ENGINEERING REPORT
CASE NO. 2019CW3098

Prepared for:

Tri-County Water Conservancy District, Ouray County, Colorado and the Ouray County Water Users Association

Wright Water Engineers, Inc.

August 2020

ENGINEERING REPORT
CASE NO. 2019CW3098

TABLE OF CONTENTS

END OF REPORT

TABLES

FIGURES

APPENDICIES

1.0 Introduction

Wright Water Engineers, Inc. (WWE), on behalf of Tri-County Water Conservancy District, Ouray County, Colorado and the Ouray County Water Users Association (the Applicants), is pleased to provide this Engineering Report for Case No. 2019CW3098. The subject water rights are located in Water Division 4 in the Uncompahgre River Basin and its tributaries including Cow Creek and Dallas Creek in Ouray County, Colorado. This Engineering Report further describes and documents the basis for each claim made by the Applicants.

2.0 First Claim: Surface Diversion for the Cow Creek – Ridgway Reservoir Pipeline

The first claim is for a 20 cfs surface water diversion in Cow Creek to deliver and subsequently store water in Ridgway Reservoir via an underground pipeline. The pipeline is approximately 1,400 feet long, and its proposed point of diversion (POD) limits are based on high definition LiDAR elevation data collected by the Colorado Water Conservation Board (CWCB) (QSI, 2018) and sites visits with the Engineer and representatives of the property owner on which the POD limits are located.

The upstream and downstream limits for the Cow Creek – Ridgway Reservoir Pipeline POD are shown in Figure 1. The purpose of the upstream and downstream POD location is for future flexibility in its location allow for optimization of pipeline hydraulics, sediment transport, and a larger longitudinal footprint for the diversion structure to allow for fish passage.

The limits of the POD are located downstream from most of the senior water rights in Cow Creek except for the Hayes Teague and Chaffee Ditches (see Figure 1). Senior water rights located on the Uncompahgre River downstream of the proposed POD include the Ouray Ditch, the Hieland Ditch, Montrose and Delta Canal (M&D Canal), and several water rights located between the Confluence of Cow Creek and the Uncompahgre River and Delta, Colorado.

The Applicant's first claim for the Cow Creek – Ridgway Reservoir Pipeline is junior to existing vested water rights and can either be curtailed when the water right is out-of-priority or can continue to divert water out-of-priority via exchange from Ridgway Reservoir (see Cow Creek Exchange below). If operating under the Cow Creek Exchange, up to 8.601 cfs should be available at the Hayes Teague and Chaffee Ditch POD's.

The 20 cfs claim is based on historical streamflow gage data from the Colorado Division of Water Resources (CDWR) Cow Creek Near Ridgway Reservoir (COWCRKCO) (Cow Creek Gage) (CDWR, 2020). The Cow Creek Gage is located downstream of all water rights that divert from Cow Creek and impacts of existing diversions from Cow Creek water users are included in the gage data. Figure 2 provides a hydrograph based on daily streamflow data from the Cow Creek Gage between water year 2008 and 2018. As shown in Figure 2, streamflow in Cow Creek is

above 20 cfs for extended periods of time during the year when there are no calls for water from downstream water rights.

One example approach evaluated by the Applicants to operate the Cow Creek Ridgway Reservoir pipeline is via flow stabilization reservoir to dampen the diurnal streamflow that is present in Cow Creek and divert the excess diurnal water to Ridgway Reservoir. Based on Cow Creek Gage Data, Cow Creek can experience fluctuations in streamflow of more than 100 cfs within a 24-hour period. The flow regulating reservoir could be sized to attenuate diurnal streamflow in Cow Creek and make daily releases consistent with the previous three days rolling average streamflow. The intent is to reduce the diurnal flow during peak runoff while maintaining the seasonal natural hydrograph with less daily variability. This analysis was based on a maximum diversion rate of 20 cfs, WWE estimates that approximately 8,000 AF of water could be delivered to Ridgway Reservoir in water year 2018 utilizing an approximately 700 AF of active storage from a flow stabilization reservoir (WWE, 2020).

3.0 Second Claim: Alternate Points of Diversion for the Cow Creek – Ridgway Reservoir Pipeline Project

Applicants are proposing to divert up to 20 cfs from Cow Creek into the Uncompahgre river basin at or upstream of Ridgway Reservoir by pipeline or open ditch at any one or combination of the Cow Creek – Ridgway Reservoir Pipeline and claimed alternative points of diversion as discussed further below.

The second claim is for Alternate Points of Diversion associated with the Cow Creek – Ridgway Reservoir Pipeline Project. The Sneva Ditch, Alkali Ditch No. 1 and Alkali Ditch No. 2 are existing inter-basin diversions carrying water from the Cow Creek basin into the Uncompahgre River basin above Ridgway Reservoir. The Applicants are claiming Alternate Points of Diversion for the 20 cfs claim including the Shortline Ditch, Alkali Ditch No.2, Alkali Ditch No. 1, and Sneva Ditch (see Figure 1).

An example of this operation is when there is capacity in one of the ditches located upstream of the Cow Creek – Ridgway Reservoir Pipeline, up to 20 cfs could be taken at one or a combination of the ditches claimed as an Alternate Points of Diversion instead of at the pipeline. The combined decreed diversion amount for all four of these ditches is 126.21 cfs. There is existing capacity in these ditches to divert the 20 cfs as an Alternate Point of Diversion for the Cow Creek – Ridgway Reservoir Pipeline. The combination of water taken under the Alternate Points of Diversion and the Cow Creek – Ridgway Reservoir Pipeline shall not exceed 20 cfs combined. One advantage of using an alternate point of diversion is that the water imported into the Uncompahgre River can be located upstream of the CWCB Uncompahgre River instream flow reach (decreed in Case No. 98CW222), and assist in the operation of the operation of the Uncompahgre River Exchange.

The diversions of the Cow Creek – Ridgway Reservoir Pipeline and the Alternate Points of Diversions at the Alkali Ditch No. 1 and Alkali Ditch No. 2, Shortline Ditch and Sneva Ditch should not exceed 20 cfs combined under the Cow Creek – Ridgway Reservoir Pipeline. The use of the Cow Creek - Ridgway Reservoir Pipeline at the proposed Alternate Points of Diversions

shall only occur when there is available capacity, is voluntary, and shall not impact the ability to divert under the existing decreed water rights for the Alternate Points of Diversion.

Before exercising the Alternate Points of Diversion the applicant shall obtain authorizations from the owners of the alternate points of diversion and install necessary measuring devices and provide accounting measuring and documenting the location and deliveries of water to the Uncompahgre River at and upstream of Ridgway Reservoir.

4.0 Third Claim: Ram's Horn Reservoir Use Enlargement

Ram's Horn Reservoir was conditionally decreed for 25,349.15 Acre-Feet (AF) of storage in Civil Action No. 2440 and its uses included irrigation, domestic, municipal and industrial, and flood control for Ouray, Delta, and Montrose Counties (see Appendix A). In addition to these already decreed uses, the Applicants identified the following uses for Ram's Horn Reservoir to benefit Ouray County water users: Flow Stabilization, Augmentation, Exchange, Aquifer Recharge, Reuse, Stream Flow Enhancement and Augmentation, and Piscatorial.

The size of the Ram's Horn Reservoir is based on the information provided the 1956 Filing Map of Ram's Horn Reservoir (see Appendix A) and is summarized as follows:

- Volume of Ram's Horn Reservoir: 25,349.15 AF
- Surface area of high-water line: 235 Acres
- Vertical height of dam: 260 feet
- High-water line depth = 250 feet
- Maximum height of dam = 260 feet

The length of the Ram's Horn Reservoir Dam is currently estimated at 720 feet and is based on high definition LiDAR elevation data collected and provided by the CWCB (QSI, 2018).

Table 1 provides a summary of example Ram's Horn Reservoir allocation amounts from an analysis of average (2002 to 2012) and dry year (2002) water needs and is partly based on information provided in the *Upper Uncompahgre Basin Water Supply Protection and Enhancement Project* Report (WWE, 2016). The analysis presented in WWE (2016) provides a summary of water shortages in four regions in the Upper Uncompahgre Basin:

- Region 1: Uncompahgre River Below Ridgway Reservoir (in Ouray County)
- Region 2: Dallas Creek
- Region 3: Uncompahgre River Above Ridgway Reservoir
- Region 4: Cow Creek

The exchange pool allocation is based on storage for 1 years' worth of average year (2002 to 2012) or dry year (2002) exchange water supply for non-mainstem water users in Region 1, all Region 2 and Region 3 water users, and non-mainstem Region 4 water users. The exchange for irrigation purposes for water users that cannot directly receive reservoir releases and must rely on exchanges is 1,500 AF on average to 4,000 AF during dry year 2002 (see Table 1).

Reservoir storage that can be released directly for irrigation (exchange not required) for water rights users on the Uncompahgre River within Ouray County ranges from an average 200 AF per year to 900 AF during a dry year. Reservoir Storage from mainstem Cow Creek water users ranges from 1,600 AF on average to 6,100 AF during dry year 2002. In this example allocation, the remaining reservoir storage is used for augmentation, Cow Creek and Uncompahgre River instream flow enhancement (subject to agreement with CWCB), supplemental irrigation for water users in Delta and Montrose Counties, compact water supplies, carryover storage for dry year firming and dead storage and sediment.

The Gunnison Basin Consumptive Needs Assessment (2011) estimates year 2050 municipal and domestic water use in Ouray County ranging between 1,300 AF and 1,800 AF. The Statewide Water Supply Initiative 2010 (CDM, 2011) has similar projections. A majority of the municipal use is water delivered by the City of Ouray and Town of Ridgway. Based on unincorporated projected water use developed in the 2016 Upper Uncompahgre Basin Water Supply and Enhancement Project, WWE calculated over 340 AF of water demands in unincorporated Ouray County. Based on a 50 percent efficiency for a combination of indoor and outdoor watering, the 340 AF of water demand translates to a 170 AF of water depletion. The 2016 Upper Uncompahgre Basin Water Supply and Enhancement Project, WWE also calculated industrial depletions for future gravel and construction products mining at over 430 AF. Thus, the combined future augmentation needs for unincorporated Ouray County domestic and industrial water use totals 500 AF.

