Colorado Division of Water Resources

2019 Annual Report

Water Division 5

Granby Reservoir 2019 spill

"Water is the driving force of all nature"
Leonardo de Vinci

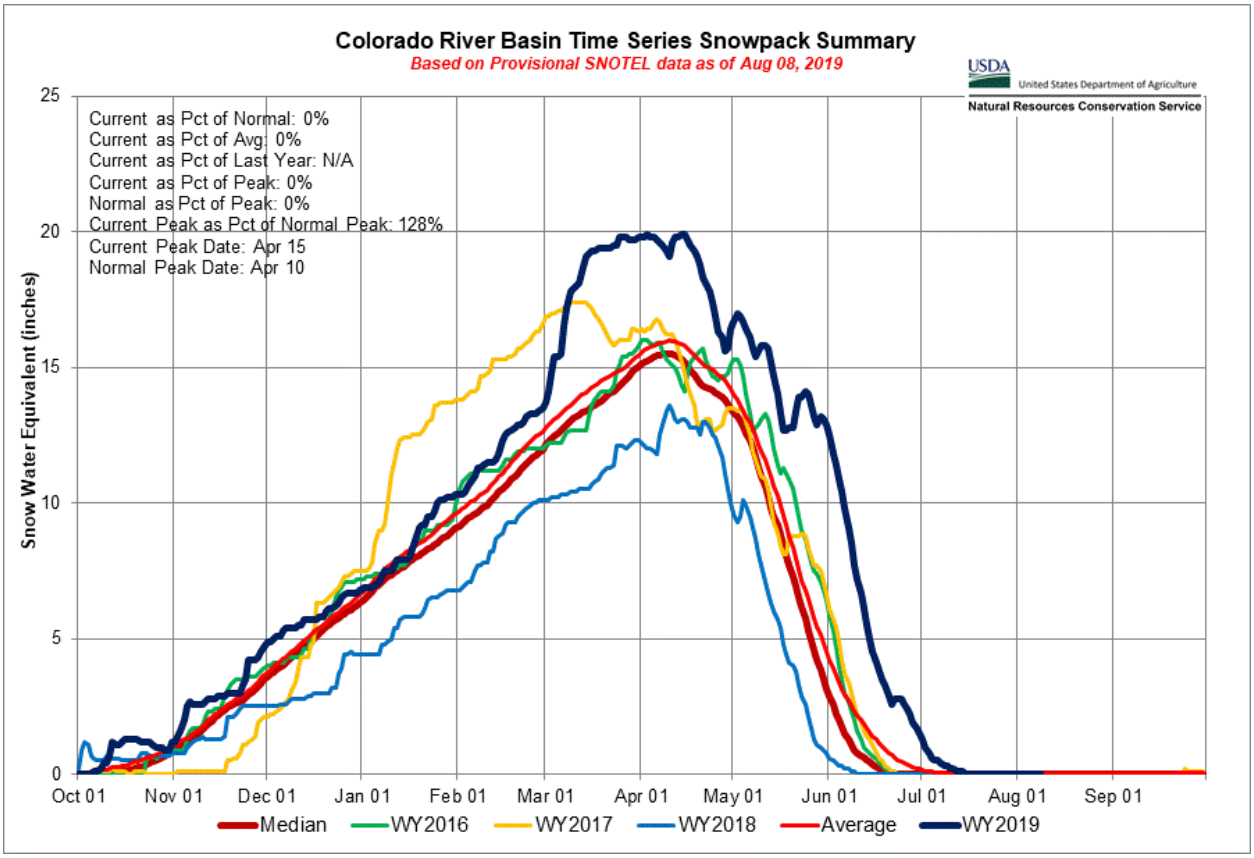
Colorado River Basin

Alan C Martellaro
Division Engineer

Surface Water Supply

"When the well is dry, we'll know the worth of water." Benjamin Franklin

The 2019 Irrigation Year began with below average stream flows, and below average reservoir storage. However, late fall provided above average precipitation as winter began with a very good snowpack. However, with below average precipitation in December, snowpack reduced to 107% of normal basin-wide on January 1, 2019. For the months of January and February, snowfall was slightly above normal. The outlook changed dramatically in March, when 180% of normal precipitation fell basin wide, leaving snowpack at 130% of normal. Near normal precipitation in April reduced the basin-wide snowpack to 118% of average on May 1, 2019. The progression of snowpack is shown graphically in the Time Series Snowpack Summary graph below.



The result was excellent spring runoff projections. The progression of the runoff forecasts for the Colorado River near Dotsero and the Colorado River near Cameo are depicted in the table below.

2019 forecast (most probable undepleted runoff), April-July in KAF

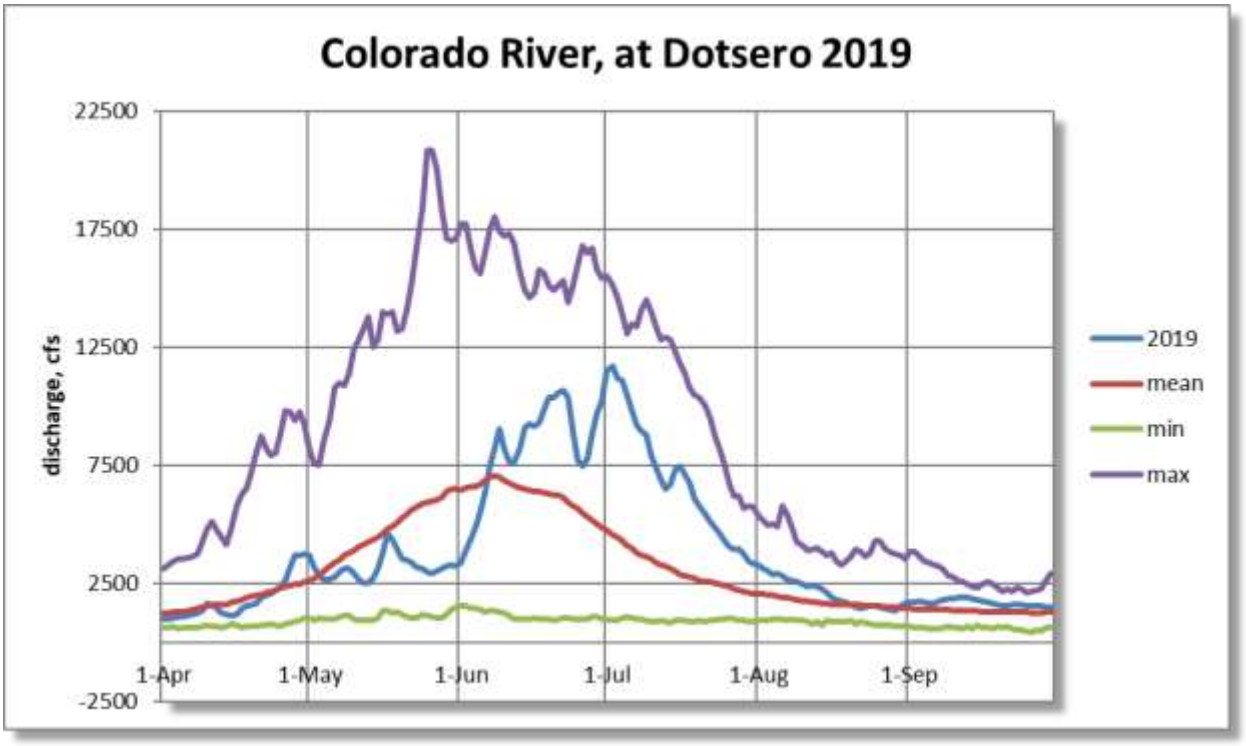
	March 1st		April 1st		May 1st		June 1st		Average Undepleted
	Flow	% avg	Flow	% avg	Flow	% avg	Flow	% avg	
Dotsero	1460	104%	1820	131%	1790	128%	No data	---	1400
Cameo	2400	102%	3200	136%	2970	126%	No data	---	2350

