
680861	GLACIER D WATER RIGHT	41.000	0.43227	No	Less than cutoff
590613	LAFAYETTE DITCH	40.611	0.43412	No	No acreage
590558	FRANK ADAMS NO 1 DITCH	40.175	0.43595	Yes	
401810	FIRE MT CANAL	40.000	0.43777	No	combined w/401133
590522	BOCKER DITCH	39.650	0.43957	Yes	
680501	ALKALI DITCH D NO80	39.500	0.44136	Yes	
680543	DALLAS DITCH	39.250	0.44315	Yes	
280576	GULLETT TOMICHI IRG D	39.000	0.44492	Yes	
590596	HYZER VIDAL MILLER D	38.434	0.44667	Yes	
590704	WHIPP DITCH	37.000	0.44835	No	No acreage
680502	ALKALI NO 2 DITCH	36.710	0.45002	Yes	
410549	OURAY DITCH	36.020	0.45166	Yes	
590699	VERZUH DITCH	36.000	0.45330	Yes	
591596	ROARING JUDY W DIVERSION	35.875	0.45493	No	Less than cutoff
680657	MCDONALD DITCH NO 145	35.820	0.45656	Yes	
420510	BROWN & CAMPION D	35.810	0.45818	Yes	Less than cutoff
420554	LAURENT DITCH	34.720	0.45976	No	Less than cutoff
400670	YOUNGS CREEK FEEDER D	34.000	0.46131	No	Use unknown
590591	HOPE RESICH DITCH	33.500	0.46283	Yes	
590645	OTIS MOORE DITCH	33.000	0.46583	Yes	
590700	VERZUH YOUNG BIFANO D	33.000	0.46433	Yes	
620529	BIG DITCH	33.000	0.46733	Yes	
400914	ALLEN MESA DITCH	32.970	0.46883	No	transferred
410519	EAGLE DITCH	32.810	0.47032	Yes	
280693	STEPHENSON DITCH	32.700	0.47181	Yes	
401189	PAONIA DITCH	32.290	0.47328	Yes	
401185	NORTH FORK FARMERS D	32.130	0.47474	Yes	
590516	BEAR GULCH DITCH	32.000	0.47619	No	No acreage
280566	GOODRICH DITCH	31.990	0.47910	Yes	
280687	SNYDER DITCHES NOS 1&2	31.990	0.47765	No	No acreage
590686	SUN CREEK DITCH	31.879	0.48055	No	Less than cutoff
401271	PATTERSON DITCH	31.632	0.48199	No	Less than cutoff
401437	HAWKINS DITCH	31.000	0.48481	Yes	
620672	MCKINLEY DITCH ENL	31.000	0.48340	Yes	
590580	HENRY PURRIER OHIO CR D	30.600	0.48620	Yes	
590679	SPRING CR IRG DITCH	30.480	0.48759	Yes	
680759	TIERRA COLO DITCH	30.020	0.48895	No	Less than cutoff
400730	NORTH DELTA CANAL	30.000	0.49168	No	combined w/400891
410501	BALDY DITCH	30.000	0.49031	No	Less than cutoff

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
590585	HIGHLINE DITCH	30.000	0.49304	No	Less than cutoff
620599	FISH CREEK NO 1 FEEDER D	30.000	0.49577	No	Less than cutoff
620769	SWANK FISH POND D NO 2	30.000	0.49441	No	Less than cutoff
280690	SORRENSON IRRIGATING D	29.500	0.49845	Yes	
400632	CHILDS DITCH	29.500	0.49711	Yes	
420506	BOLEN A & J DITCH	29.390	0.49979	No	Less than cutoff
590560	GARDEN DITCH	29.300	0.50112	No	No acreage
280631	MCCANNE NO 1 DITCH	29.093	0.50244	Yes	
401209	TERROR DITCH EXTENSION	29.000	0.50376	No	Less than cutoff
400759	FOGG DITCH	28.920	0.50508	No	No acreage
400935	PETERSON CARR&BARROW D	28.810	0.50639	No	Less than cutoff
410544	MOCK FEEDER DITCH	28.690	0.50900	No	Less than cutoff
420545	SMITH IRR DITCH	28.690	0.50769	Yes	
590600	JAMES WATT DITCH	28.500	0.51029	Yes	
400675	CEDAR MESA DITCH	28.075	0.51157	Yes	
410550	RESERVATION DITCH	28.040	0.51284	No	Less than cutoff
590588	HINKLE HAMILTON DITCH	28.000	0.51412	Yes	
590616	LIGHTLEY D & LINTON ENLT	28.000	0.51539	Yes	
401172	LOST CABIN DITCH	27.500	0.51664	Yes	
590671	SIMINEO DITCH	27.500	0.51789	Yes	
402392	WEST RES SUP D EX NO 2	27.300	0.51913	No	Less than cutoff
280715	WOOD AND GEE DITCH	27.000	0.52036	Yes	
680710	RIDGWAY DITCH	27.000	0.52159	Yes	
410517	PURDY AND VICKERS DITCH	26.920	0.52281	No	Less than cutoff
620708	PINE CREEK DITCH	26.610	0.52402	No	Less than cutoff
280550	DUNN AND WATTERS DITCH	26.500	0.52643	Yes	
620569	COOPER NO 2 D	26.500	0.52523	No	Less than cutoff
400929	JESSIE DITCH	26.055	0.52761	Yes	
590527	BUCKEY DITCH	26.000	0.53234	Yes	
590537	CEMENT CREEK DITCH	26.000	0.52998	Yes	
590660	ROARING JUDY DITCH	26.000	0.52880	No	No acreage
590711	WILSON OHIO CREEK DITCH	26.000	0.53353	Yes	
620670	M B & A DITCH ENLT	26.000	0.53116	Yes	
280632	MCCANNE 2 DITCH	25.328	0.53468	Yes	
590658	RICHARD BALL DITCH	25.300	0.53583	Yes	
280587	HOME DITCH DITCH NO 81	25.000	0.53810	Yes	
284656	TARBELL DITCH	25.000	0.54151	No	Less than cutoff
400820	STELL DITCH	25.000	0.54265	Yes	
401105	COYOTE DITCH	25.000	0.54037	Yes	
401110	DEADMANS GULCH D	25.000	0.53924	No	Less than cutoff
591531	SHEEP POND DITCH	25.000	0.53696	No	Less than cutoff
410604	COLOROW DITCH	24.640	0.54377	No	Less than cutoff
400797	DURKEE DITCH	24.500	0.54488	Yes	
590542	CUNNINGHAM DITCH	24.375	0.54599	No	Less than cutoff
591011	MESA CR DITCH	24.000	0.54817	No	Less than cutoff
680636	LODGE RES FEEDER CANAL	24.000	0.54708	Yes	
280658	NEEDLE CREEK DITCH	23.990	0.54926	No	Less than cutoff
680669	MOODY NO1 DITCH	23.937	0.55035	Yes	
410510	BULLOCK PLANT PIPELINE	23.600	0.55142	No	Less than cutoff
280581	HAZARD DITCH	23.150	0.55248	Yes	
590692	TEACHOUT-FAIRCHILD DITCH	23.000	0.55457	No	No acreage
680602	HEATH DITCH	23.000	0.55352	No	No acreage
280869	PISEL CANALS NOS 1&2 D	22.980	0.55561	No	Less than cutoff
680692	PINION DITCH	22.725	0.55665	Yes	

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
591098	RUSTLER GULCH LAB	22.500	0.55869	No	Less than cutoff
680738	SNEVA DITCH	22.500	0.55767	Yes	
590653	POWER DITCH	22.356	0.55971	Yes	
401435	EVERLASTING DITCH	22.250	0.56072	No	Less than cutoff
410554	ROSS BROS DTICH	22.250	0.56173	Yes	
400774	ORCHARD RANCH DITCH	22.150	0.56274	Yes	
420536	NORTHWESTERN DITCH	22.070	0.56374	No	Less than cutoff
280520	CAIN BORSUM DITCH	22.000	0.56674	No	
400791	CIRCLE DITCH	22.000	0.56474	No	Less than cutoff
620779	UPPER CEBOLLA DITCH	22.000	0.56574	Yes	
280610	KENNEDY DITCHES NO 1 & 2	21.750	0.56773	No	No acreage
280675	PURRIER IRRIGATING DITCH	21.500	0.56871	No	No acreage
590566	GOOSEBERRY MESA IRG D	21.473	0.56969	Yes	
620774	TABOR NO 2 DITCH	21.410	0.57066	No	
280637	MCDOWELL VAN TUYL NO 2 D	21.000	0.57257	No	No acreage
401218	WELCH MESA DITCH	21.000	0.57352	Yes	
680685	PARK DITCH	21.000	0.57161	Yes	
280526	CHITTENDEN DITCH ENLT	20.900	0.57447	No	
410515	CHIPETA BEAUDRY DITCH	20.820	0.57542	Yes	
680703	REED OVERMAN DITCH	20.750	0.57636	Yes	
280707	TORNAY HIGHLINE DITCH	20.700	0.57730	Yes	
590606	JUDY NORTH HIGH LINE D	20.500	0.57917	Yes	
590672	SLIDE DITCH	20.500	0.57824	Yes	
401479	PORTER RES NO 1 FEEDER D	20.400	0.58010	No	Less than cutoff
280871	PITKIN PIPELINE NO 7	20.120	0.58101	No	Less than cutoff
410566	STARK VOLKMAN DITCH	20.070	0.58192	No	Less than cutoff
400538	CASTLE PEAK DITCH	20.000	0.58374	No	Less than cutoff
400893	ORCHARD CITY IRR DIST PP	20.000	0.58556	No	Less than cutoff
420573	DEEP CR RES #2 SUP D	20.000	0.59011	No	Less than cutoff
590635	MEADS DITCH NO 1	20.000	0.58738	No	Less than cutoff
590665	SCHNEIDER DITCH NO 2	20.000	0.59193	No	No acreage
591140	SQUAW CREEK DITCH	20.000	0.59102	No	Less than cutoff
591467	PONDEROSA DITCH & POND	20.000	0.58465	No	Less than cutoff
591597	ROARING JUDY E DIVERSION	20.000	0.58920	No	Less than cutoff
620595	FERRARO DITCH NO 2	20.000	0.58829	No	Less than cutoff
620653	LAKE FORK NO 1 DITCH	20.000	0.58283	No	Less than cutoff
680672	N FORK OF THE PAXTON D	20.000	0.58647	No	Less than cutoff
410524	SEEPAGE FEEDER DITCH	19.900	0.59283	No	Less than cutoff
400586	PILOT ROCK DITCH	19.801	0.59373	Yes	
401132	FILMORE DITCH	19.750	0.59463	Yes	
590967	JOHN B OUTCALT NO 1D E&E	19.700	0.59553	No	Less than cutoff
280567	GOODWIN AND WRIGHT DITCH	19.599	0.59642	No	No acreage
280654	MONSON & MCCONNELL D	19.525	0.59730	Yes	
680559	DOC WADE DITCH	19.250	0.59818	Yes	
620542	BUTTE & BUTTE EX DITCH	19.170	0.59905	No	No acreage
280532	COATS BROS DITCH	19.152	0.59992	Yes	
590927	GUN ISLAND AC INC DITCH	19.000	0.60165	No	Less than cutoff
620593	E P WILSON NO 3 PUMP&D	19.000	0.60079	No	Less than cutoff
280703	TARBELL&ALEXANDER NO1 D	18.970	0.60251	Yes	
400536	DAISY DITCH	18.855	0.60337	Yes	
280636	MCDONOUGH DITCH	18.600	0.60506	Yes	
410530	GRAYS CREEK DITCH	18.600	0.60591	No	Less than cutoff
420520	GRAND JCT GUNNISON PL	18.600	0.60421	Yes	
410683	MONTROSE CITY DITCH	18.500	0.60675	No	Less than cutoff