In early 2020, Colorado Parks and Wildlife (CPW) developed a preliminary biological flow recommendation for Cow Creek (CPW, 2020). CPW (2020) recommends a minimum biological flow of 53 cfs between April 1st and July 15th, and 15 cfs between July 16th and March 31st. WWE analyzed data from the Colorado Division of Water Resources (CDWR) Cow Creek Near Ridgway Reservoir (COWCRKCO) streamflow gage (Cow Creek Gage) (CDWR, 2020) to calculate the annual volume needed to increase the streamflow at the Cow Creek Gage to meet CPW's minimum biological flow recommendations between water years 2009 and 2018. On average (2009-2018) 2,700 AF of water is required to meet CPW's biological flow recommendations, and during a dry year (2012) 6,000 AF of water is required.

The aquifer recharge is intended for water supplied to the Ouray County Gravel Pits, and other Gravels Pits in Montrose County that can receive reservoir storage water and apply the storage release to a gravel pit to obtain recharge accretions.

Flow stabilization is intended to help stabilize diurnal flows in Cow Creek in possible conjunction with the Cow Creek – Ridgway Reservoir Pipeline and or its Alternate Points of Diversion. The flow stabilization component of Rams Horn Reservoir is discussed under the 1st Claim.

In order to avoid expansion and injury from operation of the senior Ram's Horn Reservoir water right, storage for the uses under the junior use enlargement water rights should be accounted for (booked against) the senior reservoir water right as per CDWR policy.

5.0 Fourth Claim: Conditional Appropriative Right of Exchange

For each conditional exchange claimed, WWE used the dry year conditions present in 2012 to evaluate exchange demand and exchange potential based on the administrative call conditions and physically available streamflow in each exchange reach. The following sections provide a summary of the basis for each conditional appropriative right of exchange claimed.

5.1 Cow Creek Exchange

The Cow Creek Exchange is located on Cow Creek between the upstream terminus at Ram's Horn Reservoir and the downstream terminus located at the confluence of Cow Creek and the Uncompahgre River (see Figure 3). The proposed Cow Creek Exchange would allow Cow Creek water users, Ram's Horn Reservoir, and the Cow Creek – Ridgway Reservoir Pipeline to continue to divert water out of priority from Cow Creek and store water in Ram's Horn Reservoir during time periods when senior water rights (i.e. M&D Canal) are placing a call in the Uncompahgre River Basin and exchange potential exists. Water stored in Ridgway Reservoir is the source of substitution and can be released via exchange to offset out of priority depletions and diversions from Cow Creek. The Applicants are requesting a flow rate of 30 cfs for the Cow Creek Exchange.

During the 2012 water year, the M&D Canal placed a call on May 2, 2012 and the call ended on September 26, 2012. To evaluate exchange potential in Cow Creek, WWE analyzed data from the Cow Creek Gage. As discussed in Section 2.0, the Cow Creek Gage is located downstream of all active diversion structures on Cow Creek.

According to Cow Creek Gage data, average daily streamflow over the month of July 2012 was 19 cfs, with a high of 40 cfs. Average daily streamflow in Cow Creek over the month of June 2012 was 16 cfs, with a high of 66 cfs. Over the May 2nd to September 26th period, the average daily streamflow in Cow Creek exceeded 30 cfs for 39 days.

WWE also evaluated exchange demand from model runs using the Colorado Decision Support System (CDSS) Gunnison Model (CDSS, 2015). Additional diversions by water users in Cow Creek are calculated using the Gunnison Model by simulating relaxation of senior water right calls from the M&D Canal on Cow Creek water users via releases of water from Ridgway Reservoir to meet the needs of senior downstream water rights (i.e., M&D Canal). For this additional diversion by exchange analysis, WWE ran Gunnison Model simulations for 2012 and calculated the difference in model reported Cow Creek diversions under the following scenarios:

1. Releases from Ridgway Reservoir are meeting the needs of senior downstream water rights.
2. Historical conditions reported by Gunnison Model (i.e., no additional releases from Ridgway Reservoir to meet the needs of senior downstream water rights).

According to the Gunnison Model simulations the maximum additional monthly diversions from Cow Creek water users totaled 2,500 AF or average daily additional diversion of 42.1 cfs in June 2012 and 1,703 AF, or an average daily 27.7 cfs, in July 2012. It is important to note that the modelled additional diversions are based on existing conditions and did not include the potential

for water exchanged into the proposed Ram's Horn Reservoir or the Cow Creek – Ridgway Reservoir Pipeline that may increase the amount of exchange.

Given the streamflow available over 30 cfs during the 2012 call period in the streamflow analysis and the modelled exchange demand analysis, it is our opinion there is water available and sufficient demand to appropriate for the exchange.

The exchange can only be operated when there is exchange potential to avoid injury to vested intervening water rights. As discussed in Section 2.0, the Cow Creek Exchange can be operated for out of priority diversions by the Cow Creek – Ridgway Reservoir Pipeline. When operating the Cow Creek exchange in this manner, up to 8.601 cfs or the amount that can be placed to beneficial use, whichever is less, should be available for the Chaffee and Hayes Teague Ditch located on Cow Creek downstream of the pipeline POD to avoid injury to vested water rights.

5.2 Uncompahgre River Exchange

The Uncompahgre River Exchange is located on the Uncompahgre River between the upstream terminus at the confluence of Canyon Creek and the Uncompahgre River (City of Ouray), and the downstream terminus at confluence of Cow Creek and the Uncompahgre River (see Figure 3). The Uncompahgre River Exchange has two components:

1) Releases from Ram's Horn Reservoir allow Ridgway Reservoir to fill out of priority during time periods when senior water rights (i.e. M&D Canal) are placing a call in the Uncompahgre River Basin and exchange potential exists.

2) Releases from Ridgway Reservoir and or Ram's Horn Reservoir allow Uncompahgre River water users located upstream of Ridgway Reservoir to continue to divert water out of priority from the Uncompahgre River during time periods when senior water rights (i.e. M&D Canal) are placing a call in the Uncompahgre River Basin and exchange potential exists.

The Applicants are requesting a 174 cfs flow rate for the conditional Uncompahgre River Exchange. The exchange flow rate of 174 cfs is based on an analysis of data from the United States Geological Survey (USGS) Uncompahgre River Near Ridgway, CO streamflow gage (Uncompahgre River Gage) (USGS, 2020).

Under a scenario when Ridgway Reservoir is filling out of priority via releases from Ram's Horn Reservoir, the minimum required streamflow below Ridgway Reservoir is 30 cfs (USBR, 2011). Based on Uncompahgre River Gage data, average daily streamflow in June of 2012 ranged between 118 cfs and 363 cfs and averaged 204 cfs over the month. When Ridgway Reservoir is filling out of priority the rate for the Uncompahgre River Exchange is 174 cfs (204 cfs minus 30 cfs).

Additional diversions from Uncompahgre River water users upstream of Ridgway Reservoir is based on the gaged streamflow of the Uncompahgre River upstream of Ridgway Reservoir discussed above and the CWCB ISF located on the Uncompahgre River between Ridgway Reservoir and the Town of Ridgway.

The Colorado Water Conservation Board (CWCB) owns an instream flow (ISF) in the mainstem of the Uncompahgre River located within the proposed Uncompahgre River Exchange reach extents. The CWCB's water right, decreed in Case No. 98CW222, is 65 cfs between May 1st and October 14th and 20 cfs between October 15th and April 30th.

As discussed above, the Uncompahgre River Gage upstream of Ridgway Reservoir streamflow in June of 2012 ranged between 118 cfs and 363 cfs and averaged 204 cfs over the month. Thus, for June 2012, an average 139 cfs (204 cfs minus 65 cfs) during the month and up to 298 cfs (363 cfs minus 65 cfs) of exchange potential is available for exchange without impacting the intervening CWCB ISF (Case No. 98CW222). Thus, there is exchange potential for the 174 cfs exchange claim between Ridgway Reservoir and the confluence of Canyon Creek and the Uncompahgre River. However, when the streamflow drops below 239 cfs, the entire exchange amount cannot be exercised, and the amount of the exchange can be reduced to avoid injury the Uncompahgre River ISF unless an injury with mitigation proposal is approved by the CWCB or water is brought over from Cow Creek and delivered upstream on the ISF reach.

WWE also evaluated exchange demand from model runs using the Colorado Decision Support System (CDSS) Gunnison Model (CDSS, 2015). Additional diversions by water users in the Uncompahgre River upstream of Ridgway Reservoir are calculated using the Gunnison Model by simulating removal of senior water right calls on the Uncompahgre River via releases of water from Ridgway Reservoir or Ram's Horn Reservoir to meet the needs of senior downstream water rights (i.e., M&D Canal). In 2012, the M&D Canal call started on May 2, 2012 and ended on September 26, 2012. For this additional diversions analysis, WWE ran Gunnison Model simulations for 2012 and calculated the difference in model reported Uncompahgre River diversions above Ridgway Reservoir under the following scenarios:

1. Releases from Ridgway Reservoir and or Ram's Horn Reservoir are meeting the needs of senior downstream water rights.
2. Historical conditions reported by Gunnison Model (i.e., no additional releases from Ridgway Reservoir and or Ram's Horn Reservoir to meet the needs of senior downstream water rights).

According to the Gunnison Model simulations the maximum additional monthly diversions from water users upstream of Ridgway Reservoir totaled 1,703 AF or an average daily additional diversion of 28.7 cfs in June 2012. This calculated average daily exchange demand of 28.7 cfs currently exists on the Uncompahgre River upstream of the reservoir.

5.3 Dallas Creek Exchange

The Dallas Creek Exchange is located on Dallas Creek from the upstream terminus at the confluence of the East and West Forks of Dallas Creek, and the downstream terminus at the confluence of Dallas Creek and the Uncompahgre River (see Figure 3). The Dallas Creek Exchange has two components:

1. Releases from Ridgway Reservoir allow Dallas Creek water users to continue to divert water out of priority from Dallas Creek during time periods when senior water rights (i.e.

M&D Canal) are placing a call in the Uncompahgre River Basin and exchange potential exists.
2. Releases from Ram's Horn Reservoir allow Dallas Creek water users to continue to divert water out of priority from Dallas Creek during time periods when senior water rights (i.e. M&D Canal) are placing a call in the Uncompahgre River Basin and exchange potential exists.

