Historic Crop Consumptive Use Analysis

Colorado River Basin

Final Report

2015

Wilson Water Group

Acknowledgments

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Colorado River Basin

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1. Executive Summary

The Colorado River Basin historic crop consumptive use analysis was performed on a monthly basis for the period from 1950 through 2013 as part of the Colorado River Decision Support System (CRDSS). The CRDSS project was developed jointly by the State of Colorado Water Conservation Board and the Division of Water Resources. The objective of the historic crop consumptive use portion was to quantify 100 percent of the basin's historic crop consumptive use. This report documents the input and results of the historic crop consumptive use analysis updated in April 2015.

Information used in this model dataset is based on available data collected and developed through the CDSS, including information recorded by the State Engineer's Office. The model dataset and results are intended for basin-wide planning purposes. Individuals seeking to use the model dataset or results in any legal proceeding are responsible for verifying the accuracy of information included in the model.

1.1. Background

The Colorado River is located in western Colorado and encompasses approximately 9,916 square miles. The Colorado River main stem rises in the Rocky Mountains just north of Grand Lake at an elevation of 12,800 feet and flows westerly into Utah just south of Loma at an elevation of 4,325. The Upper Colorado River is the primary stream in the basin, with major tributaries including the Frasier, Blue, Eagle, and Roaring Fork Rivers. Most stream flow originates from snowmelt in the surrounding mountains. Average annual precipitation in the basin ranges from 8.7 inches at Fruita to 19.6 inches at Grand Lake.

1.2. Approach

The Colorado River historic crop consumptive use analysis was performed using StateCU, a generic, data driven consumptive use model and graphical user interface. The objective of the model is to develop monthly consumptive use estimates to assess historical and future water management policies. Key information used by the model to assess historic consumptive use includes irrigated acreage, crop types, monthly climate data, and diversion records.

The historic crop consumptive use analysis was originally performed to provide information and consumptive use estimates for the basin surface water model (StateMod) analysis of the Colorado River Basin. Data used in the historic crop consumptive use has been revised, as well as documented, under this recent effort.

1.3. Results

Table 1 presents the average annual acreage and historic crop consumptive use analyses results for the 1950 to 2013 study period. As shown, the irrigation water requirement averages 538,278 acre-feet per year while water supply-limited consumptive use averages 476,330 acre-feet per year. The average annual shortage in the basin is approximately 12 percent. Higher shortages occur in the Divide Creek Basin (District 45) and Tributaries North of CO River (District 53).

Table 1: Average Annual Acreage and Consumptive Use Results (1950-2013).

Water District - Basin	Average Acres	Irrigation Water Requirement (acre-feet)	Supply-Limited CU (acre-feet)	Percent Short
36 – Blue River	8,384	15,545	14,557	6%
37 – Eagle River	8,409	19,320	18,890	2%
38 – Roaring Fork	30,359	61,668	55,384	10%
39 – Rifle/Elk/Parachute	16,289	34,280	29,885	13%
45 – Divide Ck	27,998	59,836	42,054	30%
50 – Muddy/Troublesome	16,895	32,296	26,823	17%
51 – Upper CO/Fraser River	24,034	44,250	37,986	14%
52 – Piney/Cottonwood	3,432	6,811	6,285	8%
53 – Tribs. North of CO River	12,374	23,592	18,706	21%
70 – Roan Ck	5,564	10,648	9,177	14%
72 – Lower CO River	95,093	230,031	216,584	6%
Colorado Basin Total	**248,833**	**538,278**	**476,330**	**12%**

Figure 1 presents historic acreage by crop type for the 2010 irrigated acreage assessment. The irrigated land coverages for 1993, 2005, and 2010 were considered in the analysis. As shown, grass pasture is grown on the majority of irrigated land in the basin to support cattle ranching.

Figure 1: 2010 Irrigated Acreage by Crop Type

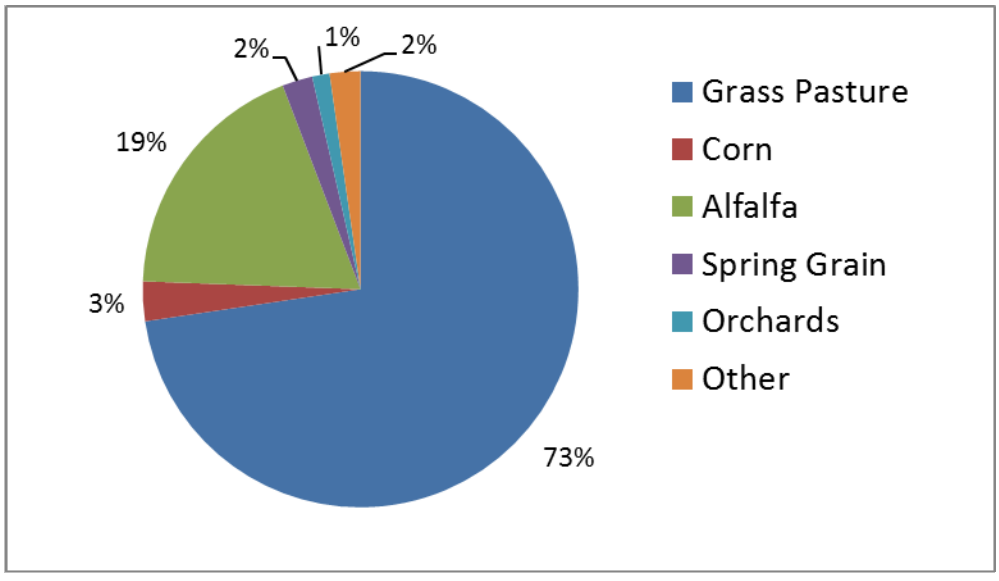


Figure 2 presents the annual historic acreage, irrigation water requirement, and supply limited consumptive use for the study period. Although there are minor changes in irrigated acreage between 1993, 2005, and 2010, the pronounced yearly variations in irrigation water

requirement are attributed to climate variability in the analysis (temperature and precipitation). The percent of irrigation water requirement not satisfied averaged 11 percent over the study period. Shortages averaging 10 percent from 1992 through 2000 are consistent with normal stream flows. Shortages increased to nearly 20 percent in the early 2000s due to drought conditions, reaching a maximum of 27 percent in 2002.

Figure 2: Historic Acreage, Irrigation Water Requirement, and Supply Limited Consumptive Use (1950-2013)

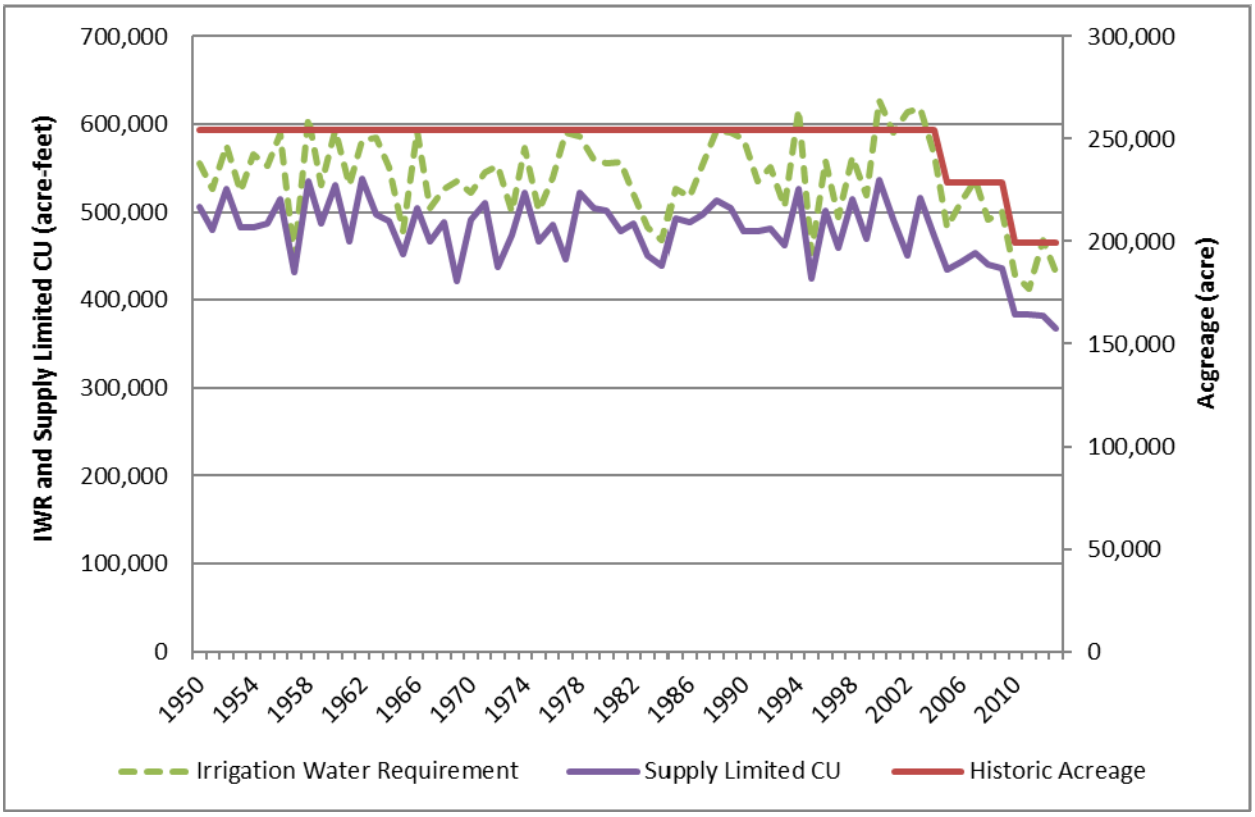
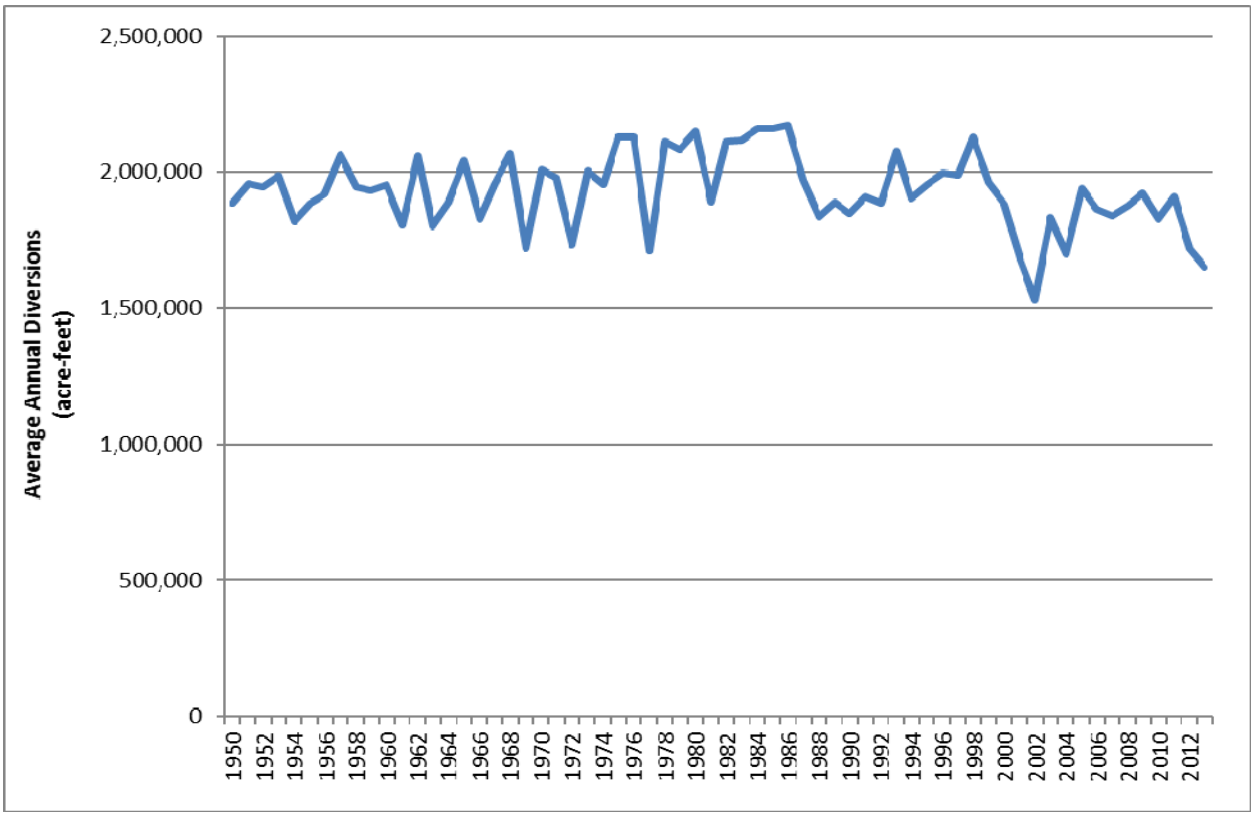


Figure 3 shows the annual estimated diversions from surface water to meet crop irrigation requirement. The average annual surface water diversions from 1950 through 2013 were 1,931,185 acre-feet.

Figure 3: Average Annual Surface Water Diversions (1950 – 2013)



2. Introduction

The estimation of historic crop consumptive use in the Colorado River Basin and the tool used to perform the analysis are documented in three major reports as follows:

1. The Historic Crop Consumptive Use Analysis Report describes climate and crop data from HydroBase used in the historic consumptive use analysis, and the parameters used in analysis, including Blaney-Criddle crop coefficients and characteristics. The document summarizes the results of the analysis, total irrigation water requirement, and the supply-limited total consumptive use for the Colorado River basin.

2. Colorado River Basin Water Resources Planning Model User's Manual describes the development of the Colorado River Basin StateMod surface water model. This document summarizes the process and results of developing the structure list for the historic consumptive use analysis.

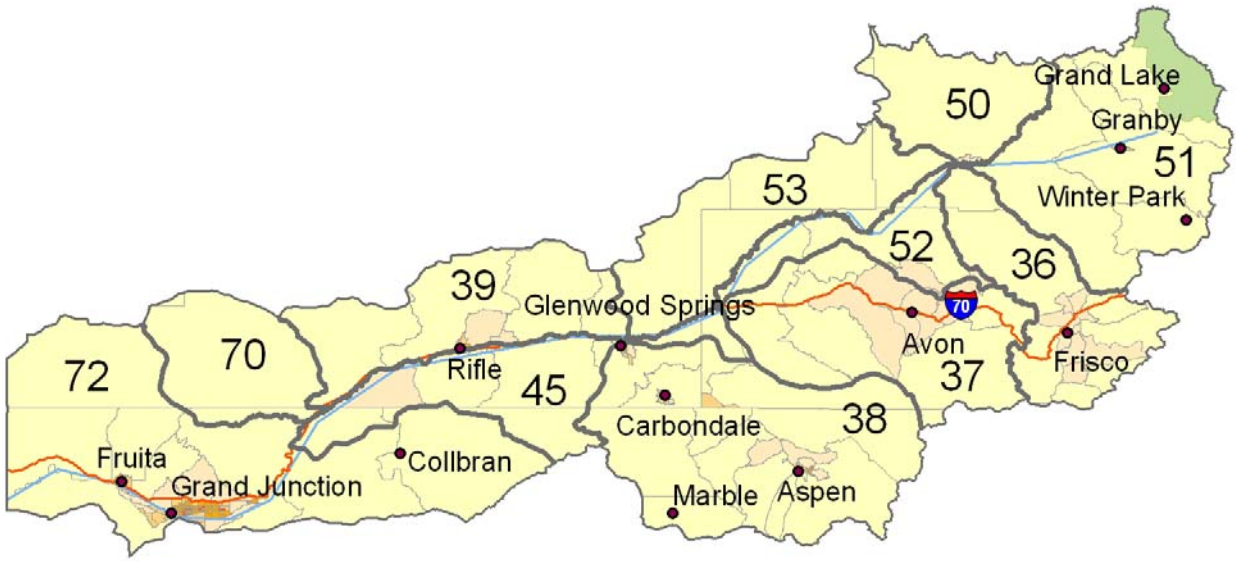
3. The StateCU Documentation describes the consumptive use model and graphical user interface used to perform all consumptive use analyses conducted as part of the Colorado River Decision Support System.

This Historic Crop Consumptive Use Analysis Report has not attempted to reiterate the detailed analyses and results of the previous efforts performed in support of the final historic crop consumptive use analysis. Instead, it summarizes the major results of each technical memorandum. Supporting memorandum and reports are available on the CDSS website.

2.1. Basin Description

The Upper Colorado River basin lies in west-central Colorado, with the headwaters originating at the Continental Divide in Rocky Mountain National Park. The Upper Colorado River flows in a westerly direction through forested mountains and irrigated valleys before it leaves the state in Mesa County downstream of the City of Grand Junction. The basin encompasses all or a large majority of Grand, Summit, Eagle, Garfield, and Pitkin counties; and portions of Mesa, Routt, and Gunnison counties in Colorado. The Upper Colorado River basin is approximately 9,916 square miles in size. It ranges in elevation from 12,800 feet at its headwaters to 4,325 feet near the Colorado-Utah state line. The Upper Colorado River is the primary stream in the basin, with major tributaries including the Gunnison River, Fraser River, Williams Fork, Blue River, Muddy Creek, Eagle River, Roaring Fork River, Rifle Creek, and Plateau Creek. Average annual streamflow in the upper drainage (USGS gage near Grand Lake, Colorado) is approximately 57,000 acre-feet, which increases to an annual average of 4.4 million acre-feet below Grand Junction, Colorado (USGS gage near the state line). Average annual streamflow on the Colorado River near Kremmling is approximately 725,000 acre-feet.

Figure 4: Colorado River Basin



2.2. Definitions

Several terms used in this report have been broadly used in other studies. The following definitions are consistent with the American Society of Civil Engineers Manuals and Reports on Engineering Practice No. 70 - Evapotranspiration and Irrigation Water Requirements.

- **Potential Evapotranspiration (ET):** The total amount of water that would be used for crop growth if provided with an ample water supply, also called potential consumptive use.

- **Effective Precipitation**: The portion of precipitation falling during the crop-growing season that is available to meet the evapotranspiration requirements of the crop.

- **Winter Effective Precipitation**: The portion of precipitation falling during the non-growing season that is available for storage in the soil reservoir, and subsequently available to crops during the next growing season.

- **Irrigation Water Requirement**: The amount of water required from surface or ground water diversions to meet crop consumptive needs. Calculated as potential evapotranspiration less effective precipitation and stored winter precipitation.

- **Water Supply-Limited Consumptive Use:** The amount of water actually used by the crop, limited by water availability. Also called actual consumptive use.

The following terms are commonly used in the CDSS efforts:

- **Irrigated Parcel:** An irrigated "field" having the same crop type, irrigation method (sprinkler or flood), and water source - not divided by a large feature, such as river or highway.

- **Ditch Service Area**: The area of land that a ditch system has either the physical ability or the legal right to irrigate. Note that a ditch service area often includes farmhouses, roads, ditches, fallow fields and undeveloped lands. Therefore, a ditch service area is typically greater than the land irrigated under that ditch.

- **Key Diversion Structure**: A ditch system that is modeled explicitly in both the StateCU historic consumptive use model efforts and the StateMod water resources planning model. Ditch systems are generally defined as key if they have relatively large diversions, have senior water rights, or are important for administration.

- **Diversion System Structure**: A group of diversion structures on the same tributary that operate in a similar fashion to satisfy a common demand.

- **Aggregated Diversion Structure:** A group of non-key structures. Aggregated diversions are typically aggregated based on location; e.g. diverting from the same river reach or tributary.

- **Demand Structure:** A defined demand (agricultural or municipal) that can be met from several surface water sources not diverted from the same point on the river. For instance, irrigation demand under Riverside Canal (Riverside "Demand Structure") can be met from a direct flow right through the Riverside Canal and, if necessary, from water released from Riverside Reservoir.

- **HydroBase**: The State of Colorado's relational database used in the CDSS efforts. HydroBase contains historic, real-time, and administrative water resources data.

- **Data Management Interface (DMI)**: A CDSS program that allows data to flow from HydroBase to the CDSS models using an automated data-centered approach.

- **StateMod**: The CDSS water allocation model used to analyze historic and future water management policies.

3. Model Development

The Colorado River historic crop consumptive use analysis was performed using StateCU, a generic data driven consumptive use model and graphical user interface. The objective of the model is to develop monthly consumptive use estimates for the assessment of historic and future water management policies.

The model originated at the USBR and has undergone substantial enhancements while being applied to the Colorado River Decision Support System, the Rio Grande Decision Support System, and the South Platte Decision Support System. The *StateCU Documentation* provides a complete description of the model and its capabilities.

3.1. Modeling Approach

The general methodology used to estimate historic consumptive use for the Colorado River Basin is as follows (See the *StateCU Documentation* for a more complete description of the calculation methods):

1. A Colorado River Basin structure scenario was developed that includes 100% of the 2005 and 2010 irrigated acreage in the Colorado River using the key, diversion system, and aggregated structures and their associated acreage and crop patterns.
2. Climate stations were assigned to each structure based on spatial determination of climate station weights by hydrologic unit code (HUC).
3. Potential ET was determined using the SCS Modified Blaney-Criddle consumptive use methodology with TR-21 crop characteristics for acreage below 6,500 feet and the Original

Blaney-Criddle consumptive use methodology with high-altitude crop coefficients developed for Denver Water for acreage above 6,500 feet. As recommended in the ASCE Manuals and Reports on Engineering Practice No. 70, Evapotranspiration and Irrigation Water Requirements (1990), an elevation adjustment of 10% adjustment upward for each 1,000 meters increase in elevation above sea level was applied to the Modified Blaney-Criddle method (i.e., for crops below 6,500 feet). The SCS effective rainfall method outlined in the SCS publication Irrigation Water Requirement Technical Release No. 21 (TR-21) was used to determine the amount of water available from precipitation, resulting in irrigation water requirement.

4. Water supply-limited consumptive use was determined by including diversion records, conveyance efficiencies, application efficiencies, and soil moisture interactions. The model determined water supply-limited consumptive use by first applying surface water to meet irrigation water requirement for land under the ditch system. If excess surface water still remained, it was stored in the soil moisture reservoir. Then if the irrigation water requirement was not satisfied, surface water stored in the soil moisture reservoir was used to meet remaining irrigation water requirement.