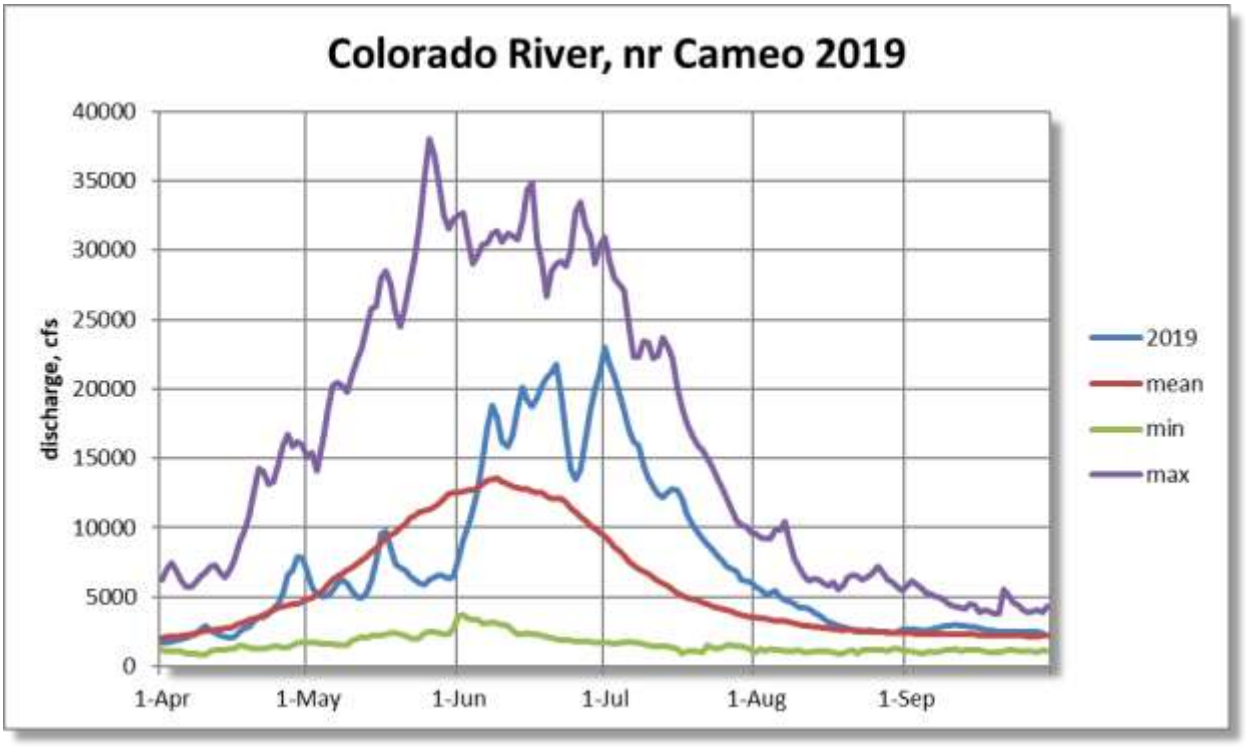
The high snowmelt runoff was followed by relatively high base flows during early summer. However, summer brought above average temperatures and below average precipitation, reducing the relatively high base flows. Actual late summer flows were mitigated on the mainstem with releases for the endangered fish recovery program. See the table below for a comparison of actual to historic average runoff.

2019 Gaged (depleted) flows, KAF

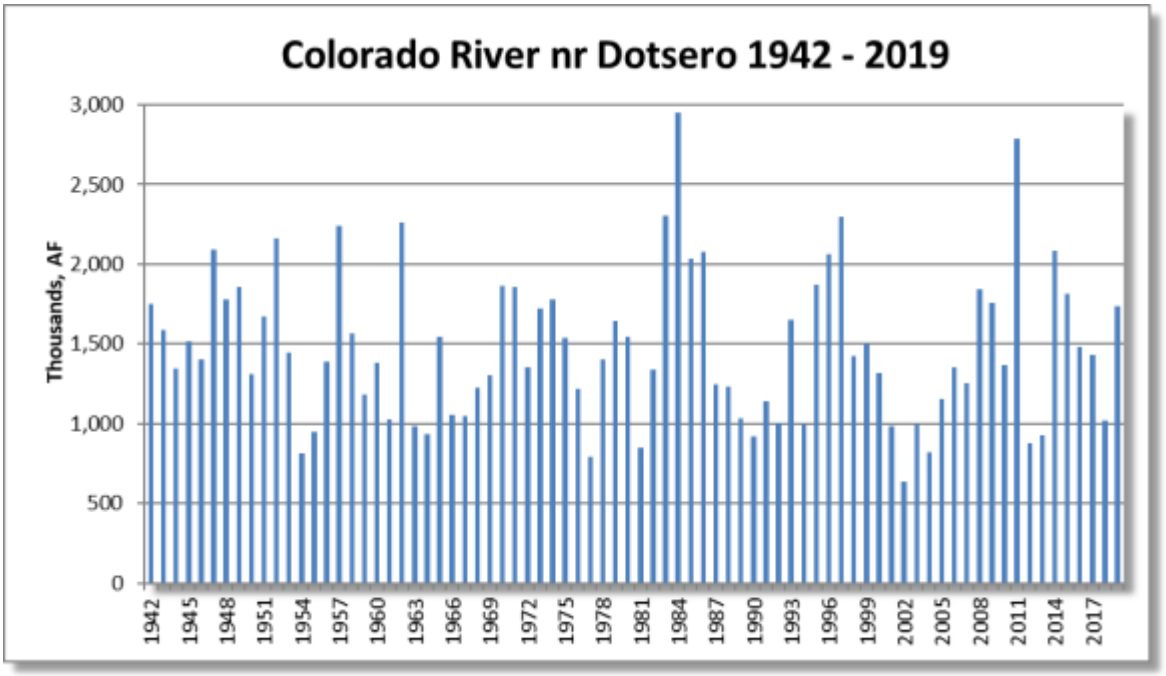
	April-July			April-September		
	Flow, KAF	%of avg	Historic avg	Flow, KAF	%of avg	Historic avg
Dotsero	1,217	127%	962	1,449	126%	1,147
Cameo	2,346	130%	1,808	2,722	129%	2,118

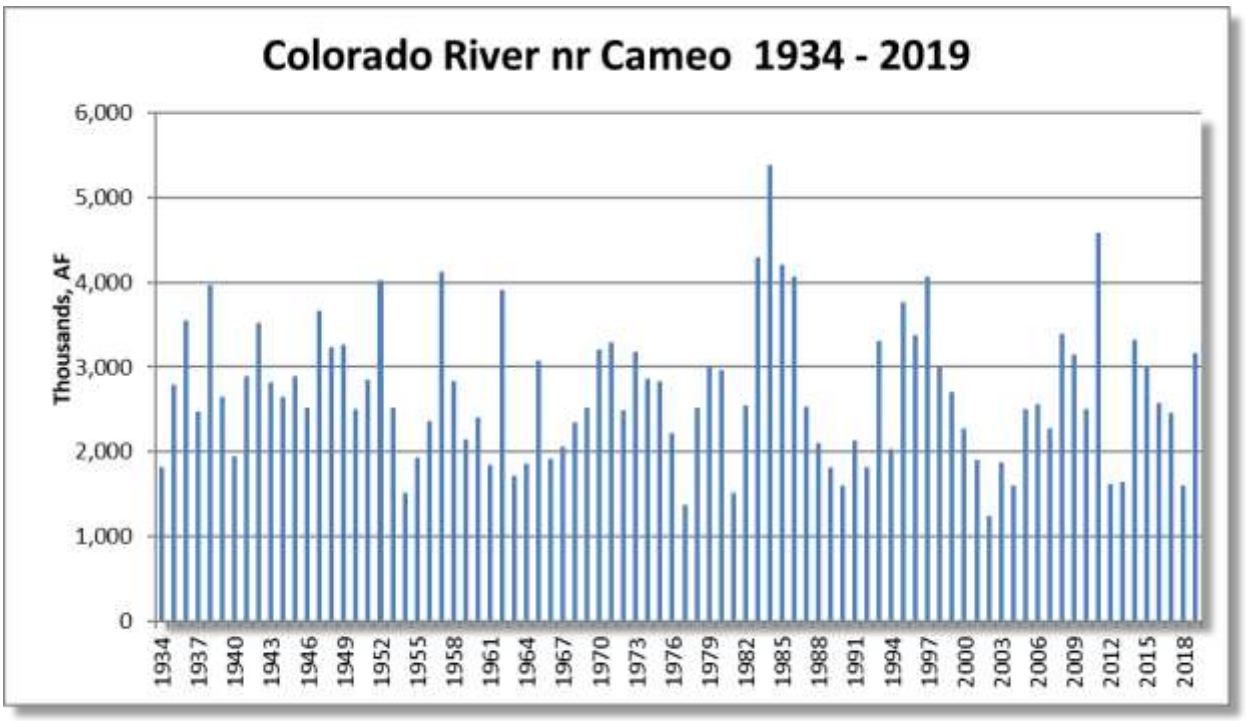
The following hydrographs of daily average flows for the Colorado River near Dotsero and the Colorado River near Cameo depict the excellent snowmelt runoff with a very late peak, and then the irrigation year ending with near normal daily flows 2019.