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
280650	MEANS BROS NO 8 DITCH	18.000	0.60920	Yes	
400510	ASPEN CR DITCH	18.000	0.61002	No	Less than cutoff
400972	DEEP CREEK DITCH	18.000	0.60757	No	Less than cutoff
590863	DOLLARD DESERT LAND D	18.000	0.60838	No	Less than cutoff
280704	TARKINGTON DITCH	17.921	0.61084	No	Less than cutoff
400808	MORTON DITCH	17.870	0.61165	Yes	
400588	POISON SPRINGS DITCH	17.500	0.61324	No	Less than cutoff
590631	MCGLASHAN S SIDE MILL CR	17.500	0.61244	Yes	
591218	F E AND A C JARVIS DITCH	17.250	0.61402	No	Less than cutoff
680767	VANCE DITCH	17.125	0.61480	No	
400758	FORREST DITCH	17.000	0.61558	Yes	
401778	STEWART MINN CR DIVR D	17.000	0.61635	No	Less than cutoff
280542	CUTJO DITCH	16.640	0.61710	Yes	
280670	PARLIN NO 2 DITCH	16.500	0.61936	Yes	
400692	SOONER DITCH	16.500	0.61860	No	Less than cutoff
590622	MARSHALL NO 1 DITCH	16.500	0.61785	Yes	
400932	MIDKIFF & ARNOLD D	16.400	0.62010	Yes	
680763	TRENCHARD DITCH	16.250	0.62084	No	Less than cutoff
400557	HARTMAN MCINTYRE DITCH	16.100	0.62157	No	Less than cutoff
400778	SETTLE DITCH	16.100	0.62230	Yes	
401195	SHEPARD & WILMONT DITCH	16.075	0.62303	Yes	
280667	OWEN NO 1 DITCH	16.000	0.62522	Yes	
280719	A B COATS DITCH	16.000	0.62813	No	Less than cutoff
284001	COLE D COLE&C D COLE RES	16.000	0.62594	No	Less than cutoff
590599	ISLAND DITCH	16.000	0.62449	No	Less than cutoff
590644	OHIO CREEK NO 2 DITCH	16.000	0.62376	Yes	
680604	HIELAND DITCH	16.000	0.62667	No	No acreage
680756	THOMAS COW TRAIL DITCH	16.000	0.62740	No	Less than cutoff
590592	HORACE G MCMILLIAN DITCH	15.999	0.62885	No	Less than cutoff
410508	BOLES A MANNEY D	15.980	0.62958	Yes	
420613	MCDONALD DITCH	15.950	0.63031	No	Less than cutoff
280536	COX AND MCCONNELL DITCH	15.885	0.63103	Yes	
590595	HYZER KETCHUM DITCH	15.847	0.63175	No	Less than cutoff
400918	COW CREEK DITCH	15.800	0.63319	Yes	
590593	HOWE & SHERWOOD IRR D	15.800	0.63247	Yes	
280554	ELSEN VADER DITCH	15.750	0.63390	Yes	
620570	COPELAND ELK CR D ENL	15.700	0.63462	No	Less than cutoff
590598	IMOBERSTEG WILLOW CR D	15.625	0.63533	No	Less than cutoff
280591	HUFF AND DICE DITCH	15.600	0.63674	No	No acreage
620783	VEO DITCH ENL	15.600	0.63603	Yes	
280580	HAWES-BERGEN-GILBERTSON	15.500	0.63815	Yes	
620732	RUDOLPH IRR DITCH	15.500	0.63745	Yes	
590931	GUNNISON TOWN PIPELINE	15.355	0.63885	No	Less than cutoff
410558	SATISFACTION DITCH	15.231	0.63954	Yes	
280635	MCDONNELL IRRIGATING D	15.200	0.64024	Yes	
680610	HOSNER ROWELL DITCH	15.195	0.64093	Yes	
280673	PERRY IRRIGATING DITCH	15.100	0.64161	Yes	
280887	ROCK CREEK DITCH	15.000	0.65048	No	Less than cutoff
400933	NEWMAN DITCH	15.000	0.64843	No	Less than cutoff
400947	GRANBY NO 12 DITCH	15.000	0.64707	No	Less than cutoff
401103	COLUMBINE DITCH NO 4	15.000	0.64775	No	Less than cutoff
401184	NORRIS DITCH	15.000	0.65457	No	Less than cutoff
401212	TWIN SPRUCE DITCH	15.000	0.65116	No	Less than cutoff
410538	LYRA DITCH	15.000	0.64980	Yes	

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
410631	F. J. LATERAL	15.000	0.65389	No	Less than cutoff
410671	LOGAN DITCH	15.000	0.64639	No	Less than cutoff
590503	AHRENS DITCH	15.000	0.64434	No	Less than cutoff
590544	DEAN IRRIGATING DITCH	15.000	0.65184	Yes	
590667	SCHUPP DITCH	15.000	0.64911	Yes	
590684	STRAND DITCH NO 1	15.000	0.65321	Yes	
590774	BIG SOAP PARK DITCH	15.000	0.64570	No	Less than cutoff
591182	WILD WOOD PARK DITCH	15.000	0.64229	No	Less than cutoff
620547	CARR DITCH	15.000	0.64298	No	Less than cutoff
680514	BURKHART EDDY DITCH	15.000	0.64366	Yes	
680526	CHARLEY LOGAN DITCH	15.000	0.64502	Yes	
680652	MAYOL LATERAL DITCH	15.000	0.65252	Yes	
280571	GRIFFING NO 1 DITCH	14.933	0.65525	Yes	
400554	GOVE DITCH	14.853	0.65592	No	Less than cutoff
590567	GRAY-TANNER ANTELOPE CR	14.700	0.65659	No	Less than cutoff
401213	VANDEFORD DITCH	14.500	0.65857	Yes	
590523	BOTTENFIELD DITCH	14.500	0.65791	No	Less than cutoff
590829	COLUMBINE DITCH	14.500	0.65725	No	Less than cutoff
280716	WOODBRIDGE DITCH	14.400	0.65923	Yes	
400533	CRYSTAL VALLEY DITCH	14.350	0.65988	Yes	
420504	BAUER DITCH	14.180	0.66052	No	Less than cutoff
410954	SILVER SPRINGS DITCH	14.160	0.66117	No	Less than cutoff
620525	BEAVER CREEK DITCH	14.040	0.66180	No	Less than cutoff
280500	ADAMS NO 1 DITCH	14.000	0.66562	No	No acreage
590524	BOURNE DITCH	14.000	0.66753	No	Less than cutoff
590529	CARBON DITCH	14.000	0.66626	No	Less than cutoff
590590	HOME DITCH	14.000	0.66690	No	Less than cutoff
590649	PASS CREEK DITCH	14.000	0.66817	Yes	
620605	FRANK ADAMS D NO 2	14.000	0.66435	Yes	
620639	HUNTER ELK CREEK DITCH	14.000	0.66244	No	Less than cutoff
620776	THOMPSON IRR DITCH	14.000	0.66371	No	Less than cutoff
680508	BETTY DITCH	14.000	0.66308	No	Less than cutoff
680607	HOMESTRETCH DITCH	14.000	0.66499	Yes	
590554	ELZE WEBBER DITCH	13.956	0.66880	No	Less than cutoff
280709	VADER RAUSIS DITCH	13.840	0.66943	Yes	
590847	CUNNINGHAM WASTEWATER D	13.795	0.67006	No	Less than cutoff
280679	ROGERS METROZ DITCH	13.767	0.67069	Yes	
410560	SHAVANO VALLEY DITCH	13.750	0.67131	Yes	
410509	BUCKSKIN DITCH	13.660	0.67193	No	Less than cutoff
620612	GEORGE ANDREWS NO 1 D	13.600	0.67255	No	Use unknown
280564	GILBERTSON NO 1 DITCH	13.500	0.67501	Yes	
401208	TERROR DITCH	13.500	0.67378	No	Less than cutoff
590609	KUBIACK DITCH	13.500	0.67317	Yes	
681064	VON HAGEN LATERAL DITCH	13.500	0.67439	No	Less than cutoff
400543	DYER FORK DITCH	13.250	0.67561	Yes	
280593	IRWIN DITCH	13.200	0.67621	No	Less than cutoff
401207	STREBER DITCH	13.120	0.67681	Yes	
680613	HYDE SNEVA DITCH	13.083	0.67740	Yes	
420530	KANNAH CREEK EXT D	13.070	0.67799	No	Less than cutoff
620567	COLLIER DITCH ENL	13.050	0.67859	Yes	
280662	OFALLON NO 3 DITCH	13.000	0.67977	Yes	
401115	DITCH NO 3 DITCH	13.000	0.68095	No	Less than cutoff
410702	SANBURG DITCH	13.000	0.68213	No	Less than cutoff
590707	WILLOW RUN DITCH	13.000	0.68036	No	Less than cutoff

