

**Colorado Division of Water Resources**

# **2016 Annual Report**

**Water Division 5**



Mount Sopris, April 2016

## **Colorado River Basin**

Alan C Martellaro  
Division Engineer

2016 Division 5 Annual Report

*“But, here is an artist. He desires to paint you the dreamiest, shadiest, quietest, most enchanting bit of romantic landscape in all the valley of the Saco. What is the chief element he employs? There stand his trees, each with a hollow trunk, as if a hermit and a crucifix were within; and here sleeps his meadow, and there sleep his cattle; and up from yonder cottage does a sleepy smoke. Deep into distant woodlands winds a mazy way, reaching to overlapping spurs of mountains bathed in their hill-side blue. But though the picture lies thus tranced, and though this pine-tree shakes down its sighs like leaves upon this shepherd’s head, yet all were vain, unless the shepherd’s eyes were fixed upon the magic stream before him.”* from Moby Dick, by Herman Melville, emphasis mine

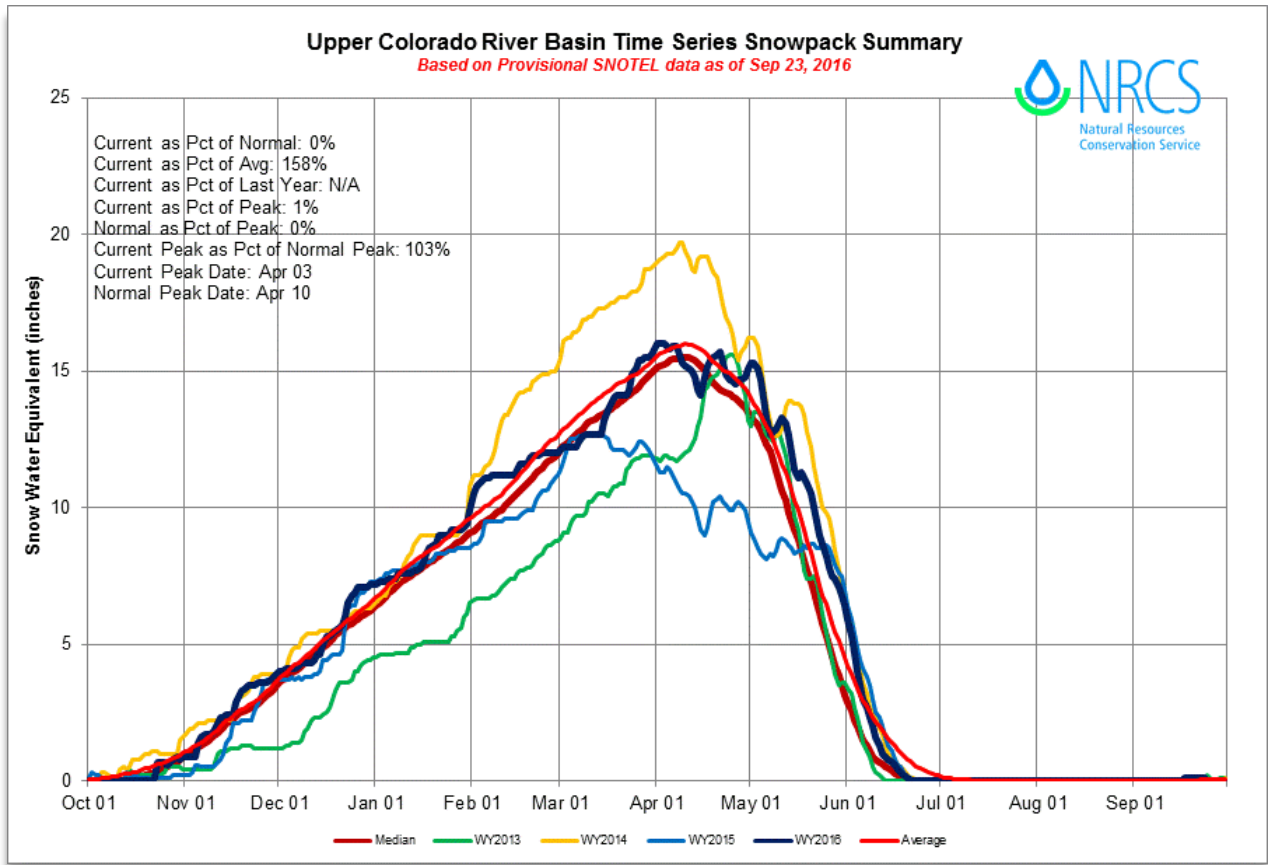
**Surface Water Supply**

The 2016 Irrigation Year began with near to above average stream flows, and near average reservoir carryover storage. Storage in the basin’s major reservoirs began the water year at 112% of average on September 30, 2014, and ended at 105% of average storage on September 30, 2015. Reservoir storage in the South Platte and Arkansas River basins can improve supply on the Colorado River when there is little space for all available transmountain supplies. The Arkansas Basin had more storage on October 1, 2015 than any year for that date since October 2000 and the South Platte basin was slightly above average; however, available storage space did not limit transmountain diversions taken east. Runoff was projected throughout the winter and into spring to be below average, thus discretionary power releases at Green Mountain, Ruedi, and Williams Fork were set to hit dry year target storage levels, improving storage conditions as compared to average in the basin. Runoff began with storage at 115% of average on May 1, 2016. The table below depicts a five year comparative end-of-water year storage for Division 5 largest reservoirs.