The 2019 irrigation season ended with gaged flow for the Colorado River near Cameo ranking as the 24th wettest year in 86 years of record. The flow for the Colorado River near Dotsero ranked as the 23rd wettest in 78 years of record. Below are Colorado River near Dotsero and Colorado River near Cameo gaged flow histograms for comparison of the 2019 irrigation year with previous years of record.





The 2018 irrigation year ended with below average storage in the six of the basins major reservoirs at 92% of average, and ended above average at 107% average. Comparison of end-of-year storage for each for year beginning with the extremely dry year of 2012 is shown in the table below. The physical capacity of these reservoirs is 1,210,000 acre-feet.

Storage Comparison of Major Reservoirs

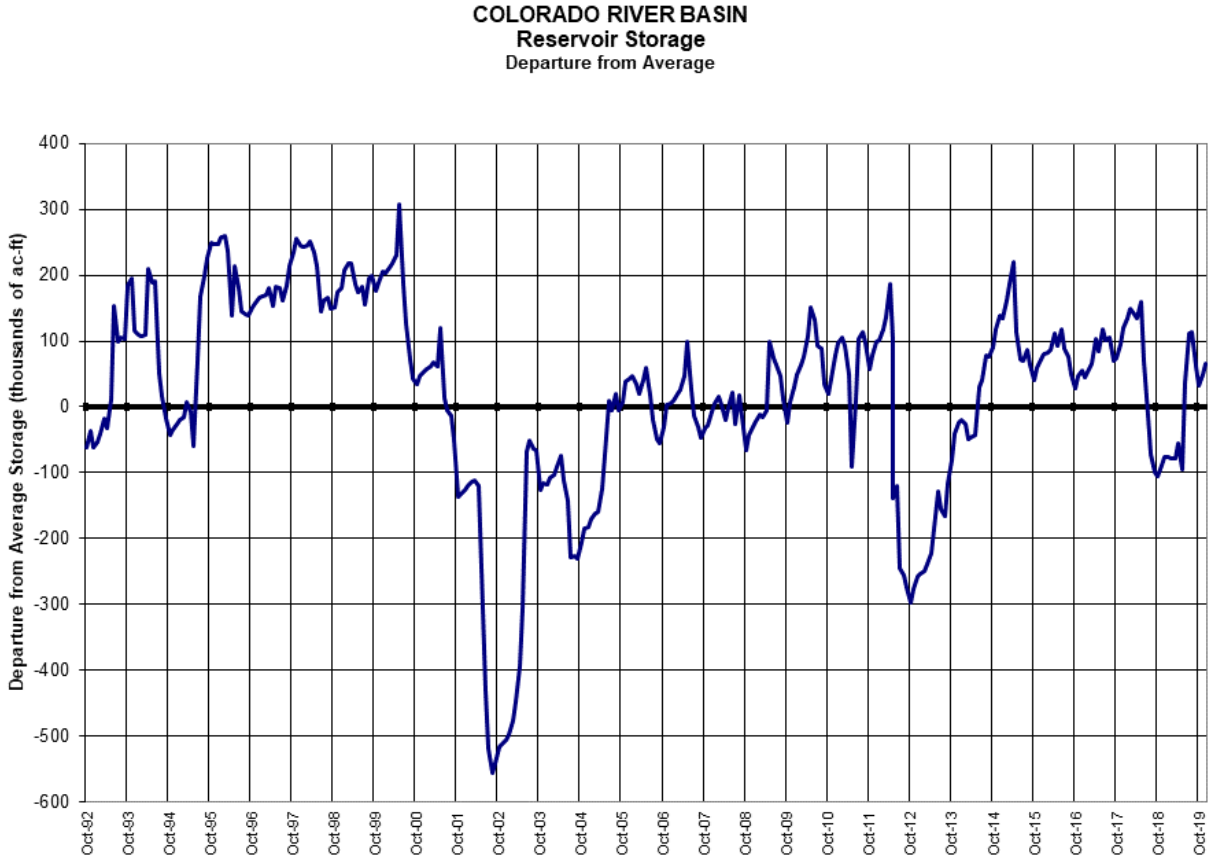
	30-Sep 2012	30-Sep 2013	30-Sep 2014	28-Sep 2015	30-Sep 2016	30-Sep 2017	30-Sep 2018	30-Sep 2019
Dillon Reservoir	198,924	245,855	247,209	251,680	249,814	245197	199825	244,919
Granby Reservoir	333,593	371,008	522,187	500,314	487,231	518992	463575	485,699
Green Mtn Res	76,719	107,058	115,215	112,410	107,507	106317	70430	117,751
Ruedi Reservoir	66,071	86,080	87,909	81,779	77,901	80421	64620	84,045
Williams Fork Res	48,379	73,041	88,275	88,530	81,544	75384	80870	81,938
Wolford Mtn Res	31,711	44,523	65,992	44,931	53,363	56872	37055	54,271
Total	755,397	927,565	1,126,787	1,079,644	1,057,360	1,083,183	916,375	1,068,623

With the exception of Rifle Gap Reservoir, the basins larger reservoirs either filled physically or attained a paper fill. Note the USBR operated reservoirs, Granby, Green Mountain, and Ruedi, had a maximum physical storage just below the uncontrollable spill elevation.

The table below lists key reservoirs in the basin and their maximum storage for the year.

Reservoir Name	Capacity, AF	Peak Storage, AF	Peak Storage, Date
Dillon	257,304	262,247	7/20
Granby	543,758	536,853	7/14
Green Mountain	153,639	152,878	7/15
Homestake	42,822	42,497	8/5
Rifle Gap	13,602	11,850	7/3
Ruedi	102,369	101,785	8/5
Williams Fork	96,822	96,838	7/12
Wolford Mountain	66,000	67,703	6/22
Vega	33,800	34,481	6/20

Another way of looking at the water supply is the graph below depicting the amount of storage as a departure from normal. As can be seen in this graph, storage in 2019 recovered from the below average levels of 2018.



Graph above is Reservoir storage departure from average end of month storage since October 1992 in Dillon, Granby, Green Mountain, Homestake, Ruedi, Vega, Williams Fork, Willow Creek, Wolford Mountain, and Shadow Mountain Reservoirs. The active capacity of these reservoirs is 1,230,000 acre-feet, and physical capacity is 1,315,000 acre-feet.

In summary, the 2019 Division 5 runoff was well above average and all major reservoirs filled in the basin. The dry summer months demanded releases from reservoirs. However, the irrigation year ended with above average storage.

Surface Water Administration

Green Mountain Reservoir

During 2019, Green Mountain Reservoir was administered pursuant to the Green Mountain Reservoir Fill Protocol. A critical principle of the protocol is a "Fill Plan" prepared by the USBR, allowing the Green Mountain Power Plant to operate where storable inflows delivered to the power plant does not account against a paper fill of the reservoir. As expected from an excellent snowpack, the initial 2019 Fill Plan allocated some Green Mountain inflows to power in excess of need to complete a fill of the reservoir. With inflow allocated to power, Denver Water and Colorado Springs Utilities diverted pursuant to their rights as interference to the Green Mountain Power right from the inflow allocated to power. As the fill season progressed, the fill plan for the 2019 fill season was not modified.