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
620620	HAZEL DITCH	13.000	0.67918	No	Less than cutoff
680765	UPPER UNCOMPAHGRE DITCH	13.000	0.68154	Yes	
680770	VON HAGEN DALLAS DITCH	13.000	0.68273	Yes	
590678	SPANN NETTICK DITCH	12.992	0.68332	No	Less than cutoff
590564	GOODWIN KNOX DITCH	12.975	0.68391	No	Use unknown
400701	CEDAR PARK DITCH	12.870	0.68449	Yes	
590594	HYZER DITCH	12.866	0.68508	No	Less than cutoff
590670	SILKA DITCH	12.800	0.68566	No	Less than cutoff
420549	WASHBURN & DOWNING DITCH	12.770	0.68624	No	Less than cutoff
680681	OLD AGENCY DITCH	12.750	0.68682	Yes	
620501	A DOERING SPR CR D	12.640	0.68739	No	Less than cutoff
410692	R D COREY FDR L & R	12.520	0.68796	No	Less than cutoff
280572	GRIFFING NO 2 DITCH	12.500	0.68853	No	combined w/280571
401414	FEEDER DITCH	12.500	0.68967	No	Less than cutoff
590528	BUCKEY LEHMAN DITCH	12.500	0.68910	No	Use unknown
620613	GEORGE ANDREWS NO 2 D	12.500	0.69024	No	Use unknown
410568	SUNRISE DITCH(HAPPY CYN)	12.420	0.69137	Yes	
620574	CRAIG DITCH	12.420	0.69080	No	Less than cutoff
680538	CRONENBURG DITCH	12.250	0.69192	Yes	
680511	BROWN DITCH	12.125	0.69247	No	Less than cutoff
280577	HANNAH J WINTERS NO 2D	12.090	0.69302	Yes	
620688	MOORE DITCH	12.027	0.69357	No	Less than cutoff
280501	ADAMS NO 2 DITCH	12.000	0.70066	No	
280660	NORMAN DITCH	12.000	0.70339	Yes	
280692	SOUTH SIDE DITCH	12.000	0.70394	Yes	
280711	WATERMAN METROZ DITCH	12.000	0.69739	No	Less than cutoff
280713	WEDDLE DITCH	12.000	0.69957	No	Less than cutoff
400576	MEEK DIVERSION TUNNEL	12.000	0.69630	No	Less than cutoff
401056	TURNER DITCH	12.000	0.70557	Yes	
401222	WM CR FEEDER DITCH	12.000	0.70012	No	Less than cutoff
401428	DAVIS BROS DITCH	12.000	0.70284	No	Less than cutoff
410721	WEST MONTROSE DITCH	12.000	0.69466	No	Less than cutoff
410746	HAIRPIN DITCH	12.000	0.69903	No	Less than cutoff
420750	ROGERS DITCH ENL	12.000	0.70121	No	Less than cutoff
590512	APRIL DITCH	12.000	0.70175	No	No acreage
590535	CASTLETON DITCH	12.000	0.70448	No	Less than cutoff
590709	WILSON DITCH	12.000	0.69412	No	Less than cutoff
620640	INDEPENDENCE IRR DITCH	12.000	0.69848	No	Less than cutoff
620641	INDIAN CREEK IRR DITCH	12.000	0.69521	No	Less than cutoff
620642	JOHN A ADAMS DITCH	12.000	0.69575	No	Less than cutoff
620743	SCHNEPF HIGHLINE DITCH	12.000	0.70230	No	Less than cutoff
680566	EDGAR WILLIAMS DITCH	12.000	0.69793	No	Less than cutoff
680603	HENRY TRENCHARD DITCH	12.000	0.70503	Yes	
680683	OWL CREEK DITCH	12.000	0.69684	Yes	
590624	MARSTON DITCH	11.996	0.70612	Yes	
590638	MERIDIAN DITCH	11.769	0.70665	No	Less than cutoff
680653	MAYOL SISSON DITCH	11.750	0.70719	Yes	
420513	GRAND JCT F L & W W	11.720	0.70772	No	Less than cutoff
280530	CLOVIS METROZ NO 1 DITCH	11.500	0.70981	Yes	
280579	HARTMAN WASTE WTR IRG D	11.500	0.71086	No	Waste ditch
400852	SANBURG DITCH	11.500	0.70929	No	Less than cutoff
401236	GRANBY PICKUP DITCH	11.500	0.71033	No	Less than cutoff
590751	BEITLER DITCH NO 2	11.500	0.70824	No	Less than cutoff
620685	MINERAL CREEK NO 2 D	11.500	0.70877	No	Less than cutoff

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
400919	CURRANT CREEK DITCH	11.375	0.71137	Yes	
680720	ROSWELL HOTCHKISS DITCH	11.375	0.71189	Yes	
420533	MIRROR NO 1 DITCH	11.250	0.71240	No	Less than cutoff
400683	HORSESHOE DITCH	11.240	0.71291	Yes	
280684	SHIPMAN LATERALS NO 1&2	11.200	0.71393	No	No acreage
620703	OSCAR RICHARDS DITCH EXT	11.200	0.71342	No	Less than cutoff
620506	ANDREWS DITCH	11.080	0.71444	No	Less than cutoff
280638	MCGOWAN IRRIGATING D	11.000	0.71494	Yes	
280880	R A PROSSER DITCH	11.000	0.71644	No	Less than cutoff
400713	GRANBY DITCH FR WARD CR	11.000	0.71694	Yes	
401121	DYKE CREEK DITCH	11.000	0.71794	No	Less than cutoff
401434	ENTERPRISE DITCH	11.000	0.71744	No	Less than cutoff
590510	ANNA ROZMAN DITCH	11.000	0.71594	Yes	
620568	COOPER DITCH	11.000	0.71544	Yes	
401027	OAK MESA DITCH	10.995	0.71844	No	Less than cutoff
420512	CITY DITCH	10.970	0.71894	No	Less than cutoff
620537	BRUCE FRANKLIN DITCH	10.850	0.71943	No	Less than cutoff
400942	STULL DITCH	10.800	0.71992	Yes	
680609	HOSNER BROWNYARD DITCH	10.750	0.72041	Yes	
280588	HOME DITCH DITCH NO 182	10.600	0.72089	Yes	
400841	HOOSIER DITCH	10.547	0.72137	No	Less than cutoff
590520	BIEBEL NO 3 DITCH	10.500	0.72233	No	Less than cutoff
590944	HEAD & FERRIER DITCH	10.500	0.72185	No	Less than cutoff
401197	SMITH AND MCKNIGHT DITCH	10.303	0.72279	Yes	
620756	SPRING BRANCH DITCH	10.300	0.72326	No	Less than cutoff
401183	MONITOR DITCH	10.250	0.72373	Yes	
400753	BONITA DITCH	10.193	0.72419	Yes	
401269	LAKE FORK DITCH	10.150	0.72465	No	Less than cutoff
280860	LANDO DITCH	10.100	0.72511	No	Less than cutoff
280529	CLARK NO 3 DITCH	10.000	0.72648	Yes	
280531	CLOVIS METROZ NO 2 DITCH	10.000	0.72739	No	Less than cutoff
280586	HIRDMAN NOS 1 & 2 & 3	10.000	0.73011	No	Less than cutoff
280652	MILLER DITCH	10.000	0.73330	Yes	
280661	NORTHSIDE DITCH	10.000	0.72557	No	Incomplete diversion record
284655	LARKSPUR DITCH	10.000	0.72875	No	Less than cutoff
400568	LONE ROCK DITCH	10.000	0.73875	No	Less than cutoff
400881	HOLLY SUGAR CORP PP	10.000	0.72693	No	Less than cutoff
401012	LONE CABIN DITCH	10.000	0.74057	Yes	
401120	DOWNING DITCH	10.000	0.73193	Yes	
401126	ELK HORN STOMP DITCH	10.000	0.73511	No	Less than cutoff
401168	LEE CREEK D NO 2	10.000	0.74103	Yes	
401313	PUG WHITE DITCH	10.000	0.72920	No	Less than cutoff
401820	KNOX RES FEEDER DITCH	10.000	0.74148	No	Less than cutoff
402444	RELIEF DITCH EXTENSION	10.000	0.73284	No	Less than cutoff
590500	A C JARVIS NO 1 DITCH	10.000	0.73648	No	Less than cutoff
590584	HIGHLAND DITCH	10.000	0.74012	Yes	
590589	HINKLE IRG DITCH	10.000	0.72966	No	Less than cutoff
590627	MCCORMICK DITCH	10.000	0.73557	Yes	
590654	PRESSLER POLISIC DITCH	10.000	0.73375	No	Less than cutoff
590655	PURRIER DITCH	10.000	0.73921	No	Less than cutoff
590680	SQUIRREL CREEK NO1 DITCH	10.000	0.73784	Yes	
590797	CASTLE PK FDR DITCH NO 2	10.000	0.72602	No	Less than cutoff
590820	CASTLE ROCK DITCH	10.000	0.72784	No	Less than cutoff
620509	ARTA SMITH NO 1 D	10.000	0.73830	No	Less than cutoff