3.2. File Directory Convention

To assist in the file organization and maintenance of official State data, the files associated with a historic consumptive use analysis will install to the default subdirectory \cdss\data\ *Analysis_description*\StateCU. *Analysis_description* is **cm2015** for the Colorado River crop consumptive use analysis, updated in 2015. Note that these directory conventions are not a requirement of the model, simply a data management convention for official State data.

3.3. File Naming Convention

Specific file names or extensions are not a requirement of the model except for the StateCU response file (*.rcu). Standard extensions have been adopted by the State for data management purposes, and are outlined in **Section 4 Data Development**.

3.4. Data Centered Model Development

Nearly all the StateCU input files have been generated from HydroBase using the data management interfaces StateDMI and TSTool. A description of these tools as applied to StateCU is included in **Section 4 Data Description,** where applicable.

3.5. Product Distribution

The StateCU model, CDSS input files, and associated documentation can be downloaded from the State of Colorado's CDSS web page at http://cdss.state.co.us.

4. Data Description

The following sections provide a description of each input file, the source of the data contained in the input file, and the procedure for generating the input file. More detailed information regarding the file contents and formats can be found in the *StateCU Documentation*.

1. Simulation information files
   - StateCU Response File ***Section 4.1***
   - StateCU Control File ***Section 4.2***
2. Structure specific files
   - StateCU Structure File ***Section 4.3***
   - Crop Distribution File ***Section 4.4***
   - Annual Irrigation Parameter File ***Section 4.5***
   - Historical Diversion File ***Section 4.6***
3. Climate data related files
   - Climate Station Information File ***Section 4.7***
   - Climate Data Files ***Section 4.8***
4. Blaney-Criddle specific files
   - Blaney-Criddle Crop Coefficient File ***Section 4.9***
   - Crop Characteristics File ***Section 4.10***

4.1. StateCU Response File (cm2015.rcu)

The StateCU response file contains the names of input files used for a StateCU analysis. The StateCU response file was created using a text editor for the Colorado River Basin. Input file names in the response file can be revised through the StateCU Interface.

4.2. StateCU Model Control File (cm2015.ccu)

The StateCU Model control file contains the following information used in the historic consumptive use analysis:

- Beginning and ending year for simulation – The simulation period for the analysis was 1950 through 2013.
- Consumptive use analysis method – Monthly SCS Modified Blaney-Criddle, described in TR-21, and the monthly Original Blaney-Criddle analysis were used.
- Effective precipitation method – The SCS Effective Precipitation method, defined in TR-21 was used.
- Scenario type – The analysis was defined as a “structure” scenario.
- Soil moisture consideration – The soil moisture switch was set to “1” indicating the analysis should include soil moisture accounting.
- Initial soil moisture information – The initial soil moisture was set to 50 percent of the capacity for each structure.
- Winter carry-over precipitation percent – The winter carry-over precipitation defines the amount of non-irrigation season precipitation that is available for storage in the soil

moisture reservoir. Winter carry-over precipitation was not used for this scenario; set to zero.

- Output options – The output summary switch was set to "3" indicating a detailed water budget output should be generated.

The StateCU model control file was created using a text editor for the Colorado River Basin. Options in the model control file can be revised through the StateCU Interface.

4.3. StateCU Structure File (cm2015.str)

A structure file defines the structures to be used in the analysis. The structure file contains physical information and structure-specific information that does not vary over time including location information; available soil capacity; and assignments of climate stations to use in the analysis. Location information includes the latitude and county for each structure. The latitude is used in the Blaney-Criddle method to determine the hours of daylight during the growing season.

The Redlands Water and Power Company diverts water from the Gunnison basin for power and irrigation in the Colorado basin. To accurately represent the irrigation consumptive use associated with Redlands Power Canal (4200541), the Redlands irrigation structure (4200541_I) was included in the Colorado consumptive use analysis.

Key and Aggregate Structures

The structure file used in the historic consumptive use analysis was created using StateDMI to extract diversion structure location information stored in HydroBase. Early in the CDSS process it was decided that, while all consumptive use should be represented in the models, it was not practical to model each and every water right or diversion structure individually. Seventy-five percent of use in the basin, however, should be represented at strictly correct river locations relative to other users, with strictly correct priorities relative to other users in both the StateCU and StateMod models. With this objective in mind, key structures to be “explicitly” modeled were determined by:

- Identifying net absolute water rights for each structure and accumulating each structure’s decreed amounts
- Ranking structures according to net total absolute water rights
- Identifying the decreed amount at 75 percent of the basin-wide total decreed amount in the ranked list
- Generating a structures/water rights list consisting of structures at or above the threshold decreed amount
- Field verifying structures/water rights, or confirming their significance with basin water commissioners, and making adjustments

Based on this procedure, 11 cubic feet per second (cfs) was selected as the cutoff value for the Upper Colorado River basin. Key diversion structures are generally those with total absolute water rights equal to or greater than this cutoff. The Upper Colorado River Model includes approximately 266 key diversion structures. Of the 266 key diversions, there are 20 diversion

systems. Diversion systems represent a group of diversion structures on the same tributary that serve a single irrigation demand but are modeled under a single structure. In the Colorado model, diversion systems are represented by structure WDID_D.

There are 5 structures that divert for both irrigation and for off-channel reservoir storage/other uses. To be consistent with the surface water modeling effort, the irrigation portion of the demand for these structures is represented by WDID_I. These structures include Redlands Power Canal (4200541_I), Mason and Eddy Ditch (7200766_I), the Grand Valley Project (7200646_I), and two structures associated with the Silt Project — Dry Elk Valley (3900563_I) and Farmers Irrigation (3903505_I).

In general, the use associated with irrigation diversions having total absolute rights less than 11.0 cfs were included in the model at aggregated nodes. These nodes represent the combined historical diversions, demand, and water rights of many small structures within a prescribed sub-basin. The aggregation boundaries were based generally on tributary boundaries, gage location, critical administrative reaches, and instream flow reaches. In the Colorado model, over 1,344 structures and more than 73,000 irrigated acres are represented by 113 different aggregated nodes. The diversion system structures and aggregates are read by StateDMI from list files. StateDMI then develops the historical diversions by summing the historical diversions of the individual structures, and their irrigation water requirement is based on the total acreage associated with the aggregation.

As presented in **Table 2**, 76 percent of the 2010 acreage with a surface water source was assigned to key structures. The approach and results for selecting key structures and aggregations are outlined in more detail in **Appendix A.**

Table 2: Key and Aggregate Structure Summary

Structure Type	2005 Acres	Percent of Total Acreage	2010 Acres	Percent of Total Acreage	Number of Structures*
Key/Diversion System Structures	152,245	67%	132,719	76%	266
Aggregated Surface Water Structures	76,292	33%	66,538	24%	113
Total Structures	**228,537**	**100%**	**199,258**	**100%**	**379**
**There are a total of 113 aggregated structures representing 1,344 individual structures*					

Available Soil Moisture Capacities

Available soil moisture capacities were estimated from Natural Resources Conservation Service (NRCS) digital mapping and assigned to individual structures in the structure file. Soil moisture capacities for each structure, in inches of holding capacity per inch of soil depth, were provided for key and aggregate structures from comma separated list files. Structure soil moisture capacity by structure ranges from 0.03 to 0.17 inches per inch. **Table 3** summarizes the range of soil moisture capacities used in the consumptive use analysis by Water District.

Table 3: Average Soil Moisture Capacity (inches/inch)

Water District	Average AWC
36	0.10
37	0.13
38	0.12
39	0.10
45	0.12
50	0.12
51	0.11
52	0.05
53	0.09
70	0.12
72	0.13
Basin Average	**0.10**

Climate Station Assignment

Climate stations were selected for use in the consumptive use calculation based on their period of records and location with respect to irrigated land (see **Section 4.7** for more information on climate stations). Climate station and respective weights were assigned to county/hydrologic unit code (HUC), originally based on USBR assignments. Structures were assigned to county and HUC areas based on the location of their irrigated acreage. Climate station weights were then assigned to structures based on this county/HUC area combination method.

The Redlands irrigation structure was assigned the Grand Junction 6 ESE climate station, representative of Water District 42 in the Gunnison River Basin. The Dry Elk Valley and Farmer irrigation structures were assigned the Rifle climate station, representative of Water District 39. The Grand Valley Project irrigation structure was assigned 68 percent to the Fruita 1 W station and 32 percent to the Grand Junction 6 ESE station, representative of the lower Colorado basin where the irrigated land is located.

4.4. Crop Distribution File (cm2015.cds)

The crop distribution file contains acreage and associated crop types for each key and aggregate surface water structures for every year in the analysis period (1950 through 2013). The irrigated acreage assessment for 1993 was originally developed by the State Engineer's Office and the USBR. Each irrigated parcel was assigned a crop type and provided a structure that provides water to the parcel. The irrigated acreage, along with crop type identification, is available spatially through GIS shapefiles and is also available in HydroBase. **Table 4** summarizes the 2005 and 2010 acreage by crop type.

Table 4: Irrigated Acreage by Crop Type

Crop Type	2005 Acreage	2010 Acreage
Alfalfa	35,146	37,065
Corn Grain	7,054	5,846
Grapes	233	497
Grass Pasture	178,781	148,386
Orchard with Cover	283	1,295
Orchard w/out Cover	2,103	1,276
Spring Grains	4,031	4,486
Vegetables	905	407
Total Acreage	**228,537**	**199,258**

1993 acreage and crop types were assigned to years 1950 through 2004 reflecting the limited change in irrigated acreage in the Colorado River Basin. The 2005 acreage and crop types were assigned to years 2005 through 2009, and the 2010 acreage and crop types were assigned to years 2010 through 2013. Note, the year 2000 acreage assessment is omitted from this analysis.

The acreage and crop type for 4200541_I, the Redlands Power Canal irrigation structure, was set based on the acreage and crop type associated with Redlands Power Canal (4200541). Similarly, the acreage and crop type for 7200646_I, the Grand Valley Project irrigation structure, was set using the acreage and crop type associated with the Grand Valley Project (7200646). The acreage and crop type for the two irrigation structures associated with the Silt Project—Dry Elk Valley (3900563_I) and Farmer's Irrigation (3903505_I)—was respectively set based on the Grass Valley Canal's (3900563) and the Grass Valley Reservoir's (3903505) associated acreage and crop type.

The crop distribution file used in the historic consumptive use analysis was created using StateDMI. StateDMI was used to extract the acreage and crop type information from HydroBase and develop the crop distribution file.

4.5. Annual Irrigation Parameter File (cm2015.ipy)

The annual irrigation parameter file contains yearly (time series) structure information required to run consumptive use simulations, including the following:

- Conveyance efficiencies
- Maximum flood irrigation efficiencies
- Maximum sprinkler irrigation efficiencies
- Acreage flood irrigated with surface water only
- Acreage sprinkler irrigated with surface water only
- Acreage flood irrigated with ground water only or supplemental to surface water

- Acreage sprinkler irrigated with ground water only or supplemental to surface water
- Maximum permitted or decreed monthly pumping capacity
- Ground water use mode (ground water primary or secondary source)

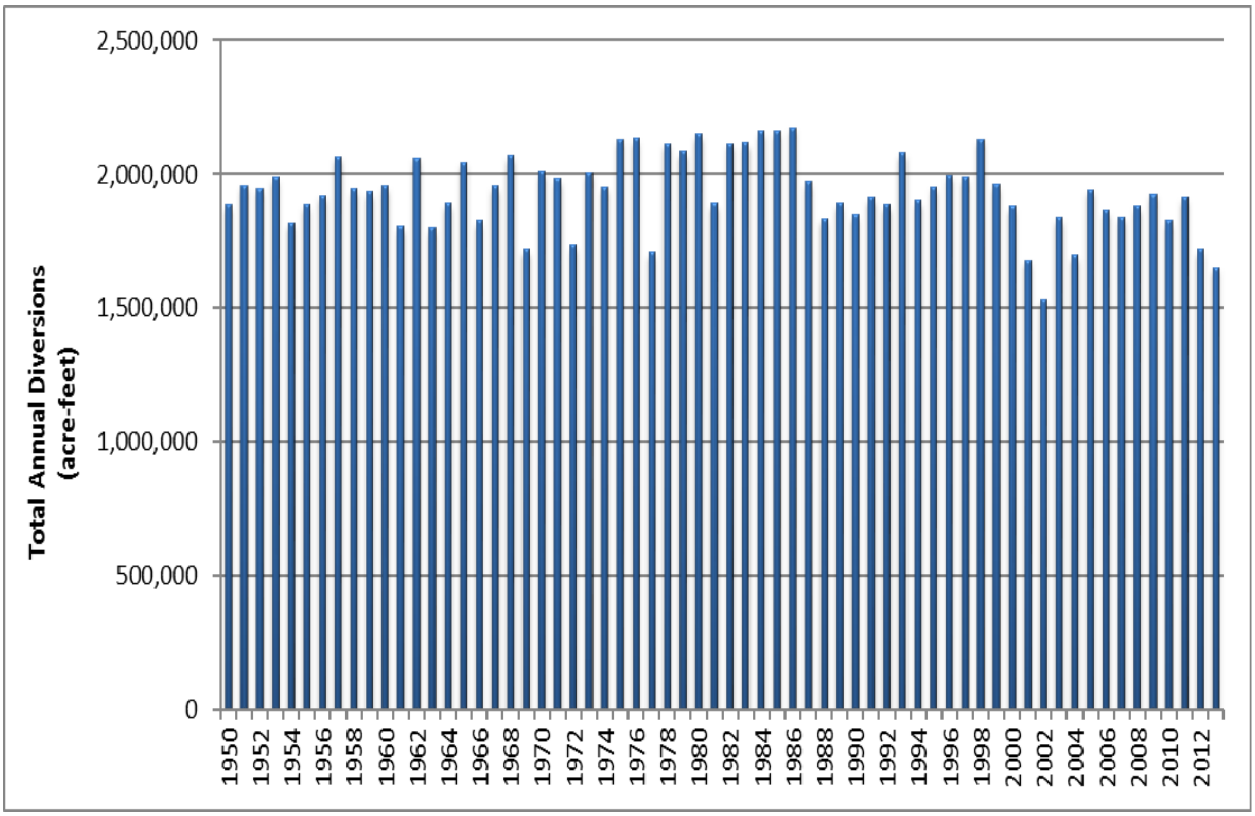
The conveyance efficiency accounts for losses between the river headgate and the farm headgate, including losses through canals, ditches and laterals. The maximum flood irrigation and sprinkler efficiencies account for application losses between the farm headgate and the crops. Note, the conveyance and maximum application efficiency data were not adjusted by year. However, a structure's overall system efficiency may change by year due to changes in the percent of land served by sprinkler or flood application methods, or due to surface water supply in excess of crop requirement.

The maximum conveyance efficiency for all structures in the Colorado River Basin is set at 100 percent. The maximum flood irrigation and sprinkler irrigation efficiencies—which represent maximum overall system efficiency—were estimated to be 54 percent and 72 percent respectively. Efficiency numbers are derived and are not stored in HydroBase. Irrigation methods (flood vs. sprinkler) are stored in HydroBase. **StateDMI** was used to extract the time series information from HydroBase, set the derived efficiency values, and create the annual irrigation parameter file.

4.6. Historical Irrigation Diversion File (cm2015_cu.ddh)

The historical diversion file provides surface water supply information required to estimate supply-limited consumptive use. Irrigation diversions are provided for each modeled key and aggregate surface water diversion structure. **Figure 5** shows how surface water diversions for irrigation in the basin have changed over time. Surface water diversions for irrigation averaged approximately 1,931,185 acre-feet per year over the 1950 through 2013 study period. The variation seen in **Figure 5** is due to water supply limitations for the basin as a whole.

Figure 5: Total Annual Surface Water Irrigation Diversions



StateDMI was used to extract diversion records from HydroBase and fill missing diversion data**.** Diversion data for structures included in a diversion structure or aggregate structure are first extracted and filled, then combined with other structures' diversion data in the diversion system or aggregate structure. Note that diversion comments were considered when extracting data from HydroBase; for instance, if the diversion comment for a specific structure indicated the structure was not usable for a specific year, that year of data for that structure was set to zero.

Missing data was filled using a wet/dry/average pattern according to an 'indicator' gage. Each month of the streamflow at the indicator gage was categorized as a wet/dry/average month through a process referred to as 'streamflow characterization'. Months with gage flows at or below the 25th percentile for that month are characterized as 'dry', while months at or above the 75th percentile are characterized as 'wet', and remaining months are characterized as 'average'. Using this characterization, missing data points were filled based on the wet, dry, or average pattern. For example, a data point missing for a wet March was filled with the average of other wet Marches in the partial time series, rather than all Marches. The pattern streamflow gages used in the Colorado River basin are the Williams Fork near Parshall, CO (09037500), Roaring Fork River at Glenwood Springs, CO (09085000), Gunnison River near Grand Junction, CO (09152500), Colorado River near Cameo, CO (09095500), and Colorado

River at Hot Sulphur Springs, CO (09034500). If missing data still existed after filling with a pattern file, historical monthly averages were used to fill the remaining data.

4.7. Climate Station Information File (COclim2015.cli)

The climate station information file provides climate station location information for climate stations used in the analysis, including latitude, elevation, county and HUC. A single climate station information file was developed for the entire western slope and therefore includes all key climate stations used in the Colorado River basin models (Gunnison, White, Yampa, Upper Colorado, San Juan/Dolores). **Table 5** lists the subset of climate stations used in the Colorado River analysis including their period of record and their percent complete for temperature and precipitation data. The climate station information file was created using **StateDMI** to extract location information stored in HydroBase based on a list of climate stations to be used in the analyses.

Table 5: Key Climate Station Information

Station ID	Station Name	WD	Period of Record	Elevation (feet)	Percent Complete (1950 – 2013)	
					Temperature	Precipitation
USC00050214	Altenbern	70	1958-2013	5,678	86.33%	99.74%
USC00051741	Collbran*	72	1950-1999	5,980	71.61%	72.53%
USW00023063	Eagle County AP	37	1950-2013	6,497	80.99%	69.27%
USC00053146	Fruita 1 W*	72	1950-2013	4,480	93.49%	93.49%
USC00053359	Glenwood Springs #2	53	1950-2013	5,880	92.97%	89.32%
USC00053489	Grand Junction 6 ESE	72	1962-2013	4,760	79.69%	77.99%
USC00053500	Grand Lake	51	1950-2013	8,288	99.87%	99.61%
USC00053592	Green Mt. Dam	36	1950-2008	7,740	89.58%	81.38%
USC00054664	Kremmling	50	1950-2013	7,460	72.40%	74.87%
USC00055507	Meredith*	38	1963-2007	7,825	59.38%	69.92%
USC00057031	Rifle*	39	1950-2013	5,450	85.55%	87.50%
USC00059265	Yampa	58	1964-2013	6,860	74.22%	98.96%

* Represents a combined climate station whereby the data from two or more stations has been combined to create a single key climate station.

4.8. Climate Data Files (COclim2015.tmp, COclim2015.prc, COclim2015.fd)

StateCU requires historical time series data, in calendar year, for temperature, frost dates, and precipitation. The CRDSS climate data files, developed using the TSTool, contain monthly data for fifty-four stations. Note, a single set of climate data files were developed for the entire western slope and, therefore, include data for all key climate stations used in the Colorado River basin models (Gunnison, White, Yampa, Upper Colorado, San Juan/Dolores). **Table 6** summarizes the average annual temperature, frost dates and precipitation based on filled data for the subset of stations used in the Colorado River analysis.

Table 6: Average Annual Filled Climate Values (1950-2013)

Station Name	Station ID	Average Annual		Frost Dates (Degrees F)			
		Temperature (Degrees F)	Precipitation (Inches)	Spring 28 Deg	Spring 32 Deg	Fall 32 Deg	Fall 28 Deg
Altenbern	USC00050214	46.8	16.41	12-May	27-May	17-Sep	1-Oct
Collbran*	USC00051741	46.7	14.17	5-May	27-May	20-Sep	6-Oct
Eagle County AP	USW00023063	43.4	10.68	23-May	12-Jun	27-Aug	11-Sep
Fruita 1 W*	USC00053146	50.7	8.67	25-Apr	10-May	1-Oct	15-Oct
Glenwood Springs #2	USC00053359	47.4	16.20	30-Apr	19-May	23-Sep	7-Oct
Grand Junction 6 ESE	USC00053489	53.3	8.76	8-Apr	27-Apr	11-Oct	25-Oct
Grand Lake	USC00053500	36.5	13.90	30-May	18-Jun	14-Aug	13-Sep
Green Mt. Dam	USC00053592	39.4	14.81	23-May	11-Jun	29-Aug	19-Sep
Kremmling	USC00054664	38.3	11.73	30-May	14-Jun	7-Aug	2-Sep
Meredith*	USC00055507	38.4	15.33	12-Jun	23-Jun	16-Jul	21-Aug
Rifle*	USC00057031	47.7	11.62	3-May	25-May	20-Sep	5-Oct
Yampa	USC00059265	39.4	16.35	3-Jun	16-Jun	24-Aug	19-Sep

* Represents a combined climate station whereby the data from two or more stations has been combined to create a single key climate station.