Storage Comparison at Major Reservoirs					
	30-Sep 2012	30-Sep 2013	30-Sep 2014	28-Sep 2015	30-Sep 2016
Dillon Reservoir	198,924	245,855	247,209	251,680	249,814
Granby Reservoir	333,593	371,008	522,187	500,314	487,231
Green Mtn Res	76,719	107,058	115,215	112,410	107,507
Ruedi Reservoir	66,071	86,080	87,909	81,779	77,901
Williams Fork Res	48,379	73,041	88,275	88,530	81,544
<b>Total</b>	<b>723,686</b>	<b>883,042</b>	<b>1,060,795</b>	<b>1,034,713</b>	<b>1,003,997</b>

## 2016 Division 5 Annual Report

The “Super El Nino” of 2016 did not produce the expected tremendous precipitation and snowpack. Precipitation throughout the fall and winter hovered around average, with a few exceptions. The first few days of February delivered the most significant storm of the winter, with some areas receiving 2 to 3 feet in a 4 day period. Two relatively wet periods, one in the latter half of March and the other from late April through mid-May also improved conditions. May was wet as can be seen graphically on the Time Series Snowpack Summary below by the receding limb of the snow water equivalent remaining above average until most SNOTEL sites were completely without snow.



The runoff forecast began on January 1 with lower basin tributaries below average, while upper basin tributaries were well above average, a trend that continued throughout the winter. For example, the Roaring Fork began the year with a forecast of 94% that continued to drop until April 1 it was 80%. This moderated by June 1 with an 89% forecast. The Blue River above Dillon began with 102% of average and increased each month until the final forecast at 112% of average. This distribution of snowpack as compared to average, with northern and eastern sub-basins of the Upper Colorado experience relatively greater snowfall and higher forecasts than the more westerly and southerly basins, continues a four year trend. The resultant forecasted March through June flows for Water Division Five’s two most important mainstem gages are in the following table.