By decree the Green Mountain Reservoir start of fill is declared between April 1 and May 15 of each year by the USBR. Generally, only the driest of years have an April start of fill, while most years' trend toward a May 15th start of fill. For 2019, the start of fill was declared on May 7, 2019 with 64,350 acre-feet in storage. Storage of 15,130 acre-feet between April 9th and May 7th start of fill was done under the senior refill right that had not been satisfied in 2018 and the junior refill right. Green Mountain Reservoir paper filled on July 2, 2019 of 154,645 acre-feet. It did not attain the physical fill of 153,639 acre-feet, to maintain storage below the uncontrolled spill, water was released through the spillway prior to reaching the spill elevation. The maximum physical storage in the reservoir was 152,878 acre-feet on July 15, 2019.

Shoshone Power Plant

The Shoshone Power Plant operated without any major outages in 2019. A call by the power plant was maintained throughout the winter of 2018-19. River flows exceeded power plant capacity for 132 days in 2019, where the administrative call from the power plant was not enforced April 7 and 13 and then April 18 through August 22. Therefore, the total call days by the Shoshone Power Plant during the 2019 irrigation year was 233 days.

Mainstem Administration and Operation of the OMID Check Case

With good runoff conditions mainstem calls were very late in the summer. The Shoshone call was not in effect until August 22nd, while the Cameo Call was not placed until September 24th. The lack of early demand on Green Mountains Historic Users Pool created a surplus that was declared on Aug 28th. The result was relatively simple administration of the OMID check case and the Green Mountain HUP, and provided considerable storage for release to the Endangered Fish Recovery Program.

Releases from the HUP for beneficiaries and surplus deliveries to the 15 miles reach left the pool above the drawdown band for the entire year. The irrigation year ended with 7,949 acre-feet, well above the drawdown band and the 500 acre-feet minimum needed for winter replacement of beneficiary depletions. When possible water is left in the HUP at the end of the irrigation season to provide storage for mitigating low flows in the following spring, known as the April Hole.

SUMMARY OF COLORADO RIVER MAIN STEM CALLS
2019 IRRIGATION YEAR

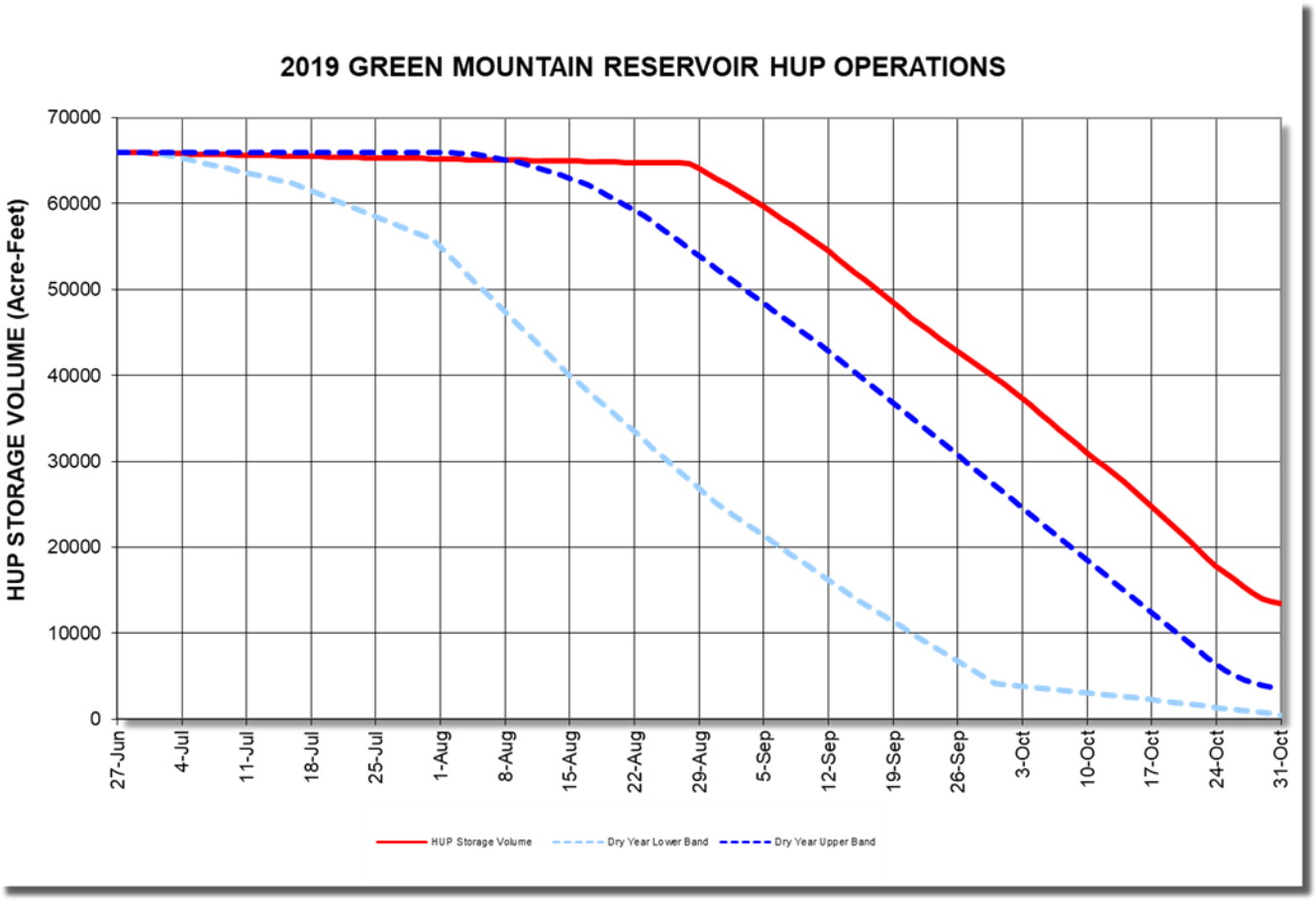
STATUS OF CALL AT THE SHOSHONE POWER PLANT
(As determined using the Colorado River near Dotsero gage)

DATE ON	THRU	NO. DAYS CALL ON/OFF	CALLING RIGHT	DECREED AMT.	SWING PRIORITY	SWING PRIORITY ADMIN. NO.	COMMENTS
11-01-18	04-07-19	158	Shoshone Power Plant	1,250 cfs	----	20427.18999	
04-08-19	04-13-18	6	Free River	---	---	---	Shoshone outage protocol was operated during this period
04-14-19	04-16-19	3	Shoshone Power Plant	550 cfs	CBT Alva B Adams Tunnel	31258.00000	
04-17-19	04-18-19	2	Shoshone Power Plant	158 cfs	Junior Shoshone Power	33023.28989	
04-19-19	08-22-19	126	Free River	---	---	---	
08-23-19	08-27-19	5	Shoshone Power Plant	158 cfs	Junior Shoshone Power	33023.28989	
08-28-19	08-29-19	2	Shoshone Power Plant	550 cfs	CBT Alva B Adams Tunnel	31258.00000	
08-30-19	09-01-19	3	Shoshone Power Plant	1,280 cfs	Moffat Water Tunnel	30870.2617	
09-02-19	10-31-19	60	Shoshone Power Plant	1,250 cfs	----	20427.18999	

STATUS OF CALL IN THE GRAND VALLEY
(As determined using the Colorado River near Cameo gage)

DATE ON	THRU	NO. DAYS CALL ON/OFF	CALLING RIGHT	DECREED AMT.	SWING PRIORITY	SWING PRIORITY ADMIN. NO.	COMMENTS
11-01-18	9-24-19	328	Free River	---	---	---	
09-25-19	10-14-19	20	Grand Valley Project Power Right	400	Grand Valley Project Power Right	30895.21241	
10-15-19	10-31-19	17	Free River	---	---	---	