Figure 6 and **Figure 7** show the 1950 through 2013 average monthly precipitation and temperature for the Kremmling (USC00054664) climate station, located in the northeastern portion of the Colorado River Basin. Historic missing data for these climate stations were filled from 1950 through 2013 using TSTool. Historic month averages were used to fill missing precipitation data and linear regression techniques were used to fill missing temperature data**.**

Figure 6: Average Mean Monthly Temperature Kremmling Climate Station (1950 – 2013)

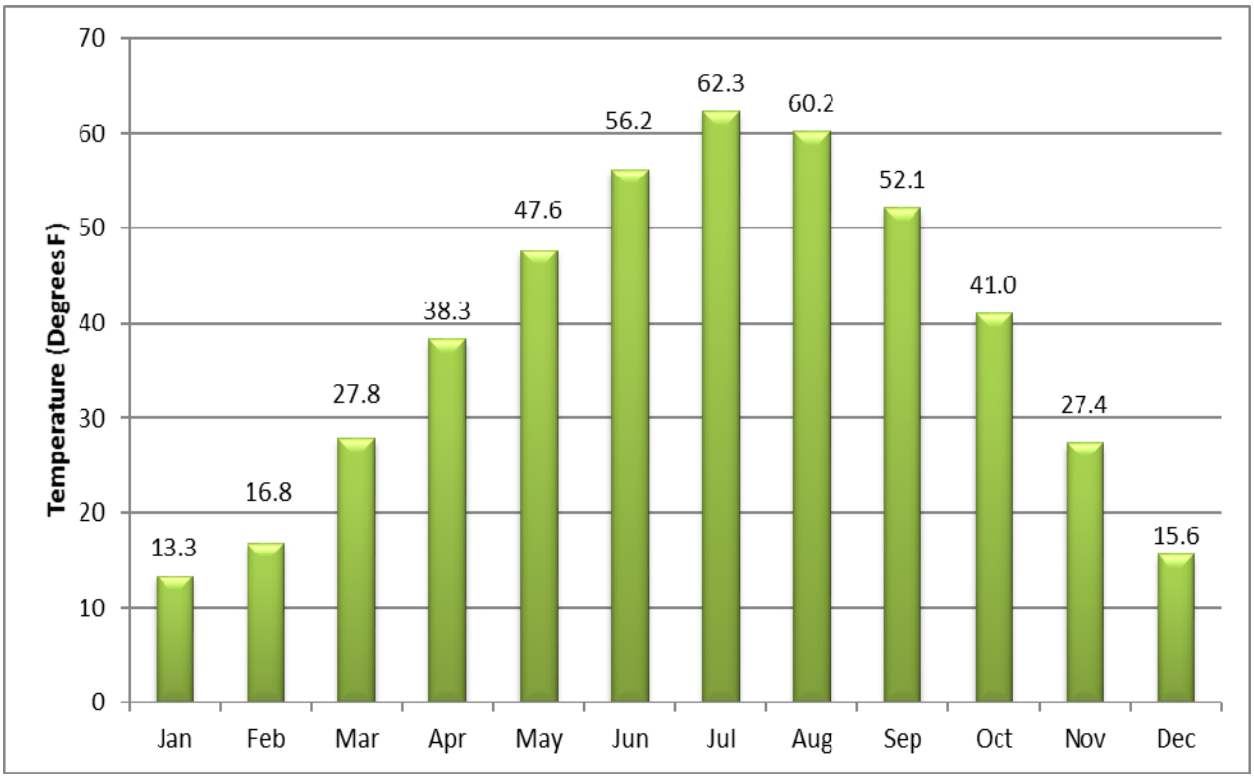
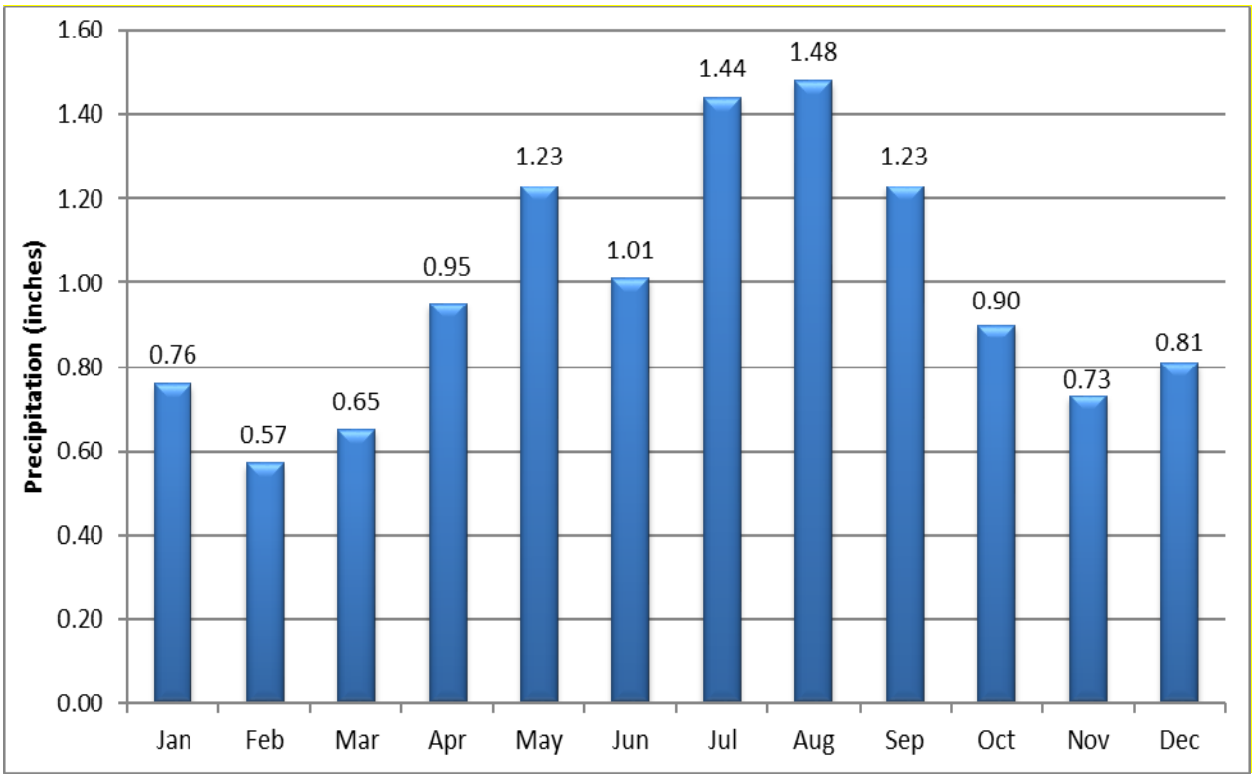


Figure 7: Average Mean Monthly Precipitation Kremmling Climate Station (1950 – 2013)



4.9. Blaney-Criddle Crop Coefficient File (CDSS.kbc)

The Blaney-Criddle crop coefficient file contains crop coefficient data used in the CRDSS historic consumptive use analysis. Standard TR-21 Blaney-Criddle crop coefficient curve data is available for the Modified Blaney-Criddle method. The crop coefficient file contains TR-21 curve data for several crops, however only nine TR-21 crops are modeled in the Colorado River Basin; alfalfa, corn grain, dry beans, grapes, grass pasture, orchard with cover, orchard without cover, spring grains, and vegetables.

Structures with irrigated grass pasture acreage located above 6,500 feet in elevation were assigned the Denver Water High Altitude crop coefficients, included in the CDSS.kbc file, for use with the Original Blaney-Criddle methodology. Additional details on high altitude crop coefficients can be found in the SPDSS Task 59.1 Technical Memorandum available on the CDSS website.

The flag to indicate an elevation adjustment to specific crops in the analysis is located in the crop coefficient file. It is recommended in the ASCE Manuals and Reports on Engineering Practice No. 70, Evapotranspiration and Irrigation Water Requirements (1990) that an elevation adjustment of 10 percent adjustment upward for each 1,000 meters increase in elevation above sea level should be applied to the Modified Blaney-Criddle method when using TR-21 coefficients, i.e. for crops below 6500 feet. For this analysis, an elevation adjustment was applied for all Modified Blaney-Criddle crops. The elevation adjustment is applied based on the elevation of the structure, if provided in the structure file. However, in general, structure elevations are not available in HydroBase. If no structure elevation is provided, the elevation of the weighted climate station(s) is used for the elevation adjustment.

The crop coefficient file used in the historic consumptive use analysis was created using **StateDMI** to extract the representative crop coefficients from HydroBase.

4.10. Crop Characteristic File (CDSS.cch)

The crop characteristic file contains information on planting, harvesting, and root depth. Standard TR-21 Blaney-Criddle crop characteristics were used in the analysis. Crop characteristics from the Denver Water study were adapted for grass pasture above 6,500 feet in elevation. See **Table 7** for specific crop characteristics including Denver Water High Altitude.

The crop characteristic file used in the historic consumptive use analysis was created using **StateDMI** by extracting the representative crop characteristics from HydroBase and develop the crop characteristics input file.

Table 7: Characteristics of Crops in the Yampa River Basin

Crop Type	Source	Length of Season	Beginning Temperature	End Temperature
Alfalfa	TR21	365	50	28
Corn Grain	TR21	140	55	32
Dry Beans	TR21	112	60	32
Grapes	TR21	365	55	50
Grass Pasture	TR21	365	45	45
Orchard with Cover	TR21	365	50	45
Orchard w/out Cover	TR21	365	50	45
Spring Grains	TR21	137	45	32
Vegetables	TR21	146	55	45
High Altitude Grass Pasture	Denver Water Study	365	42	42

5. Results

5.1. StateCU Model Results

The Colorado River Basin historic crop consumptive use results are a product of the input files described in **Section 4**. This section provides a summary of historic crop consumptive use and system efficiencies. Results for individual key and aggregated structures can be easily viewed and printed by obtaining the StateCU input files and StateCU model from the CDSS website (see **Section 3.5**).

Table 8 shows the average annual basin consumptive use water budget accounting for the period 1950 through 2013. The individual component results are discussed in detail in the following sections.

Table 8: Basin Average Annual Results 1950 through 2013 (acre-feet)

Water District	Irrigation Water Required	Surface Water Diversion Accounting					Estimated Crop CU		
		River Headgate Diversion	Surface Water Diversion To:			Calculated System Efficiency	From SW	From Soil	Total
			CU	Soil	Non-Consumed				
36	15,545	95,202	13,286	1,279	80,637	14%	13,286	1,271	14,557
37	19,320	83,570	17,717	1,191	64,662	16%	17,717	1,173	18,890
38	61,668	358,513	52,011	3,399	303,102	10%	52,011	3,373	55,384
39	34,280	117,962	27,344	2,556	88,062	21%	27,344	2,541	29,885
45	59,836	130,754	35,167	6,856	88,731	24%	35,167	6,887	42,054
50	32,296	80,695	21,821	4,966	53,909	29%	21,821	5,002	26,823
51	44,250	140,326	33,201	4,780	102,345	25%	33,201	4,785	37,986
52	6,811	22,280	5,753	528	15,999	31%	5,753	531	6,285
53	23,592	73,678	17,553	1,147	54,979	20%	17,553	1,153	18,706
70	10,648	35,017	8,089	1,085	25,843	26%	8,089	1,088	9,177
72	230,031	793,187	209,630	7,145	576,413	20%	209,630	6,954	216,584

The Irrigation Water Requirement (IWR) is potential consumptive use less the amount of precipitation effective in meeting crop demands directly during the irrigation season. Note that a conveyance loss of 10 percent is factored directly into the maximum system application efficiencies, as presented in **Section 4.5**. Therefore, the River Headgate Diversion is adjusted for conveyance and application efficiency through the maximum application efficiency value. The Non-Consumed represents the total water not consumed by the crops; loss through canal conveyance or during application of the irrigation water. The non-consumed portion of diversions returns to the river and is available for re-diversion downstream.

5.2. Historic Crop Consumptive Use

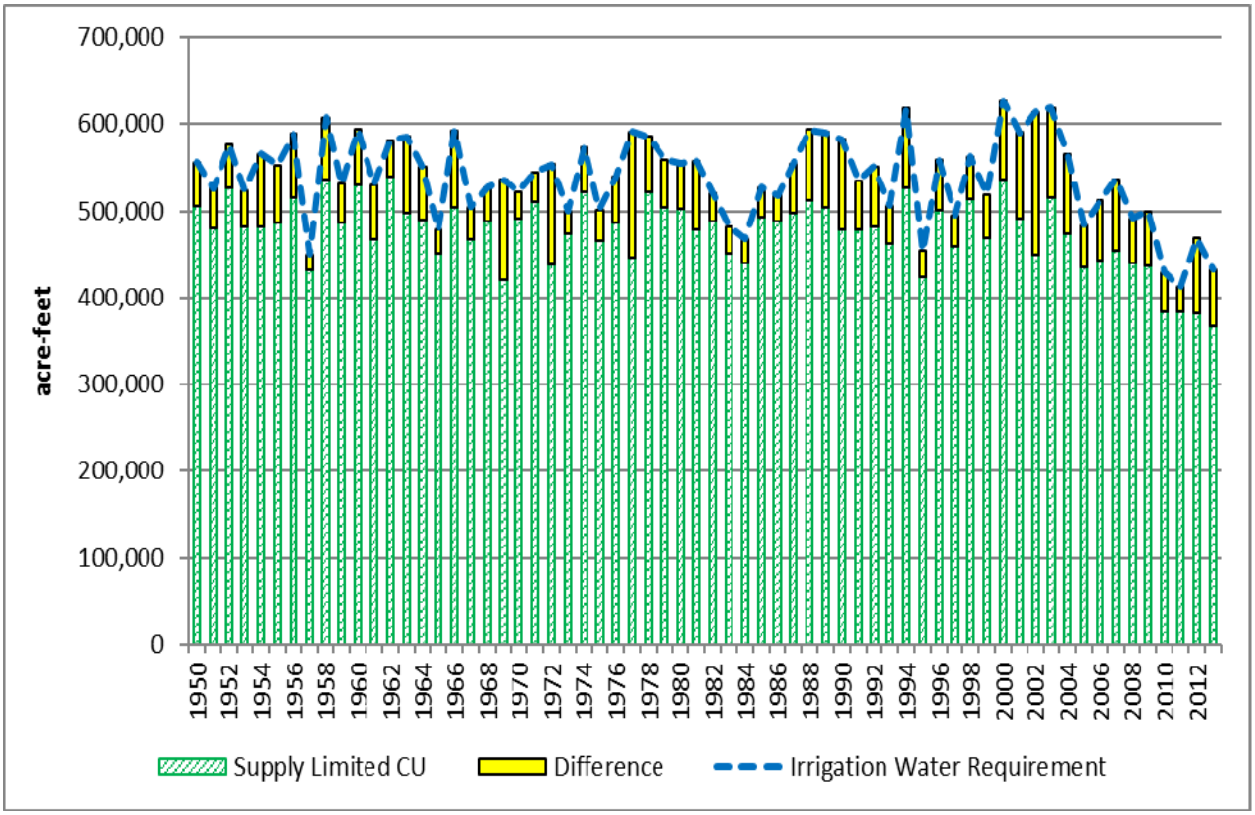
Table 9 presents the historic crop consumptive use analysis results for the 1950 to 2013 study period. Irrigation water requirement in the Colorado River basin is satisfied from surface water diversions, resulting in an estimate of water supply limited consumptive use. The Colorado River basin averages 538,278 acre-feet of water supply limited consumptive use annually. The average annual shortage in the basin is 13 percent. Note the consumptive use from surface water includes excess surface water stored in the soil moisture and then subsequently used by crops.

Table 9: Average Annual Consumptive Use Results (1950 – 2013)

Water District	Average Acres	Irrigation Water Requirement (acre-feet)	Supply-Limited CU (acre-feet)	Percent Short
36 – Blue River	8,384	15,545	14,557	6%
37 – Eagle River	8,409	19,320	18,890	2%
38 – Roaring Fork	30,359	61,668	55,384	10%
39 – Rifle/Eagle/Parachute	16,289	34,280	29,885	13%
45 – Divide Ck	27,998	59,836	42,054	30%
50 – Muddy/Troublesome	16,895	32,296	26,823	17%
51 – Upper CO/Fraser	24,034	44,250	37,986	14%
52 – Piney/Cottonwood	3,432	6,811	6,285	8%
53 – Tribs. North of CO River	12,374	23,592	18,706	21%
70 – Roan Creek	5,564	10,648	9,177	14%
72 – Lower CO River	95,093	230,031	216,584	6%
Colorado Basin Total	**248,833**	**538,278**	**476,330**	**12%**

Figure 8 presents basin crop consumptive use results by year. As shown, the percent of irrigation water requirement not satisfied is directly related to water supply. Shortages averaging 10 percent from 1992 through 2000 are consistent with normal stream flows. Shortages increased to 18 percent in the early 2000s due to drought conditions, reaching a maximum of 27 percent in 2002.

Figure 8: Irrigation Water Requirement and Supply Limited CU



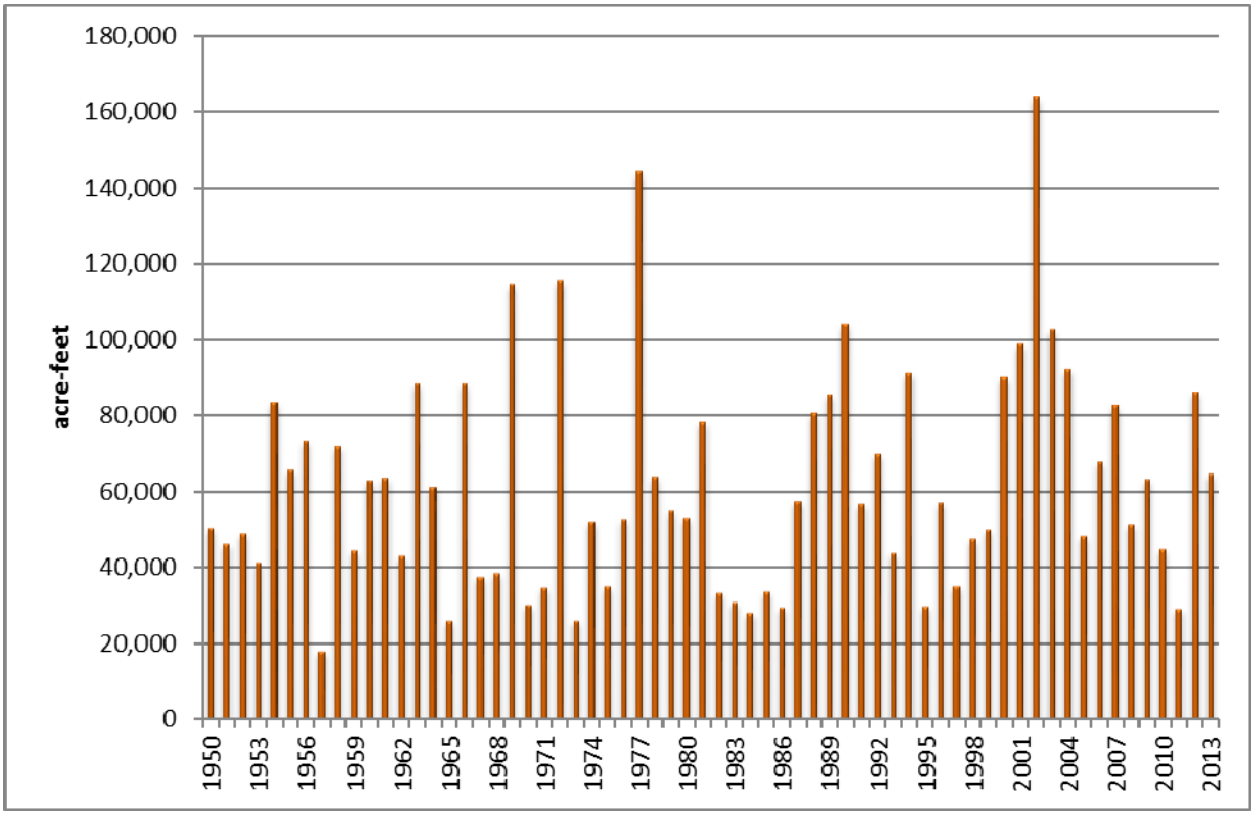
Basin-wide average monthly shortages for the study period vary from a low of 6 percent in June to a high of 22 percent in September, as shown in **Table 10**.

Table 10: Average Monthly Shortages (1950 – 2013)

Water District	Apr	May	Jun	Jul	Aug	Sep	Oct
36 - Blue River	12%	11%	2%	2%	6%	15%	22%
37 – Eagle River	3%	4%	2%	2%	2%	1%	2%
38 – Roaring Fork	9%	7%	7%	11%	13%	14%	15%
39 – Rifle/Eagle/Parachute	4%	5%	7%	15%	16%	18%	23%
45 – Divide Ck	16%	5%	8%	27%	52%	59%	45%
50 – Muddy/Troublesome	13%	13%	5%	11%	26%	42%	45%
51 – Upper CO/Fraser	13%	17%	7%	8%	15%	32%	37%
52 – Piney/Cottonwood	6%	2%	2%	5%	14%	20%	25%
53 – Tribs. North of CO River	19%	25%	15%	15%	21%	29%	30%
70 – Roan Creek	2%	3%	8%	15%	21%	19%	8%
72 – Lower CO River	3%	3%	4%	6%	7%	10%	10%
Colorado Basin Total	**7%**	**7%**	**6%**	**10%**	**16%**	**22%**	**20%**

Figure 9 present shortages by year. As illustrated in the graph, shortages increased dramatically in the drought years in the early 2000s.

Figure 9: Annual Shortages



5.3. Estimated Actual Efficiencies

As described in the StateCU Documentation, the amount of surface water available to meet the crop demand is the river headgate diversion less conveyance losses and application losses. If the surface water supply exceeds the irrigation water requirement, water can be stored in the soil moisture up to its water holding capacity.

Maximum system efficiencies for surface water diversions are provided as input to StateCU, as described in **Section 4.5**. Actual system efficiencies are calculated based on the amount of water available to meet crop demands and the application method (e.g., flood or sprinkler). In the 1993 irrigated acreage assessment, only 33,000 acres, or 12 percent of the total irrigated acreage in the basin, is served by sprinklers. The total irrigated acreage served by sprinklers decreased slightly in 2005 to approximately 24,800 acres (11 percent) and further decreased in 2010 to less than 24,500 acres (12 percent). The remaining acreage is irrigated with flood irrigation practices.

Table 11 provides the average monthly calculated system efficiencies for surface water supplies. Surface water system efficiencies have remained relatively constant throughout the study period, with the slight variations due to water availability.