The conditional Dallas Creek Exchange of 35 cfs is based on the amount of available Dallas Creek streamflow above the existing CWCB ISF during the 2012 call period. The CWCB owns an ISF water right in Dallas Creek decreed in Case No 98CW234 located within the Dallas Creek Exchange reach extents. The CWCB's ISF water right, decreed in Case No. 98CW234, is 20 cfs between May 1st and October 14th and 9 cfs between October 15th and April 30th. The exchange on Dallas Creek can only operate when there is more than 20 cfs in the Dallas Creek ISF reach unless an injury with mitigation proposal is approved by the CWCB. For use of the entire 35 cfs exchange, 55 cfs of streamflow is required in Dallas Creek to avoid injury to the Dallas Creek ISF.

Based on Dallas Creek Gage data, average daily streamflow in July of 2012 ranged between 14.5 cfs and 56 cfs. Therefore, a 35 cfs exchange rate is available during July of 2012.

WWE also evaluated exchange demand from model runs using the Colorado Decision Support System (CDSS) Gunnison Model (CDSS, 2015). Additional diversions by Dallas Creek water users are calculated using the Gunnison Model by simulating removal of senior water right calls on the Uncompahgre River via releases of water from Ridgway Reservoir or Ram's Horn Reservoir to meet the needs of senior downstream water rights (i.e., M&D Canal). In 2012, the M&D Canal call started on May 2, 2012 and ended on September 26, 2012. For this additional diversions analysis, WWE ran a Gunnison Model simulation for 2012 and calculated the difference in model reported Dallas Creek diversions under the following scenarios:

1. Releases from Ridgway Reservoir or Ram's Horn Reservoir are meeting the needs of senior downstream water rights.
2. Historical conditions reported by Gunnison Model (i.e., no additional releases from Ridgway Reservoir and or Ram's Horn Reservoir to meet the needs of senior downstream water rights).

According to the Gunnison Model simulations the maximum additional monthly diversions from Dallas Creek water users totaled 3,011 AF or an average daily additional diversion of 49.1 cfs in June 2012. Thus, under current modelled conditions the exchange demand of 49.1 cfs exceeds the amount of 35 cfs claimed for the conditional exchange.

6.0 Suggested Protective Terms and Conditions

Before operating the exchanges, the applicant shall give notice to the Division Engineer with accounting and documentation that exchange potential exists and a list and location of water users that will be the recipient of the exchange.

Exchanges should be operated in priority and adjusted to avoid injury to vested senior water rights during periods of stream administration.

If the Cow Creek – Ridgway Reservoir Pipeline is operated out of priority under the Cow Creek Exchange, up to 8.601 cfs, or the amount of water that can be applied to the decreed beneficial use, whichever is less, should remain available at the Chaffee and Hayes-Teague Ditch to satisfy their senior Water Rights.

Water Stored in Ram's Horn Reservoir under this decree shall be accounted for and operated in general conformance to Colorado Division of Water Resources General Administration Guidelines for Reservoirs October 2011 Amended February 2016 including book over accounting against the senior storage water right decreed in CA2440 in Ram's Horn Reservoir.

Before exercising the Alternate Points of Diversion the applicant shall obtain authorizations from the owners of the alternate points of diversion and install necessary measuring devices and provide accounting measuring and documenting the location and deliveries of water to the Uncompahgre River at and upstream of Ridgway Reservoir.

7.0 References

CDSS, 2015. Colorado Decision Support Systems Gunnison River Basin Water Resources Planning Model (Gunnison StateMod Model). Available at: https://www.colorado.gov/pacific/cdss/surface-water-statemod

CDM, 2011. Statewide Water Supply Initiative 2010. Prepared for Colorado Department of Natural Resources, and Colorado Water Conservation Board. CDM, Denver Colorado.

CDWR, 2020. Cow Creek Near Ridgway Reservoir (COWCRKCO) Streamflow Gage Data. Colorado Division of Water Resources. Available at: https://dwr.state.co.us/tools/stations

CPW, 2020. Cow Creek and Uncompahgre River Environmental Flow Needs. Colorado Parks and Wildlife Instream Flow Program. Authored by Katie Birch.

QSI, 2018. CWCB NASA Re-Process Colorado Priority Sites LiDAR – Technical Data Report. Prepared for Colorado Water Conservation Board, Denver, CO 80222. Prepared by Quantum Spatial (QSI) Corvallis. 517 SW 2nd St., Suite 400 Corvallis, OR 97333.

USBR, 2011. Final Environmental Assessment – Tri-County Water Hydropower Project. United State Department of the Interior Bureau of Reclamation. Western Colorado Area Office, Upper Colorado Region.

USGS, 2020. USGS Gage #09146200 Uncompahgre River Near Ridgway, CO gage data. United States Geological Survey. Available at: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=09146200

USGS, 2020A. USGS Gage #09147000 Dallas Creek Near Ridgway, CO gage data. United States Geological Survey. Available at: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=09147000

WWE, 2016. Upper Uncompahgre Basin Water Supply Protection and Enhancement Project. Wright Water Engineers, Inc. 1666 N. Main Ave., STE C. Durango, CO.

WWE, 2020. Upper Uncompahgre Basin Water Supply Protection and Enhancement Plan Phase II. Wright Water Engineers, Inc. 1666 N. Main Ave., STE C. Durango, CO.

P:\151-032 Ouray County - UUB\022 Water Rights Application\Engineering Report\2020 8 31 Engineering Report - 2019CW003098.docx

TABLES

Table 1
Summary of Potential Ram's Horn Reservoir Allocation Amounts
Engineering Report for Case No. 2019CW3098

Reservoir Allocation Description	Storage Volume (AF)		Notes and Comments
	Average (2002 to 2012)	Dry Year (2002)	
1) All Dallas Creek and Upper Uncompahgre River Water Users 2) All Non-Mainstem Cow Creek and Lower Uncompahgre Water Users (in Ouray County)	1,500	4,000	Use Enlargement: estimated storage for 1 years worth of average year or dry year exchange water supply for non-mainstem Region 1 water users, all Region 2 and Region 3 water users, and non-mainstem Region 4 water users. Note, Region 1 and Region 4 mainstem users can be provided with additional physical water supply from the water supply allocation for those Regions.
Water Supply Storage For Lower Uncompahgre River Water Users (in Ouray County)	200	900	Confirming: direct supplemental irrigation water to meet Irrigation Water Requirement for mainstem Region 1 water users.
Water Supply Storage for Mainstem Cow Creek Water Users	1,600	6,100	Confirming: direct supplemental irrigation water to meet Irrigation Water Requirement for mainstem Region 4 water users.
Augmentation Water for Unincorporated Ouray County Domestic and Industrial Depletions	500	500	Based on unincorporated projected water use developed in the 2016 Upper Uncompahgre Basin Water Supply and Enhancement Project (WWE, 2016)
Cow Creek Biological Flow Augmentation	2,700	6,000	According to Colorado Parks and Wildlife (CPW, 2020) initial recommended biological flow for Cow Creek is: 53 cfs - April 1st to July 15th. 15 cfs - July 16th to March 31st.
1) Carry over storage for dry year firming 2) Supplemental irrigation water for lower Uncompahgre River (Delta and Montrose Counties) 3) Compact Water 4) Dead storage / sediment	18,849	7,849	Amount available for original supplemental irrigation purposes, and reservoir firming. Recommend performing a study on Cow Creek and Uncompahgre River below Ridgway Reservoir to determine pool volume needed for Aquatic Habitat.
Total Volume (AF)	**25,349.15**	**25,349.15**	Ramshorn Reservoir was conditionally decreed for 25,349.15 AF of storage in Decree of April 14, 1961, Civil Action No. 2440.

Notes:

Region Descriptions:
Region 1: Uncompahgre River Below Ridgway Reservoir (in Ouray County)
Region 2: Dallas Creek
Region 3: Uncompahgre River Above Ridgway Reservoir
Region 4: Cow Creek
Use Enlargement Storage Volume, Water Supply Storage for Region 1 and Region 4, and Augmentation Water for Unincorporated Ouray County based on information presented in Upper Uncompahgre Basin Water Supply Protection and Enhancement Project Report (WWE, 2016).

Table 2

Cow Creek Exchange Demand Analysis Summary
Engineering Report for Case No. 2019CW3098

Year	Month	Days In Month	Total Diversions By Structures With Calling Senior Water Rights		Total Diversions By Structures Without Calling Senior Water Rights		Exchange Demand		Gaged Cow Creek Streamflow		
			AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	Average Daily (cfs)	Maximum Average Daily (cfs)	Minimum Average Daily (cfs)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	January	31	0	0.0	0	0.0	0	0.0	14	26	10
	February	28	0	0.0	0	0.0	0	0.0	11	12	10
	March	31	0	0.0	0	0.0	0	0.0	32	72	10
	April	30	702	11.8	702	11.8	0	0.0	48	89	7
	May	31	3,168	51.6	3,168	51.6	0	0.0	73	137	4
	June	30	3,036	51.1	5,536	93.2	2,500	42.1	16	66	5
	July	31	1,759	28.7	3,462	56.4	1,703	27.7	19	40	7
	August	31	2,079	33.9	2,079	33.9	0	0.0	11	19	4
	September	30	1,247	21.0	1,879	31.6	632	10.6	12	38	5
	October	31	0	0.0	0	0.0	0	0.0	13	15	11
	November	30	171	2.9	171	2.9	0	0.0	12	14	9
	December	31	71	1.2	71	1.2	0	0.0	17	72	7

General Notes:

1 Only diversion structures included in the Gunnison Model for Cow Creek were used in the exchange analysis. See CDWR Gunnison Model Documentation for why certain diversion structures are explicitly modeled, aggregated or excluded from the State's model.