WDID	Name of structure	Net Absolute Decreed Amt.	Ranking	Included in Model	Comments
620562	CLIFF IRR DITCH	10.000	0.73239	No	Less than cutoff
620565	COBB-CEBOLLA CR D	10.000	0.73102	No	Less than cutoff
620582	DRY POWDERHORN DITCH	10.000	0.73421	No	Less than cutoff
620722	REECE RICHART NO 1 D	10.000	0.73602	No	Less than cutoff
620738	SAMMONS IRG D NO 6	10.000	0.73966	Yes	
620809	YOUMANS IRG D NO 1	10.000	0.73148	Yes	
621022	LAKE CITY TOWN DITCH	10.000	0.73693	No	Less than cutoff
680587	GIBSON DITCH	10.000	0.73466	No	Less than cutoff
680647	MARTIN DITCH	10.000	0.73739	Yes	
680721	RUFFE WADE DITCH	10.000	0.73057	No	Less than cutoff
680729	SHORTLINE D COW CREEK	10.000	0.72830	Yes	
400946	GRANBY DITCH	9.967	0.74193	No	Less than cutoff
590597	IMOBERSTEG DITCH	9.725	0.74238	Yes	
400616	VIRGINIA DITCH	9.722	0.74282	Yes	
280943	WESTSIDE DITCH	9.700	0.74370	No	Less than cutoff
400703	EAGLE DITCH	9.700	0.74326	Yes	
680668	MOODY DITCH	9.653	0.74414	Yes	
620661	LONE PINE DITCH	9.610	0.74458	No	Less than cutoff
620723	REECE RICHART NO 2 D	9.600	0.74501	No	Less than cutoff
590646	PALISADES DITCH	9.595	0.74545	Yes	
280888	ROCK SLIDE SPRING DITCH	9.590	0.74588	No	Less than cutoff
280602	JOHN B COATS NO 1 DITCH	9.500	0.74675	No	No acreage
620575	CREEDE TRAIL IRR DITCH	9.500	0.74632	No	Less than cutoff
620764	STUBBS GULCH DITCH	9.390	0.74717	No	Less than cutoff
280559	FLICK DITCH NO 1	9.300	0.74802	No	Incomplete diversion record
401317	SPRUCE SPRING DITCH	9.300	0.74760	No	Less than cutoff
620687	MINNIE B NO 2 DITCH	9.300	0.74844	No	Less than cutoff
590720	PIONEER DITCH	9.272	0.74887	No	Less than cutoff
410655	HOMESTAKE DITCH	9.233	0.74928	No	Less than cutoff
590695	TINGLEY DITCH	9.127	0.74970	No	Less than cutoff
280672	PEARCE DITCH	9.000	0.75502	No	No acreage
400506	ALUM GULCH DITCH	9.000	0.75461	Yes	
400592	RAINBOW RUN FISH POND D	9.000	0.75379	No	Less than cutoff
401219	WEST HUBBARD DITCH	9.000	0.75216	No	Less than cutoff
402389	LONE CABIN DITCH EXT 2	9.000	0.75543	No	Less than cutoff
410712	STITELER DITCH	9.000	0.75134	No	Less than cutoff
590581	HENRY PURRIER OHIO CR 2D	9.000	0.75256	No	Use unknown
590587	HILDEBRAND NO 2 DITCH	9.000	0.75011	Yes	
590615	LEHMAN HARRIS DITCH	9.000	0.75093	No	No acreage
590706	WILLOW DITCH	9.000	0.75052	No	Less than cutoff
590912	GEORGE KAPUSHION DITCH	9.000	0.75338	No	Less than cutoff
591180	WEINERT-OWENS CR DITCH	9.000	0.75584	No	Less than cutoff
620523	BAKER EAST SIDE	9.000	0.75420	No	Less than cutoff
620602	FOSTER DITCH NO 1	9.000	0.75175	Yes	
620789	WARRANT DITCH	9.000	0.75297	Yes	

Several structures were added to the model, though they were below the 9.0 cfs cutoff or had no direct diversion off the river. These reflect structures that were deemed as important by the Water Commissioners for river administration (see section 3.2. Basin Meeting Notes for additional information on these structures). These structures are listed in Table 3.2.

Table 3.2
Additional Diversion Structures

#	Model ID#	Name	Cap (cfs)	Area (acres)	Monthly Average System Efficiency (percent)	Average Annual Demand (acre-feet)
9	280535	COLE NOS 1 2 + 3 DITCHES	8	48	12	618
23	280588	HOME DITCH DITCH NO 182	25	25	5	685
24	280604	KANE DITCH	6	120	30	439
25	280607	KENDALL NO 3 DITCH	27	59	18	661
26	280608	KENDALL NO 4 DITCH	11	59	16	605
27	280624	LOCKWOOD MUNDELL DITCH	57	695	46	1571
33	280642	MEANS BROS NO 13 DITCH	15	6	2	533
34	280645	MEANS BROS NO 4 DITCH	5	21	8	335
35	280646	MEANS BROS NO 5 DITCH	4	66	18	398
36	280647	MEANS BROS NO 6 DITCH	8	16	4	488
37	280648	MEANS BROS NO 7 DITCH	5	25	10	346
38	280649	MEANS BROS NO 12 DITCH	12	44	18	574
45	280663	OFALLON NO 4 DITCH	14	26	6	806
54	280681	SARGENTS NO 1 D	5	14	7	389
55	280682	SARGENTS NO 2 D	6	27	14	321
72	400502	SADDLE MTN D	80	1454	56	3594
82	400568	LONE ROCK DITCH	9	19	6	768
119	401087	BLACK SAGE DITCH	4	27	18	457
121	401106	COYOTE DITCH	6	319	60	439
122	401112	DEER DITCH	6	57	23	641
123	401114	DITCH NO 2 DITCH	6	79	45	382
124	401118	DRIFT CREEK DITCH	8	1581	60	581
125	401119	DUGOUT DITCH	2	730	60	228
127	401122	DYKE NO 2 DITCH	4	195	60	200
128	401127	ELKS BEAVER DITCH	7	68	46	337
131	401145	GROUSE CREEK DITCH	5	113	45	463
132	401166	LARSON NO 2 DITCH	7	453	60	692
138	401190	PILOT KNOB DITCH	3	78	54	119
142	401201	SPATAFORA DITCH NO 1	3	5	10	281
146	401214	WADE DITCH	2	115	60	107
148	401221	WILLIAMS CR DITCH	4	445	60	144
180	410577	WEST_CANAL	302	4491	12	56153
181	410578	SOUTH_CANAL	193	5379	24	50846
187	420541	REDLANDS POWER CANAL	610	-999	30	418344
191	590509	ANDERS BOTTOM D	6	65	13	400
262	620604	FOSTER IRR D NO 4	3	68	40	188
268	620733	SAMMONS DITCH	5	13	24	331
269	620734	SAMMONS NO 2 D	6	49	20	538

#	Model ID#	Name	Cap (cfs)	Area (acres)	Monthly Average System Efficiency (percent)	Average Annual Demand (acre-feet)
270	620736	SAMMONS IRR D NO 4	5	25	26	350
271	620737	SAMMONS IRR D NO 5	8	70	32	562
316	950050	REDLANDS_POWER_CANAL-IRR	221	2935	12	65541
317	950051	GRAND_JUNCTION_DEMAND	21	-999	100	6491
318	Fruitl	FRUITLAND	999	7064	59	12708
319	Gunimp		999	-999	0	0
320	IrrCim	CIMMARON_CANAL	999	5959	14	28623
321	Proj_7	PROJECT_7	999	-999	20	5972

3.2. Basin Meeting Notes

Meetings with the Division 4 Engineer and staff were held on June 26 - 27, 1996 to discuss the Gunnison Model. The main purpose of these meetings was to refine the initial list of structures to be modeled and to gain an understanding of the administration of water rights in each basin. Several items still need to be addressed, such as acreage assignments, which were beyond this scope of work. In addition, the following key points were covered:

- Administration issues in each water district
- Irrigation practices
- Irrigation and municipal return flow locations
- Availability of diversion records
- Irrigated acreage estimates

WATER DISTRICT 28

Information for this water district came from Crandall Howard former Water Commissioner in this district. It appears that several structures divert more than what is needed by crop, system efficiencies will quite small. Diversions after 1989 to 1992 should be reviewed carefully. Majority of farms get one cutting with very little irrigating occurring after mid-July. GIS mapping needs to be reviewed to confirm and location return flow location points, where noted.

ID	COMMENTS
500	Water source for the Pioneer ditch(674). DWR personnel need to check acreage assignment.
501	Large diversion, but no acreage. DWR personnel need to check acreage assignment.
510	Large acreage and structure. Flow from Razor & Needle Creeks flow in to this structure. Need to check acreage map for possible return flow locations.
515	Return flow from this structure gets back to Tomichi Creek. Possible that other water may be used on this land. DWR personnel need to check acreage assignment.
520	Large diversions but no acreage. DWR personnel need to check acreage assignment.
526	Large diversions but no acreage. DWR personnel need to check acreage assignment.
529	Diversions less than 9.0 cfs cutoff. Does Clark #1(527) & Clark #2(528) supplement this ditch. DWR personnel need to check acreage assignment.
530	Diverts less than 9.0 cfs cutoff. Diverts out of Quartz Creek. DWR personnel need to check acreage

assignment.

531 TAKE OUT, diverts less than 9.0 cfs cutoff. Diverts out of Quartz Creek.

532 Irrigation returns go straight back to Tomichi Creek.

533

536 Should have acreage, maybe under S. Davidson #3(680) or DA McConnell (543). DWR personnel need to check acreage assignment.

542 Return flow to Quartz Creek.

550 TAKE OUT, diversion records for only two years (1975&1976). DWR personnel need to check acreage assignment.

554 Return to Tomichi Creek.

559 TAKE OUT, diversion records incomplete and acreage small.

564 Operated with Gilbertson #2(565). DWR personnel need to check acreage assignment, look under Gilbertson #2(565).

566 Pick up the return flows from Pioneer Ditch (674). Return flow goes into Goodwin & Wright (567).

567 Should have acreage. Gets return flow from Goodrich (566). DWR personnel need to check acreage.

568 Operated with McDowell Van Tuyl #2(637). Need to combine diversions.

571 Combine with Griffing #2(572). Return flow to Tomichi Creek.

572 See comment under 571. Not sure of return flow source.

576 Returns go to Tomichi Creek. DWR personnel need to check acreage assignment.

577 Returns go to Tomichi Creek.

579 TAKE OUT, waste water ditch.

580 Returns go to Tomichi Creek.

581 More acreage under structure. Lowest diversion on Cochetopa Creek. Returns go to Cochetopa Creek. DWR personnel need to check acreage assignment.

586 Acreage may be closer to 250 acres. Can take all flow in Razor creek along with Kennedy #1&2(610). Returns go to Kennedy #1&2(610). DWR personnel need to check acreage assignment.

587 TAKE OUT, diversions less than the 9.00 cfs cutoff. DWR personnel need to check acreage assignment.

588 TAKE OUT, diversions less than the 9.00 cfs cutoff. DWR personnel need to check acreage assignment.

591 Should have acreage attached. Returns from Lockwood Mundel (624). DWR personnel need to check acreage assignment.

593 TAKE OUT, diversions less than 9.0 cfs cutoff. Should have around 150 acres. Returns go to Los Pinos Creek. DWR personnel need to check acreage assignment.