Table 11: Average Monthly Calculated System Efficiencies (1950 – 2013)

Water District	Apr	May	Jun	Jul	Aug	Sep	Oct
36 – Blue R Basin	31%	24%	15%	15%	16%	21%	14%
37 – Eagle R Basin	37%	40%	29%	25%	19%	17%	13%
38 – Roaring Fork R Basin	14%	20%	20%	20%	14%	11%	6%
39 – Rifle/Elk/Parachute Creeks	28%	22%	27%	33%	32%	24%	12%
45 – Divide Creek	34%	36%	36%	40%	34%	27%	19%
50 – Muddy/Troublesome Creek	43%	37%	28%	39%	47%	47%	40%
51 – Upper Colorado/Fraser R	35%	33%	24%	27%	37%	33%	27%
52 – Piney/Cottonwood Creeks	44%	32%	27%	36%	40%	46%	45%
53 – Tribs. North of CO R	22%	26%	27%	30%	26%	25%	19%
70 – Roan Creek Basin	28%	23%	29%	37%	38%	34%	26%
72 – Lower Colorado R	22%	23%	37%	42%	34%	21%	13%
Colorado Basin Total	**18%**	**26%**	**28%**	**32%**	**27%**	**20%**	**10%**

6. Comments and Concerns

The historic crop consumptive use estimates are based on measured and recorded data; information from other studies; information provided by local water commissioners and users; and engineering judgment. The results developed for this project are considered appropriate to use for CRDSS planning efforts. Areas of potential improvement or concern include:

- Historic Acreage. The irrigated acreage assessed for year 1993 serves as the basis for estimating historic acreage from 1950 to 2004 and is considered relatively accurate, as are irrigated acreage estimates for 2005 and 2010. Diversion structures with irrigated acreage in either 2005 or 2010 were represented in the model. This model may not represent all acreage that was irrigated prior to 1993.
- System Efficiencies. Maximum system efficiency estimates were set for the basin as a whole, in general based on user-supplied information. Limited conveyance efficiency information based on actual canal loss studies exists for systems in the basin. Canal loss studies, specifically for the larger systems, could improve the estimate of maximum system efficiencies used in the historic consumptive use estimate. Additionally, conveyance efficiency estimates based on soil type and ditch length, determined by the GIS soil type and canal coverages, could be used to also increase the accuracy of the maximum system efficiency estimates.
- Water Use. The results presented are based on an approach that attempts to represent how water is actually applied to crops in the basin. The approach used is based on engineering judgment and informal discussions with water users. The effort did not include determining surface water shares for each owner under a ditch or determining different application rates based on crop types. Instead historically diverted water was shared equally based on acreage under each ditch system. This basin-wide historical crop consumptive use analysis is appropriate for CRDSS planning purposes. However, it should be used as a starting point only for a more detailed ditch level analysis.

Appendix A: Aggregation of Irrigation Diversion Structures

A-1: Colorado River Basin Aggregated Irrigation Structures

A-2: Identification of Associated Structures (Diversion System and Multi-Structures)

A-1: Colorado River Basin Aggregated Irrigation Structures

Introduction

The original CDSS StateMod and StateCU modeling efforts were based on the 1993 irrigated acreage coverage developed during initial CRDSS efforts. Irrigated acreage assessments representing 2005 and 2010 have now been completed for the western slope basins. A portion of the 2005 and 2010 acreage was tied to structures that did not have identified acreage in the 1993 coverage, and, consequently, are not currently represented in the CDSS models. As part of this task, aggregate and diversion system structure lists for the western slope basins were revised to include 100 percent of the irrigated acreage based on both the 2005 and 2010 assessments. The update also included identification of associated structures and the development of "no diversion" aggregates—groups of structures that have been assigned acreage but do not have current diversion records.

The methodology for identifying associated structures is described more in-depth in **Section A-2** of this appendix. In general, associated structures—which divert to irrigate a common parcel of land—were updated to more accurately model combined acreage, diversions, and demands. These updates include the integration of the 2005 irrigated acreage, the 2010 irrigated acreage, as well as verification based on diversion comments and water right transaction comments. In StateCU, the modeling focus is on the irrigated parcels of land. Therefore, all associated structures are handled in the same way. The acreage is assigned to a single primary node, which can be supplied by diversions from any of the associated structures. In StateMod, there are two types of associated structures. Diversion systems represent structures located on the same tributary that irrigate common land. Diversions systems combine acreage, headgate demands, and water rights; StateMod treats them as a single structure. In contrast, multi-structure systems represent structures located on different tributaries that irrigate common land. Multi-structure systems have the combined acreage and demand assigned to a primary structure; however, the water rights are represented at each individual structure, and the model meets the demand from each structure when their water right is in priority.

"No diversion" aggregates are included in StateCU in order to capture 100 percent of irrigated acreage. However, they were not included in the StateMod modeling effort. Because the individual structures included in these aggregates do not have current diversion records, their effect on the stream cannot be accounted for in the development of natural flows. Therefore, it is appropriate that their diversions also not be included in simulation. The individual structures in the "no diversion" aggregates generally irrigate minimal acreage, often with spring water as a source. There is an assumption that the use will not change in future "what-if" modeling scenarios.

Approach

The following approach was used to update the aggregated structures in the Colorado River Basin.

1. Identify structures assigned irrigated acreage in either the 2005 or 2010 CDSS acreage coverages.
2. Identify Key structures represented explicitly in the model. The process for determining key structures is outlined in **Section 4** of the report.
3. Identify Key structures that should be represented as diversion systems or multi-structures, based on their association with other structures as outlined in **Section A-2** of this appendix.
4. Aggregate remaining irrigation structures identified in either the 2005 or 2010 irrigated acreage coverages based on the aggregate spatial boundaries shown in Figure A-1. The boundaries were developed during previous Colorado River Basin modeling effort to general group structures by tributaries with combined acreage less than 2,200.
5. Further split the aggregations based on structures with and without current diversions during the period 2000 through 2012.

Results

Table A-1 indicates the number of structures in the aggregation and the total the 2005 and 2010 aggregated acreage. All of the individual structures in the aggregates have recent diversion records.

Table A-1: Colorado River Basin Aggregation Summary

Aggregation ID	Aggregation Name	Number of Structures	2005 Acres	2010 Acres
36_ADC017	Upper Blue River	52	1,356	1,331
36_ADC018	Blue River abv Green Mountain Rsvr	18	739	737
36_ADC019	Blue River bl Green Mountain Rsvr	22	1,302	1,102
37_ADC029	Eagle River abv Brush Creek	26	1,376	1,365
37_ADC030	Brush Creek	24	873	874
37_ADC031	Eagle River bl Gypsum	19	922	792
38_ADC033	Upper Roaring Fork	17	650	638
38_ADC034	Snowmass Creek	20	1,297	1,288
38_ADC035	Frying Pan River	13	363	276
38_ADC036	West Sopris Creek	16	651	654
38_ADC037	Roaring Fork abv Crystal	17	1,052	1,002
38_ADC038	Crystal River	13	924	918
38_ADC039	Cattle Creek	21	1,175	1,012
38_ADC040	Lower Roaring Fork	7	310	265
39_ADC041	Elk Creek	24	1,071	970
39_ADC045	Rifle Creek	19	807	488
45_ADC042	Colorado River bl Garfield Creek	32	1,500	1,223
45_ADC043	Colorado River bl Divide Creek	31	2,022	1,088

Aggregation ID	Aggregation Name	Number of Structures	2005 Acres	2010 Acres
45_ADC044	Colorado R bl Mamm Creek	17	1,949	1,462
45_ADC046	Colorado River bl Beaver Creek	17	924	591
45_ADC047	Colorado River bl Cache Creek	23	1,561	851
45_ADC048	Colorado River nr De Beque	33	2,313	848
50_ADC012	Troublesome Creek	29	2,498	2,481
50_ADC013	Upper Muddy Creek	16	1,997	1,474
50_ADC014	Muddy Creek abv Tyler Ditch	21	1,252	1,168
50_ADC015	Muddy Creek abv Red Dirt Creek	9	932	835
50_ADC016	Lower Muddy Creek	14	751	733
50_ADC020	Colorado River bl Kremmling	8	923	828
51_ADC001	Colorado River nr Granby	12	881	874
51_ADC002	Willow Creek	9	967	841
51_ADC003	Ranch Creek	6	876	839
51_ADC004	Fraser River bl Crooked Creek	10	743	743
51_ADC005	Tenmile Creek	27	2,018	1,971
51_ADC006	Fraser River at Granby	11	554	549
51_ADC007	Colorado River abv Hot Sulphur Springs	16	548	497
51_ADC008	Colorado River abv Williams Fork	17	825	764
51_ADC009	Upper Williams Fork	12	953	779
51_ADC010	Lower Williams Fork	16	975	984
51_ADC011	Colorado River abv Troublesome Creek	14	768	758
52_ADC021	Black Tail & Sheephorn Creek	57	1,706	1,614
52_ADC027	Colorado River abv Derby Creek	17	919	979
53_ADC022	Upper Egeria Creek	9	930	941
53_ADC023	King Creek	8	1,133	1,244
53_ADC024	Egeria Creek abv Toponas Creek	9	828	937
53_ADC025	Toponas Creek	10	554	554
53_ADC026	Colorado River abv Alkali Canyon	22	526	540
53_ADC028	Derby Creek	21	1,751	1,735
53_ADC032	Colorado River abv Glenwood Springs	62	1,844	1,863
70_ADC049	Upper Roan Creek	33	2,070	1,571
70_ADC050	Colorado River nr Cameo	18	1,011	785
72_ADC051	Plateau Creek abv Vega Rsvr	7	450	445
72_ADC052	Plateau Creek bl Vega Rsvr	6	910	891
72_ADC053	Salt Creek	16	1,135	1,077
72_ADC054	Upper Buzzard Creek	14	680	531
72_ADC055	Plateau Creek bl Buzzard Creek	17	1,216	1,159
72_ADC056	Upper Grove Creek	10	646	659
72_ADC057	Lower Grove Creek	7	901	682
72_ADC058	Kimball Creek	7	425	350
72_ADC059	Big Creek	26	1,218	1,109
72_ADC060	Cottonwood Creek	10	1,470	1,465

Aggregation ID	Aggregation Name	Number of Structures	2005 Acres	2010 Acres
72_ADC061	Bull Creek	8	352	332
72_ADC062	Coon Creek	13	837	771
72_ADC063	Mesa Creek	10	911	871
72_ADC064	Plateau Creek	9	136	57
72_ADC065	Colorado River nr State Line	28	1,499	1,025

Table A-2 shows the number of structures in the "no diversions" (AND) aggregates and the total 2005 and 2010 acreage. None of the individual structures in the aggregates have recent diversion records.

Table A-2: No Diversion Aggregation Summary

Aggregation ID	Aggregation Name	Number of Structures	2005 Acres	2010 Acres
36_AND017	Upper Blue River	7	255	259
36_AND019	Blue River bl Green Mountain Rsvr	1	272	271
37_AND029	Eagle River abv Brush Creek	4	114	163
37_AND030	Brush Creek	2	123	123
37_AND031	Eagle River bl Gypsum	1	20	20
38_AND035	Frying Pan River	9	226	258
38_AND037	Roaring Fork abv Crystal	6	672	530
38_AND038	Crystal River	9	435	120
38_AND036	West Sopris Creek	5	212	212
38_AND033	Upper Roaring Fork	6	127	121
38_AND040	Lower Roaring Fork	5	606	454
38_AND034	Snowmass Creek	2	103	103
38_AND039	Cattle Creek	4	356	250
39_AND041	Elk Creek	6	209	190
39_AND045	Rifle Creek	8	209	95
45_AND042	Colorado River bl Garfield Creek	10	136	128
45_AND044	Colorado R bl Mamm Creek	2	81	44
45_AND048	Colorado River nr De Beque	5	289	127
45_AND043	Colorado River bl Divide Creek	2	28	25
45_AND046	Colorado River bl Beaver Creek	1	15	9
50_AND016	Lower Muddy Creek	1	67	67
50_AND014	Muddy Creek abv Tyler Ditch	1	96	101
51_AND003	Ranch Creek	1	147	147
51_AND005	Tenmile Creek	2	100	63
51_AND006	Fraser River at Granby	4	140	140
51_AND004	Fraser River bl Crooked Creek	2	67	67
51_AND001	Colorado River nr Granby	2	75	75
51_AND010	Lower Williams Fork	1	44	44

Aggregation ID	Aggregation Name	Number of Structures	2005 Acres	2010 Acres
53_AND032	Colorado River abv Glenwood Springs	5	43	43
52_AND021	Black Tail & Sheephorn Creek	8	120	90
53_AND028	Derby Creek	4	379	380
53_AND023	King Creek	1	24	24
53_AND026	Colorado River abv Alkali Canyon	2	28	32
53_AND025	Toponas Creek	1	53	73
50_AND020	Colorado River bl Kremmling	1	32	32
70_AND049	Upper Roan Creek	2	27	14
70_AND050	Colorado River nr Cameo	2	44	19
72_AND063	Mesa Creek	4	156	138
72_AND054	Upper Buzzard Creek	1	79	88
72_AND058	Kimball Creek	1	55	14
72_AND062	Coon Creek	4	106	107
72_AND056	Upper Grove Creek	1	19	19
72_AND065	Colorado River nr State Line	2	87	58
72_AND053	Salt Creek	1	12	12
72_AND051	Plateau Creek abv Vega Rsvr	2	38	38
72_AND061	Bull Creek	2	28	28
72_AND052	Plateau Creek bl Vega Rsvr	1	46	46
45_AND047	Colorado River bl Cache Creek	2	34	0

Table A-3 indicates the structures in the diversion systems and multi-structures.

Table A-3: Diversion System and Multi-Structure Summary

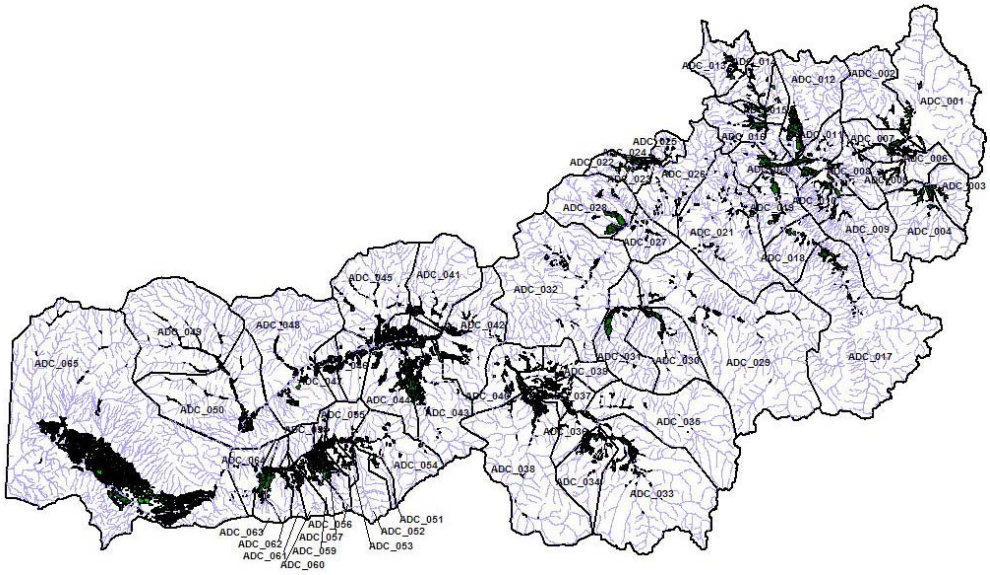
Diversion System ID	Diversion System Name	WDID
3600649_D HAMILTON DAVIDSON DIVSYS	HAMILTON DAVIDSON DITCH	3600649
	BRUSH CREEK DITCH	3600541
	UTE CREEK NO 1	3600849
	UTE CREEK NO 2	3600850
	UTE CREEK NO 3	3600851
	SLATE CREEK DITCH	3600800
	HIGHLINE DITCH (SLATE CR)	3600659
5100529_D BIG LAKE DIVSYS	BIG LAKE DITCH	5100529
	COBERLY BROTHERS DITCH	5100584
7200512_D ARBOGAST PUMP DIVSYS	ARBOGAST PUMPING PLANT 3	7200512
	ARBOGAST PUMPING PLANT	7201072
7200852_D RMG DIVSYS	R M G DITCH	7200852
	BUCKHORN DITCH	7200555
5000653_D	TOM ENNIS DITCH	5000653

Diversion System ID	Diversion System Name	WDID
TOM ENNIS DIVSYS	TOM ENNIS DITCH HGT NO 3	5000741
	TOM ENNIS DITCH HGT NO 2	5000756
4500576_D DIVIDE CREEK HIGHLINE DIVSYS	DIVIDE CREEK HIGHLINE D	4500576
	WILSON DITCH	4500828
4500693_D MINEOTA DIVSYS	MINEOTA DITCH	4500693
	ED CONNER DITCH	4500585
	DRY HOLLOW DITCH	4500574
7200730_D KIGGINS SALISBURY DIVSYS	KIGGINS SALISBURY DITCH	7200730
	OAK GLEN DITCH	7200810
7000583_D ROAN CREEK NO 2 DIVSYS	ROAN CREEK NO 2 DITCH	7000583
	BUMGARDNER WW DITCH	7000507
5300767_D HMS RELOCATED DIVSYS	H M S RELOCATED DITCH	5300767
	H M S DITCH	5301059
5100880_D SELAK LARRABEE DITCH DIVSYS	SELAK LARRABEE DITCH	5100880
	SELAK SUPPLEMENTAL DITCH	5100922
4500632_D HOLMES DIVSYS	HOLMES DITCH	4500632
	COTTONWOOD GULCH DITCH	4500558
3900546_D DAVENPORT DIVSYS	DAVENPORT DITCH	3900546
	SPRING DITCH	3900666
3801096_D WILLIAMS NO 2 DIVSYS	WILLIAMS NO 2 DITCH	3801096
	WILLIAMS NO 1 D CAP CR	3801095
3600776_D PHARO BAUER DIVSYS	PHARO BAUER DITCH	3600776
	PHARO BAUER NO 1 DITCH	3600777
3600868_D WESTLAKE DIVSYS	WESTLAKE DITCH	3600868
	CATARACT CREEK NO 2	3600555
3600662_D HOAGLAND DIVSYS	HOAGLAND CANAL (ELLIOT)	3600662
	HOAGLAND CANAL (BENTON)	3600946
	HOAGLAND CANAL (DEEP CR)	3601018
	HOAGLAND CANAL (MARTIN)	3601047
	HOAGLAND CANAL (SMITH)	3601020
	HOAGLAND CANAL (SPRING)	3601019
	HOAGLAND CANAL (SPRUCE)	3600945
	HOAGLAND CANAL (N SPRING)	3601048
	HOAGLAND CANAL (N SPRUCE)	3601049
3800880_D MT. SOPRIS DIVSYS	MOUNT SOPRIS DITCH	3800880
	MOUNT SOPRIS D PRINCE CR	3801633
5000734_D DEBERARD DIVSYS	DEBERARD DITCH	5000734
	DEBERARD DITCH OVFLW SYS	5000548
5300555_D DERBY DIVSYS	DERBY DITCH	5300555
	CABIN CREEK DITCH	5300519
	CABIN CREEK DITCH	5300521
*5101309_D	FRASER RIVER DIVERSION PROJECT - ST LOUI	5101309

Diversion System ID	Diversion System Name	WDID
FRASER RIVER DIVR PROJ	CROOKED CREEK SUPPLY D	5100593
*7201329_D RAPID CREEK PP DIVSYS	RAPID CREEK PUMPNG PLANT	7201329
	UTE PUMPING STATION	7201235
*7200820_D PARK CREEK DIVSYS	PARK CREEK DITCH (VEGA)	7200820
	PARK CREEK DITCH (PARK)	7200819
5100941 VAIL IRR MULTI	VAIL IRR SYS HGT NO 2	5100941
	VAIL IRR SYS HGT NO 1	5101231
5300883 WILSON AND DOLL DITCH	WILSON AND DOLL DITCH	5300883
	NOTTINGHAM PUMP	5200731
3600801 SMITH DITCH	SMITH DITCH	3600801
	SUTTON NO 1 DITCH	3600832
***Carrier structures (not included in CU analysis)**		

Figure A-1 shows the spatial boundaries of each aggregation. **Exhibit A: Diversion Structures in each Aggregate**, attached, lists the diversion structures represented in each aggregate. **Exhibit B: Diversion Structures in each "No Diversion Records" Aggregate** lists the diversion structures represented in each no diversion aggregate. Both **Exhibit A** and **Exhibit B** provide a comparison of the 2005 and 2010 irrigated acreage assigned to each structure.

Figure A-1: Aggregate Structure Boundaries



Recommendations

As part of this modeling update, various lists have been developed for review and reconciliation by the Water Commissioner. The lists include:

- Structures tied to irrigated acreage that do not have current diversion records
- Structures tied to irrigated acreage that do not have water rights for irrigation
- Structures that have current diversion records coded as irrigation use, but do not have irrigated acreage in either 2005 or 2010
- Structures that have irrigation water rights, but do not have irrigated acreage in either 2005 or 2010
- More than one structure is assigned to the same irrigated parcel, however there was no indication that the structures serve the same acreage in either diversion comments or water rights transaction comments.