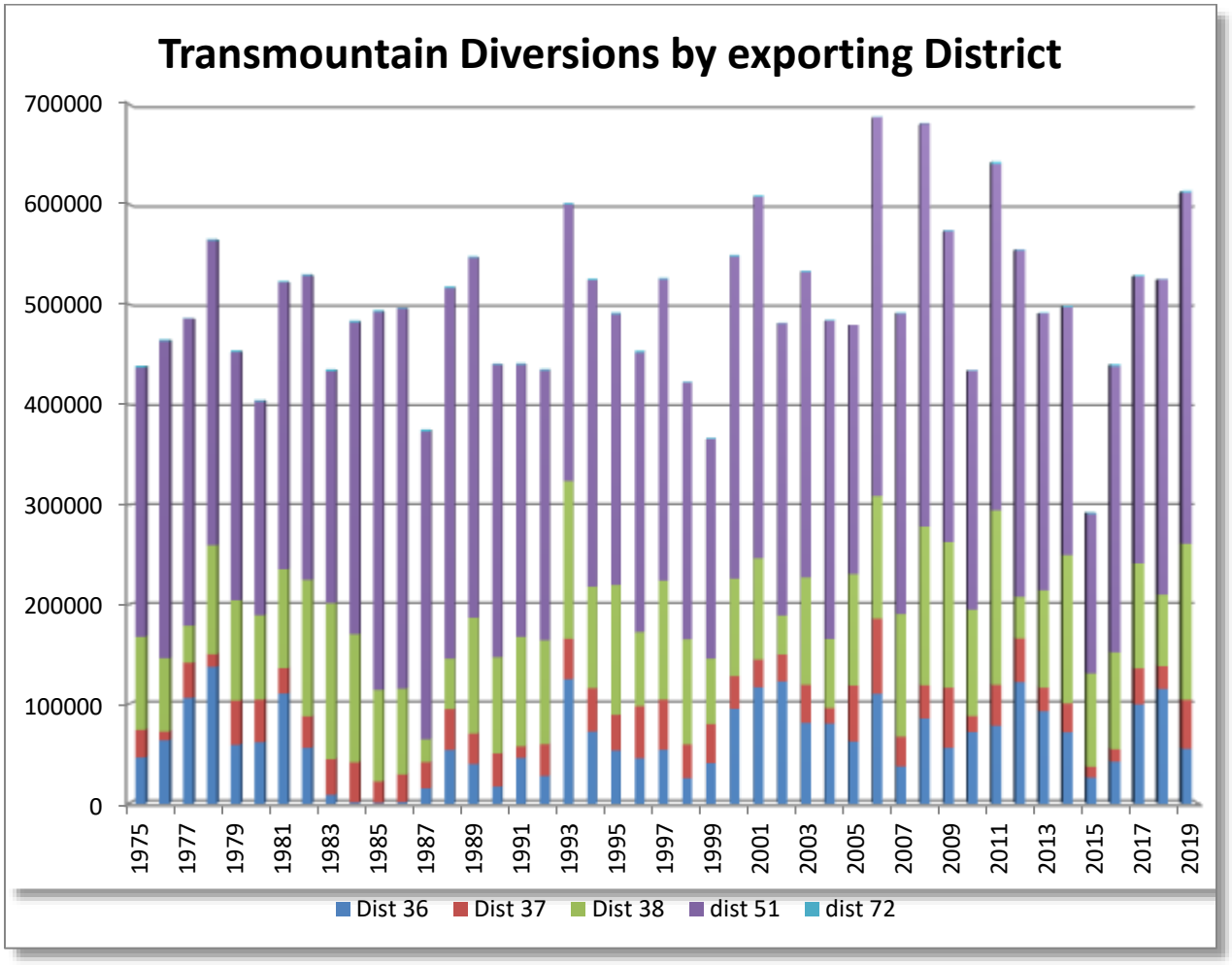
SWING PRIORITY = MOST JUNIOR WATER RIGHT, EITHER TOTALLY OR PARTIALLY IN PRIORITY, U/S OF THE CALLING STRUCTURE

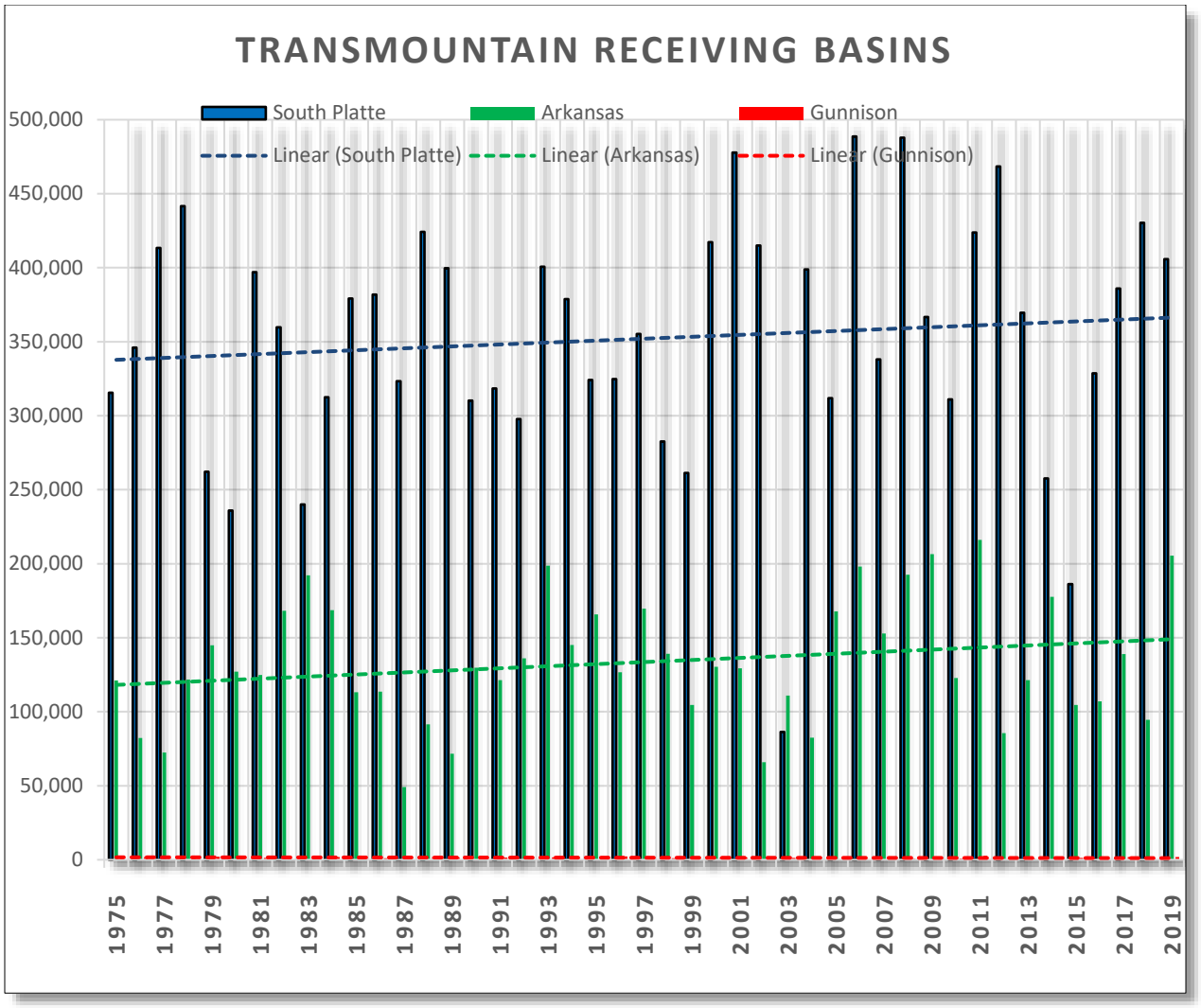


Transmountain Diversions

Transmountain Diversions from Division 5 are primarily delivered to the South Platte and Arkansas Rivers with a minor diversion to the Gunnison River. Total exports from Division 5 for 2019 were 613,245 acre-feet. This is the fourth highest diversion of exports on record. The volume is nearly 88KAF more that the 525,622 acre-feet diverted in 2018. The total exceeds the 1975-2019 of 487,033 acre-feet, and the 30 year average of 496, 550 acre-feet. A good water supply provided for above Transmountain diversions across the board. The exception was Denver Water's Blue River Diversion Project, where South Platte Basin supplies and lack of space in east slope reservoirs required little Blue River water to meet system demands. Denver Water diverted 45,149 acre-feet through Roberts Tunnel compared to the 104,659 acre-feet diverted in 2018. The Fry-Ark Project diversions through Boustead Tunnel were an all-time record at 114,711 acre-feet, exceeding the previous record set in 1984 at 109,711 acre-feet. This compares to the historic average diversion through Boustead Tunnel of 62,060 acre-feet. The following two graphs provide a depiction Transmountain annual diversion data from 1975 to present; first as exported by water district, and then as annual deliveries by receiving basin. The second graph includes a trend line demonstrating the gradual increase over time to both the South Platte and Arkansas Basins. Diversions to the Gunnison are relatively small in relation to the

South Platte and Arkansas and barely appear on the graph. Unlike the other basins, the trend has been a continued decrease in export to the Gunnison. A result of reservoir seepage, tunnel maintenance, and tighter administration.