2 Gaged Cow Creek streamflow data from CDWR Cow Creek Near Ridgway Reservoir (COWCRKCO) gage.

Column Notes:

(1) Total Gunnison Model reported diversions by Cow Creek Diversion Structures by Month with active M&D canal call.
(2) Column (1) divided by days in month divided by 1.98
(3) Total Gunnison Model reported diversions by Cow Creek Diversion Structures by Month with no active M&D canal Call.
(4) Column (3) divided by days in month divided by 1.98
(5) Column (3) minus Column (1)
(6) Column (5) divided by days in month divided by 1.98
(7) Average daily gaged streamflow in Cow Creek for the month and year based on data from CDWR Cow Creek Near Ridgway Reservoir (COWCRKCO) gage
(8) Maximum average daily gaged streamflow in Cow Creek for the month and year based on data from CDWR Cow Creek Near Ridgway Reservoir (COWCRKCO) gage
(9) Minimum average daily gaged streamflow in Cow Creek for the month and year based on data from CDWR Cow Creek Near Ridgway Reservoir (COWCRKCO) gage

Table 3

Uncompahgre River Exchange Demand Analysis Summary
Engineering Report for Case No. 2019CW3098

Year	Month	Days In Month	Total Diversions By Structures With Calling Senior Water Rights		Total Diversions By Structures Without Calling Senior Water Rights		Exchange Demand		Gaged Uncompahgre River Streamflow		
			AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	Average Daily (cfs)	Maximum Average Daily (cfs)	Minimum Average Daily (cfs)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	January	31	284	4.6	284	4.6	0	0.0	47	51	42
	February	28	254	4.6	254	4.6	0	0.0	43	48	39
	March	31	228	3.7	228	3.7	0	0.0	72	139	39
	April	30	230	3.9	230	3.9	0	0.0	131	235	87
	May	31	1,977	32.2	1,977	32.2	0	0.0	266	388	142
	June	30	2,389	40.2	4,091	68.9	1,703	28.7	204	363	118
	July	31	2,345	38.2	3,698	60.2	1,352	22.0	114	139	99
	August	31	2,076	33.8	2,104	34.3	28	0.5	80	105	61
	September	30	1,532	25.8	1,576	26.5	44	0.7	74	100	57
	October	31	955	15.6	955	15.6	0	0.0	57	67	50
	November	30	506	8.5	506	8.5	0	0.0	47	53	41
	December	31	360	5.9	360	5.9	0	0.0	40	42	35

General Notes:

1 Only diversion structures included in the Gunnison Model for Uncompahgre River above Ridgway Reservoir were used in the exchange analysis. See CDWR Gunnison Model Documentation for why certain diversion structures are explicitly modeled, aggregated or excluded from the State's model.

2 Gaged Uncompahgre River streamflow data from USGS Gage #09146200 Uncompahgre River Near Ridgway, CO gage data.

Column Notes:

(1) Total Gunnison Model reported diversions by Uncompahgre River Diversion Structures upstream of Ridgway Reservoir by Month with active M&D canal call.

(2) Column (1) divided by days in month divided by 1.98

(3) Total Gunnison Model reported diversions by Uncompahgre River Diversion Structures upstream of Ridgway Reservoir by Month with no active M&D canal Call.

(4) Column (3) divided by days in month divided by 1.98

(5) Column (3) minus Column (1)

(6) Column (5) divided by days in month divided by 1.98

(7) Average daily gaged streamflow in Uncompahgre River for the month and year based on streamflow data from USGS Gage #09146200 Uncompahgre River Near Ridgway, CO gage

(8) Maximum average daily gaged streamflow in Uncompahgre River for the month and year based on streamflow data from USGS Gage #09146200 Uncompahgre River Near Ridgway, CO gage

(9) Minimum average daily gaged streamflow in Uncompahgre River for the month and year based on streamflow data from USGS Gage #09146200 Uncompahgre River Near Ridgway, CO gage

Table 4

Dallas Creek Exchange Demand Analysis Summary
Engineering Report for Case No. 2019CW3098

Year	Month	Days In Month	Total Diversions By Structures With Calling Senior Water Rights		Total Diversions By Structures Without Calling Senior Water Rights		Exchange Demand		Gaged Dallas Creek Streamflow		
			AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	AF	Equivalent Average Daily Flow (cfs)	Average Daily (cfs)	Maximum Average Daily (cfs)	Minimum Average Daily (cfs)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	January	31	623	10.1	623	10.1	0	0.0	18.4	19.0	17.4
	February	28	541	9.8	541	9.8	0	0.0	19.1	21.7	16.9
	March	31	449	7.3	449	7.3	0	0.0	34.8	62.8	19.5
	April	30	1,728	29.1	1,728	29.1	0	0.0	23.6	47.2	2.4
	May	31	5,794	94.4	5,794	94.4	0	0.0	4.5	20.5	0.8
	June	30	12,691	213.7	12,691	213.7	0	0.0	8.0	28.2	2.4
	July	31	8,662	141.1	11,672	190.2	3,011	49.1	25.8	55.7	14.5
	August	31	7,109	115.8	7,109	115.8	0	0.0	18.3	29.9	11.4
	September	30	4,676	78.7	5,185	87.3	509	8.6	14.5	21.5	8.4
	October	31	1,523	24.8	1,709	27.8	187	3.0	21.0	27.3	16.0
	November	30	1,354	22.8	1,354	22.8	0	0.0	20.0	22.3	15.7
	December	31	852	13.9	852	13.9	0	0.0	17.7	19.0	15.9

General Notes:

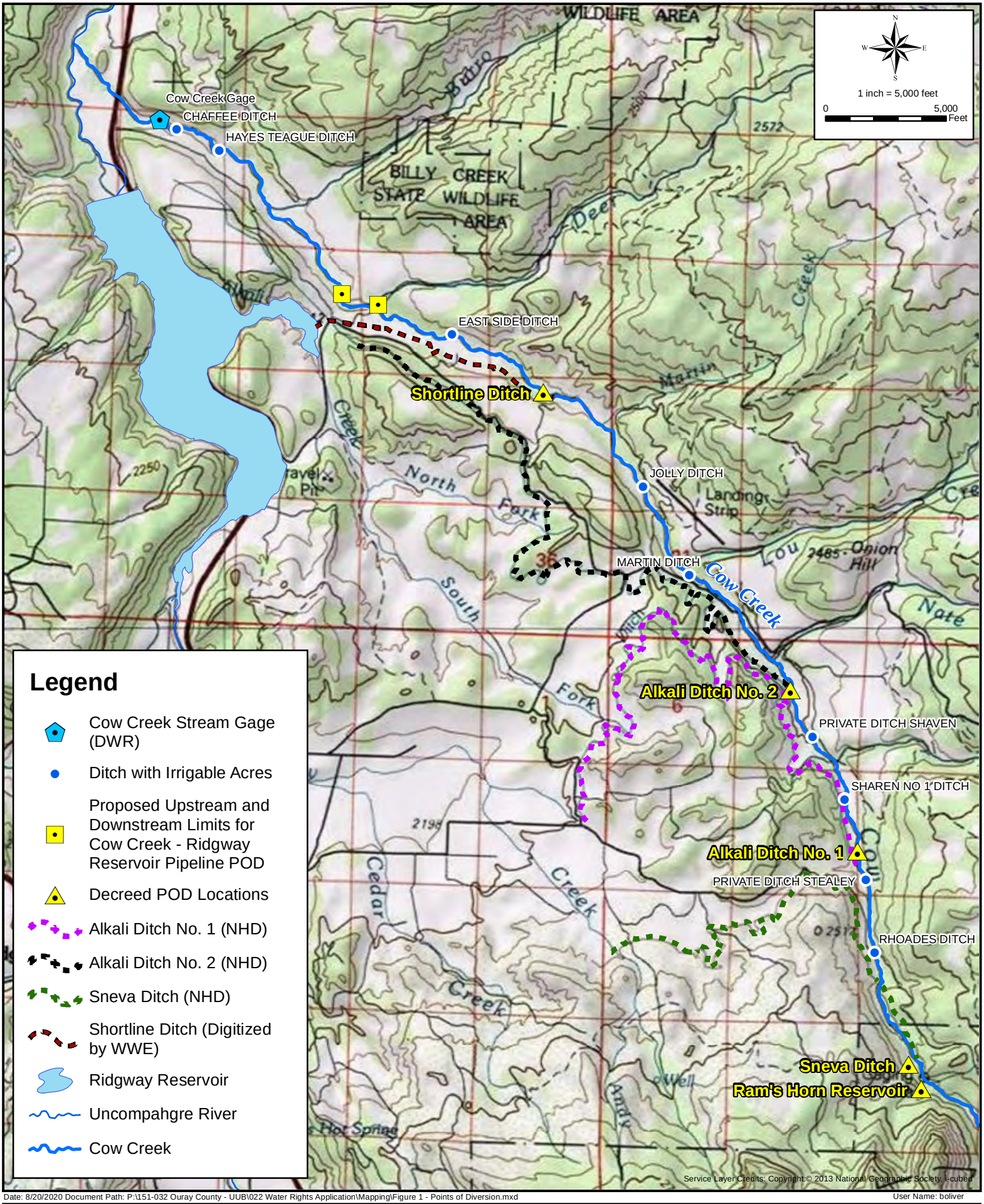
1 Only diversion structures included in the Gunnison Model for Dallas Creek were used in the exchange analysis. See CDWR Gunnison Model Documentation for why certain diversion structures are explicitly modeled, aggregated or excluded from the State's model.