Exhibit A: Diversion Structures in each Aggregate

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
36_ADC017 UPPER BLUE RIVER	BOBO DITCH	3600535	17	0
	BROWN ACORN DITCH	3600540	87	87
	BUFFALO DITCH	3600542	36	36
	C M OMER DITCH	3600569	75	75
	COLUMBINE DITCH	3600571	7	7
	DOMESTIC SUPPLY DITCH	3600591	15	15
	DUSING NO 1 DITCH	3600597	10	10
	EMMET BRUSH CREEK NO 3 D	3600609	25	25
	EMMET BRUSH CREEK NO 1 D	3600611	25	25
	FAMINE CREEK DITCH	3600617	21	21
	GILBERT DITCH	3600637	5	5
	GOULD DITCH	3600640	14	14
	HERBERT DITCH	3600654	24	24
	J F R DITCH	3600678	15	15
	LINDSTROM NO 1 DITCH	3600705	183	183
	LINDSTROM NO 2 DITCH	3600706	45	45
	LUND BLUE RIVER DITCH	3600717	26	26
	MARSHALL NO 1 DITCH	3600720	9	9
	MARSHALL NO 2 DITCH	3600721	29	29
	MARSHALL NO 4 DITCH	3600723	4	4
	MARYLAND NO 1 DITCH	3600726	49	47
	MARYLAND NO 2 DITCH	3600727	112	112
	MIDDLE BARTON NO 1 DITCH	3600741	14	15
	MIDDLE BARTON NO 2 DITCH	3600742	4	0
	NORTH ACORN DITCH HDG 1	3600759	8	8
	N P TREMBLAY DITCH	3600761	4	4
	OLD WHETSTONE SHEEP CR D	3600763	15	15
	PASS CREEK NO 1 DITCH	3600766	28	28
	ROBERTS IRRIGATING DITCH	3600791	14	14
	RUTH DITCH	3600794	39	40
	SARAH DITCH	3600795	25	25
	SAWMILL DITCH	3600797	42	48
	SONDREGGER DITCH	3600810	8	8
	SONDREGGER NO 2 DITCH	3600811	5	5
	SONDREGGER NO 3 DITCH	3600812	23	23
	SONDREGGER NO 4 DITCH	3600813	8	8
	SOUTH ROCK CREEK DITCH	3600816	31	28
	SPERRY DITCH	3600818	25	25
	SPERRY F W DITCH	3600819	25	25

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	SWANSON ORO GRANDE DITCH	3600838	38	35
	VENDETT DITCH	3600852	23	16
	VALIER NO 2 DITCH	3600856	9	11
	VIE DITCH	3600857	25	25
	WAHLSTROM NO 4 DITCH	3600861	7	10
	WAHLSTROM NO 5 DITCH	3600862	7	7
	WHATLEY NO 2 DITCH	3600872	4	4
	WHATLEY NO 3 DITCH	3600873	13	11
	WHATLEY NO 4 DITCH	3600874	5	5
	WHATLEY NO 5 DITCH	3600875	11	11
	GUETZ-RUMACK DITCH	3600987	14	14
	INDEPENDENT BLUE (ACORN)	3600991	43	43
	GIBERSON HIGHLINE DITCH	3601017	11	11
36_ADC018 BLUE RIVER ABV GREEN MOUNTAIN RSVR	BLACK CREEK DITCH	3600526	72	72
	CLANCEY DITCH	3600567	29	29
	CLEAR CREEK DITCH HDG 1	3600568	12	12
	COW CAMP DITCH	3600577	12	12
	GARDEN DITCH	3600633	10	10
	GUTHRIE BROS DITCH	3600644	25	25
	GUYSELMAN DITCH	3600646	133	133
	GUYSELMAN NO 2 DITCH	3600647	17	17
	KNORR NO 1 DITCH	3600689	7	6
	KUMNIG NO 1 DITCH	3600691	86	86
	KUMNIG KNORR DITCH	3600696	40	40
	LEE BROS BEAVER CR NO 1	3600699	43	43
	LILLIAN DITCH	3600702	33	33
	MCDONALD DITCH	3600733	134	134
	MILLER DITCH	3600745	8	8
	MILLER NO 2 DITCH	3600746	42	42
	OTTER CREEK NO 1 DITCH	3600764	7	6
	NEW KUMNIG DITCH	3600966	30	29
36_ADC019 BLUE RIVER BL GREEN MOUNTAIN RSVR	BEAVER CREEK NO 1 DITCH	3600514	28	28
	BELL DITCH	3600517	18	18
	BELLS BLUE RIVER DITCH	3600520	30	30
	BUMGARNER NO 1 DITCH	3600545	11	11
	BUMGARNER NO 2 DITCH	3600546	11	11
	DRY CREEK DITCH (HDG 1)	3600593	47	47
	DRY CREEK NO 2 DITCH	3600595	160	26
	DRY CREEK NO 3 DITCH	3600596	79	79
	GRIGGS DITCH	3600643	211	147
	HEIL NO 1 DITCH	3600651	33	33

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	HEIL NO 2 DITCH	3600652	33	33
	HEIL NO 3 DITCH	3600653	66	66
	INTAKE DITCH	3600675	28	28
	NOONEN DITCH	3600758	26	26
	SMITH NO 1 DITCH	3600802	307	307
	SPRING CREEK NO 1 DITCH	3600820	4	4
	SPRING CREEK NO 2 DITCH	3600821	19	16
	SPRING CREEK NO 3 DITCH	3600822	32	32
	STAFFORD BLUE RIVER DITC	3600827	61	61
	STAFFORD GREEN MTN DITCH	3600828	46	46
	WILLIAMSON DITCH	3600876	41	41
	HIGH DITCH	3600903	11	11
37_ADC029 EAGLE RIVER ABV BRUSH CREEK	ALKALI DITCH	3700502	175	175
	ARMINDA DITCH	3700505	4	4
	CASTEEL DITCH	3700531	36	36
	CASTLE NO 1 DITCH	3700534	28	28
	CASTLE NO 2 DITCH	3700535	78	75
	COWEN DITCH	3700557	53	53
	A B DEGRAW DITCH	3700563	24	24
	F E W NO 2 DITCH	3700597	57	57
	F E W NO 4 DITCH	3700599	57	57
	GRAHAM DITCH	3700614	149	149
	HAWLEY AND REESE DITCH	3700632	60	60
	BERT HYDE DITCH	3700662	37	65
	MUDDY DITCH	3700721	50	50
	MUDDY CREEK DITCH	3700722	8	8
	NEILSON PUMP LINE DITCH	3700724	13	13
	SHERWOOD DITCH	3700801	25	25
	BERT SIDDELL DITCH	3700803	63	63
	SMITH & PALLISTER DITCH	3700809	7	7
	TOURVILLE NO 1 DITCH	3700833	24	24
	TOURVILLE NO 2 DITCH	3700834	18	18
	WELSH DITCH	3700853	14	14
	WILKINSON DITCH	3700858	41	41
	CASTLE DITCH	3700906	179	139
	VAIL GOLF COURSE DITCH	3701156	94	96
	PINEY VALLEY RANCH DITCH	3701243	9	9
	GROFF DITCH COTTONWD ENL	3701277	74	74
37_ADC030 BRUSH CREEK	BEECHER CREEK DITCH	3700509	5	0
	BEMIS DITCH	3700510	4	4
	CRANN DITCH	3700559	8	8

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	DITCH NO 1 DITCH	3700566	12	12
	DITCH NO 2 DITCH	3700567	5	5
	DITCH NO 3 DITCH	3700568	26	26
	EAST FROST DITCH	3700585	81	81
	FROST DITCH	3700604	64	64
	HASHBERGER DITCH	3700628	21	21
	LAURA A HOCKETT DITCH	3700640	22	27
	HOLLINGSWORTH POTTER D	3700643	59	44
	HOLLINGSWORTH POTTER NO2	3700644	25	55
	J P O NO 1 DITCH	3700667	1	2
	J P O NO 2 DITCH	3700668	1	2
	LOVE FROST DITCH	3700685	40	40
	MCKENZIE DITCH	3700704	94	94
	OLESON DITCH	3700741	26	13
	BOB REID DITCH	3700776	51	51
	ROBERTSON DITCH	3700778	5	5
	RUSSELL DITCH	3700785	17	17
	SCHUMM NO 1 DITCH	3700793	73	73
	SQUIRES DITCH NO 1	3700818	17	16
	SQUIRE & HAMMOND DITCH	3700820	134	134
	ZARTMAN DITCH	3700871	81	81
37_ADC031 EAGLE RIVER BL GYPSUM	COLLINS NO 2 DITCH	3700550	14	14
	COOLEY L E NO 1 DITCH	3700551	1	2
	ERICKSON NO 1 DITCH	3700594	4	4
	ERICKSON NO 2 DITCH	3700595	10	10
	GRUNDELL BROS DITCH	3700620	11	11
	MCBRAYER DITCH	3700698	28	28
	MCBRAYER & FENNER DITCH	3700699	315	157
	MILLER DITCH	3700712	44	44
	MUCKEY DITCH	3700720	37	37
	NELSON DITCH	3700725	49	52
	PHILLIPS DITCH	3700761	244	244
	SCHUMM NO 2 DITCH	3700794	7	22
	CASPER SCHUMM DITCH	3700795	23	31
	SKIFF AND SCHLIFF DITCH	3700807	2	2
	SUNDELL DITCH NO 1	3700824	44	44
	Y & V DITCH NO 4	3700868	35	35
	BEST DITCH	3701111	5	5
	BEARD PUMP	3701236	8	10
	WILSON SWAMP DRAIN DITCH	3701280	42	42
38_ADC033	BRUSH CREEK DITCH	3800556	130	128

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
UPPER ROARING FORK	CERISE DITCH	3800580	64	40
	CHRISTOPHER SOUTH DITCH	3800590	19	0
	DAVIGNON DITCH	3800627	14	14
	EVERGREEN DITCH	3800666	-999	46
	LAST CHANCE DITCH	3800813	50	50
	LEMOND DITCH	3800814	17	16
	MCPHERSON DITCH	3800895	27	27
	NELLIE BIRD DITCH	3800904	10	10
	WENGER DITCH	3801084	49	49
	WHEATLEY DITCH	3801090	38	14
	BIONAZ DITCH	3801109	25	25
	BIVERT DITCH	3801110	30	30
	JOTE SMITH DITCH	3801145	70	70
	HAYDEN PEAK DITCH NO 2	3801241	-999	12
	COLLINS CREEK DITCH EXT	3801485	25	25
	LITTLE WOODY DITCH	3801549	83	83
38_ADC034 SNOWMASS CREEK	BROWN DITCH	3800554	17	17
	FORKER DITCH	3800684	35	35
	HORGAN DITCH	3800761	88	88
	JACOBSON & SOLBERG DITCH	3800785	46	46
	STEWART NO 1 DITCH	3800788	4	0
	LIME CREEK DITCH	3800824	56	56
	LINDVIG DITCH	3800825	7	7
	LITTLE ELK DITCH	3800830	185	200
	LUTZ DITCH	3800844	6	6
	MCPHERSON NO 1 DITCH	3800896	61	61
	PERRY DITCH	3800937	12	12
	POWELL MCKENZIE DITCH	3800946	55	55
	ROWNAN & JACOBSON DITCH	3800974	46	46
	SANDY DITCH	3800984	58	58
	SNOWMASS DITCH	3801011	147	148
	STAATS HARMON DITCH	3801023	232	224
	TANDY DITCH	3801041	-999	13
	WALTER DITCH	3801079	155	155
	WILLIAMS NO 4 DITCH	3801098	76	47
	GEORGE DITCH	3801289	13	13
38_ADC035 FRYING PAN RIVER	ALVIN SLOSS DITCH	3800506	45	44
	BIGLOW DITCH NO 219	3800540	11	11
	DAN GERMAN DITCH	3800626	17	17
	DAVISON DITCH	3800629	20	20
	DESERT DITCH FRENCHMAN C	3800638	7	7

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	DOWNEY DITCH NO 1	3800642	48	48
	EUREKA DITCH	3800668	72	0
	FRENCHMAN CREEK D NO 1	3800696	62	48
	JAKEMAN DITCH	3800782	12	12
	SMITH TONER CREEK D NO 2	3801009	12	12
	SPRING CREEK DITCH	3801020	11	11
	FRENCHMAN CREEK D NO 2	3801160	11	11
	JOUFLAS DITCH HGT 2	3801673	37	37
38_ADC036 WEST SOPRIS CREEK	BUCK PASTURE DITCH	3800558	13	13
	CERISE BROS NO 1 DITCH	3800583	30	30
	CERISE BROS NO 2 DITCH	3800584	25	25
	CERISE ARBANEY DITCH	3800585	3	3
	DAVIS DITCH	3800628	17	17
	EAST MESA DITCH SOPRIS C	3800652	15	15
	GOOD FRIEND DITCH	3800713	29	29
	HATCH DITCH	3800742	31	31
	HIGHLAND NO 2 DITCH	3800752	63	63
	JACOBS DITCH	3800780	82	82
	LIGHT AND LIGHT DITCH	3800820	29	29
	MILLER DITCH	3800873	19	19
	SOPRIS HIGHLINE DITCH	3801015	166	169
	SWEARINGEN DITCH	3801035	8	8
	KELEY DITCH	3801149	114	114
	DRY CREEK DITCH	3801271	6	6
38_ADC037 ROARING FORK ABV CRYSTAL	FLYNN DITCH	3800681	74	72
	GOULD DITCH	3800714	62	62
	GRANGE AND CERISE DITCH	3800716	89	89
	HARDING SPRING W W DITCH	3800731	71	28
	JOHN CERISE DITCH	3800784	8	3
	KELLEY DITCH	3800791	153	156
	KELLY POND & SPRING 2 D	3800795	122	122
	LYONS DITCH	3800846	53	53
	MIDDLE DITCH	3800868	82	82
	MCCARTHY WWD & UPPER EXT	3800885	9	9
	NORTHSIDE PIONEER DITCH	3800908	44	44
	NORTH SPRINGS	3800910	19	19
	OXFORD NO 2 DITCH	3800921	91	91
	PATTERSON AND CUMMINS D	3800931	93	91
	SMITH NO 1 DITCH	3801001	3	4
	SMITH NO 2 DITCH	3801002	15	15
	JOHN J DITCH	3801125	64	64

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
38_ADC038 CRYSTAL RIVER	BANE DITCH	3800521	136	136
	BANE & THOMAS DITCH	3800522	135	135
	CLOUD DITCH	3800600	10	10
	COLPITTS DITCH NO 1	3800607	25	20
	DOOLEY DITCH	3800640	16	16
	EDGERTON DITCH	3800655	79	79
	EDGERTON SPG & WASTE D	3800656	78	78
	GRAY DITCH	3800719	93	93
	HELMS DITCH	3800747	141	141
	LOST BASIN DITCH	3800835	140	140
	NORTHSIDE THOMPSON D	3800909	27	27
	THOMPSON DITCH	3801131	28	28
	TYBAR DITCH AND PIPELINE	3801511	16	14
38_ADC039 CATTLE CREEK	C AND L HIGHLINE DITCH	3800568	70	70
	COULTER WEST SIDE DITCH	3800613	123	123
	DELCON SPRING GULCH D	3800637	4	4
	FONDER DITCH	3800683	18	10
	H C AND L DITCH	3800725	65	65
	HEUSCHKEL AND CHAPMAN D	3800750	21	21
	MASON DITCH	3800860	19	16
	MCNULTY NO 2 DITCH	3800878	73	38
	MCNULTY DITCH	3800894	73	38
	PAT MCNULTY NO 1 DITCH	3800927	9	9
	PAT MCNULTY NO 2 DITCH	3800928	11	11
	PRIOR DITCH	3800949	76	76
	RALSTON NO 1 DITCH	3800953	72	72
	SHEAFFER DITCH	3800987	25	13
	STATON DITCH	3801027	54	14
	WEST HIGHLINE DITCH	3801088	93	93
	WATERS DITCH	3801133	24	24
	LAURENCE DITCH	3801134	258	227
	KEETON & EMISON DITCH	3801148	46	46
	FONDER DITCH NO 2	3801177	24	24
	KEETON & EMISON DITCH AP	3801867	18	18
38_ADC040 LOWER ROARING FORK	BUCK FARM DITCH	3800557	98	98
	DEARING DITCH	3800635	24	24
	GRISTY DITCH	3800724	2	2
	HARDWICK DITCH	3800732	133	96
	LIGNITE NO 2 DITCH	3800823	25	25
	LYNCH DITCH	3800845	21	21
	SMART AND GREEN DITCH	3800997	7	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
39_ADC041 ELK CREEK	BENSON PIERSON NELSON D	3900510	39	29
	C O & C P PIERSON	3900525	74	63
	CLINETOP DITCH NO 1	3900530	32	16
	CLINETOP DITCH	3900531	53	53
	CONNALLY DITCH	3900536	25	24
	EDWARD B JORDAN DITCH	3900556	6	6
	HARRIS NO 2 DITCH	3900579	2	2
	JENNINGS NO 1 DITCH	3900592	68	68
	JENNINGS NO 2 DITCH	3900593	57	46
	LARSON DITCH	3900603	9	9
	NEW HARRIS DITCH	3900626	16	5
	OAK GROVE DITCH	3900633	59	59
	RYDEN SPRING DITCH	3900654	16	14
	RYDEN NO 2 DITCH	3900655	7	0
	RYDEN NO 1 DITCH	3900656	118	118
	RED GLEN HIGHLINE DITCH	3900657	165	165
	SAINT NO 2 DITCH	3900661	140	124
	SAMPLE NO 1 DITCH	3900662	4	4
	TROUT DITCH	3900674	71	71
	W E DITCH	3900688	4	5
	WAGGONER DITCH	3900689	51	31
	WHITTINGHAM DITCH	3900693	36	38
	PARK DITCH	3900810	2	2
	HADLEY CONSOLIDATED D	3900934	16	16
39_ADC045 RIFLE CREEK	CLARK DITCH	3900529	27	26
	G E HARRIS DITCH	3900566	39	36
	G E HARRIS NO 2 DITCH	3900567	56	56
	HARRIS WASTE WATER DITCH	3900580	59	59
	HEINZE DITCH	3900582	23	15
	LAKE DITCH	3900602	-999	20
	MANNING DITCH	3900614	69	62
	MCKEAL NO 1 DITCH	3900616	95	31
	MULLEN DITCH	3900625	78	64
	NELSON DITCH	3900627	13	13
	PERRY SPRINGS & DITCH	3900637	2	0
	PIONEER DITCH	3900640	23	0
	RIFLE CREEK NO 1 DITCH	3900646	51	51
	STODDARD DITCH	3900667	9	9
	WISDOM DITCH	3900695	119	25
	YOUKER DITCH	3900699	3	3
	C W D DITCH	3900706	104	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	MCKEAL NO 3 DITCH	3900723	31	13
	BELL COLLECTION DITCH	3900900	5	5
45_ADC042 COLORADO RIVER BL GARFIELD CREEK	BAXTER NO 2 DITCH	3900506	17	17
	BAXTER SP BR & WASTE W	3900507	46	46
	BUSTER NO 1 DITCH	3900521	1	2
	DALLS DITCH	3900545	105	105
	HERMITAGE DITCH	3900584	22	22
	KEYSER DITCH	3900601	16	16
	LEWIS NO 1 DITCH	3900608	9	9
	MINGS CHENOWETH WOLVERTO	3900618	25	25
	POSSUM CREEK DITCH	3900641	1	1
	POSSUM NO 1 DITCH	3900642	5	5
	REYNOLDS AND CAIN DITCH	3900659	22	23
	URQHART DITCH	3900680	19	19
	WARNER DITCH	3900690	4	5
	ROCK-N-PINES NO 1 DITCH	3900827	104	104
	BUD DITCH	4500530	78	80
	BUD NO 2 DITCH	4500531	56	57
	COOLEY NO 1 DITCH	4500554	17	17
	COOLEY NO 2 DITCH	4500555	33	33
	ENTERPRISE DITCH	4500593	121	0
	HARRINGTON DITCH	4500621	9	9
	LAKE DITCH	4500665	54	48
	MOORE DITCH	4500695	2	0
	STARBUCK DITCH	4500779	78	82
	STARBUCK AND PAXTON D	4500780	19	0
	WARD DOW & TAYLOR DITCH	4500809	48	43
	WILLIAMS DITCH NO 1	4500823	30	30
	WILLIAMS JOINT DITCH	4500826	46	49
	YOUNG AND HESS DITCH	4500834	45	45
	YULE AND COOLEY DITCH	4500836	150	143
	MICKLISH NO 2 DITCH	4500837	19	6
	DWIRE DITCH	4501055	50	50
	VULCAN DITCH	4504725	246	131
45_ADC043 COLORADO RIVER BL DIVIDE CREEK	PYEATT AND CLAVEL DITCH	3900644	9	9
	A F SOMMER DITCH NO 1	4500500	24	24
	A F SOMMER DITCH NO 2	4500501	-999	63
	BUNN DITCH NO 1	4500534	20	0
	BURNETT DITCH	4500535	23	23
	CABE AND SKIFF DITCH	4500536	5	6
	CLEAR CREEK DITCH	4500550	257	198

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	CROOKED DITCH	4500561	13	6
	DAVIS DITCH	4500564	24	12
	EAST CORRAL CREEK DITCH	4500580	16	13
	HAHN AND OTTEN DITCH	4500618	33	5
	HIGHEST DITCH	4500628	34	34
	HODGSON NO 1 DITCH	4500630	14	3
	JOHNSON DITCH E DIVIDE	4500649	29	190
	JUNE CREEK DITCH	4500655	9	9
	KAMM AND DAVIS DITCH	4500656	919	0
	KING DITCH	4500660	41	38
	KING HEATHERLY DITCH	4500661	101	98
	J LARSON DITCH	4500666	10	10
	MOSQUITO DITCH	4500699	27	27
	PENNY IRR DITCH NO 1	4500719	161	147
	POLE CREEK DITCH	4500724	34	34
	PROBASCO WASTE WATER D	4500728	21	21
	SCHATZ DITCH	4500755	69	0
	STOBAUGH DITCH	4500782	20	26
	WEST CORRAL CREEK DITCH	4500816	8	9
	BUNN DITCH NO 2	4500843	34	34
	PORTER PUMP & DIVR D	4500846	18	0
	RENO DITCH NO 1	4500849	6	6
	OTTEN DITCH NO 1	4500940	4	4
	HALLS GULCH DITCH	4501144	38	38
45_ADC044 COLORADO R BL MAMM CREEK	COLEMAN DITCH	3900538	5	4
	STOBAUGH D PUMP	3900980	11	0
	BERNUDY DITCH	4500524	26	26
	BOULTON AND BANTA DITCH	4500528	178	142
	CHADWICK DITCH	4500544	34	0
	EMANUEL GANT DITCH	4500592	101	84
	HUNTER AND GANT DITCH	4500637	409	300
	JONATHAN GANT DITCH	4500653	56	56
	NUCKOLLS DITCH	4500710	366	320
	SLIDING DITCH	4500764	116	0
	UPPER MAMM CREEK DITCH	4500800	219	242
	NANCY SPRING NO 2	4500842	10	8
	BARBARA SPRING NO 1	4500885	10	8
	RAINBOW DITCH	4501079	53	25
	LAST RESORT D-DRY HOLLOW	4501127	335	245
	COUEY SPRING NO 1	4501135	15	0
	BANTA SPRING DITCH	4501146	4	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
45_ADC046 COLORADO RIVER BL BEAVER CREEK	LANGSTAFF DITCH	3900604	11	6
	BEAVER CREEK DITCH	4500518	7	7
	CLAUSEN DITCH	4500548	72	56
	DAME DITCH	4500562	54	54
	HANN DITCH	4500619	28	25
	HILL DITCH	4500629	122	16
	J A CLARK DITCH	4500641	94	52
	LEE DITCH	4500670	121	78
	OCONNOR DITCH	4500713	85	67
	RUSTLER DITCH	4500751	49	16
	SMITH DITCH	4500766	103	71
	SMITH AND NEVE DITCH	4500768	71	71
	YOUNG MACKAY & OCONNOR D	4500835	37	0
	ANDERSON INTERCEPTION D	4500870	4	4
	MCCARNES SPRING NO 2	4500925	6	6
	RANCHO TRES WELL NO 1	4505166	51	57
	HILLTOP FARM WELL NO 2	4505310	8	7
45_ADC047 COLORADO RIVER BL CACHE CREEK	MOSBY PUMP AND PL NO 2	3900789	44	0
	BERNKLAU DITCH	4500523	86	40
	CAMP BIRD DITCH	4500538	270	238
	CEADER DITCH	4500541	6	6
	DILLMAN DITCH	4500567	53	14
	GRAVES SPRINGS	4500611	16	16
	HUMMING BIRD DITCH	4500636	110	75
	IVY SPRINGS WASTE WTR D	4500640	11	12
	JAY BIRD DITCH	4500645	92	5
	MARTIN AND KENNEDY DITCH	4500689	442	218
	MOCKING BIRD DITCH	4500694	51	5
	OBRIEN AND BAUMGARTNER D	4500711	51	51
	OBRIEN FEEDER DITCH	4500712	17	0
	R AND A G ANDERSON DITCH	4500730	94	23
	SPRING CREEK DITCH	4500772	88	64
	FORSHEE GATHERING D NO 2	4500903	15	8
	SPRING DITCH NO 1	4500948	18	13
	SPRING DITCH NO 2	4500949	18	13
	SPRING DITCH NO 3	4500950	18	13
	MAHAFFEY GATHERING D NO1	4501072	17	7
	MAHAFFEY GATHERING D NO2	4501073	17	7
	CANARY BIRD (EAST)	4501133	19	14
	HILLTOP FARM WELL NO 1	4505309	8	7
45_ADC048	BENSON AND BARNETT DITCH	3900509	38	38