Other surface water administration

The majority of Division 5's surface water administration as measured by staff hours and operating costs will always be the curtailment water rights to satisfy local calls on the many tributaries with rights senior to those on mainstem. The call chronology in CDSS records the administration of these tributaries. The total number of call changes recorded in CDSS on Division 5 tributaries for 2019 were 179. This is a major reduction from 2018's dry year call changes of 299. The number in all years does not fully represent the workload, as calls that are changed more than once a day during the tail end of the snowmelt runoff are not recorded in the call chronology data. Further, shepherding storage releases is a major workload on these tributaries that are subject to call, as many adjustments are made during a call with no call change. Calls for junior rights upstream of a senior call, often deemed a "call within a call", or in the CDSS terminology "non-consumptive calls" are generally for exchanges and non-consumptive rights. The total of non-consumptive calls was 9, of which 5 were for CWCB minimum stream flows, 3 for hydro-electric power, and 1 for recreation and fish.

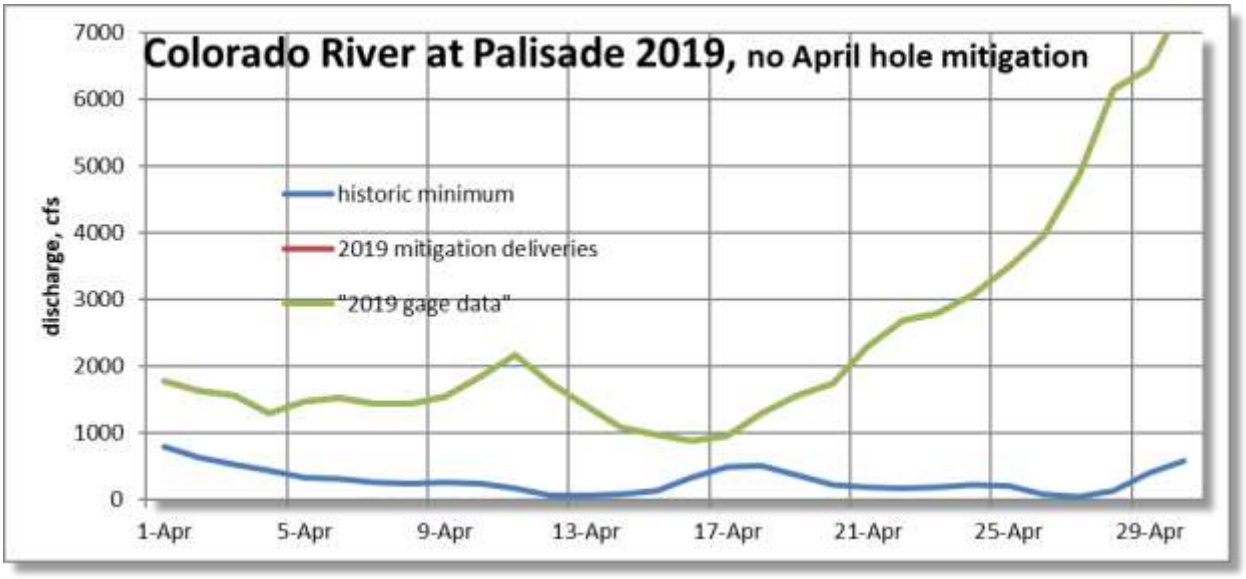
Only one administrative orders issued in 2019, which was issued for installation of an adequate measuring device.

Augmentation plan administrative activities included 59 written contacts to either through deficiencies notices or less formal correspondence to correct plan operations for lack of measuring devices, inadequate replacement source, expired contracts, and accounting. These were followed-up with 16 meetings and site visits. A deficiency letter is sent to municipal providers and to augmentation plan operators after no progress is made through less formal communication, and precedes a written order and curtailment.

Thirteen administrative exchanges were approved pursuant to CRS §37-83-104 in Division 5 for the 2019 Irrigation Year. They include several that are annually approved for Denver Water, Winter Park snowmaking, Clinton Reservoir, Byers Peak snowmaking, two landscaping companies, a grow operation, and Grand County Road and Bridge. The remaining approvals were first or second time approvals for construction projects or other short-term work.

Endangered Fish Recovery Program

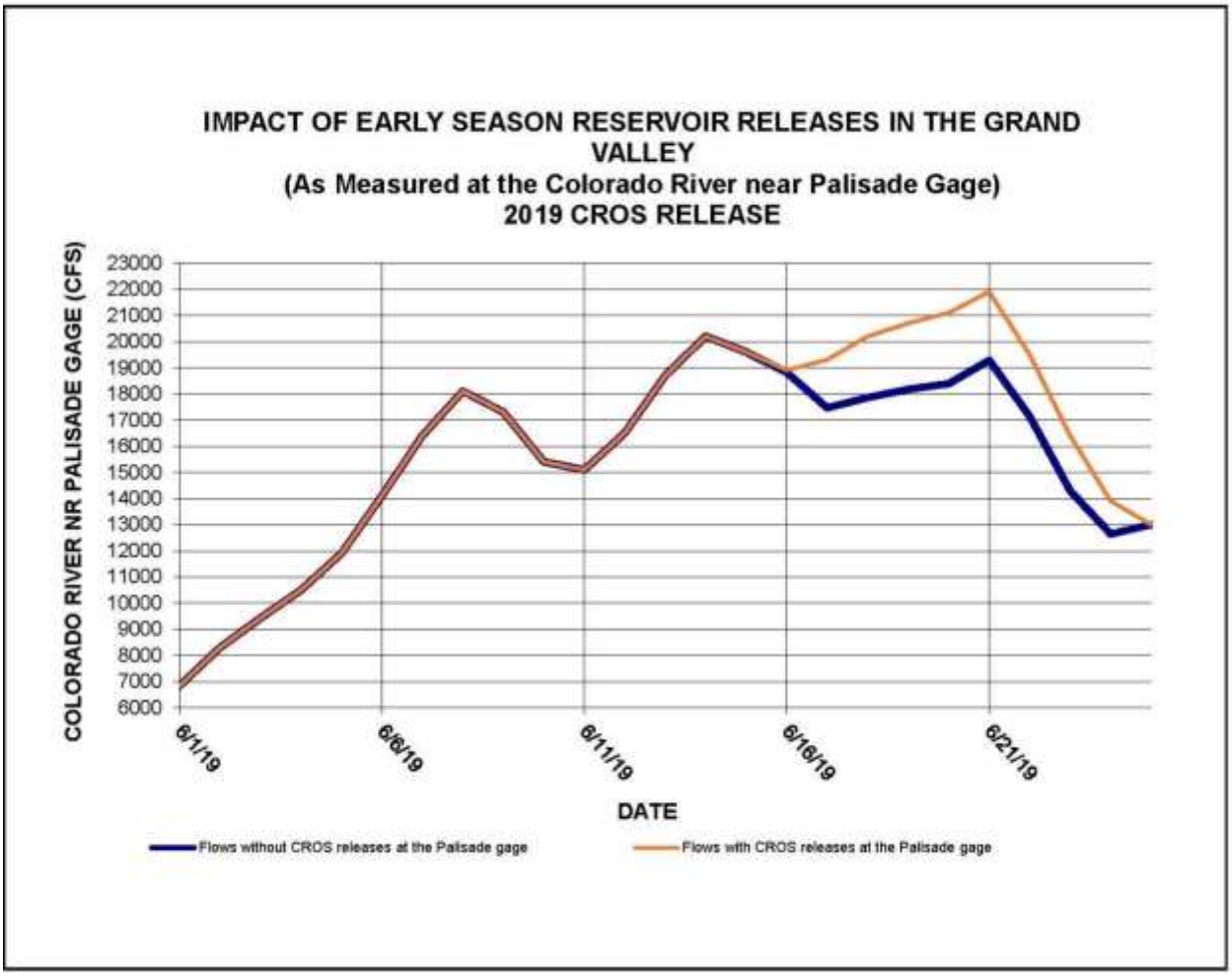
In April 2013, flows measured at the Colorado River near Palisade gage dropped as low as 55cfs. The gage is at the head of the 15-mile reach, considered critical to the recovery program. The target initially was 400cfs for 2014. The USFWS changed the absolute minimum flow to 500cfs, which was benchmark used for the "April Hole". Note the USFWS requested in 2019 that the minimum flow be set at 810cfs. In 2020, the USFWS provided a technical basis for the beneficial use of an absolute minimum at 810cfs. Planning begins in March. For April 2019, gaged flow briefly dropped below 1000cfs, and no mitigation from reservoir storage was necessary. The graph below depicts the April 2019 flows compared to the historic minimum.