602 Should have around 50 acres attached. Returns to Tomichi Creek. DWR personnel need to check acreage assignment.

610 No acreage assigned. No diversion record from 1975-1976. Starting in 1990 diversions were recorded as Kennedy #1(806) & Kennedy #2(807). This structure along with Hirdman #'s1-3 can dry stream. Returns to Razor Creek. DWR personnel need to check acreage assignment.

624 Return flows go to Huff & Dice (591).

631 Return flows go back to Tomichi Creek.

632 Return flows go back to Tomichi Creek.

635 Return flows go back to Quartz Creek.

636 Return flows go back to Los Pinos Creek. Reservoir supplies water during late season, August & September. Talk with Water Commissioner about the use of S Davidson & Co. Feeder#3(680).

637 Irrigates same land as Government (568). Need to look at map to see if diversions need to be combined. DWR personnel need to check acreage assignment.

638 Acreage seems low for the amount of diversions. Returns go back to Tomichi Creek. DWR personnel need to check acreage assignment.

650 Return flows go back to Tomichi Creek.

651 Return flows go back to Cochetopa Creek.

652 Return flows go back to Los Pinos. Does this get reservoir water like McDonough (636), diversions in August & September?

654 Return flows go back to Tomichi Creek.

658 TAKE OUT, diversions less than the 9.0 cfs cutoff.

660 TAKE OUT, diversions less than the 9.0 cfs cutoff and small acreage.

661 TAKE OUT, diversion records are not complete. 1979-1989 missing. DWR personnel need to check acreage assignment.
662 Acreage seems small compared to diversions. DWR personnel need to check acreage assignment.
667 Return flows from Owen Redden (668). Return flows go back to Tomichi Creek.
668 Some returns go to Owen #1(667) and Owen #2(666).
670 Downstream of Cutjo (542). May irrigate similar lands as Cutjo. DWR personnel need to check acreage assignment, may be high.
671 Upstream of Parlin #2(670). Returns go back to Quartz. DWR personnel need to check acreage assignment.
672 TAKE OUT, no acreage assigned and diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment.
673 Returns go back to Cochetopa Creek.
674 Irrigates same area as Goodwich (566). DWR personnel need to check the acreage assignment.
675 Part of the land historically irrigated is under the airport. DWR personnel need to check acreage assignment.
679 Small amount of land compared to diversions. Returns go back to Quartz Creek. DWR personnel need to check acreage assignment.
680 May include lands irrigated by Cox & McConnell (536). DWR personnel need to check acreage assignment.
684 TAKE OUT, no acreage or diversion records.
686 Return flows go back to Cochetopa Creek.
687 Upstream of Hirdman (568). May irrigate around 80 acres. DWR personnel need to check acreage assignment.
690 Return flows go back to Quartz Creek.
692 Diversion records available, no other information known.
693 Return flows go back to Tomichi Creek.
703 Acreage is subirrigated, reason for low diversions.
704 TAKE OUT, located on small tributary (Gold).
707 Acreage may be low since the diversions are large. DWR personnel need to check the acreage assignment.
709 TAKE OUT, diversions less than 9.0 cfs cutoff.
711 TAKE OUT, diversions less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment.
713 TAKE OUT, diverts out small tributary.
715 Return flows go back to Tomichi Creek.
716 Return flows go back to Tomichi Creek.
860 TAKE OUT, no diversion records. DWR personnel need to check acreage assignment.
869 TAKE OUT, no diversion records for the 1975-1992 modeling period. DWR personnel need to check acreage assignment.
871 TAKE OUT, nonconsumptive. Owned by DOW.
880 TAKE OUT, diversion less than the 9.0 cfs cutoff.
887 TAKE OUT, diversion records for only 2 years.
888 TAKE OUT, no diversion records for the 1975-1992 modeling period.
943 TAKE OUT, diversion records for only 1 years.
4001 TAKE OUT, no diversion records for the 1975-1992 modeling period.
4655 Transmountain diversion into Div. 2.
4656 Transmountain diversion into Div. 3

WATER DISTRICT 40

Information for this water district came from Jim Boyd and Bob Starr, Water Commissioners. General comment, Water District 40 for the most part a "water short" basin compared to the other water districts in Division 5. For several irrigation structures on the Surface Creek, the main source of water are several small reservoirs located on the Grand Mesa. These reservoirs are under the Fruitgrowers water user association, but each reservoir has its own accounts and not all users have accounts in each reservoir. Additional thought

needs to go into how part of this water district needs to be modeled. All diversions from Smith Fork return to Cottonwood Creek.

ID	COMMENTS
500	Several laterals take off this structure. Crawford Res. makes releases into structure about a mile down ditch. This structure traverses along way but does not get any inflow from tributaries it crosses. Return flows get to Alum Gulch (this make up the flow in this gulch) and the North Fork. This structure does dry up Smith Fork from June to September. Water diverted under the Aspen ditch (508) need to be added to this structure since it irrigates the same land.
501	Lower end gets Crawford (500). Return flows go to Cottonwood Creek. Need to add in Aspen Canal (509), irrigates the same land. DWR personnel need to check acreage assignment.
503	Flows through canyon, then opens up near the Gunnison River. Uses direct flow, exchange and storage. Return flows to Alum Gulch.
504	Direct flow, a small amount (80 af/yr). Diverts from Iron Creek and supplies Crawford Res. Dries river up entire irrigation season.
506	Alum Gulch gets its water from return flows from Grandview (503) & Crawford (500). Return flows go back to Alum Gulch.
508	Add these diversions to Crawford (500).
509	Add these diversions to Needle Rock (501).
510	TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, large acreage for very small diversions.
533	Is called out early, returnflows go back to river.
536	Same ditch as Smith Fork Feeder (605). Smith Fork Feeder used only during res. filling. Returns upstream of Grandview (503) and downstream of Crawford (500). Small winter time diversions from 1975 to 1986 (0.5 cfs).
538	TAKE OUT, no diversions or information.
543	Return flows to Iron Creek.
549	Fills Gould Res. in early part of year. Meets some of irrigation needs then Gould Res. meets the rest. Very little return flow to Smith Fork. Very high efficiencies.
554	TAKE OUT, diversions less than the 9.0 cfs cutoff.
557	TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to look at acreage assignment, diversions but no acreage.
568	TAKE OUT, diversions less than the 9.0 cfs cutoff.
576	TAKE OUT, diversion are less than the 9.0 cfs cutoff. Gets return flow from Crystal Valley Ditch (533). DWR personnel need to check acreage assignment, seems high when compared to small diversions.
585	TAKE OUT, Acreage assigned Overland Ditch (944) on Leroux Creek. Need to add the diversions to 944 to get total diversions available to the irrigated acreage.
588	TAKE OUT, diversion for only 1976.
592	TAKE OUT, fishery.
605	See comments under 536. Used to fill reservoir during fill period.
616	TAKE OUT, diversions less than the 9.0 cfs cutoff. Why are there winter diversions, livestock? DWR personnel need to check acreage assignment, large acreage for small diversions.
632	Large diversion for 65 acres, averages 3300 af/yr. Has year round diversions. DWR personnel need to check acreage assignment, may assigned to Lake Fork (1269) or Surface Creek Ditch (661). Need to talk with Water Commissioner about water use.
661	DWR personnel need to check acreage assignment.
670	DWR personnel need to check acreage assignment, irrigating same acreage as Surface Creek Ditch (661). If so then diversions need to be combined for modeling.
675	Supplies reservoir water? Return flows to Dry Creek
683	Return flows to Surface Creek.
686	Controlling structure on Surface Creek.
692	TAKE OUT, carrier.
701	Need to talk to Water Commissioner about return flow locations.
703	TAKE OUT, diversions located less the 9.0 cfs cutoff. Located upstream of Cedar Park Ditch (701). DWR personnel need to check acreage assignment, large acreage for small diversions.

713 TAKE OUT, diversions less than the 9.0 cfs cutoff. Year round diversions, for stock?
730 Part of the North Delta Canal (891). Irrigates same lands as 891.
751 Most senior structure. Fills Fruit Growers Res.

753 TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, large acreage for small diversions.
754 Downstream of Bonita Ditch (753).
758 Upstream of Bonita Ditch (753).
759 DWR personnel need to check acreage assignment, large diversions no acreage.
774 Upstream of Fogg (759). Dries up stream, streams stay dry.
778 Upstream of Alfalfa Ditch (751).
791 TAKE OUT, diversions less than the 9.0 cfs cutoff. Supplies water to Fogg (759) & Buttes (754). Gets water from Fruit Growers Res.
797 Return flows from Sooner Ditch (692) & Cedar Mesa (675).
808 TAKE OUT, diversions less than the 9.0 cfs cutoff. Downstream of Durkee Ditch (797). Is this structure used with Morton #2(809). DWR personnel need to check out acreage assignment.
820 Downstream of Alfalfa (751). Supplements Fogg (759) & Buttes (754). Empties Fruit Growers Res.
821 Fills Fruit Growers Res.
841 TAKE OUT, diversions less than the 9.0 cfs cutoff. City of Delta Res.(Potters #'s 1&4, Dugger, Clark, Morris & Pitcarin).
852 TAKE OUT, diversions less than the 9.0 cfs cutoff. Direct diversion, no reservoir water used.
863 Gets return flows for the Relief (900). Returns go back to the Gunnison.
879 Uses some of North Delta (891) returns. Returns go back to the Gunnison.
881 TAKE OUT, not used. Partial diversion records for 1975-1977.
891 Combine the diversions of North Delta (730). Return flows go back to the Gunnison..
893 TAKE OUT, not used. Partial record for 1976-1978.
900 UCVWA waste goes into this structure.
914 TAKE OUT, transferred to Highline (923).
918 Uses Leroux Creek Water Users Res. No irrigation returns, water short. DWR personnel need to check acreage assignment, high acreage but low diversions.
919 Direct diversions as well as reservoir water. Returns go back to Dry Creek.
923 Direct diversions, reservoir water & water from Overland (944). Need to talk with Water Commissioner on how Overland water is used. Returns go back to Big Gulch (50%) and the rest to Fire Mountain (1133).
926 Acreage under Fire Mountain (1133) but diversions kept separate. Combine diversions for modeling purposes.
929 Direct diversions as well as getting water from Fire Mountain (1133), not recorded. Returns go back to North Fork of Gunnison. Check with Water Commissioner about diversion in Aug. & Sept., constant 30 af, stock watering?
932 Upstream of Fire Mountain (1133). Direct, reservoir and Overland Res. (944??). Returns go back to Leroux Creek.
933 TAKE OUT, partial diversions for 1975-1979.
935 TAKE OUT, water transferred out in 1978? No diversions after 1977.
942 Get reservoir water and direct flow. Irrigation returns go back to Dry Creek. DWR personnel need to check acreage assignment, low acreage but VERY large diversions, included in Overland (944)?
944 27 miles long, 80% or more use on Redland Mesa, remaining used for structures that are not specifically addressed. Returns go back to the Gunnison River.
946 Carrier and feeder to other structures. Need to talk with Water Commissioner on how diversions recorded. DWR personnel need to check acreage assignment, no acreage but diversions greater than 9.0 cfs.
947 TAKE OUT, no diversion records. Feeder to Grand Mesa reservoirs.
972 TAKE OUT, diversion recorded under various structures.
1012 TAKE OUT, diversions less than the 9.0 cfs cutoff. Direct diversions and Lone Cabin Res. water. Maximum structure capacity is 6.0 cfs.
1020 Water from direct as well as from Deep Creek, Beaver & Monument Res.'s. Returns go back to several drainages, check mapping.