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
COLORADO RIVER NR DE BEQUE	DAISY DITCH	3900544	25	18
	DIAMOND DITCH	3900549	7	2
	EVANS DITCH	3900558	15	0
	GARDEN GULCH NO 2 DITCH	3900565	14	14
	JENSEN DITCH	3900594	104	41
	MCKEAL NO 2 DITCH	3900617	96	0
	PURDY DITCH	3900643	9	9
	WOODTICK DITCH	3900698	160	0
	VAN HORN PUMP	3900989	13	0
	BAKER DITCH	4500511	60	60
	DOBEY DITCH	4500570	27	5
	EGBERT SPRING DITCH NO 1	4500588	39	0
	ESTELLA DITCH	4500595	96	0
	HEWITT AND MILBURN DITCH	4500625	104	82
	HOMESTAKE DITCH	4500633	134	71
	KNIGHT PUMP & PIPELINE	4500662	43	36
	LONE STAR DITCH	4500674	211	73
	MESA DITCH	4500691	189	191
	MUSCONETCONG DITCH	4500706	119	28
	NUMBER ONE DITCH	4500708	11	11
	OLD TRUSTY DITCH	4500714	491	0
	PETE AND BILL DITCH	4500721	4	0
	R F DITCH	4500732	9	4
	RIVERS DITCH	4500744	14	2
	SHUTT DITCH	4500758	13	5
	TANNEY NO 2 DITCH	4500792	40	40
	TENDERFOOT DITCH	4500796	63	63
	WANDERING JEW DITCH	4500808	119	32
	FORSHEE GATHERING D NO 1	4500902	15	8
	BAKER SPRINGS	4501048	9	3
	HAYWARD & WYATT ENLG	4501122	20	10
	LAVA DITCH	7200742	3	3
50_ADC012 TROUBLESOME CREEK	BECKER NO 1 DITCH	5000515	41	41
	BECKER NO 2 DITCH	5000516	120	120
	BECKER NO 4 DITCH	5000518	14	14
	BECKER NO 5 DITCH	5000519	34	34
	BIG SPRING DITCH	5000523	5	5
	CARLSON DITCH	5000530	123	123
	CHARLEY NO 2 DITCH	5000533	2	2
	CHRIS NO 1 DITCH	5000534	28	28
	CHRIS NO 2 DITCH	5000535	123	123

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	EAST FORK DITCH	5000565	43	43
	KIRTZ DITCH NO 1	5000592	18	18
	KIRTZ DITCH NO 3	5000594	18	18
	MILLER SPRINGS DITCH	5000604	40	40
	MRS A KING DITCH	5000608	243	226
	MUNKERS DITCH	5000609	66	66
	PARADISE DITCH	5000625	16	16
	ROUND CREEK DITCH	5000639	1	1
	TOM ENNIS D (SERREL LAT)	5000644	48	48
	SIX DIAMOND DITCH	5000645	210	210
	STAR GULCH DITCH	5000649	31	31
	STAR GULCH DITCH NO 2	5000650	49	49
	WHEATLEY DITCH NO 1	5000661	109	109
	WHEATLEY DITCH NO 2	5000662	109	109
	WHEATLEY DITCH NO 3	5000663	109	109
	WHEATLEY DITCH NO 4	5000664	109	109
	ZWAHLEN NO 1 DITCH	5000667	171	171
	CLIFF DITCH HGT NO 3	5000732	366	366
	CLIFF D MID STUART DIVR2	5000733	36	36
	CLIFF D MID STUART DIVR1	5000742	214	214
50_ADC013 UPPER MUDDY CREEK	ALBERT CREEK DITCH	5000501	309	309
	ALBERT CREEK DITCH NO 3	5000503	297	297
	ALFRED ARGAHALIE DITCH	5000504	66	66
	ALFRED ARGAHALIE DITCH 3	5000505	232	257
	ALFRED ARGAHALIE DITCH 4	5000506	116	91
	D H RIGGLE DITCH NO 1	5000544	77	55
	D H RIGGLE DITCH NO 2	5000545	122	0
	DIAMOND CREEK DITCH	5000550	23	23
	MILK CREEK DITCH	5000603	161	0
	MCGEE DITCH	5000615	249	57
	P J MARTIN DITCH	5000624	196	171
	MARTIN OUTLET DITCH	5000674	11	11
	ALBERT CREEK DITCH NO 4	5000681	9	9
	BASIN DITCH	5000683	58	58
	COLBURN DITCH NO 1	5000687	27	27
	COLBURN DITCH NO 2	5000688	44	44
50_ADC014 MUDDY CREEK ABV TYLER DITCH	WEGGENMAN DITCH NO 2	5000659	35	35
	ADOLPH DITCH	5000500	54	54
	ANTON HEINI DITCH	5000511	71	71
	BADGER CREEK DITCH NO 1	5000513	24	24
	BADGER CREEK DITCH NO 2	5000514	40	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	CARTER CREEK DITCH	5000531	83	83
	DUNNING DITCH	5000563	56	56
	DIETRICH DITCH NO 2	5000564	34	34
	HEINI AND OAKS DITCH	5000577	110	110
	HEINI DITCH NO 5	5000580	62	62
	HEINI DITCH NO 6	5000581	36	36
	HERMAN DITCH	5000583	36	36
	HILL CREEK DITCH	5000584	203	203
	LINDSEY CREEK DITCH	5000599	94	94
	MCBRIDE DITCH	5000610	30	30
	MCBRIDE NO 2 DITCH	5000611	7	7
	RITSCHARD DITCH	5000638	144	144
	TAILOR DITCH	5000652	58	14
	WEGGENMAN DITCH	5000658	25	25
	BADGER CREEK DITCH NO 3	5000682	15	15
	DUNNING DITCH NO 2	5000774	34	34
50_ADC015 MUDDY CREEK ABV RED DIRT CREEK	ANTELOPE DITCH	5000509	33	31
	ANTELOPE CREEK NO 2 DITC	5000510	106	106
	DIETRICH DITCH NO 2	5000552	151	58
	PINTO CREEK DITCH	5000631	282	282
	SHIP DITCH	5000677	12	11
	HEINI-KRAMER DITCH	5000678	30	30
	LEWIS EXTENSION DITCH	5000679	12	11
	SCHULER NO 2 DITCH	5000720	275	275
	SCHULER NO 3 DITCH	5000760	32	32
50_ADC016 LOWER MUDDY CREEK	ALBERT KEYES DITCH	5000507	103	103
	ARNOLD DITCH	5000512	59	59
	COLUMBINE DITCH	5000540	25	25
	CRAZY MANS DITCH	5000542	31	29
	HARRISON DITCH	5000575	52	52
	HAZEL CREEK DITCH	5000586	19	19
	INFANGER DITCH NO 2	5000589	210	195
	PINNEY DITCH NO 1	5000629	8	8
	PINNEY DITCH NO 2	5000630	59	59
	SCHWAB DITCH	5000641	38	38
	SMITH DITCH HGT 1	5000647	43	43
	RENO GRAVITY PIPELINE	5000711	18	18
	SMITH DITCH HGT 2	5000738	43	43
	SMITH DITCH HGT 3	5000739	43	43
50_ADC020 COLORADO RIVER BL KREMMLING	ENNIS PUMP DITCH SYSTEM	5000566	126	143
	T A ENGLE DITCH NO 1	5000651	34	34

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	MCELROY STATE PUMP NO 1	5000755	272	160
	HOLDCROFT PUMP NO 1	5101274	76	76
	MARTIN PUMP NO 1 DITCH	5300694	114	114
	STRAWBERRY DITCH	5300816	28	28
	JONES OUTLET DITCH	5301068	137	137
	SIPHON DITCH	5301144	137	137
51_ADC001 COLORADO RIVER NR GRANBY	CHESTER DITCH	5100580	50	50
	GEORGE BUNTE NO 2 DITCH	5100663	48	48
	HANSCOME DITCH	5100703	222	222
	HARRY BUNTE DITCH	5100707	25	25
	KOERBER DITCH	5100768	188	188
	PINE DITCH	5100833	7	7
	RAEDEL DITCH	5100841	94	94
	SPITZER HIGHLINE DITCH	5100906	92	92
	BARR DITCH	5100974	8	8
	DIGOR DITCH	5101048	18	16
	PITCHER DITCH	5101120	60	60
	RED TOP VALLEY DITCH	5101315	70	64
51_ADC002 WILLOW CREEK	CURTIS DITCH -16	5100596	299	173
	JOHNSON DITCH	5100742	112	112
	MCQUEARY NO 1 DITCH	5100818	19	19
	MCQUEARY NO 2 DITCH	5100819	67	67
	RAY DITCH	5100847	77	77
	SHERIFF DITCH -24	5100921	67	67
	TERRELL NO 2 DITCH	5100930	121	121
	WILLOW DITCH -316	5100962	40	40
	DIAMOND BAR T NO 3 D	5100987	165	165
51_ADC003 RANCH CREEK	AXEL DITCH	5100513	63	63
	DIAMOND BAR TEE NO 2 D	5100606	165	165
	GRANITE DITCH	5100681	62	25
	HARTSHORN DITCH	5100708	64	64
	HURD CREEK DITCH	5100727	281	281
	KLEIN DITCH	5100767	242	242
51_ADC004 FRASER RIVER BL CROOKED CREEK	ALGER DITCH	5100504	64	64
	COZENS DITCH	5100592	119	119
	FOWLER DITCH	5100635	8	8
	GEHMAN AND JUST DITCH	5100661	144	143
	HAMMOND NO 3 DITCH	5100701	21	21
	INDEPENDENT DITCH	5100729	50	50
	POLE CREEK DITCH NO 2	5100836	42	42
	SKUNK CREEK DITCH	5100888	117	117

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	TYRON DITCH	5100936	128	128
	SWANSON DITCH NO 1	5100971	50	50
51_ADC005 TENMILE CREEK	BECK DITCH	5100521	232	232
	BEHRENS DITCH	5100522	42	42
	BUTTON NO 1 DITCH	5100554	60	60
	BUTTON NO 2 DITCH	5100555	35	35
	BUTTON NO 3 DITCH	5100556	35	35
	BUTTON NO 4 DITCH	5100557	250	331
	BUTTON NO 6 DITCH	5100559	34	34
	BUTTON NO 7 DITCH	5100560	34	34
	BUTTON NO 8 DITCH	5100561	51	51
	CENTER DITCH	5100579	95	95
	COINE DITCH	5100586	124	124
	EGGER NO 1 DITCH	5100614	42	76
	EGGER NO 3 DITCH	5100616	64	64
	F W LINKE DITCH	5100650	42	29
	F W LINKE DITCH NO 2	5100651	44	82
	F W LINKE NO 3 DITCH	5100652	4	4
	HALKOWEIZ DITCH	5100693	74	74
	HOLWORTH NO 1 DITCH	5100696	22	22
	HOLWORTH NO 2 DITCH	5100697	22	22
	HERSHEY DITCH	5100710	95	95
	HOME DITCH	5100714	42	42
	LINKE NO 2 DITCH	5100779	89	89
	MCNERNY DITCH	5100815	218	30
	NINE MILE DITCH	5100820	165	165
	ROHRACKER NO 2 DITCH	5100863	41	41
	ROHRACKER NO 3 DITCH	5100864	41	41
	ROHRACKER NO 4 DITCH	5100865	22	22
51_ADC006 FRASER RIVER AT GRANBY	DEBERARD DITCH -150	5100602	202	197
	GEORGE SNIDER DITCH	5100665	25	25
	GRANBY NO 1 DITCH	5100677	66	66
	JAMES SNIDER DITCH	5100735	2	2
	MUELLER DITCH -31	5100806	2	2
	MUELLER DITCH -56	5100807	40	40
	SIMPSON DITCH	5100923	82	82
	FRONTIER DITCH	5101286	37	37
	WILLISS NO 1 DITCH	5101294	19	19
	BAYLIS DITCH NO. 1	5101347	40	40
	BAYLIS DITCH NO. 2	5101367	40	40
51_ADC007	ARTHUR G BLANEY D PL	5100512	34	34

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
COLORADO RIVER ABV HOT SULPHUR SPRINGS	DENNIS DITCH	5100603	43	43
	HORN DITCH NO 2	5100718	62	31
	KINNEY DITCH	5100764	9	14
	LOVE GLESSNER DITCH	5100787	14	14
	MARIETTA DITCH	5100791	63	44
	MCQUEARY DITCH 42	5100817	57	48
	REINHARDT NO 1 DITCH	5100853	28	28
	REINHARDT NO 2 DITCH	5100854	28	28
	REINHARDT NO 3 DITCH	5100855	28	28
	WASATCH DITCH	5100950	53	53
	WILLOW DITCH -322	5100963	13	13
	ISLAND DITCH	5100986	23	28
	JACQUES DITCH NO 2	5101076	42	42
	MATHEW SHERIFF D NO 1	5101172	27	27
	COYOTE DITCH NO 2	5101329	23	23
51_ADC008 COLORADO RIVER ABV WILLIAMS FORK	AMELIA WILLIAMS DITCH	5100508	28	28
	BUTTON NO 5 DITCH	5100558	42	42
	BYERS DITCH NO 2	5100563	87	87
	BYERS NO 5 DITCH	5100566	43	43
	DOLLOFF DITCH	5100608	60	0
	JONES NO 3 DITCH	5100747	50	50
	LITTLE MUDDY DITCH	5100783	30	30
	RAUH NO 1 DITCH	5100845	28	28
	RAUH NO 2 DITCH	5100846	41	41
	REINI BROTHERS DITCH	5100856	144	144
	SMITH DITCH	5100889	18	18
	SMITH NO 2 DITCH	5100890	99	99
	STANLEY DITCH	5100903	19	19
	UTE BILL DITCH NO 1	5100938	32	32
	WILKINS DITCH	5100954	50	50
	WOOD NO 2 DITCH	5100966	36	36
	WOOD NO 3 DITCH	5100967	16	16
51_ADC009 UPPER WILLIAMS FORK	B W FIELDS MULE CR 1	5100514	35	35
	BARKER NO 1 DITCH	5100516	96	147
	BRINKER DITCH	5100539	10	10
	F A FIELD DITCH	5100624	105	105
	GERVENS NO 2 DITCH	5100667	39	39
	GUS BOHM DITCH	5100689	38	34
	JOHN SHORE NO 1 DITCH	5100741	138	0
	KEYSER DITCH	5100760	83	0
	LOST CREEK DITCH	5100786	161	161

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	NORTH SKYLARK DITCH	5100823	43	43
	SCHOLL DITCH	5100875	72	72
	WILLIAMS DITCH -175	5100955	134	134
51_ADC010 LOWER WILLIAMS FORK	BATTLE CREEK DITCH NO 1	5100518	38	38
	BERG NO 1 DITCH	5100525	21	21
	BERG NO 2 DITCH	5100526	50	50
	BULL RUN DITCH NO 1	5100545	32	32
	COLE NO 1 DITCH	5100587	66	66
	COLE NO 2 DITCH	5100588	85	85
	DALE DITCH	5100600	59	59
	JESSMER DITCH	5100737	24	26
	LANGHOLEN NO 1 DITCH	5100769	28	28
	LANGHOLEN NO 2 DITCH	5100770	61	61
	LANGHOLEN NO 3 DITCH	5100771	28	28
	LONG GULCH DITCH	5100784	34	34
	OLSON NO 1 DITCH	5100824	29	29
	OLSON NO 2 DITCH	5100825	29	29
	ROHAN DITCH	5100860	148	148
	ROHAN NO 2 DITCH	5100861	48	48
	RORIC DITCH	5100866	29	29
	SHORE DITCH NO 2	5100885	68	68
	TYNDALL DITCH	5100937	46	52
	SHORE DITCH	5100972	51	51
51_ADC011 COLORADO RIVER ABV TROUBLESOME CREEK	ALEXANDER DITCH	5100503	36	36
	CARR DITCH	5100599	55	55
	FARRIS DITCH	5100628	37	37
	GIBBS DITCH	5100668	69	69
	HOME NO 1 DITCH	5100715	59	59
	HOME NO 2 DITCH	5100716	171	171
	REEDER CREEK DITCH	5100850	81	82
	REEDER CREEK NO 1 DITCH	5100851	18	18
	R WILLIAMS NO 2 DITCH	5100869	11	0
	ROCK CREEK DITCH ENLARGE	5100871	35	35
	SADDLE DITCH	5100872	112	112
	WALKER DITCH	5100949	13	13
	WEIMER DITCH	5100951	33	33
	WILLIAMS DITCH -247	5100956	39	39
52_ADC021 BLACK TAIL & SHEEPHORN CREEK	A A P DITCH	5200500	19	19
	ANGEHRN DITCH	5200505	13	13
	ASHLOCK DITCH	5200514	35	65
	ASHLOCK NO 2 DITCH HDG 1	5200515	5	17

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	ASHLOCK NO 2 DITCH HDG 2	5200516	11	0
	ASPEN CREEK DITCH	5200517	33	33
	BOX CANYON NO 2 DITCH	5200524	72	0
	CABIN DITCH	5200530	24	24
	CASTLE DITCH	5200531	130	130
	COLE BLACK DITCH	5200539	39	39
	CONGER DITCH	5200540	21	21
	ERNEST SUTTON DITCH	5200545	19	19
	GIBSON NO 1 DITCH	5200551	5	5
	GIBSON NO 2 DITCH	5200552	5	5
	GUTZLER DITCH NO 3	5200561	29	33
	HARTMAN DITCH	5200563	53	53
	HARTMAN NO 2 DITCH	5200566	31	8
	JONES DITCH	5200583	89	89
	LAVA CREEK DITCH	5200587	5	6
	LAVA CREEK NO 2 DITCH	5200588	4	4
	LITTLE COTTONWOOD DITCH	5200589	11	24
	MILL DITCH	5200591	19	19
	MOOREHEAD DITCH	5200593	1	2
	MCPHEE DITCH	5200598	34	0
	MCPHEE DITCH (NO 2)	5200599	34	67
	OSAGE DITCH	5200607	17	18
	PERRY DITCH	5200608	9	12
	PEYTON DITCH	5200610	-999	6
	PINEY NO 1 DITCH	5200612	11	14
	ROCK CREEK DITCH	5200621	19	19
	RUNDELL DITCH	5200624	68	68
	RUSSELL NO 2 DITCH	5200627	33	33
	RUSSELL NO 4 DITCH	5200629	16	16
	SOUTH GOODSON DITCH	5200640	15	15
	SWITZER DITCH	5200648	37	37
	WINSLOW DITCH	5200660	17	17
	HINTON DITCH	5200692	3	3
	PINEY WLDLF AREA SP NO 2	5200702	6	0
	OSAGE DITCH HDG 2	5200741	17	18
	OSAGE DITCH HDG 3	5200742	17	18
	OSAGE DITCH HDG 4	5200743	32	32
	PINEY NO 1 DITCH HDG 2	5200745	20	20
	GUTZLER DITCH NO 3 HDG 2	5200869	29	33
	BAILEY MESA DITCH	5300508	54	66
	BLACKTAIL DITCH	5300513	53	56