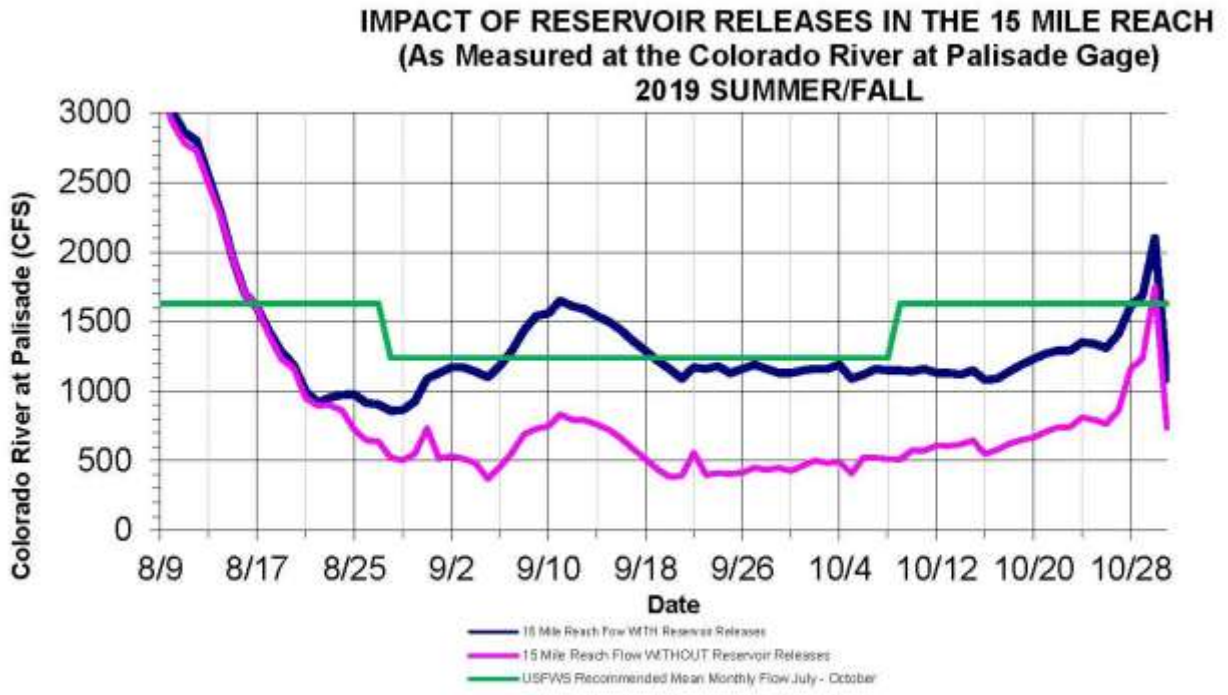
The Coordinated Reservoir Operations (CROS) program was established in 1995 as part of the Upper Colorado River Endangered Fish Recovery Program and patterned after less

formal operations that Water Users and Division 5 began in the early 1990's. Preparation for CROS generally begins in March and is refined until triggered in May or June. The primary purpose of CROS is to enhance spring peak flows for a 10-day period in the 15-Mile section of the Colorado River immediately upstream of the Gunnison River. The "15-Mile Reach" is critical habitat for four endangered fish species: Humpback Chub, Razorback Sucker, Bonytail Chub, and the Colorado Pikeminnow. In years with sufficient snowpack, surplus inflows to the reservoirs can be passed on downstream to benefit these fish without affecting reservoir yield. The goal of CROS is to time the bypass of storable inflows, release of storage, or other divertible flows at participating reservoirs and operators to enhance the peak at the Colorado River near Cameo gage, such that enhancement will result in flows that exceed 12,900cfs, the minimum deemed to benefit the habitat, and flows that will not exceed 25,000cfs, which is bank full in the Palisade-Grand Junction area. The decision to trigger CROS operations is made after managers of participating reservoirs are confident that bypasses at their individual reservoirs could be made prior to filling without impacting the yield of their storage rights, and the group determines CROS operations will fall within the acceptable range. Meetings usually become weekly as peak snowmelt runoff approaches.

CROS operations did occur in 2019. Out of concern that enhancement of the peak would exceed bank full conditions, the parties decided to broaden the peak. Deliveries enhanced the peak between June 13 and June 24 reaching a maximum of 2711cfs additional flow with a total of 35,391 acre-feet delivered. From the graph below, the operation of CROS was very successful in broadening the peak.



With the excellent snowpack and the filling of all pools used for the program, the USFWS set the Endangered Fish Recovery Program target flow for the Colorado River at Palisade gage at the wet year minimum of 1630cfs. As with the previous two years, the intent was to set the target at one level for the entire late summer base flow augmentation period. However, lack of rainfall persisted through the summer, making it difficult to meet the 1630cfs target, and the target was reduced to 1240cfs from August 28 through October 8. Excluding a brief rainy period in mid-September, the actual flows were below the target most of the augmentation period. In addition to the programs pools in Ruedi, Wolford Mountain, and Granby Reservoir, a surplus was declared in Green Mountain Reservoir's HUP. Also, the check structures within the Grand Valley Water Users Association Canal provided returns via the Palisade Pipeline. Considering transit losses, the total of augmented deliveries in the 15-mile reach was 86,207 acre-feet, with a maximum daily delivery of 820cfs on September 11. Without deliveries, the minimum flow would have been 369cfs on September 5.



Water Court

For 2019, there were 187 new and 21 amended water court applications for a total of 208 applications. This is considerably less than the 289 filed in 2018. Division 5 submitted 286 Summary of Consultation Reports to the Water Court for these applications. We filed all Summary of Consultation reports with the court within the statutory 35-day deadline. In our continued effort to help expedite court cases nearly all consultations were filed within one week of the consultation meeting (the exception was one case that needed additional information from the field, and one case that had extensive findings of fact), and no extensions of time (beyond the 35-day deadline) were requested. Several cases were re-referred to the Water Court Judge, only one was prior to consultation with the Referee, thus one written recommendation in lieu of a Summary of Consultation was sent to the Judge.

General water court activities in Division 5 followed our plan to assume the role as a technical advisor to the court, and a less litigious participant. Thus, Division 5 has not filed a Statements of Opposition for a number of years. However, we did file one Statements of Opposition in 2019. Earlier in 2019, the Attorney General on our behalf attempted to file a motion to intervene in a water court case after it was clear the applicant disagreed with our position and the court was entertaining granting most of a proposed ruling we had issue. After the court denied the motion to intervene, we determined that the SOP filed in 2019 was necessary. In addition, in 2019 the Attorney General filed a protest to a Referee Ruling in our division. Division 5 staff did participate in trial at the request of the Water Judge,

and both the Applicant and Opposition subpoenaed the Division Engineer to testify in a trial involving the disputed internal operate of the Gaskill Ditch in Water District 51.

No Division 5 related Water Court cases were pending in front of the Supreme Court during 2019.