2 Gaged Dallas Creek streamflow data from USGS Gage #09147000 Dallas Creek Near Ridgway, CO gage data.

Column Notes:

(1) Total Gunnison Model reported diversions by Dallas Creek Diversion Structures by Month with active M&D canal call.
(2) Column (1) divided by days in month divided by 1.98
(3) Total Gunnison Model reported diversions by Dallas Creek Diversion Structures by Month with no active M&D canal Call.
(4) Column (3) divided by days in month divided by 1.98
(5) Column (3) minus Column (1)
(6) Column (5) divided by days in month divided by 1.98
(7) Average daily gaged streamflow in Dallas Creek for the month and year based on average daily streamflow data from USGS Gage #09147000 Dallas Creek Near Ridgway, CO gage
(8) Maximum average daily gaged streamflow in Uncompahgre River for the month and year based on streamflow data from USGS Gage #09147000 Dallas Creek Near Ridgway, CO gage
(9) Minimum average daily gaged streamflow in Uncompahgre River for the month and year based on streamflow data from USGS Gage #09147000 Dallas Creek Near Ridgway, CO gage

FIGURES



Legend

- Cow Creek Stream Gage (DWR)
- Ditch with Irrigable Acres
- Proposed Upstream and Downstream Limits for Cow Creek - Ridgway Reservoir Pipeline POD
- Decreed POD Locations
- Alkali Ditch No. 1 (NHD)
- Alkali Ditch No. 2 (NHD)
- Sneva Ditch (NHD)
- Shortline Ditch (Digitized by WWE)
- Ridgway Reservoir
- Uncompahgre River
- Cow Creek

Date: 8/20/2020 Document Path: P:\151-032 Ouray County - UUB\022 Water Rights Application\Mapping\Figure 1 - Points of Diversion.mxd

User Name: boliver

WWE
Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

OURAY COUNTY, CO

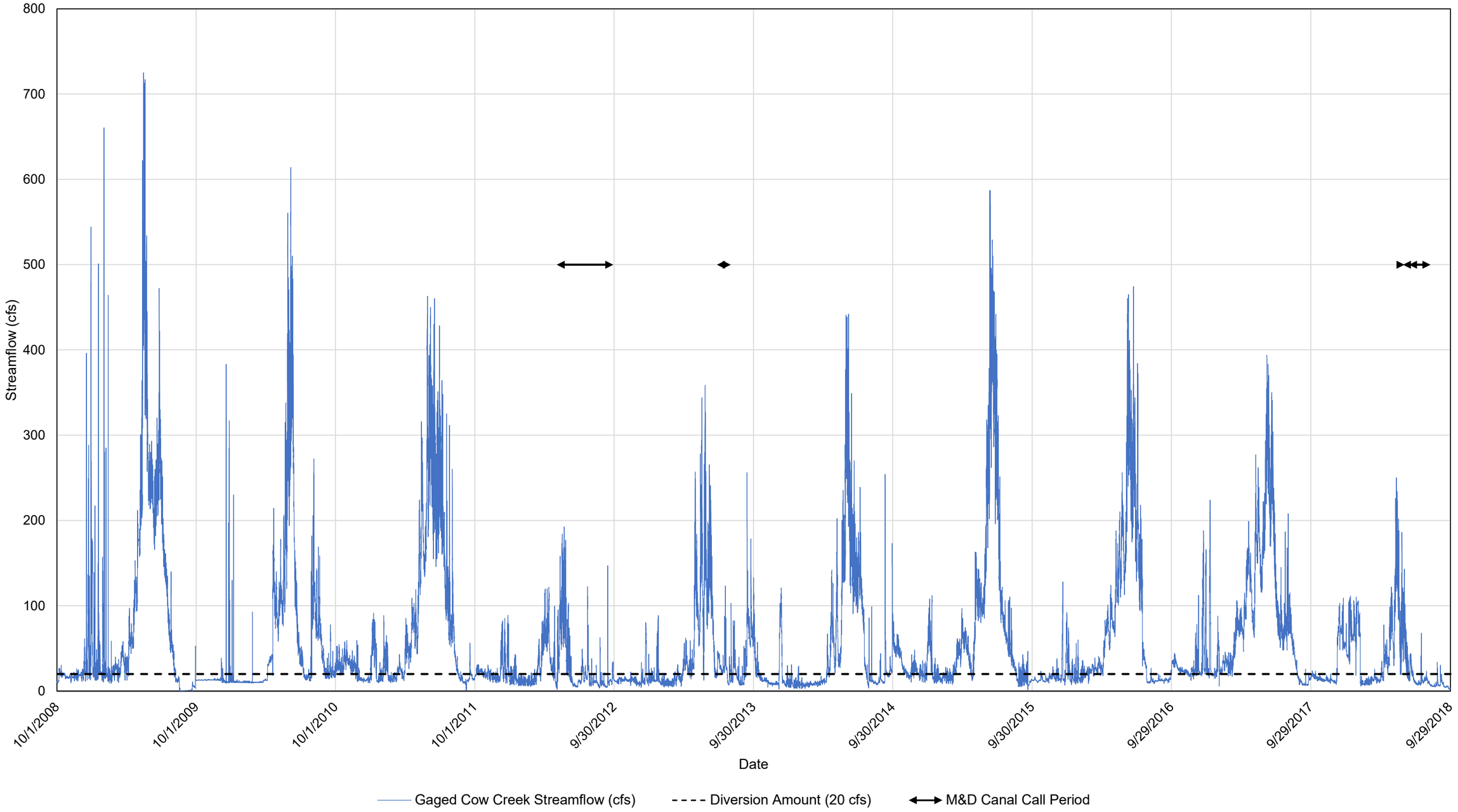
POINTS OF DIVERSION

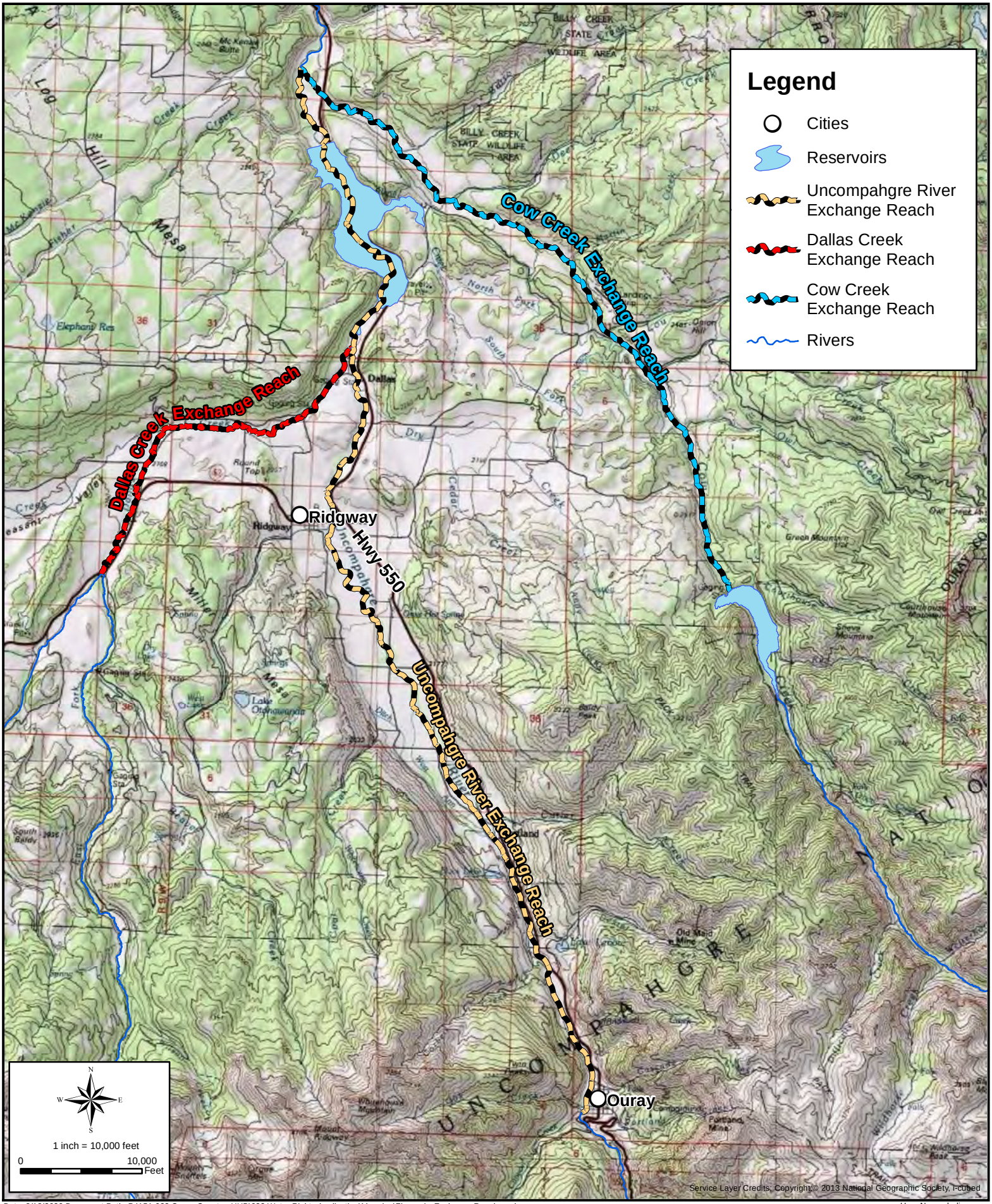
OURAY COUNTY

PROJECT NO. 151-032.022

FIGURE 1

Figure 2.
Gaged Cow Creek Streamflow
CDWR Cow Creek Near Ridgway Reservoir (COWCRKCO) Gage





Date: 8/18/2020 Document Path: P:\151-032 Ouray County - UUB\022 Water Rights Application\Mapping\Figure 4 - Exchange Reach.mxd

User Name: boliver

Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

OURAY COUNTY, CO

EXCHANGE REACHES

OURAY COUNTY

PROJECT NO. 151-032.022

FIGURE 3

APPENDICES

Recve

THE RAM'S HORN RESERVOIR

RESERVOIR NO. 16 Priority No. 48-5th.Ad. CONDITIONAL.

THE COURT FINDS:

That said Reservoir is Numbered 16, and it is entitled to Conditional Priority No. 48-5th.Ad.

That the claimant thereof is The Tri-County Water Conservancy District, the post office address of which is Montrose, Colorado.

That this claim was originally filed by the Uncompahgre Valley Water Users Association as claimant, and thereafter an assignment was executed by said Association assigning all of its rights thereunder to said Conservancy District. Said assignment being filed herein as an exhibit.

That said reservoir is one of the separate units of a system of 4 storage reservoirs proposed to be constructed at or near the headwaters of the Uncompahgre River and its principal tributaries in Water District No. 60.

That the other three units of said storage system are The Willow Swamp Reservoir, The Ridgway Reservoir and the Dallas Divide Reservoir.

That the source of supply for said Ram's Horn Reservoir is Cow Creek and Red Creek, a tributary thereof, bothtributary to The Uncompahgre River. That said reservoir will be located at the confluence of said creeks in Sections 21, 22, and 27, Twp. 45 N., R. 7 W., N.M.P.M.

That the initial point of survey of the high water line of said reservoir is located at a point whence the NW corner of Sec. 9, Twp. 45 N., R. 7 W., N.M.P.M. bears N. 10° 03' W. 13438 feet.

That the maximum height of the dam to be 260 feet; surface area of said reservoir at high water line of 250 feet to be 10,247,500 square feet, and storage capacity 25,349.15 acre feet of water.