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	CHARLES B MCCOY DITCH	5300526	46	46
	HIGHLINE NO 2 DITCH	5300620	49	49
	HOYT DITCH	5300637	4	6
	MAUDLIN NO 1 DITCH	5300695	10	10
	MUGRAGE HOYT DITCH HGT 1	5300713	21	23
	MUGRAGE HOYT DITCH HGT 2	5300714	30	30
	O C MUGRAGE HGT 1 DITCH	5300749	3	4
	PURGATORY DITCH	5300758	50	51
	PURGATORY NO 2 DITCH	5300759	84	84
	TYLER DITCH	5300848	76	0
	WEST YARMANY DITCH	5300873	22	22
	YARMANY PARK DITCH	5300891	94	94
52_ADC027 COLORADO RIVER ABV DERBY CREEK	BRUNER NO 1 DITCH	5200526	40	45
	BRUNER NO 2 DITCH	5200527	29	34
	BRUNER NO 3 DITCH	5200528	12	19
	BUTTE CREEK DITCH	5200529	86	86
	CASTLE CREEK DITCH	5200532	75	75
	CASTLE PEAK DITCH	5200534	4	4
	CATAMOUNT NO 1 DITCH	5200536	39	39
	DRY PARK DITCH	5200544	265	285
	SCHLEGAL DITCH (ALKALI)	5200632	117	117
	SEVEN PINES DITCH	5200633	45	45
	WASTE DITCH	5200653	9	9
	JOSEPHENE NO 1 DITCH	5200665	3	5
	JOSEPHENE NO 2 DITCH	5200666	24	29
	ALBERTSON WRIGHT DITCH	5200729	45	45
	DEER PEN SPRING	5200730	10	18
	ROGERS NO 2 DITCH HDG 5	5200750	10	18
	HOOVER DITCH	5300627	106	106
53_ADC022 UPPER EGERIA CREEK	CLARK DITCH	5300532	42	47
	HALL DITCH	5300603	91	91
	JOHN THOMAS DITCH	5300648	325	332
	LONG PARK DITCH	5300682	87	87
	TABLE MESA DITCH	5300829	103	103
	WILLOW DITCH	5300879	112	112
	BRONCO NO 1 DITCH	5301019	39	39
	BRONCO NO 2 DITCH	5301020	39	39
	EGERIA BASIN DITCH & PL	5301160	91	91
53_ADC023 KING CREEK	BUFFALO HEAD DITCH	5300518	70	70
	GROVER CLEVELAND DITCH	5300596	87	87
	KAYSER WASTE WATER DITCH	5300660	-999	92

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	MERRIMAN DITCH	5300702	160	160
	NELLIE BLY DITCH	5300729	276	374
	N G DITCH	5300732	81	81
	NUMBER 1 DITCH	5300735	153	152
	SUTTON NO 1 DITCH	5300825	305	228
53_ADC024 EGERIA CREEK ABV TOPONAS CREEK	ELK HEAD DITCH	5300571	-999	63
	KIER NO 2 DITCH	5300664	106	102
	QUAKER DITCH	5300760	79	83
	RAVENS NEST DITCH	5300763	214	255
	S D DITCH	5300791	93	105
	WILSON SEEP & WSTE DITCH	5300885	-999	45
	WOHLER GULCH DITCH	5300887	177	177
	STILLWATER DITCH	5304715	153	100
	OTTO GUMPRECHT WELL NO.1	5305000	6	6
53_ADC025 TOPONAS CREEK	COBERLY NO 1 DITCH	5300534	10	10
	IDLEWILD DITCH	5300639	29	29
	JONES NO 1 AND NO 2	5300653	65	65
	MCKEAN DITCH	5300722	69	69
	MCKEAN NO 2 DITCH	5300723	69	69
	TOPONAS ELLIOTT DITCH	5300835	48	48
	WILLOW DITCH	5300878	154	154
	COBERLY NO 2 DITCH	5301034	5	5
	MARY JEAN SEEPAGE D NO 1	5301083	29	29
	HIGHLAND DITCH NO 1	5301137	76	76
53_ADC026 COLORADO RIVER ABV ALKALI CANYON	WATER WHEEL DITCH	5200652	27	18
	DESERT DITCH	5300557	2	2
	ELK DITCH	5300569	10	10
	ELK CREEK DITCH	5300570	20	20
	GRIMES DITCH	5300592	19	49
	HORN CONSOLIDATED DITCH	5300628	91	93
	HORN NO 1 DITCH	5300629	14	18
	JOHANNBROER NO 1 DITCH	5300647	17	17
	JOLLY HOMESTEAD NO 1 D	5300649	11	0
	KIRBY DITCH	5300666	42	42
	KIRBY WASTE WATER DITCH	5300668	15	15
	LITTLE MESA DITCH	5300680	12	12
	MAXWELL DITCH	5300698	26	26
	MESA DITCH	5300703	26	26
	OAK KNOLL DITCH	5300746	13	13
	QUINLAN DITCH	5300761	24	31
	RUSSELL NO 2 DITCH	5300785	11	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	TEPE DITCH	5300831	50	50
	WOHLER DITCH	5300886	65	65
	JOHANNBROER NO 2 DITCH	5301069	6	6
	WHITE COTTON DITCH	5301131	4	4
	FRANK GROH PUMP STATION	5301172	21	24
53_ADC028 DERBY CREEK	BAXTER DITCH	5300510	18	18
	BIG MESA DITCH	5300511	46	46
	CABIN CREEK BASIN DITCH	5300522	130	130
	CEDAR CREEK NO 2 DITCH	5300528	61	61
	CORRELL DITCH	5300539	62	58
	DAWSON DITCH	5300546	160	160
	DRY DITCH	5300559	18	18
	HOOPER DITCH	5300626	310	310
	LINK DITCH	5300677	18	18
	LITTLE DRY GULCH DITCH	5300679	123	123
	LUARK DITCH	5300683	19	25
	MERRIMAC DITCH	5300701	15	15
	OAK GROVE DITCH	5300745	295	290
	SANDERS DITCH	5300790	46	46
	SUNNYSIDE DITCH	5300820	81	81
	SUNNYSIDE ROBERTS DITCH	5300822	18	18
	TANNER DITCH	5300830	15	0
	WASTE WATER DITCH	5300869	41	43
	MERRIMAC II DITCH	5301014	15	15
	DOME RANCH DITCH HGT 1	5301039	130	130
	DOME RANCH DITCH HGT 2	5301040	130	130
53_ADC032 COLORADO RIVER ABV GLENWOOD SPRINGS	O H ANDERSON DITCH	3700503	25	25
	ALAMO DITCH	5200502	5	5
	ALLEN DITCH	5200503	6	9
	BAIR DITCH	5200518	2	2
	BARRIER DITCH	5200519	11	12
	DOLL DITCH	5200543	46	26
	EAST LATERAL DITCH	5200546	6	6
	MATHER DITCH	5200590	7	7
	PRUETT NO 1 DITCH	5200617	3	4
	SPRUCE CREEK NO 1 DITCH	5200643	15	16
	SPRUCE CREEK NO 2 DITCH	5200644	6	6
	SPRUCE CREEK NO 3 DITCH	5200645	10	10
	SPRUCE CREEK DITCH NO 5	5200647	3	3
	WISE DITCH	5200661	31	32
	POSEY DITCH	5200711	7	7

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	KENNYS DITCH	5200720	12	11
	SCHULTZ PUMP 1A	5200721	2	2
	WOLTER PUMP	5200763	3	3
	ALLEN NO 1 DITCH	5300501	7	0
	ALLEN NO 2 DITCH	5300502	7	7
	ALLEN NO 3 DITCH	5300503	2	5
	CHOCKIE NORTH DITCH	5300529	3	3
	CHOCKIE SOUTH DITCH	5300530	6	6
	CYRUS NO 1 DITCH	5300542	48	48
	CYRUS NO 2 DITCH	5300543	4	4
	CYRUS NO 3 DITCH	5300544	4	4
	DEEP CREEK DITCH	5300549	87	75
	DEMPSEY NO 1 DITCH	5300553	21	21
	DEMPSEY NO 2 DITCH	5300554	22	22
	ED HULL NO 1 DITCH	5300566	6	6
	FREDRICK DITCH	5300579	80	80
	GANNON DITCH	5300580	9	17
	GODAT DITCH	5300586	10	10
	GRUNER NO 1 DITCH	5300597	6	6
	GRUNER NO 2 DITCH	5300598	9	9
	HACK NO 2 DITCH	5300600	11	11
	IDE DITCH	5300638	30	30
	KEEP DITCH	5300662	44	32
	MACHIN DITCH	5300687	19	19
	MALONEY NO 1 DITCH	5300688	11	31
	MALONEY NO 2 DITCH	5300689	4	4
	MALONEY NO 3 DITCH	5300690	71	66
	MEANA DITCH	5300700	10	10
	MIDDLE FORK MASON CR D	5300706	90	90
	MCKEEN NO 1 DITCH	5300726	16	16
	NORTH FORK MASON DITCH	5300744	90	90
	RIVER DITCH	5300772	71	71
	ROGERS DITCH	5300781	36	36
	SNODGRASS AND MANNERS D	5300798	85	117
	SOUTH FORK MASON DITCH	5300802	62	62
	STEPHENS DITCH	5300809	20	20
	TUCKER DITCH	5300838	22	22
	TUCKER NO 1 DITCH	5300839	3	3
	TUCKER NO 2 DITCH	5300840	3	3
	TUCKER PETERSON DITCH	5300842	17	26
	WILLOW CREEK NO 4 DITCH	5300881	79	67

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	YOST DITCH	5300892	22	27
	CHOCKY JACKSON DITCH	5301032	16	16
	FOUR CREEK DITCH HGT 2	5301047	397	397
	LOWER ED HULL NO 2 DITCH	5301145	38	38
	FOSTER PUMP NO 1	5301149	45	45
	LUARK PUMP NO 1	5301159	4	6
70_ADC049 UPPER ROAN CREEK	ALTENBERN DITCH	7000500	31	31
	CALDWELL DITCH	7000510	50	50
	CANNON DITCH	7000511	153	141
	CANNON HIGHLINE DITCH	7000512	60	60
	CARLISLE DITCH	7000514	9	9
	CATARACT DITCH	7000516	185	0
	CAUGHMAN DITCH	7000517	86	70
	A V AND D DITCH ALT	7000526	40	40
	FLUME DITCH	7000538	95	87
	FRANKLIN D AND LATERAL	7000539	30	13
	FRANKLIN NO 1 DITCH	7000540	8	8
	FRANKLIN NO 2 DITCH	7000541	9	9
	FRASHIER DITCH	7000542	57	57
	GERRICKE DITCH	7000544	37	0
	GIBLER DITCH	7000545	54	50
	H SCOTT DITCH	7000549	28	28
	HIMEBAUGH DITCH	7000551	623	494
	HOAGLUND-FRASIER DITCH	7000555	67	67
	KIMBALL DITCH	7000556	53	53
	KREPS DITCH AND LATERAL	7000559	7	7
	LONG GULCH DITCH NO 1	7000561	17	0
	LONG GULCH DITCH NO 2	7000562	16	0
	LONGSETH NO 1 DITCH	7000563	19	4
	MEADOWS DITCH	7000568	10	10
	NEWTON DITCH	7000572	132	115
	OLLIS DITCH	7000573	21	21
	PARKES DITCH	7000578	2	0
	S L AND W DITCH	7000588	39	39
	SCOTT DITCH	7000589	27	2
	SIMMONS NO 2 DITCH	7000592	4	4
	VAN CLEAVE DITCH	7000597	74	74
	KAISER GULCH DITCH	7000628	20	20
	BOYD GULCH DITCH	7000639	8	8
70_ADC050 COLORADO RIVER NR CAMEO	ANDERSON AND HAYES DITCH	7000501	23	0
	ARMSTRONG DITCH	7000503	61	38

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	BAKER AND BOWDISH DITCH	7000505	97	93
	BAKER CANNON DITCH	7000506	13	13
	CISSNA DITCH NO 2	7000519	29	27
	CONWELL DITCH	7000527	142	56
	COTTONWOOD DITCH	7000529	77	0
	DE LA MATYR DITCH	7000533	41	75
	DE LA MATYR & ANDERSON D	7000534	47	13
	DE LA MATYR GUNDERSON D	7000535	46	46
	DRY FORK DITCH	7000536	17	17
	GUNDERSON & GUNDERSON D	7000547	32	0
	HAYES DITCH (DRY FORK)	7000553	93	61
	LOVELESS DITCH	7000565	101	101
	OMUNDSON AND FROST DITCH	7000575	30	23
	ROTHSCHILD DITCH	7000587	69	129
	SMITH DITCH	7000593	48	48
	HIGH LONESOME AP NO 1	7000605	45	45
72_ADC051 PLATEAU CREEK ABV VEGA RSVR	BILLY DITCH	7200538	30	30
	ERIE CANAL	7200615	329	327
	VEGA DITCH	7200928	10	10
	WILSON DITCH	7200943	25	25
	ZEIGLE MEADOWS DITCH	7200953	20	19
	ZEIGEL SEEPAGE DITCH	7201252	18	17
	ZEIGEL SEEPAGE DITCH NO2	7201253	18	17
72_ADC052 PLATEAU CREEK BL VEGA RSVR	HARDSCRABBLE DITCH	7200662	297	296
	HIGHLINE DITCH (BUZZARD)	7200691	177	164
	LINWOOD DITCH	7200750	20	20
	LITTLE FINN IRRIGATING D	7200752	147	147
	PARKINSON DITCH	7200822	179	174
	ROSA DITCH	7200858	90	90
72_ADC053 SALT CREEK	BAILEY DITCH	7200522	83	71
	BLACKMAN DUNLAP CLARK D	7200540	240	232
	CEDAR DITCH	7200566	47	46
	CLIFTON DITCH	7200572	8	0
	DUNLAP NO 1 D (PLATEAU)	7200605	11	11
	JOHN A FITZPATRICK DITCH	7200619	14	14
	FRANCIS DITCH	7200622	18	13
	NORMAN F HILL DITCH A	7200694	94	94
	HILL JOHNSON DITCH	7200697	56	56
	JONES BROS DITCH	7200723	105	105
	KIGGINS DITCH	7200728	194	191
	PINES DITCH	7200830	17	17

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	SALISBURY KIGGINS DITCH	7200863	129	107
	SUNNYSIDE NO 1 DITCH	7200902	11	11
	ELIZABETH TURNER DITCH	7200914	40	40
	LEWIS C WILLIAMS DITCH	7200944	68	68
72_ADC054 UPPER BUZZARD CREEK	ADVENT DITCH	7200502	91	91
	ALFALFA DITCH LATERAL	7200503	4	4
	CHENEY CREEK DITCH	7200569	111	111
	CO-OPERATIVE DITCH	7200582	117	117
	ELIZABETH DITCH HDG 1	7200614	50	49
	GEORGE GUNDERSON LUNVAL	7200653	4	4
	JORGEN GUNDERSON DITCH	7200654	4	4
	KLOSTERMAN DITCH	7200733	48	48
	LINN DITCH	7200749	43	0
	MIDDLETON MEADOWS DITCH	7200790	103	0
	VAN DEN HEUVEL DITCH	7200925	11	11
	WOODY DITCH	7200949	14	14
	BUZZARD CREEK DITCH	7201338	56	56
	GIPP DITCH	7201733	25	23
72_ADC055 PLATEAU CREEK BL BUZZARD CREEK	ACORN DITCH	7200501	47	14
	BROWN NO 1 DITCH	7200550	5	5
	CRANE DITCH	7200588	14	14
	DUNLAP DITCH (HAWXHURST)	7200604	149	144
	HAWXHURST DITCH	7200675	77	77
	LAST DOLLAR DITCH	7200739	64	64
	MATTINGLY DITCH	7200769	14	14
	MCCURRY DITCH	7200774	30	30
	MCCURRY HIGHLINE DITCH	7200775	197	199
	MIDLINE DITCH	7200791	297	295
	OAKLAND DITCH	7200811	144	144
	RED BLUFF DITCH	7200845	72	72
	SMALLEY DITCH	7200871	14	14
	SUPERIOR DITCH	7200906	14	14
	WHIZZER IRRIGATING DITCH	7200937	26	26
	DEER TRAIL DITCH	7201350	14	14
	SUPERIOR DITCH (SMALLEY)	7201457	37	17
72_ADC056 UPPER GROVE CREEK	N F GUTHRIE DITCH NO	7200655	18	6
	HARRIS DITCH (OAK CREEK)	7200665	-999	17
	KOCH DITCH	7200734	19	19
	LITTLE CREEK DITCH	7200751	128	128
	ROCKWELL DITCH	7200854	306	303
	SPRING CREEK DITCH GROVE	7200887	24	24

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	SUNSET DITCH (GROVE CR)	7200904	11	11
	WALLACE DITCH (GROVE CR)	7200929	35	35
	NORRELL DITCH	7201181	26	26
	N F GUTHRIE DITCH NO	7201451	79	92
72_ADC057 LOWER GROVE CREEK	ANDERSON GULCH DITCH	7200505	104	18
	ATKINSON DITCH	7200515	57	51
	BERTHOLF FLEMING DITCH	7200532	184	188
	FITZPATRICK DITCH	7200617	148	110
	GILT EDGE DITCH	7200637	138	138
	MURRAY DITCH	7200805	115	72
	RED MOUNTAIN DITCH	7200846	156	105
72_ADC058 KIMBALL CREEK	ATWELL DITCH	7200516	87	79
	ATWELL WASTE SEEP DITCH	7200519	72	58
	BACON IRRIGATION DITCH	7200521	36	0
	JONES DITCH	7200722	107	104
	MCKEE DITCH	7200777	102	89
	HILL DITCH	7200956	15	15
	HODSON DITCH	7201443	4	4
72_ADC059 BIG CREEK	ANDERSON DITCH	7200504	29	30
	BARKER AND WEBER DITCH	7200525	48	48
	DAUMAN DITCH	7200594	18	18
	FITZPATRICK SPRING DITCH	7200618	10	10
	GIBSON DITCH (BIG CR)	7200633	11	12
	HANNAH DITCH	7200659	116	119
	HAWKINS DITCH	7200673	24	17
	ILES SPRING DITCH	7200711	6	2
	C D LUDE DITCH	7200757	176	147
	MASON GULCH DITCH	7200767	11	0
	MASQUATO DITCH	7200768	34	22
	PARROT DITCH	7200824	61	61
	PENSION DITCH	7200828	22	23
	R A PITTS SEEPAGE DITCH	7200835	51	51
	RYAN SPRING DITCH	7200861	7	7
	SHAW DITCH	7200865	47	37
	SILVER BELL DITCH	7200869	136	136
	STANDIFORD SPRING DITCH	7200891	15	15
	D & G PLATEAU DITCH	7201008	12	12
	D & G SPRINGS DITCH	7201033	7	0
	D & G SPRINGS DITCH	7201041	171	171
	NICHOLS DITCH	7201179	63	63
	WOODY-BROWN DITCH	7201249	6	6

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	STODDART WW SEEPAGE D	7201388	94	53
	COAKLEY KIGGINS EXT D	7201417	27	27
	ED LONG DITCH	7201424	17	22
72_ADC060 COTTONWOOD CREEK	CROWN POINT DITCH	7200591	67	63
	DAVENPORT D (COTTNWD)	7200596	446	446
	HALL DITCH (COTTONWOOD)	7200656	148	145
	JULIA KRUH DITCH	7200735	6	6
	NICHOLS DITCH RES SYSTEM	7200809	26	27
	PLATEAU FLOUR MILL DITCH	7200838	46	40
	SHOTWELL DITCH	7200867	568	567
	SNIPES DITCH	7200877	77	92
	WINTERS OR WOLFE DITCH	7200945	64	58
	WOODRING SEEP WASTE D 1	7200946	22	22
72_ADC061 BULL CREEK	FREDERICK NO 2 DITCH	7200625	16	16
	JENKINS CROSS PHILLIPS 1	7200718	93	87
	LOST TIME DITCH	7200756	57	49
	RIESER DITCH	7200850	31	31
	SNIPES GULCH DITCH	7200878	44	45
	SPRING DITCH (BULL CR)	7200885	33	26
	STEELE DITCH	7200894	14	14
	STEWART DITCH (BULL CR)	7200895	64	64
72_ADC062 COON CREEK	BARNES DITCH	7200526	49	49
	CRAIG STEWART DITCH	7200587	58	58
	DINGMAN SP SEEPAGE DITCH	7200600	201	201
	HARKLEROAD DITCH	7200663	67	67
	HEELY DITCH NO 3 (PLAT)	7200682	15	15
	MCGEOCH DITCH	7200776	28	0
	MCKINNEY DITCH	7200779	74	74
	PIONEER EXTENSION DITCH	7200829	210	199
	SADDLE DITCH	7200862	30	0
	SPRING DITCH (COON CR)	7200882	27	29
	CRAIGS SPRING DITCH NO 2	7201404	3	3
	V P BYRAM DITCH NO	7201513	15	15
	SPRING DITCH (SPRING DRW)	7201522	60	61
72_ADC063 MESA CREEK	ATWELL SHORT LINE DITCH	7200518	41	41
	BROWN DITCH	7200549	14	14
	COON CREEK DITCH	7200581	51	52
	INDEPENDENT DITCH	7200712	460	459
	JACKSON DITCH (PLATEAU)	7200714	38	0
	MARINERS IRR DITCH	7200763	114	114
	SMITH DITCH (COON CR)	7200873	8	8

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	SPURLOCK DITCH	7200889	41	42
	SUNSET DITCH (MESA CR)	7200903	100	98
	THISTLE SPRINGS DITCH	7200912	44	45
72_ADC064 PLATEAU CREEK	COPPOCK DITCH	7200584	8	8
	JACKSON D (WALLACE GU)	7200715	14	0
	MCQUEARY SHOEMAKER D HG1	7200782	55	0
	SHUEY DITCH	7200868	17	3
	TATE CREEK DITCH	7200909	6	24
	ERVEN DITCH	7201078	7	0
	LUCY ROGERS DITCH	7201151	3	3
	WILKINSON PUMP NO 1	7201392	8	0
	HARVEY NO 2 DITCH-HDGT 2	7201452	18	18
72_ADC065 COLORADO RIVER NR STATE LINE	COYLE RANCH DITCH	7200585	93	58
	CRESCENT DITCH	7200590	77	11
	DAVENPORT DITCH (E SALT)	7200595	160	150
	GAVIN CANAL DITCH	7200629	110	0
	GAVIN WASTE WATER DITCH	7200630	88	86
	GOFFREDI DITCH	7200641	4	0
	GRAPEVINE DITCH	7200647	22	12
	HOWARD SALT RIVER	7200705	52	46
	HURLBURT WASTE DITCH	7200709	26	26
	KELLEY DITCH	7200727	202	63
	KINNEY DITCH	7200732	24	8
	HUDSON DITCH & PUMP NO	7200738	2	2
	MCCABE DITCH	7200770	-999	11
	WILLIAM MILLER DITCH	7200792	25	12
	MONUMENT DITCH	7200798	24	8
	ROGERS DITCH	7200857	56	32
	SMITH DITCH (RAPID CR)	7200872	17	16
	SMITH STRUTHERS DITCH #1	7200875	19	19
	TAYLOR NO 1 DITCH	7200908	58	21
	UPPER SALT WASH DITCH	7200919	75	102
	WILLIAMS IRRIGATING D	7200941	53	26
	BRACH PUMP	7201024	123	115
	DUPONT PUMP	7201070	11	11
	H F MCCLAIN DITCH	7201107	43	61
	TALBOTT PIPELINE	7201225	28	28
	MOORLAND DITCH	7201299	12	12
	SMITH-HOLMES SPG WW HDGT	7201484	23	20
	HURLBURT DITCH PUMP	7201682	70	69