1027 TAKE OUT, diversions less than the 9.0 cfs cutoff.
1056 TAKE OUT, diversions less than the 9.0 cfs cutoff. Water from direct as well as from Deep Creek & Beaver Res.'s. Returns go back into Minnesota Creek.
1065 TAKE OUT, feeder ditch.
1103 TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignments, diversions but no acreage. Is acreage under Columbine's 1-3?
1105 TAKE OUT, diversions less than the 9.0 cfs cutoff. Uses Paonia Res. exchange water. DWR personnel need to check acreage assignment, large acreage but very small diversions.
1110 TAKE OUT, no acreage and no diversions since 1989. DWR personnel need to check acreage assignment, known acreage prior to 1989?
1115 Receives Paonia Res. exchange water. DWR personnel need to check acreage assignment, is acreage under Ditches #2,4 & 5(1114,1116 & 1117).
1120 Receives Paonia Res. exchange water. Return flows back to Muddy Creek.
1121 TAKE OUT, diversions less than the 9.0 cfs cutoff. Receives Paonia Res. exchange water. Return flows back to Muddy Creek. DWR personnel need to check acreage assignment, diversions but no acreage.
1126 TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, diversion but no acreage.
1132 Direct and Paonia Res. exchange. Returns go back to Anthracite Creek. DWR personnel need to check acreage assignment, acreage high.
1133 Direct & Paonia Res. Direct (13000 af/yr). Add in Leroux Creek Ditch (926) diversions in. Return flows to North Fork, very little return flows to downstream structures.
1168 TAKE OUT, diversions less than the 9.0 cfs cutoff. Gets Paonia exchange water. Returns go back to Muddy Creek.
1172 Gets Paonia exchange water. Returns go back to Muddy Creek. DWR personnel need to check acreage assignment, low acreage for large diversions.
1183 Direct diversions, returns go back to North Fork.
1184 TAKE OUT, diversions less than the 9.0 cfs cutoff. Returns get back to the N Fork.
1185 Receives some Fire Mountain (1133) returns. Returns go back to Monitor (1183), Shepard & Wilmont (1195) & Vandeford (1213).
1189 Returns get back to the North Fork.
1195 Some return flows from the North Farmers (11850. Returns get back to the North Fork.
1196 Downstream of Shepard & Wilmont (1195). Get return flows from Stewart(1206)
1197 Returns get back to the North Fork.
1206 Diverts Minnesota Creek water. Receives some return flows from Minnesota Canal (1020). Return flows into Short (1196).
1207 Gets Paonia Res. exchange water. Returns get back to Muddy Creek.
1208 TAKE OUT, diversions less than the 9.0 cfs cutoff. Gets Brue (?) Park Res. water. Returns get back to Fire Mountain (1133).
1209 TAKE OUT, partial records. Feeder to Brue(?) Park Res..
1212 TAKE OUT, diversions less the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, diversions but no acreage.
1213 Return get back to the North Fork. DWR personnel need to check acreage assignment, diversions but no acreage.
1218 TAKE OUT, diversions less than the 9.0 cfs cutoff. Receives Paonia Res. exchange water. Returns get back to Muddy Creek.
1219 TAKE OUT, diversions less than the 9.0 cfs cutoff.
1222 TAKE OUT, feeder ditch to reservoir.
1236 TAKE OUT, feeder ditch to reservoir.
1269 TAKE OUT, no diversion records. DWR personnel need to check acreage assignment, acreage but no diversions, should be assigned to Big Ditch (?).
1271 TAKE OUT, transferred out in 1962.
1313 TAKE OUT, diversions less than the 9.0 cfs cutoff. Serves same land as Everlasting (1435). Combine diversions for modeling.
1317 TAKE OUT, diversion records from 1984 to 1987.
1414 TAKE OUT, no diversion records.
1426 TAKE OUT, diversions less than the 9.0 cfs cutoff. Diversion records from 1982 to 1992. DWR

	personnel need to check acreage assignment, acreage but very little diversions.
1428	Acreage under Everlasting (1435) & Hawkins (1437). Combine diversions.
1434	Acreage under Everlasting (1435) & Hawkins (1437). Combine diversions.
1435	Add Pug (1313) diversions to this structure, serves same land. Returns get back to Roubideau Creek.
1437	Returns get back to Roubideau Creek.
1479	TAKE OUT, no diversion records.
1631	TAKE OUT, no diversion records.
1778	Supplemental water for Stewart (1206). Diversions for only 1986 to 1992.
1819	TAKE OUT, no diversion records.
1820	TAKE OUT, no diversion records.
2389	TAKE OUT, no diversion records.
2392	TAKE OUT, no diversion records.
2444	TAKE OUT, no diversion records.
4657	Transmountain diversion. Divide Creek, Division 5.

WATER DISTRICT 41

Information for this water district came from Crandall Howard, Water Commissioner. No mainstem calls in this water district. The Uncomphagre River can and is dried up at the Ironstone Ditch (534) and at the East Canal (520). The Garnet (527), Ironstone (534) & the Selig (559) act as carrier ditches for other structures, but it is not recorded as such. For structures with land in the Project area, mapping needs to be reviewed to identify return flow points.

ID	COMMENTS
501	TAKE OUT, sporadic use from 1975 to 1987 then no diversion records after 1987.
508	Receives not Project water. There are winter diversions from 1975 to 1978, need to talk with Water Commissioner about this.
509	TAKE OUT, diversions less than 9.0 cfs cutoff, 9 years of missing diversions. DWR personnel need to check acreage assignment, large acreage for small diversions. Possible that 516 acres were irrigated prior to 1975.
510	TAKE OUT, owned by Colo. Ute, not used. Diversion records not complete.
515	No Project water used. Takes some water out of Garnet (527). These diversions not reflected in Garnet's diversion records. Some of Garnet's return flows are used on this land.
517	AKA Delta Ditch & Purdy & Vickers Ditch. No Project water used. Talk to Water Commissioner as to why there are year round diversions.
519	Diverts out of the Selig (559). Need to review how to set this up in Statemod.
520	Total Project water used. Can and has dried up the Uncompahgre River.
524	TAKE OUT, no diversions, seepage ditch.
527	Total Project water used.
530	TAKE OUT, small tributary.
532	Lateral off the Cimarron Canal (620650). Diversion included in Cimarron Canal’s diversion records.
534	Total Project water used. Has dried up the Uncompahgre River.
537	Total Project water used.
538	No Project water used.
544	TAKE OUT, diversions less than 9.0 cfs cutoff.
545	AKA M&D Canal, Uncompahgre Cedar Creek Valley. Total Project water.
549	No Project water used. Take water from Homestretch (680607).
550	TAKE OUT, diversion less than 9.0 cfs cutoff.
554	No Project water used. Acreage is closer to 400 acres. DWR personnel need to check acreage assignment.
558	Diverts out of the Ironstone (534) using its own priorities. Not separated out in Ironstones diversions. DWR personnel need to check acreage assignment, should have around 80 acres.

559	Total Project water used.
560	Should have around 100 acres not 2531 acres. DWR personnel need to check the acreage assignment.
564	Talk with Water Commissioner about where this water is diverted, through the South Canal? DWR personnel need to check acreage assignment, may be under West (577).
566	Irrigates around 100 acres. DWR personnel need to check acreage assignment.
568	Receives Project water returns. Talk with Water Commissioner on way water was diverted year round from 1977 to 1987. DWR personnel need to check acreage assignment, seems low for diversions.
571	TAKE OUT, sporadic diversions, no diversions since 1988.
604	TAKE OUT, no diversion records. Water for land attached to this structure is taken from the East Canal (520). DWR personnel need to check acreage assignment, assign to East Canal (520).
610	TAKE OUT, no diversion records.
631	TAKE OUT, no diversion records.
655	TAKE OUT, no diversion records.
671	TAKE OUT, no diversion records.
683	TAKE OUT, no diversion records.
692	TAKE OUT, no diversion records.
702	TAKE OUT, no diversion records.
712	TAKE OUT, no diversion records.
718	TAKE OUT, no diversion records.
721	TAKE OUT, no diversion records.
746	TAKE OUT, no diversion records.
954	TAKE OUT, no diversion records.
983	TAKE OUT, no diversion records.

WATER DISTRICT 42

Information for this water district came from Lynn Bixler, Water Commissioner. Some of the irrigated acreage delineated may be what was done historically or what could be irrigated during an extremely wet year.