126

And the Court Further Finds from the Findings and Report of the Referee herein in relation to said reservoir,-which are hereby approved and confirmed,-that the general findings as to the use of, and requirements for, the water proposed to be stored in the 4 separate units of said storage project, as well as the date of appropriation and exchange provisions, as detailed heretofore in the decree to the Willow Swamp Reservoir, one of said separate units, are applicable to each of said units, and by reference are made a part hereof without re-copying same herein.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED that, subject to the several limitations and provisions in the preamble to this decree expressed, there be allowed to flow into said Ram's Horn Reservoir from said Cow Creek and Red Creek, for storage for irrigation, domestic, municipal, industrial and flood control purposes, for the benefit of the parties lawfully entitled thereto, under and by virtue of appropriation by survey and proposed construction, storage and beneficial use as aforesaid, and as Conditional Priority No. 46-5th.Ad., so much water as can be stored therein as proposed to be constructed, not to exceed 25,349.15 acre feet of water, as of appropriation date November 16, 1956. CONDITIONED, However, upon the completion of said proposed construction, the diversion and storage of said water, and its beneficial use in the manner and within the time provided by law. AND CONDITIONED FURTHER upon proof of compliance with the provisions of the exchange statute at the time said conditional priority is sought to be rendered absolute, if the showing of such exchange use is necessary to justify the amount of the award.

AND IT IS FURTHER ORDERED that this priority, together with Priorities Numbers 46, 47 and 49 awarded herein to the other units of said system of storage reservoirs, are of equal date, right and authority.

652

Appendix B Definite Plan Report Dallas Creek Project

Water Rights

The following water rights are owned by the Tri-County Water Conservancy District.

A. Decree of April 14, 1961, Civil Action No. 2440, conditional water right with appropriation date of November 16, 1956, for irrigation, domestic, municipal and industrial, and flood control uses.

		Storage (acre-feet)
Willow Swamp Reservoir	East Dallas Creek	12,736.60
Ridgway Reservoir	Dallas Creek and Uncompahgre River	223,046.14
Ramshorn Reservoir	Red Creek and Cow Creek	25,349.15
Dallas Divide Reservoir	Pleasant Valley Creek	14,089.16

B. Decree of September 13, 1971, Civil Action No. C-2710, the following conditional water rights were awarded for irrigation, domestic, municipal, industrial, and flood control uses, all with an appropriation date of November 16, 1965.

		C.f.s.
Dallas Feeder Canal	Branches of East and West Dallas Creeks	150
Log Hill Mesa Canal	Dallas Divide Reservoir	110
Pleasant Valley Canal	Pleasant Valley Creek	25
Sneva Outlet Canal	Sneva Reservoir outlet	25
Cow Creek Feeder Canal	Cow Creek	325
Ridgway Penstock[1/]	Ridgway Reservoir outlet	900
Ridgway Pumpstock[1/]	Ridgway Penstock	205
McKenzie Canal[1/]	Outlet of pumpstock	205
Laterals A-L	Various drainages	
A1-M1		range 5-30

		Acre-feet
Sneva Reservoir	Cow Creek by Sneva Ditch	823.02
Dallas Divide Reservoir enlargement	Pleasant Valley Creek and Dallas Feeder Canal	3,489.69

1/ Included as expanded uses of the Ridgway Reservoir decree.

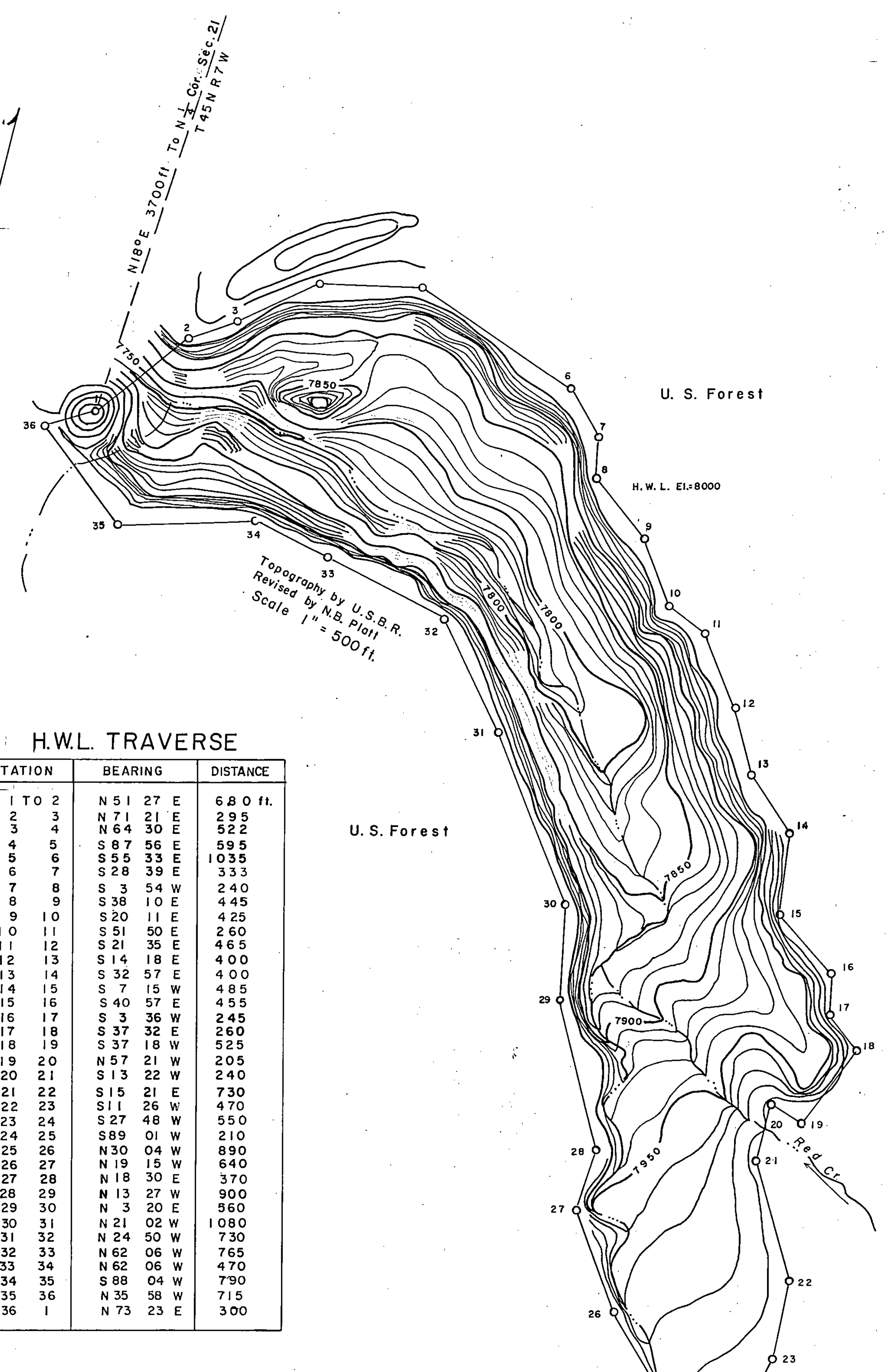
The United States of America, in December 1971, filed applications for water rights for irrigation, municipal, domestic, stock watering, industrial, piscatorial, and wildlife protection and propagation purposes. The applications encompassed the features of the present project plan. No filing was made, however, for the municipal and industrial use of surplus direct flows in the Uncompahgre River during the periods of spill from Ridgway Reservoir. All water shown as divertible in the operation studies, above and below the reservoir, would be surplus to storage and appropriatable.

The exact location of the diversion for municipal and industrial use is not known, so an application for the surplus direct flows could be made at any point along the river between Ridgway and the Montrose and Delta Canal diversion. The filing should be for 95 c.f.s. to allow for a peak month supply with a peak daily use factor of 120 percent.

The Uncompahgre Project water rights are in the name of the United States and consist of 111,260 acre-feet of storage in Taylor Park Reservoir, a 1,300 c.f.s. direct flow right in the Gunnison River and 1,182 c.f.s. direct flow right in the Uncompahgre River. Other direct flow rights include 172.7 c.f.s. in Dry Creek, 44.1 c.f.s. in Cedar Creek, and 65.1 c.f.s. in Spring Creek.

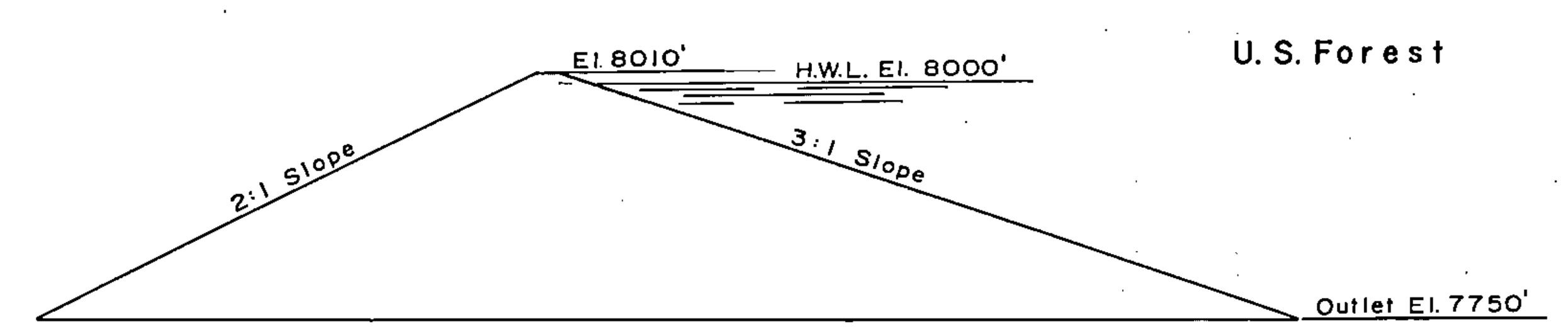
Preproject water rights

All existing water rights have been taken into consideration to determine the project plan. The water operation studies are based on full recognition of existing water rights with strict administration in accordance with the established priority system. Water supply available for project development was determined as historical flows less existing rights on nonproject lands and existing rights on project lands limited to ideal diversion requirements.