Groundwater

Well Permitting and Well Drilling activity in 2019 slightly increased over the previous year. This continues a trend since the recovery from the economic down turn of 2007-08. Division 5 groundwater permit applications for exempt and non-exempt wells are reviewed and approved by staff in both the Division 5 office and the SEO Denver office. The following reflects the efforts of both offices. Well permitting activity was study during 2019 receiving 787 applications with 725 water well permits approved. The approvals including 614 production well permits, 108 monitoring/observation hole notifications, 1 dewatering well permit application and 2 Geo-exchange Loop Field Construction and Test Reports received in 2019. This compares to 775 applications received and 746 permits approved in 2018. Furthermore, drilling activity increased in 2019, with 387 Well Construction and Yield Estimate Reports received in 2019, an increase over 2018 where 349 Well Construction and Yield Estimate Reports were received.

Colorado River Cooperative Agreement

Major negotiation of the Colorado River Cooperative Agreement (CRCA) concluded in 2013 with the signing of the Green Mountain Reservoir Protocol and Protocol Agreement, leaving full implementation conditioned on resolution of several agreements and water rights applications, and a federal court decree. The completed pieces to the CRCA include:

- The main CRCA agreement signed in 2011,
- Green Mountain Fill Protocol, and Protocol Agreement signed in 2013,
- Water Court Case No. 10CW298 for Grand Counties for RCID's,
- Water Court Case No 11CW152 by Denver Water, Grand County and the CWCB for a right of substitution using Fraser River diversions and Gross Reservoir in Water Division 1,
- Denver's "reverse exchange" decreed in Case No. 11CW21 allowing Dillon storage to be exchanged to the Moffatt Tunnel and Williams Fork Reservoir,
- Shoshone Outage Protocol Agreement signed June 2016,
- Water Court Case No. 06CW255, a diligence decree that also provides use of Dillon Reservoir for West Slope purposes and anywhere in the Denver Metro Area as defined in the CRCA,
- Federal Court effectively closed the case without any findings filed to recognize the Green Mountain Protocol as within the scope of the Blue River Decrees.

Outstanding issues continue to be:

- A ruling in 13CW3077 requesting the Water Court recognize the Green Mountain Fill Protocol is within the scope of the Blue River Decree, and
- The final piece to the CRCA will be the construction of the enlargement of Gross Reservoir, held up by a law suit filed in the USACE 404 permitting process. A FERC permit also remains unapproved. Until the lawsuit was filed, final dam design was to begin in 2019, and construction completion by 2025.

Regarding, Case No. 13CW3077, the parties continued to work on a proposed decree to submit to the Water Court, and modification of the Green Mountain Fill Protocol Agreement. The Protocol Agreement requires the State Water Court and the Federal Court find sections I, II and III of the Green Mountain Reservoir Fill Protocol are consistent with the Blue River Decrees, while only the Federal Court consider section IV. In the interim, and because objectors are either in support or deemed unlikely to block a positive judicial finding, DWR continues to administer the fill pursuant to the protocol without a decree. Negotiations among the parties and DWR are working on language that the Water Court would find sections I, II, and III of the Fill Protocol are consistent with the Blue River Decree and administrable by DWR, and that section IV, which determines repayment of out-of-priority storage to Green Mountain Reservoir is a contract among the parties to the BRD and not the administrative responsibility of DWR.

Division 5 Administration

Abandonment List

In preparation of field work and other research by field staff, database queries were completed and results were loaded into the HBDMC Activity Manager during 2018. The initial list included 1883 water rights, which were reduced to 470 that were the target of efforts in 2019. The list was further reduced by 154 water rights based on data review, leaving 297 for field inspection. The results of field inspections removed another 54 water rights. The result of 2019 work on the abandonment list left 243 water rights to be reviewed by the Division Engineer in the spring of 2020 in preparation of the published Abandonment List.

Awards 2019

The Division 5 Water Commissioner of the Year was Lead Water Commissioner for the Upper River (Districts 36, 50 and 51) Neal Misbach for his efforts with difficult issues on St Louis Creek and the Blue River, for leading his group to collect data for the abandonment list, communication with water users, and collaboration with our Augmentation Plan team.

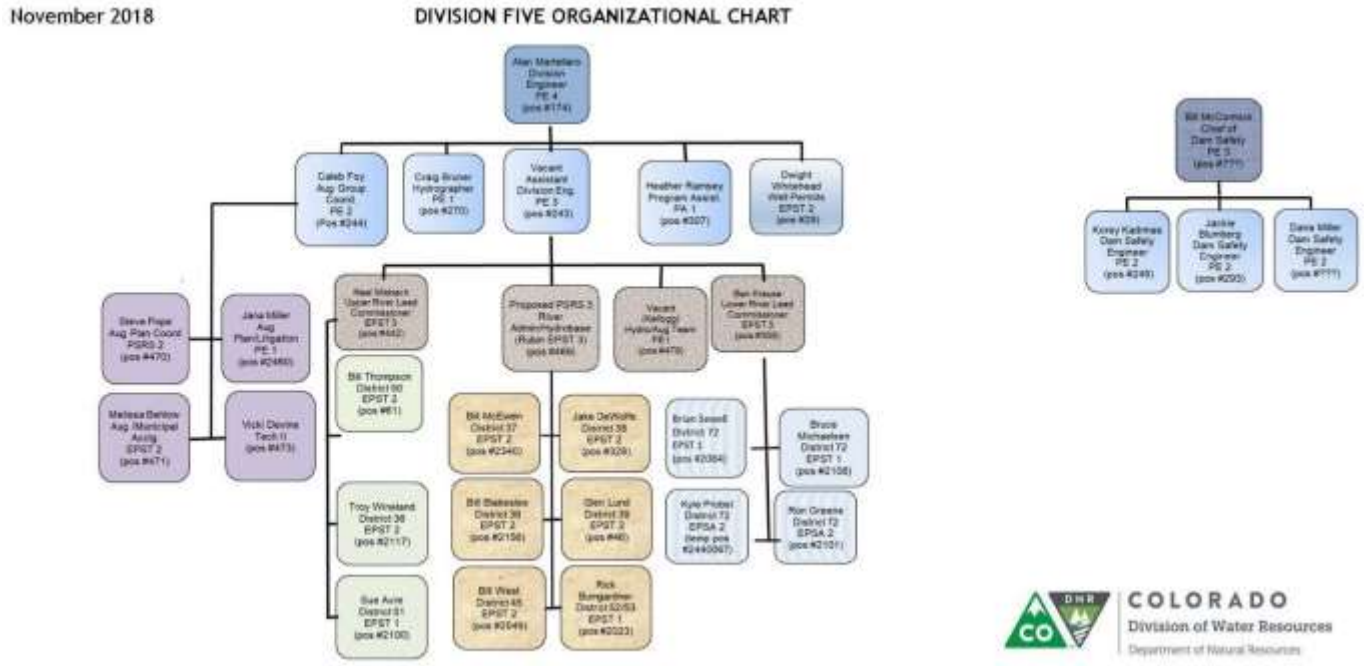
The Division 5 Rusty Shovel is awarded to someone how digs up new dirt. This year the award was given to Jake DeWolfe. Jake administers the lower Roaring Fork drainage that includes heavily administered Four Mile, Cattle, Sopris, and Thomas Creek, as well as the occasionally administer Crystal River. As any Water Commissioner knows, the occasionally administered stream can present the most problems. The Crystal is no different. After the

difficult 2018 irrigation season, Jake continued to work with water users on that stream that were subject to curtailment to avoid the problems on the past dry years.

We do not issue "Bricks and Mortar" and "Above and Beyond" awards every year, but two employees were very deserving. Vicki Devine is the very definition for the "Bricks and Mortar Award"; the augmentation plan team begins with her effort to keep water users current on data submittal, ensuring data is as requested and of needed quality, distributing the data to team members, and tracking progress. This requires a very diligent individual with the desire to complete projects timely and with quality. All this defines Vicki's value to the team.

Craig Bruner was recognized for the "Above and Beyond Award." Craig is always available to provide support and training to other staff performing hydrographic work. More critically, Craig is available at the drop of a hat, even though he is stretched by other work demands, to provide measurements of administrative devices to ensure proper administration of our streams. This includes any request by Water Commissioners on our tributaries, to requests from our River Administrator to check the major canals in the Grand Valley.

Organization Chart



I respectfully submit the 2019 Annual Report on behalf of the Staff of Water Division 5, by

Alan C Martellaro, Division Engineer
April 27, 2020