ID	COMMENTS
504	TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment.
506	TAKE OUT, no diversion records.
509	Dries up stream. Once stream is dry, it is dry the remainder of season. Check mapping for return flow points. Diversion from 1979 on. DWR personnel need to check acreage assignment.
510	Acreage may be high. May receive reservoir water. Small amount of return flow goes into Kannah Ext. (530). DWR personnel need to check acreage assignment.
512	Goes to Juniata Ditch (528). Confirm with Water Commissioner, Richard Belden.
513	Diversions go straight to the City of Grand Junction via pipeline.
520	Transmountain diversion to Div. 5. Limited diversion records, 3 years.
528	Diversions suggest that probably more than 93 acres are irrigated. Probably need to talk with Grand Junction's engineer.
529	Some returns to Kannah Creek, irrigates on Purdy Mesa. Diversion record shows year round use, possible owned by Grand Junction. Talk with Water Commissioner.
530	Dries Kannah Creek up.
533	TAKE OUT, no diversion records.
536	TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, seems high.
545	Acreage seems high. Check with Water Commissioner about reservoir releases during late season. DWR personnel need to check acreage assignment.
549	TAKE OUT, diversions less than 9.0 cfs cutoff.
554	Talk with Water Commissioner to try and get additional information on historic diversions. Diversions start in 1980, with 2 years missing, with very little diversions after 1989. If no additional

	information is obtained , TAKE OUT.
573	TAKE OUT, supplies water to reservoirs.
613	TAKE OUT, no diversions or acreage.
750	TAKE OUT, no diversions or acreage.

Water District 59

The Water Commissioner for this district, George Wear was not available so Ken Knox, division engineer, went through the list and talked about the structures he was familiar with. To get the same detail as in the other basins, particularly the return flow issues, the Water Commissioner will have to be contacted. Wherever the comment is "talk with Water Commissioner", no information was given and the Water Commissioner has to be contacted.

ID	COMMENTS
500	TAKE OUT, no diversions or acreage.
501	Takes decreed amount. Ohio Creek is the sole water source; the crop is only cut once.
503	Need to talk to Water Commissioner.
510	Need to talk to Water Commissioner.
512	Diverts around 12 cfs off the mainstem. No acreage assigned, DWR personnel will check on acreage assignment.
516	No diversion history. The acreage shown for this structure should be attached with other structure, DWR personnel will check out.
520	Very complex system. Structure is fed by return flow from the Gleason ditch (563), reason for low diversions, less than 9.0 cfs. No acreage assigned, but should have acreage. DWR personnel should check acreage assignment and Water Commissioner should be consulted.
522	Need to talk to Water Commissioner.
523	TAKE OUT, no diversion records. DWR personnel need to check acreage assignment.
524	TAKE OUT, never diverted decreed amount, max. 7 cfs. No acreage assigned, DWR personnel need to check assignment.
527	This ditch is used jointly with Buckley Lehman (528). Need to combine diversions for modeling effort.
528	See comments under 527.
529	TAKE OUT, diversions less than 9.0 cfs cutoff. Max. diversion was 6.5 cfs.
535	Leave in for now, diversions less than 9.0 cfs cutoff. Max. diversion was 4.5 cfs. DWR personnel need to check acreage assignment, could be attached to another structure.
537	Has diverted decreed amount, 26 cfs. High diversion to acreage, 10 acres/cfs. Will probably have low headgate efficiencies.
541	TAKE OUT, decreed amount is below 9.0 cfs cutoff.
542	TAKE OUT, diversions less than 9.0 cfs cutoff. Max. diversion was 8.3 cfs.
544	Diverts far more than decreed amount of 15 cfs. Check location of tributary to see if it is worth modeling.
546	Has diverted more than decreed amount of 43 cfs. Max. diversion 48 cfs.
549	Max. diversion around 110 cfs. 12 ac-ft/acre applied on average.
550	Has diverted far more than decreed amount of 43 cfs. Max. diversion was 73 cfs. 17 ac-ft/acre applied on average.
554	TAKE OUT, poor diversion records and diversions less than cutoff.
556	Has diverted close to its decreed amount of 42 cfs. 10 ac-ft/acre applied on average.
558	9 ac-ft/acre applied on average.
560	Historic diversion but not acreage assigned. DWR personnel need to check acreage assignment.
563	Main source of water for the lower end of Ohio creek, due to return flows. Very little use in July and August. One cutting/season.
564	This structure irrigates the same land as Kelmel Owens #1 (607) and Kelmel Owens #2 (608). Need to combine diversions when modeling. DWR personnel need to check acreage assignment.
566	Check with Water Commissioner for historic use. Diversion records available and greater than 9.0 cfs cutoff.

567 TAKE OUT, diversion records poor and less than 9.0 cfs cutoff.
569 Diverts out of Gunnison & Ohio. Need to talk with Water Commissioner regarding how water is diverted and where.
570 Talk with Water Commissioner on how water is diverted.
571 DWR personnel need to check acreage assignment. 365 ac-ft/acre average applied. Talk with Water Commissioner.
572 DWR personnel need to check acreage assignment. 186 ac-ft/acre average applied. Talk with Water Commissioner.
578 Talk with Water Commissioner.
580 Talk with Water Commissioner.
581 Talk with Water Commissioner.
584 TAKE OUT, diversions less than 9.0 cfs cutoff.
585 TAKE OUT, no historic diversions.
587 Talk with Water Commissioner.
588 Talk with Water Commissioner.
590 Historic less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment. No acreage attached, but diversions. Talk with Water Commissioner.
591 Talk with Water Commissioner. Has historically diverted more than 9.0 cfs cutoff. DWR personnel need to check acreage assignment, acreage seems high.
592 TAKE OUT, no historic diversions.
593 Water source for another structure? Talk with Water Commissioner. Historic diversions greater than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, seems to low.
594 TAKE OUT, historic diversions less than 9.0 cfs. DWR personnel need to check acreage assignment, no acreage attached. Talk with Water Commissioner.
596 Return flow from this structure is a major component to other structures. Talk with Water Commissioner to verify this point.
597 Historic diversions far exceed its decree. Talk with Water Commissioner about use, is it tied with Imobersteg Willow (598)?
598 See comment under 597.
599 TAKE OUT, diversions less than the 9.0 cfs cutoff. Small acreage, but large diversions. Water source for other lands, talk to Water Commissioner.
600 Diverts far more than decreed amount. Talk with Water Commissioner about the new flumes installed and the cleaning of the structure affect on diversions.
602 Possible has other water sources, Hyzer Ketchum (595) and possible the Garden (560). Talk with Water Commissioner.
606 Large diversions but no acreage. DWR personnel need to check acreage assignments.
607 Water sources from Frank Adams (558) and Kelmel Owens #2 (608). Talk to Water Commissioner.
608 See comments under 607.
609 Talk with Water Commissioner.
613 No acreage, but diversions. DWR personnel need to check acreage assignment, may be under East River #1 (549). Talk with Water Commissioner. Diverted far more than decree.
615 No acreage, but diversions. DWR personnel need to check acreage assignment. Talk with Water Commissioner.
616 Talk with Water Commissioner.
617 Talk with Water Commissioner.
622 This may operate with Marshall #2(623). Talk with Water Commissioner.
623 Diverts more than decree. See comments for 622. Talk with Water Commissioner.
624 Talk with Water Commissioner.
625 Talk with Water Commissioner.
627 TAKE OUT, historic diversions less than 9.0 cfs. DWR personnel need to check acreage assignment.
631 Talk with Water Commissioner. May need to include all the McGlashan ditches (629,630 & 632).
635 Talk with Water Commissioner about water source. Trib. to Slate?
638 TAKE OUT, historic diversions less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment.

644 TAKE OUT, historic diversions less than 9.0 cfs cutoff.
645 TAKE OUT, historic diversions less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment, acreage high for small diversions.
646 TAKE OUT, historic diversions less than 9.0 cfs cutoff.
649 TAKE OUT, historic diversions less than 9.0 cfs cutoff.
651 Talk with Water Commissioner.
653 Talk with Water Commissioner.
654 TAKE OUT, on small tributary.
655 TAKE OUT, historic diversions less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment, diversions but no acreage.
658 Talk with Water Commissioner
660 TAKE OUT, nonconsumptive owned by DOW
665 TAKE OUT, no records, small acreage.
667 Talk with Water Commissioner.
668 DWR personnel need to check acreage assignment, it seems to low.
670 TAKE OUT, on small tributary.
671 Talk with Water Commissioner, diversion records are poor. May receive return flow water from the Acme ditch (501). DWR personnel need to check acreage assignment, seems high.
672 Talk with Water Commissioner, diversions high compared to acreage. DWR personnel need to check acreage assignment.
678 TAKE OUT, diversions records incomplete. Missing for several years.
679 Diverts from the Taylor mainstem.
680 TAKE OUT, diversion records incomplete. DWR personnel need to check acreage assignment, no diversions but acreage.
684 Talk with Water Commissioner.
686 TAKE OUT, incomplete diversion record & diverts less than 9.0 cfs cutoff.
691 Talk with Water Commissioner.
692 Large diversions but no acreage. Talk with Water Commissioner. DWR personnel need to check acreage assignment, no acre attached.
695 TAKE OUT, poor diversion records. Diverts less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment.
699 Talk with Water Commissioner.
700 Talk with Water Commissioner.
704 Talk with Water Commissioner, large diversions but no acreage. DWR personnel need to check acreage assignment.
706 TAKE OUT, diversion records for only 1978. DWR personnel need to check acreage assignment, acreage but no diversions.
707 TAKE OUT, diversions less than the 9.0 cfs cutoff.
709 TAKE OUT, poor diversion records, less than the 9.0 cfs cutoff.
711 TAKE OUT, incomplete diversions records, diverts less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, lot of acreage but small diversions.
720 TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment.

The following irrigation structures have no recorded diversion records for the 1975-1991 modeling period and will not be modeled:

751, 744, 797, 820, 829, 847, 847, 863, 875, 912, 927, 931, 944, 967, 1011, 1084, 1098, 1140, 1180, 1182, 1198, 1218, 1467, 1531, 1596, 1597.

The underlined structures have irrigated acreage attached to them; DWR personnel need to check acreage assignments to see if other structures may be irrigating these lands.

WATER DISTRICT 62

Information for this water district came from Crandall Howard, Water Commissioner. No mainstem calls in this water district.