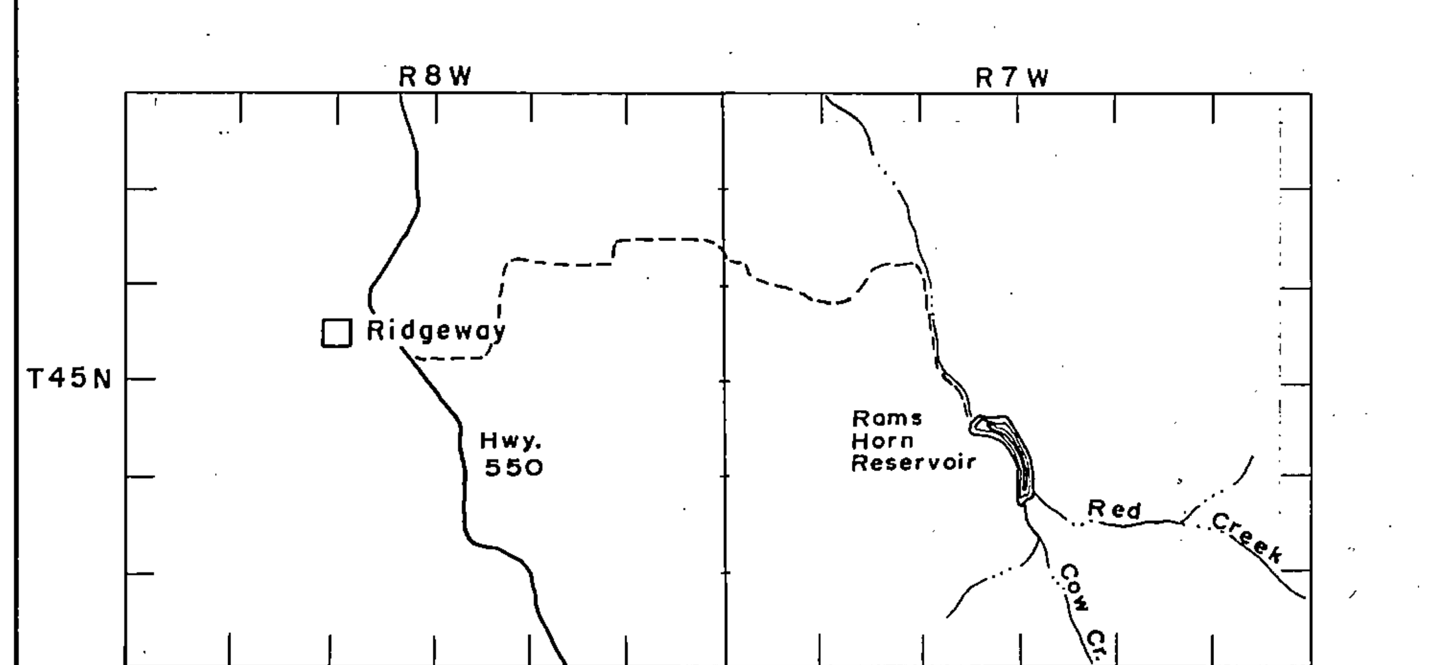


H.W.L. TRAVERSE

STATION		BEARING	DISTANCE
1 TO	2	N 51 27 E	680 ft.
2	3	N 71 21 E	295
3	4	N 64 30 E	522
4	5	S 87 56 E	595
5	6	S 55 33 E	1035
6	7	S 28 39 E	333
7	8	S 3 54 W	240
8	9	S 38 10 E	445
9	10	S 20 11 E	425
10	11	S 51 50 E	260
11	12	S 21 35 E	465
12	13	S 14 18 E	400
13	14	S 32 57 E	400
14	15	S 7 15 W	485
15	16	S 40 57 E	455
16	17	S 3 36 W	245
17	18	S 37 32 E	260
18	19	S 37 18 W	525
19	20	N 57 21 W	205
20	21	S 13 22 W	240
21	22	S 15 21 E	730
22	23	S 11 26 W	470
23	24	S 27 48 W	550
24	25	S 89 01 W	210
25	26	N 30 04 W	890
26	27	N 19 15 W	640
27	28	N 18 30 E	370
28	29	N 13 27 W	900
29	30	N 3 20 E	560
30	31	N 21 02 W	1080
31	32	N 24 50 W	730
32	33	N 62 06 W	765
33	34	N 62 06 W	470
34	35	S 88 04 W	790
35	36	N 35 58 W	715
36	1	N 73 23 E	300



MAXIMUM SECTION OF DAM
SCALE 1"= 200'



LOCATION MAP Scale 1"= 2 miles

EXISTING DITCHES

DITCH NAME	PRIORITY NO.	Cu.Ft/Sec.	ACRES
Sneva	129,54	21.5	840
Rhoads	111A,287	4.0	80
Alkali 1	91,104,125	32.0	1318
Alkali 2	73,118,149 160,159,135,233	34.96	1000
Martin	101,247	10.0	200
Jolly-Martin Priv.	107A,144	5.0	200
Shortline	121,261	9.0	200
Eastside	88,239	6.0	120
Westside	77,235	4.0	85
Hayes Teague	277	3.0	35
Duckett	269	2.0	80
Homestretch	52,114,252	19.25	760
Old Agency	1,124,260	12.75	480
Upper Uncompahgre	49,243	13.0	520
Hieland	18,84,244	16.0	640
Pinion	55,113,250	22.0	1000
Roswell Hotchkiss	50,85,237	11.85	400
Mc Donald	149,251	30.0	1200

AREA AND CAPACITY TABLES

DEPTH IN FT. FROM BOTTOM OF OUTLET TUBE	AREA IN SQ. FEET	CAPACITY IN CUBIC FEET	CAPACITY IN ACRE FEET
0	56,250	0	0.0
1	70,125	63,188	1.5
2	84,000	140,251	3.2
3	97,875	231,188	5.3
4	111,750	336,000	7.7
5	125,625	454,687	10.4
6	139,500	587,250	13.5
7	153,375	733,687	16.8
8	167,250	893,999	20.5
9	181,125	1,068,186	24.5
10	195,000	1,256,248	28.8
11	210,875	1,459,185	33.5
12	226,750	1,677,997	38.5
13	242,625	1,912,684	43.9
14	258,500	2,413,809	55.4
15	274,375	2,680,247	61.5
16	290,250	2,962,560	67.9
17	306,125	3,260,250	74.8
18	322,000	3,574,810	82.0
19	337,875	3,904,750	89.6
20	353,750	4,250,560	97.5
21	379,500	4,617,185	105.9
22	405,250	5,009,560	116.9
23	431,000	5,427,685	124.5
24	456,750	5,871,560	134.7
25	482,500	6,346,185	145.6
26	508,250	6,841,560	156.9
27	534,000	7,362,685	168.9
28	559,750	7,409,560	181.5
29	585,500	8,482,185	194.6
30	611,250	9,080,560	208.3
31	633,750	9,703,060	222.6
32	656,250	10,348,060	237.5
33	678,750	11,015,560	252.8
34	701,250	11,705,560	268.6
35	723,750	12,418,060	284.9
36	746,250	13,153,060	301.8
37	768,750	13,910,560	319.2
38	791,250	14,690,560	337.1
39	813,750	15,493,060	355.5
40	836,250	16,318,060	374.4
41	854,200	17,163,285	393.8
42	872,150	18,027,060	413.6
43	890,100	18,908,185	433.8
44	908,050	19,807,260	454.5
45	926,000	20,725,285	475.6
46	943,950	21,659,260	497.0
47	961,900	22,612,185	518.9
48	979,850	23,583,060	541.1
49	997,800	24,571,885	563.9
50	1,015,750	25,578,660	586.9
51	1,071,675	26,622,370	610.9
52	1,127,600	27,722,010	636.1
53	1,183,525	28,877,570	662.6
54	1,239,450	30,089,060	690.5
55	1,295,375	31,356,470	719.5
56	1,351,300	32,679,810	749.9
57	1,407,225	34,059,070	781.5
58	1,463,150	35,494,260	814.5
59	1,519,075	36,985,370	848.7
60	1,575,000	38,532,410	884.2
61	1,610,625	40,125,220	920.8
62	1,646,250	41,753,660	958.1
63	1,681,875	43,417,720	996.3
64	1,717,500	45,117,410	1,035.3
65	1,753,125	46,852,720	1,075.1
66	1,788,750	48,623,660	1,116.2
67	1,825,375	50,430,720	1,157.2
68	1,860,000	52,273,410	1,199.5
69	1,895,625	54,151,220	1,242.6
70	1,931,250	56,064,660	1,286.5
71	1,966,500	58,013,535	1,331.2
72	2,001,750	59,997,660	1,376.7
73	2,037,000	62,017,035	1,423.1
74	2,075,250	64,071,710	1,470.2
75	2,107,500	66,161,585	1,518.2
76	2,142,750	68,186,710	1,564.7
77	2,178,000	70,347,085	1,614.9
78	2,213,250	72,542,710	1,665.3
79	2,248,500	74,773,585	1,716.5
80	2,283,750	77,039,710	1,768.5
81	2,338,875	79,351,030	1,820.8
82	2,394,000	81,712,465	1,875.0
83	2,449,125	84,134,030	1,931.4
84	2,504,250	86,610,720	1,988.3
85	2,559,375	89,142,530	2,046.4
86	2,614,500	91,729,470	2,105.8
87	2,669,625	94,371,530	2,166.4
88	2,724,750	97,068,720	2,226.4
89	2,779,875	99,821,030	2,289.6
90	2,835,000	102,628,470	2,356.0
91	2,902,500	105,497,220	2,421.8
92	2,970,000	108,433,970	2,489.3
93	3,037,500	111,437,720	2,558.2
94	3,105,000	114,508,970	2,628.7
95	3,172,500	117,647,720	2,698.6
96	3,240,000	120,853,970	2,774.2
97	3,307,500	124,127,700	2,849.3
98	3,375,000	127,468,970	2,926.0
99	3,442,500	130,877,720	3,004.2
100	3,510,000	134,353,970	3,081.0
101	3,542,250	137,880,095	3,161.9
102	3,574,500	144,996,845	3,321.2
103	3,606,750	148,587,470	3,411.0
104	3,639,000	152,210,345	3,494.1
105	3,671,250	155,845,470	3,577.5
106	3,703,500	159,512,845	3,661.7
107	3,735,750	163,232,470	3,747.2
108	3,768,000	166,984,345	3,833.5
109	3,800,250	170,768,470	3,920.1
110	3,832,500	174,401,220	4,003.4
111	3,861,000	178,247,970	4,091.7
112	3,889,500	182,123,220	4,180.9
113	3,918,000	186,026,970	4,270.4
114	3,946,500	189,959,220	4,360.6
115	3,975,000	193,919,970	4,451.6
116	4,003,500	197,909,220	4,543.3
117	4,032,000	201,926,970	4,635.5
118	4,060,500	205,973,220	4,728.5
119	4,089,000	210,047,970	4,822.0
120	4,117,500	214,151,220	4,916.2
121	4,158,750	218,389,345	5,013.5
122	4,200,000	220,568,720	5,063.6
123	4,241,250	224,789,345	5,160.4
124	4,282,500	229,051,220	5,258.2