Exhibit B: Diversion Structures in each "No Diversion Records" Aggregate

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
36_AND017 UPPER BLUE RIVER	KEYSTONE DITCH (UPPER)	3600683	66.131	66.366
	SONDREGGER NO 5 DITCH	3600814	2.188	2.564
	WARD NO 3 DITCH HDG 1	3600864	0	2.656
	SWAN RIVER WATER SYSTEM	3601009	71.013	77.262
	GOLF SURFACE DIVERSION 1	3601093	69.888	70.459
	COPPER MTN WELL NO 1A	3605217	26.099	39.539
	MONTEZUMA TOWN PIPELINE	3600752	19.952	0
36_AND019 BLUE RIVER BL GREEN MOUNTAIN RSVR	SMITH NO 2 DITCH	3600803	271.615	271.451
37_AND029 EAGLE RIVER ABV BRUSH CREEK	BRETT DITCH	3700521	0	46.729
	NOTTINGHAM DITCH -76	3700732	9.514	9.514
	ROOT DITCH	3700779	31.041	32.506
	EAGLE-VAIL MUN WATER SYS	3701084	73.681	74.27
37_AND030 BRUSH CREEK	EAGLE TOWN OF GRAV SYS	3700583	101.508	101.508
	JOE GOODE NO 1 DITCH	3700610	21.267	21.267
37_AND031 EAGLE RIVER BL GYPSUM	GRUNDELL A F DITCH	3700619	20.375	20.375
38_AND033 UPPER ROARING FORK	DEANE FISH PONDS & DITCH	3800631	17.261	18.54
	GARDNER DITCH	3800911	34.774	34.774
	QUAKING ASPEN DITCH	3800951	11.078	11.078
	HAYDEN PEAK DITCH NO 1	3801238	0	19.372
	OGARA DITCH	3801870	37.501	37.501
	BRUSH CREEK PUMP NO 1	3801496	26.697	0
38_AND034 SNOWMASS CREEK	HUNTER DITCH	3800767	90.634	90.634
	PINNELL AND MCLAUGHLIN D	3800938	12.734	12.734
38_AND035 FRYING PAN RIVER	ALFRED SLOSS DITCH NO 1	3800502	14.999	14.999
	CLYDE DITCH	3800601	31.858	31.858
	HALL DITCH	3800727	0	17.955
	HYRUP DITCH	3800772	26.768	26.768
	SHEHI DITCH	3800988	76.622	76.622
	FRENCHMAN CREEK D NO 3	3801161	34.361	48.082
	FRANCES NISBET D NO 1	3801778	8.576	8.576
	FRANCES NISBET D NO 2	3801779	10.466	10.466
	JAKEMAN DITCH AP	3801909	22.764	22.764
38_AND036	DEAN DITCH	3800630	19.504	19.504

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
WEST SOPRIS CREEK	ETIENNE ARBANEY DITCH	3800664	7.687	7.794
	JACOBS NO 2 DITCH	3800781	31.928	31.928
	LIGHT DITCH	3800819	139.825	139.825
	BRUSH CREEK RNCH SPG NO2	3801583	13.075	13.075
38_AND037 ROARING FORK ABV CRYSTAL	BLUE CRK LATERAL DITCH	3800542	19.088	19.088
	FRIELER DITCH	3800697	25.046	24.747
	GEIGEL WASTE WATER DITCH	3800705	240.366	212.343
	WILLOW SPRINGS	3801399	30.424	30.93
	SPRING PARK RESERVOIR	3803744	294.753	243.042
	KELLY NO 3 DITCH	3800793	62.361	0
38_AND038 CRYSTAL RIVER	COAL CREEK DITCH	3800602	11.219	11.219
	PROSPECT DITCH	3800950	135.295	72.866
	VILLAGE FARM DITCH	3801069	12.693	12.693
	GUILFORD DITCH NO 1	3801295	7.895	7.743
	VORHIES CREEK DITCH HG 2	3801674	5.625	5.625
	PLANK SPRING & PIPELINE	3805651	10.142	10.142
	PRINCE DITCH	3800948	33.617	0
	SPRING GULCH DITCH	3801372	199.299	0
	EDGERTON RES FEEDER D	3801478	18.981	0
38_AND039 CATTLE CREEK	THOMAS MCNULTY COULTER D	3801046	151.002	128.072
	MARY MCLEAN DITCH HGT 2	3801652	121.542	121.542
	HAFF SPRINGS NO 1 & 2 D	3800726	53.733	0
	LAFAYETTE COX DITCH	3800807	29.736	0
38_AND040, LOWER ROARING FORK	FREEMONT DITCH	3800695	21.608	21.608
	KENDALL AND STRICKLETT D	3800799	385.245	344.457
	REYNOLDS DITCH	3800961	91.515	11.321
	WADDELL DITCH	3801074	77.045	77.045
	FRANK CHAPMAN DITCH	3800691	30.784	0
39_AND041 ELK CREEK	ALLEY SPRINGS NO 1 2 3	3900501	3.126	3.126
	JOHN ROLLETTO NO 1 DITCH	3900598	37.855	37.873
	TONY PERRY DITCH	3900673	3.86	3.86
	TONIOLLI DITCH	3900676	21.267	21.266
	PARK RESERVOIR	3903507	139.498	123.754
	ALLEY SPRING NO 4	3900500	3.878	0
39_AND045 RIFLE CREEK	BROWN DITCH	3900516	21.707	21.707
	CRYSTAL FALLS DITCH	3900543	23.375	23.375
	RIFLE FALLS DITCH	3900647	13.357	13.357
	RAYNARD DITCH	3900702	38.622	34.944
	JONES WELL NO 2	3905633	1.836	1.836
	BEANE SPRING PIPELINE	3900508	10.233	0

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
	HUBBARD DITCH	3900588	88.151	0
	HABLUTZEL PUMP	3900805	12.036	0
45_AND042 COLORADO RIVER BL GARFIELD CREEK	GILMORE DITCH	3900569	59.114	50.788
	JACKSON SPRING PIPELINE	3900591	19.781	22.396
	CANYON CREEK WELL NO 1	3905033	2.746	2.746
	CANYON CREEK WELL NO 2	3905647	2.746	2.746
	BELLODI NO 1 DITCH	4500521	13.192	13.192
	RINEBERGER & LAKE DITCH	4500740	17.744	17.744
	TALBOTT PUMP & PIPELINE	4500791	10.193	10.193
	DEBOY SPRING NO 1 & PL	4500893	7.844	7.844
	ROCK-N-PINES POND NO 8	3903618	1.156	0
	COOLEY NO 3 DITCH	4500556	1.651	0
45_AND043 COLORADO RIVER BL DIVIDE CREEK	MULTA-FLEXA DITCH	4500703	3.834	3.834
	GUTHERIDGE DITCH NO 2	4501095	24.185	21.491
45_AND044 COLORADO R BL MAMM CREEK	STOBAUGH DITCH	3900668	31.231	17.201
	BISHOP WELL	4505002	50.009	26.644
45_AND046 COLORADO RIVER BL BEAVER CREEK	SPENCER SPRINGS DITCH	4500771	15.231	8.789
45_AND047 COLORADO RIVER BL CACHE CREEK	CLOUGH NO 2 STOCKWATER D	3900534	1.316	0
	RULISON MILLER DITCH	3900653	32.901	0
45_AND048 COLORADO RIVER NR DE BEQUE	HAYWARD AND WYATT PL	4500623	101.671	92.604
	GARDNER DITCH	4500731	44.215	34.074
	STREIT BOTTOM DITCH	3900669	25.819	0
	MARLING DITCH	4500688	107.999	0
	SAM B WASSON WW D NO 1	4500756	9.099	0
50_AND014 MUDDY CREEK ABV TYLER DITCH	CARTER CREEK FEEDER D	5000770	96.007	100.57
50_AND016 LOWER MUDDY CREEK	CAMERON SP NO 1 2 3 4 D	5000537	66.791	66.791
50_AND020 COLORADO RIVER BL KREMMLING	WEST END NO 1 DITCH	5300870	32.011	32.011
51_AND001 COLORADO RIVER NR GRANBY	BUSSE PICKUP LATERAL NO1	5101032	54.775	54.775
	BUSSE PICKUP LATERAL NO2	5101033	19.739	19.739

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
51_AND003 RANCH CREEK	CABIN CREEK DITCH	5100568	147.358	147.331
51_AND004 FRASER RIVER BL CROOKED CREEK	SPRING BRANCH DITCH	5100899	54.997	54.997
	SPRING BRANCH NO 2 DITCH	5100900	12.182	12.182
51_AND005 TENMILE CREEK	CROOKED DITCH	5100595	21.926	21.926
	WESTMAN NO 2 DITCH	5100953	77.823	40.824
51_AND006 FRASER RIVER AT GRANBY	DEBERARD DITCH -88	5100601	12.45	12.45
	STRAWBERRY DITCH NO 1	5100918	24.727	24.727
	GRAND ELK GOLF DIV NO. 1A	5101381	53.421	53.35
	GRAND ELK GOLF DIV NO. 2A	5101382	49.418	49.348
51_AND010 LOWER WILLIAMS FORK	SPACEK RESERVOIR	5103697	43.994	43.994
52_AND021 BLACK TAIL & SHEEPHORN CREEK	A P R NO 4 DITCH	5200511	23.492	23.492
	KUHN DITCH	5200667	0	7.43
	OSAGE DITCH HDG 5	5200744	17.008	22.981
	MAUDLIN NO 2 DITCH	5300696	10.44	10.44
	O C MUGRAGE DITCH	5300748	8.01	8.01
	ORNDOFF DIVR POINT NO 2	5301151	14.242	14.242
	HASTINGS SPRING	5305026	3	3
	GORE CANYON RANCH DITCH	5200685	43.475	0
53_AND023 KING CREEK	ELLIOTT NO 2 DITCH	5300573	24.304	24.304
53_AND025 TOPONAS CREEK	STRINE DITCH	5300817	53.311	72.595
53_AND026 COLORADO RIVER ABV ALKALI CANYON	HART NO 3 DITCH	5300607	21.46	21.46
	TOWERS DITCH	5300836	6.344	10.537
53_AND028 DERBY CREEK	CABIN CREEK NO 2 DITCH	5300520	123.378	123.378
	DOME RANCH DITCH	5300558	129.688	129.689
	ROGERS DITCH	5300779	123.378	123.378
	WURTSMITH SPRING PL	5300889	2.399	3.951
53_AND032 COLORADO RIVER ABV GLENWOOD SPRINGS	ANDERSON DITCH	5200504	8.419	8.419
	SMALLEY DITCH	5200638	2.844	2.844
	CRAGHEAD PUMP POINT 1	5200734	20.095	20.096
	INDIAN CAMP ALTERNATE POINT	5200765	9.69	9.69
	RILAND DITCH (HACK CR)	5300770	2.444	2.444
70_AND049 UPPER ROAN CREEK	BRIDGES DITCH	7000509	13.744	13.744
	A V AND D DITCH	7000635	13.08	0
70_AND050	BOWEN WELL NO 1	7005001	12.747	5.739

Aggregation ID	Structure Name	WDID	2005 Acres	2010 Acres
COLORADO RIVER NR CAMEO	FINLEY RANCH PMP PLANT	7201080	30.842	13.587
72_AND051 PLATEAU CREEK ABV VEGA RSVR	ZEIGEL STOCK DITCH	7201254	17.857	17.216
	VEGA RESERVOIR	7203844	20.341	20.34
72_AND052 PLATEAU CREEK BL VEGA RSVR	VEGA RES (VEGA PROJ POOL)	7204906	46.215	46.419
72_AND053 SALT CREEK	LORIMOR SPRING	7201148	11.719	11.719
72_AND054 UPPER BUZZARD CREEK	FRED F CARNAHAN DITCH	7200565	79.072	87.605
72_AND056 UPPER GROVE CREEK	Y T RESERVOIR DITCH	7200951	18.901	18.9
72_AND058 KIMBALL CREEK	NEWMAN DITCH	7200808	54.816	14.442
72_AND061 BULL CREEK	BULL CREEK RES NO 5	7203894	14.5	14.5
	TWIN BASIN RESERVOIR	7203902	13.547	13.952
72_AND062 COON CREEK	PISEL DITCH	7200832	48.014	48.014
	PITTS HIGHLINE DITCH	7200834	13.825	13.83
	WELCH DITCH	7200932	6.304	6.304
	WILDCAT DITCH	7200939	37.615	38.503
72_AND063 MESA CREEK	ATWELL ENL IRR DITCH	7200517	27.318	27.317
	WEIMER DITCH	7200931	24.851	14.85
	DIEMOZ DITCH	7201060	10.288	10.288
	ATWELL DITCH	7201448	93.361	85.207
72_AND065 COLORADO RIVER NR STATE LINE	COLORADO R PUMP STA NO 1	7200981	25.698	25.699
	BROWN POND & PMP PLT	7201030	-999	7.07
	ECHO LAKE RESERVOIR	7203920	53.363	25.524
	GILBERT WEBB DITCH	7200636	7.856	0

A-2: Identification of Associated Structures (Diversion Systems and Multi-structures)

Background

The previous CDSS Western Slope models include associated structures which divert to irrigate common parcels of land. These associations were primarily based on information provided directly during meetings with Water Commissioners, and were not based on information from the original 1993 irrigated acreage assessment. The original CDSS 1993 irrigated acreage assessment was based on the USBR identification of irrigated land enhanced with a water source (ditch identifier) that served that land. Many of the irrigated acreage parcels covered more than one ditch service area and, in lieu of spending significant time splitting the parcels by ditch service area, more than one ditch was assigned. For CDSS modeling purposes, the acreage was simply "split" and partially assigned to each ditch.

Introduction

For the recent 2005 and 2010 acreage assessments, there was significant effort spent trying to refine irrigated parcels based on the legal and physical ditch boundaries so, where possible, there was only one ditch assigned to each irrigated parcel in Divisions 5, 6, and 7. Division 4 efforts concentrated on a few areas, but not the entire basin. To model these ditches as accurately as possible, it is important to understand if the acreage that is still assigned to more than one ditch is actually irrigated by all assigned ditches in a comingled fashion or, alternatively, if the acreage should be "split" and the structures should be modeled as having no association. Ditches combined for modeling because the supplies are believed to be comingled are termed "associated structures" for the CDSS modeling effort.

Some associated structures can be identified based on the HydroBase water rights transaction table because they are decreed alternate points or exchange points, while others can be identified based on Water Commissioner accounting procedures, generally documented in their comments accessible through HydroBase. In the models, associated structures are represented as diversion systems if the structures are located on the same tributary or multi-structure systems if they are located on different tributaries. As part of Task 3, the associated structures were updated to more accurately model the combined acreage, diversions, and demands. These updates include the integration of the 2005 irrigated acreage, the 2010 irrigated acreage, as well as verification of associated structures based on diversion comments and water right transaction comments.

Approach

The following steps were used to identify associated structures in Divisions 5, 6, and 7. Because the Division 4 parcels have not yet been refined to the ditch service level, no effort was made to determine additional associated structures. Note, however, the parcels that require additional refinement have been identified and provided to Division 4. These updates should be included with the next acreage assessment.

Updating the associated structures was a multi-step process that involved 1) identifying potential associated structures by integrating the 2005 and 2010 CDSS irrigated acreage, 2) verifying the associated structures using the diversion and water right transaction comments, and 3) making recommendations on how to best represent the associated structures in the CDSS Western Slope models.

1) *Develop an Associated Structure List Based on Revised 2005 and 2010 CDSS Irrigated Acreage*

   An initial associated structure list was developed by combining the CDSS revised 2005 and 2010 irrigated acreage. During this process the overlapping similarities between the two irrigated acreage coverages were integrated, resulting in a list of associated structures containing unique IDs. An illustrative example is presented below. In this example, the 2005 irrigated acreage coverage contains parcel A assigned to structures 1, 2, and 3; while the 2010 irrigate acreage coverage contains parcel B assigned to structures 2 and 4. Parcel A and B are integrated, resulting in an association comprised of structures 1, 2, 3, and 4.

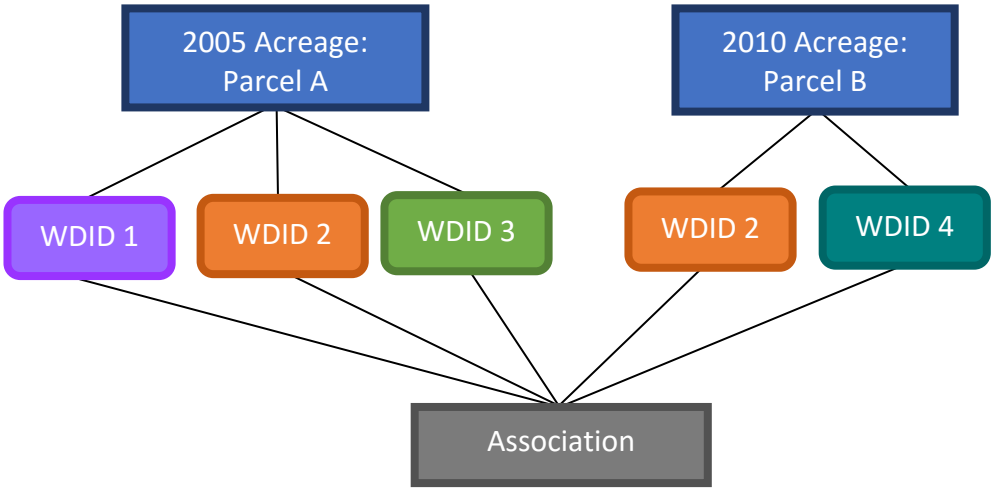


Figure A-2. Example of integrating the CDSS irrigated acreage coverage to identify associated structures.

2) *Verify the Associations Using Diversion and/or Water Right Transaction Comments*

Once a unique list of associated structures was developed, each association was verified using diversion comments and/or water right transaction comments. If the diversion comments and/or water right transaction comments could not verify structure associations, then unverified structures were removed from the list of associated structures (i.e., their diversions will not be treated as commingled). Types of verification included comments identifying structures as alternate points of diversion, points of exchange, acreage reported under alternative structure, same points of diversion, and water right transfers.

Below is an example of the verification methodology using the diversion and/or transaction comments for the association shown in step 1.

Table A-4. Example of Integrating the Diversion and Water Right Transaction Comments for Verification.

WDID	Verification Comment	Source	Verified?
1	Irrigates Y Ranch	Diversion Comment	N
2	Water right transferred to WDID 4	Transaction Comments	Y
3	Acreage is recorded under WDID 2	Diversion comments	Y
4	-	-	Y

Given this example, WDID 1 was not verified by the comments and, thus, not included in the final list of associated structures.

3) Recommend a Modeling Approach for Representing Associated Structures in the CDSS Western Slope Models

Using the refined associated structure list developed in step 2, recommendations on how to best represent the associated structures in the CDSS models were provided. These recommendations were based on the following criteria:

- If located on non-modeled tributaries, the associated structures were added to appropriate aggregates.
- Associated structures were explicitly modeled—either in diversion systems or multi-structure systems—if the net water rights for at least one structure in the association exceeded a specific threshold identified in previous modeling efforts. In general, the thresholds represent 75% of the net water rights and are listed in **Table A-5**.

Table A-5. Water Right Thresholds for Explicit Modeling

CDSS Model	Water Right Threshold (CFS)
Yampa	5
White	4.8
Upper Colorado	11
San Juan/Dolores	5/6.5

Structures located on the same tributary were modeled as diversion systems, while structures located on different tributaries were modeled as a multi-structure system. Note, diversions systems combine acreage, headgate demands, and water rights; and the model treats them as a single structure. Contrastingly, multi-structure systems have the combined acreage and demand assigned to a primary structure; however, the water rights are represented at each individual structure, and StateMod meets the demand from each structure when their water right is in priority. **Figure A-3** illustrates how a diversion system is modeled, while **Figure A-4** illustrates how a multi-structure system is modeled.

Figure A-3. Model Representation of a Diversion System.

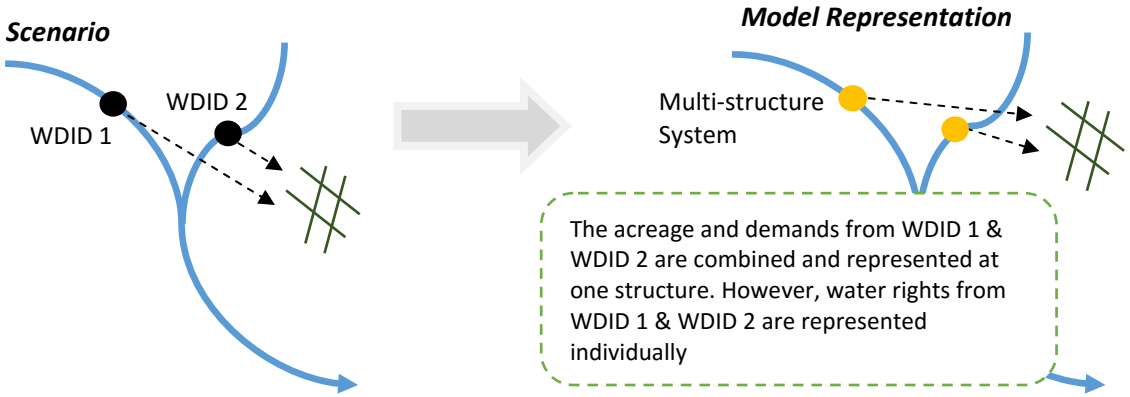


Figure A-4. Model Representation of a Multi-Structure System.

- The structure with the most irrigated acreage—based on the 2005 and 2010 CDSS coverages—was selected as the modeled structure for each diversion system.

    - The structure with the greatest net water rights was selected as the primary structure for multi-structure systems.
- If none of the structures in an association exceeded the water right threshold identified in Table 2 and have contemporary diversion records, the structures were modeled in an aggregate.
- If all structures in an associated did not have diversion records, the structures were placed in a “no diversion” aggregate.