ID	COMMENTS
501	TAKE OUT, diversions less than 9.0 cfs cutoff also has 10 years of missing diversions. Diverts out of Spring Creek.
506	TAKE OUT, diversions less than 9.0 cfs cutoff.
509	TAKE OUT, no diversions or acreage.
523	TAKE OUT, diversions less than 9.0 cfs cutoff and 10 years of missing data.
525	TAKE OUT, diversions less than 9.0 cfs cutoff and 10 years of missing data. DWR personnel need to check acreage assignment, no acreage but diversions.
528	Return flows to go the Little Cimarron. DWR personnel need to check acreage, maybe around 1000 acres.
529	Return flows back to Cebolla Creek; valley is half mile wide.
537	TAKE OUT, diversions less than 9.0 cfs cutoff. 10 years of missing diversions. DWR personnel need to check out acreage, diversions but no acreage assigned.
542	50 % of returns go back to Big Cimarron, remaining in Little Cimarron. DWR personnel need to check acreage assignment, large diversion no acreage, around 600 acres.
547	TAKE OUT, diversion less than 9.0 cfs cutoff, 11 years of missing diversions.
560	Runs 19 miles before reaching irrigated lands. Irrigates in the Uncomphagre Basin. Gets additional water from intercepted tributaries; also get storage water out of Silver Jack Res. Water is used on only 24 % of the land? DWR personnel need to check acreage assignment.
561	Transbasin, empties into Uncompahgre. Records kept in Water District 68, need to check with Water Commissioner.
562	TAKE OUT, no diversion records.
565	TAKE OUT, small acreage also 11 years of diversions missing.
567	50% of return flows get back to Little Cimarron, the remaining going to Big Cimarron.
568	Large diversions but no acreage. Talk with Water Commissioner about how this structure is used. DWR personnel need to check acreage assignment.
569	Frank Adams #2(605), George Andrews #1(612) & George Andrews#2(613) irrigate the same lands. DWR personnel need to check acreage assignment.
570	TAKE OUT, located on small tributary.
574	TAKE OUT, diversions less than 9.0 cfs cutoff.
575	TAKE OUT, diversion records for only 1974. Diverts out of Spring Creek.
582	TAKE OUT, located on small tributary, diverts less than the 9.0 cfs cutoff. 10 years of missing data.
593	TAKE OUT, no diversion records.
595	TAKE OUT, diversion for only 1986.
599	TAKE OUT, diversion for only 1986.
602	Check with Water Commissioner about the use of Foster#2(603) on this land and on other lands. DWR personnel need to check acreage assignments, small acreage and large diversions.
605	See comments under 569.
612	See comments under 569.
613	See comments under 569.
617	No diversion records, are they recorded in water districts 41 or 68?
620	TAKE OUT, diversions less than 9.0 cfs cutoff. 10 years of missing data. DWR personnel need to check acreage assignment.
639	TAKE OUT, diversions less than 9.0 cfs cutoff. 11 years of missing data. DWR personnel need to check acreage assignment.
640	TAKE OUT, diversions less than 9.0 cfs cutoff.
641	TAKE OUT, diversions less than 9.0 cfs cutoff, located on small tributary.
642	TAKE OUT, no diversion records or acreage.
653	TAKE OUT, diversions less than 9.0 cfs cutoff. DWR personnel need to check acreage assignment, no acreage attached.
661	TAKE OUT, diversion for only 1975.

670	Returns go back to Cebolla Creek, located in narrow valley. Diversions for 1986-1990 missing.
672	Located on Little Cimarron upstream of Collier(567). Return flows back to Little Cimarron upstream and downstream of Collier (567). Picks up large amount of Big Blue (528), about 10 cfs.
685	TAKE OUT, no diversion records.
687	TAKE OUT, diversions less than the 9.0 cfs cutoff.
688	TAKE OUT, diversions less than the 9.0 cfs cutoff.
703	TAKE OUT, diversions less than the 9.0 cfs cutoff.
708	TAKE OUT, located on small tributary and less than the 9.0 cfs cutoff.
722	TAKE OUT, small acreage and diversions records for only 3 years.
723	TAKE OUT, small acreage and diversions records for only 3 years.
732	Return flows back to stream (75%) and the remaining 25% are picked up by the Radek (719), which is not being modeled.
738	Roughly 10% of Big Ditch (529) is picked up. Talk with Water Commissioner about the Sammons#4(736) and Sammons#5(737) to see if they used all together.
743	TAKE OUT, diversions less than 9.0 cfs cutoff and has 10 years of missing data.
756	TAKE OUT, no diversion records available.
764	TAKE OUT, no diversion records available.
768	TAKE OUT, nonconsumptive right.
769	TAKE OUT, nonconsumptive right.
774	Transmountain diversion to Div. 3.
776	TAKE OUT, diversions less than the 9.0 cfs cutoff. 10 years of missing diversions.
779	Return flows go back to Cebolla Creek, located in narrow valley.
783	Return flows go back to Big Cimarron Creek.
789	TAKE OUT, diversions less than the 9.0 cfs cutoff.
809	TAKE OUT, small acreage and diversions less than the 9.0 cfs cutoff.
1022	TAKE OUT, no diversion records.
1049	TAKE OUT, no diversion records.

WATER DISTRICT 68

Information for this water district came from Rodger Noble, Water Commissioner.

ID	COMMENTS
501	Majority of return flows goes back into Cow Creek, the rest into Alkali #2(502). Land located in narrow valley.
502	Small part of return flow goes into Martinv (647).
508	TAKE OUT, no diversion records for modeling period. Diversion record for only 1970-1974. Extension ditch of Von Hagen Dallasv (770). DWR personnel need to check acreage assignment.
511	TAKE OUT, small tributary, diversions less than the 9.0 cfs cutoff.
514	Most of irrigated land in Pleasant Valley drainage. Most returns into Pleasant Valley, small part go back into Dallas Creek. DWR personnel need to check acreage assignment.
526	Third structure, located upstream of the Morrison (671), Moody (668) & Moody #1(669). Return flows go to these structures. Tailwater into Moody.
538	First structure, Burkhart Eddy (514) is 2-3 miles downstream. Return flows go into Dallas Creek.
543	Located above Ridgway Res.. Most of all return flows go to downstream structures.
559	Second structure diverting out of E. Dallas Creek. Return flows go to Reed Overman (703) & Trenchard (763).
566	TAKE OUT, diversions less than the 9.0 cfs cutoff and diversions are sporadic.
587	Carrier for Alkali #80 (501) may be double counting diversions. Check with Water Commissioner on how records diversions for this structure.
602	TAKE OUT, diversions sporadic. Located upstream of Ridgway Res. DWR personnel need to check acreage assignment, no acreage but diversions.
603	Located downstream of Mayol lateral (652) & Mayol Sisson (653). Gets some water from the returns from these ditches.
604	Irrigated land in water district 41. DWR personnel need to check acreage assignment, find out if attached to another structure in water district 41.
607	Located just downstream of Ridgway Res. Receives no Ridgway water. Returns go into Old

Agency (681) & Upper Uncompahgre (765). Tail water drops into Ouray (410549).

609 Return flows in to Uncompahgre River and about 40% into Charley Logan (526).

610 Gets return flows from Dallas (543). A portion (25%) of return flows go to Hyde Sneva (613).

613 Major calling structure on Dallas Creek. Has dried up Dallas Creek. Return flows get back to Dallas Creek.

636 Water source is Leopard Creek in the San Miguel.

647 Gets return flows from Alkali #80 (502). Small amount of return flows goes to Shortline (729).

652 Returns go to Mayol Sisson (653).

653 Half of return flows go into Henry Trenchard (603), the remaining goes to Dallas River.

657 Irrigated acreage in water district 41. DWR personnel need to check acreage assignment, should be fairly large, 200 acres.

668 Gets return flow from Morrison (671). Return flows go back to Dallas River. Need to include the Morrison Ditch (671).

671 Added this structure even though it is less than the 9.00 cfs cutoff. Large diverter, above its decreed amount.

672 TAKE OUT, diversions for only 1984. Structure washout.

681 Get returns from Homestretch (607). Return flows go to the upper Uncompahgre River.

683 Cimarron Feeder (620562) water used. Return flows go back to Cow Creek. Need to talk with Water Commissioner as to why there are winter diversions.

685 Return flows to the West Fork of the Uncompahgre River.

692 Irrigated lands in water district 41. DWR personnel need to check acreage assignment, should have around 400 acres.

703 Gets return flow from Doc Wade (559). Returns back to Dallas River. DWR personnel need to check acreage assignment, acreage too low compared to diversions.

710 TAKE OUT, diversions less than the 9.0 cfs cutoff. Why does this structure have 2 wdid's, 710 & 711?

720 TAKE OUT, diversions less than the 9.0 cfs cutoff. Gets return flow from Pinon (692). Return flows into McDonald #145 (657).

721 TAKE OUT, diversions less than the 9.0 cfs cutoff. Diversions for only the 1986-1991 period. DWR personnel need to check acreage assignments, diversions but no acreage.

729 TAKE OUT, diversions less than the 9.0 cfs cutoff. Gets return flows from Martin 647). Return flows back to Cow Creek.

738 Check mapping for return flow points.

756 TAKE OUT, diversions less than the 9.0 cfs cutoff. DWR personnel need to check acreage assignment, large acreage with little diversions.

759 Check mapping for return flow points.

763 Gets return flows from Doc Watson (559). Return flows back to Dallas River. DWR personnel need to check acreage assignment, no acreage but large diversions.

765 DWR personnel need to check acreage assignment, acreage in water district 41.

767 Return flows back to McKenzie Creek.

770 Look at mapping for return flow points.

861 TAKE OUT, used for mining.

1064 TAKE OUT, no diversion records.

4. Gunnison Basin Instream Flow Rights

The March 2004 instream flow right tabulation for Division 4 shows there are 275 appropriations covering 1,748 stream miles in the Gunnison River basin. To obtain a copy of the tabulation, visit the CWCB's website at www.cwcb.state.co.us , click on "Stream and Lake Protection" and then "Instream Flow and Natural Lake Level Water Rights Database".

5. Gunnison Basin Modeling Efforts

The data collection effort for CDSS called for the review of prior modeling efforts in the Gunnison River basin. This section summarizes the modeling efforts performed by Hydrosphere Resource Consultants in 1994 for the ”Gunnison Basin Planning Model”. This study was performed to examine the Gunnison River basin hydrology and historical water supply. The study was sponsored by the Bureau of Reclamation, Colorado Water Conservation Board, the Office of the State Engineer, the Colorado River Water Conservation District, the Upper Gunnison River Water Conservancy District, Tri-County Water Conservancy District, and the Uncompahgre Valley Water Users Association. The model utilizes the Central Resource Allocation Model (CRAM), a proprietary network allocation model.

This particular study was performed on a monthly time-step for the period 1952-1990. The CRAM modeling environment is significantly different from the StateMod environment; none of the basic data generated for or by this model were incorporated into the CRDSS WRPM.