DEPTH IN FT.	AREA IN SQ. FEET	CAPACITY IN CUBIC FEET	CAPACITY IN ACRE FEET
125	4,323,750	233,354,345	5,359.4
126	4,365,000	237,698,720	5,456.7
127	4,406,250	242,084,345	5,557.4
128	4,447,500	246,511,220	5,658.9
129	4,488,750	250,979,345	5,761.5
130	4,530,000	255,488,720	5,866.9
131	4,565,250	260,036,345	5,962.5
132	4,600,500	264,619,220	6,074.8
133	4,635,750	269,237,345	6,180.8
134	4,671,000	273,890,720	6,287.8
135	4,706,250	278,579,345	6,395.2
136	4,741,500	283,303,220	6,503.9
137	4,776,750	288,062,345	6,610.1
138	4,812,000	292,856,720	6,723.2
139	4,847,250	297,686,345	6,834.0
140	4,882,500	302,051,220	6,934.1
141	4,923,750	306,954,345	7,047.7
142	4,965,000	311,898,720	7,160.1
143	5,006,250	316,884,345	7,274.5
144	5,047,500	321,911,220	7,389.9
145	5,088,750	326,975,345	7,506.4
146	5,130,000	332,088,720	7,623.7
147	5,171,250	337,239,345	7,741.9
148	5,212,500	342,431,170	7,861.0
149	5,253,750	347,664,295	7,981.2
150	5,295,000	352,938,670	8,100.2
151	5,325,750	358,249,045	8,227.5
152	5,356,500	363,590,170	8,350.2
153	5,387,250	368,962,045	8,470.2
154	5,418,000	374,364,670	8,594.2
155	5,448,750	379,798,045	8,718.9
156	5,479,500	385,262,170	8,844.4
157	5,510,250	390,757,045	8,970.5
158	5,541,000	396,282,670	9,097.4
159	5,571,750	401,839,045	9,224.9
160	5,602,500	407,426,170	9,353.2
161	5,631,750	413,043,295	9,482.1
162	5,661,000	418,689,570	9,611.8
163	5,690,250	424,366,195	9,742.1
164	5,719,500	430,071,070	9,873.1
165	5,748,750	435,805,320	10,004.7
166	5,778,000	441,568,695	10,137.0
167	5,807,250	447,361,320	10,270.0
168	5,836,500	453,183,195	10,403.6
169	5,865,750	459,034,320	10,537.9
170	5,895,000	464,914,695	10,672.9
171	5,931,750	470,828,070	10,808.7
172	5,968,500	476,778,195	10,945.3
173	6,005,250	482,765,070	11,082.7
174	6,042,000	488,788,695	11,221.0
175	6,078,750	494,849,070	11,360.2
176	6,115,500	500,946,195	11,500.1
177	6,152,250	507,080,070	11,640.9
178	6,189,000	513,250,695	11,782.6
179	6,225,750	519,458,070	11,925.1
180	6,262,500	525,702,195	12,068.5
181	6,308,250	531,987,570	12,212.7
182	6,354,000	538,318,695	12,358.0
183	6,399,750	544,695,570	12,504.5
184	6,445,500	551,118,195	12,651.9
185	6,491,250	557,586,570	12,800.4
186	6,537,000	564,100,695	12,949.9
187	6,582,750	570,660,570	13,100.5
188	6,628,500	577,267,195	13,252.2
189	6,674,250	583,918,570	13,404.9
190	6,720,000	590,715,695	13,560.9
191	6,774,375	597,462,880	13,715.8
192	6,828,750	604,264,445	13,872.0
193	6,883,125	611,120,380	14,029.3
194	6,937,500	618,030,695	14,188.0
195	6,991,875	624,995,380	14,347.9
196	7,046,250	632,014,445	14,509.0
197	7,100,625	639,087,880	14,671.4
198	7,155,000	646,215,695	14,837.0
199	7,209,375	653,397,880	14,999.9
200	7,263,750	660,634,445	15,166.0
201	7,313,625	667,923,130	15,333.4
202	7,363,500	675,261,695	15,501.8
203	7,413,375	682,650,130	15,671.4
204	7,463,250	690,088,445	15,842.2
205	7,513,125	697,576,630	16,014.1
206	7,563,000	705,114,695	16,187.2
207	7,612,815	712,702,630	16,361.4
208	7,662,750	720,340,415	16,536.7
209	7,712,625	728,028,100	16,713.2
210	7,762,500	735,765,665	16,890.8
211	7,807,500	743,550,665	17,069 5
212	7,852,500	751,380,665	17,249.3
213	7,897,500	759,255,665	17,430.1
214	7,942,500	767,175,665	17,611.9
215	7,987,500	775,140,665	17,794.8
216	8,032,500	783,150,665	17,978.6
217	8,077,500	791,205,665	18,163.6
218	8,122,500	799,305,665	18,349.5
219	8,167,500	807,450,665	18,536.5
220	8,212,500	815,640,665	18,724.5
221	8,272,875	823,883,350	18,913.7
222	8,333,250	832,186,415	19,104.4
223	8,393,625	840,554,850	19,296.5
224	8,454,000	848,978,665	19,489.9
225	8,514,375	857,462,850	19,684.6
226	8,574,750	866,007,415	19,880.8
227	8,635,125	874,612,350	20,078.3
228	8,695,500	883,277,665	20,277.3
229	8,755,875	892,003,352	20,477.5
230	8,816,250	900,789,415	20,679.3
231	8,882,250	909,638,665	20,882.4
232	8,948,250	918,553,915	21,087.1
233	9,014,250	927,535,165	21,293.3
234	9,080,250	936,582,415	21,500.9
235	9,146,250	945,695,665	21,710.2
236	9,212,250	954,874,915	21,920.9
237	9,278,250	964,120,165	22,133.2
238	9,344,250	973,431,415	22,346.9
239	9,410,250	982,808,665	22,562.2
240	9,476,250	992,251,915	22,778.9
241	9,538,125	1,001,759,100	22,997.2
242	9,600,000	1,011,328,165	23,216.9
243	9,661,875	1,020,959,100	23,437.9
244	9,723,750	1,030,651,915	23,660.5
245	9,785,625	1,040,406,600	23,884.4
246	9,847,500	1,050,223,165	24,109.8
247	9,909,375	1,060,101,600	24,336.6
248	9,971,250	1,070,041,915	24,564.8
249	10,033,125	1,080,044,100	24,803.5
250	10,095,000	1,090,108,165	25,025.4

STATEMENT

KNOW ALL MEN BY THESE PRESENTS: That the undersigned, The Ouray County Water Users Association, Claimant, whose postoffice address is Ridgeway, Colorado, has caused to be located the Rams Horn Reservoir as hereinafter mentioned, has made these statements relative thereto and filed the same in compliance with the laws of the State of Colorado. The accompanying map shows the location of said reservoir, and forms a part of this filing.

First : The heigth of the dam is 260 feet.

Second : The initial point of survey of the high water line of the of the reservoir is located at a point whence the N¼ cor. Sec. 21 T.45 N. R.7 W. of the N.M.P.M. bears N. 18 E. a distance of 3700 feet.

Third : The area capacity table as shown on this map gives the area and total capacity of said reservoir for each foot of depth from the bottom of the outlet tube up to and including the high water line.

Fourth : The capacity of said reservoir is 1,090,108,165 cubic feet of water, for which claim is hereby made for supplementary irrigation purposes for existing ditches.

Fifth : The source of supply for said reservoir is Cow Creek and Red Creek.

Sixth : Work was commenced on said reservoir October, 12, 1956

Seventh: The estimated cost of said reservoir is $ 966,000.

Eighth : Claimant: Ouray County Water Users Association.

[signature] Reuben Tinkler
President

[signature] Robert K. Lewis
Secretary

STATE OF COLORADO
COUNTY OF OURAY } SS

Norman B. Platt, being duly sworn on his oath, deposes and says that he is the engineer of the Rams Horn Reservoir; that the survey of the same and the map thereof was originaly made by the United States Bureau of Reclamation and revised by him and that such survey is accurately represented upon this map; that he has read the statements thereon, and that the same are true of his own knowledge.

[signature] Norman B. Platt
Registered Engineer

Subscribed and sworn to before me this 7th day of December, A.D. 1956.

My commission expires January 28, 1957.

[signature] Theodore H. Brooks
Notary Public

FILING MAP OF
RAMS HORN RESERVOIR

IRRIGATION DIVISION NO. 4
WATER DISTRICT NO. 68

OURAY COUNTY, COLORADO

COURSES REFERRED TO TRUE MERIDIAN
SCALES AS SHOWN

Accepted for filing in the office of the State Engineer of Colorado on the 17th day of JANUARY, A.D. 1957.

J. E. WHITTEN
State Engineer

By: [illegible]
Deputy

20974

DENVER
2490 W. 26th Avenue Suite 100A
Denver, Colorado 80211
Phone: 303.480.1700
Fax: 303.480.1020

GLENWOOD SPRINGS
818 Colorado Avenue
P.O.Box 219
Glenwood Springs, Colorado 81602
Phone: 970.945.7755
Fax: 970.945.9210

DURANGO
1666 N. Main Avenue Suite C
Durango, Colorado 81301
Phone: 970.259.7411
Fax: 970.259.8758

www.wrightwater.com

Wright Water Engineers, Inc.