2016 Division 5 Annual Report

Colorado River nr Dotsero, and nr Cameo

**2016 forecast** (most probable undepleted runoff), April-July in KAF

	March 1 <sup>st</sup>		April 1 <sup>st</sup>		May 1 <sup>st</sup>		June 1 <sup>st</sup>		Average Undepleted
	Flow	% avg	Flow	% avg	Flow	% avg	Flow	% avg	
Dotsero	1270	91%	1390	99%	1430	102%	1400	100%	1400
Cameo	2010	86%	2090	89%	2120	90%	2190	93%	2350

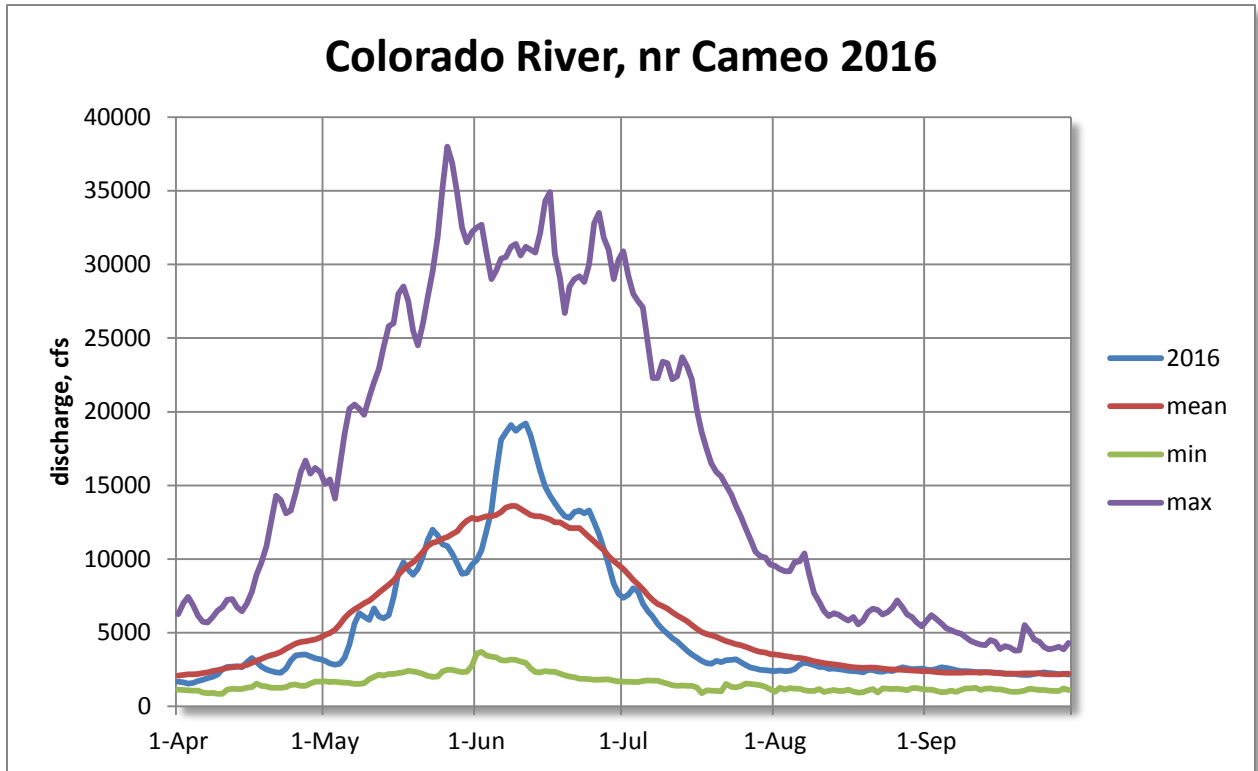
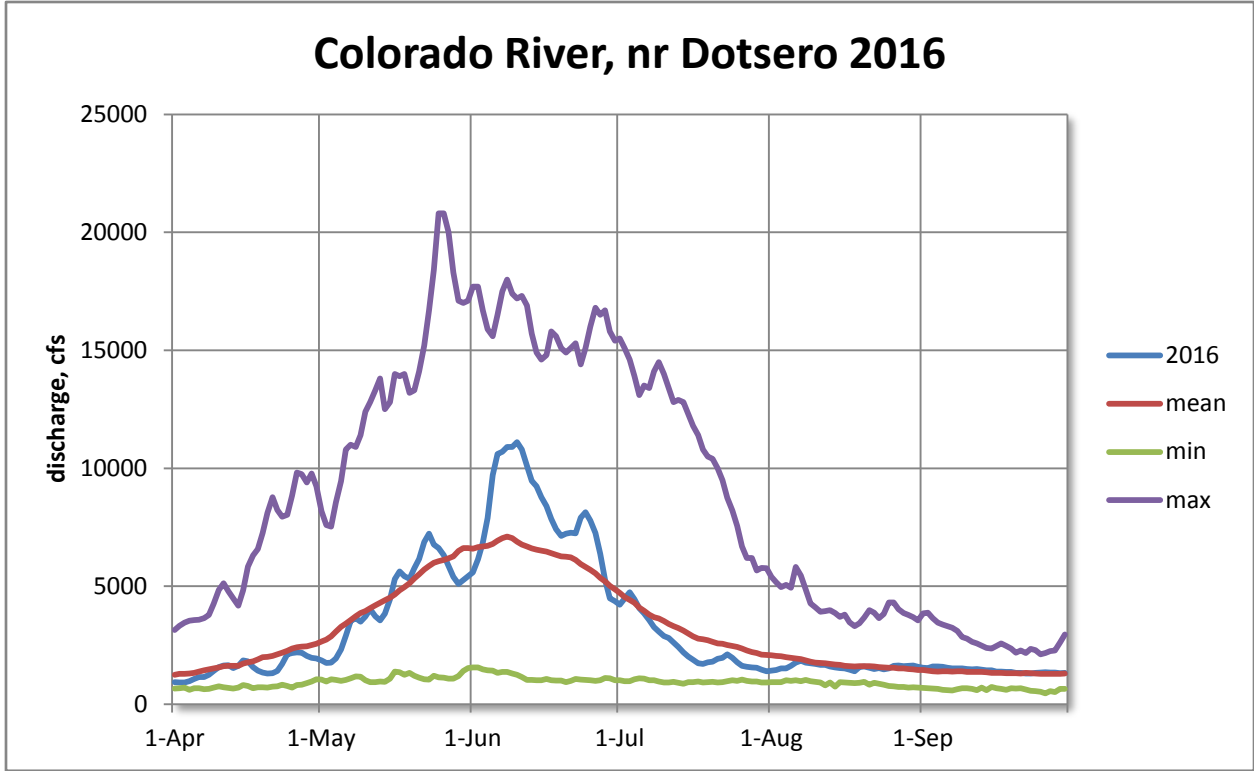
Weather for June and July was above average temperatures and below average precipitation in much of the Colorado River Basin. The exception was a relatively wet July for the Roaring Fork, Flattops, and area west of Glenwood Canyon to Parachute. In spite of the June-July weather, gaged flows were slightly higher compared to normal, than the forecasted undepleted flows. For a comparison of gaged flow with the June 1<sup>st</sup> undepleted flow forecast, the table below depicts actual gaged (depleted) flow for the same gages in the forecast table above.

Colorado River near Dotsero, and Colorado River near Cameo

**2016 Gaged** (depleted) flows

	April-July			April-September		
	Flow, AF	%of avg	Historic avg	Flow, AF	%of avg	Historic avg
Dotsero	1,007,955	104%	965,726	1,190,278	103%	1,150,251
Cameo	1,721,320	95%	1,817,640	2,016,068	95%	2,127,264

The following hydrographs of daily average flows for the Colorado River near Dotsero, and the Colorado River near Cameo depict for 2016 near historical daily average flows until early June, when peak of snowmelt runoff maintained flows as much as 60% above the average curve into the third week of June. A portion of the flows on the mainstem that were above average can be attributed to CROS that will be discussed later in the report. After snowmelt runoff, Colorado River flows hovered around historical averages through the end of the irrigation season. The irrigation season ended with total 2016 water year volumetric gaged flow for the Colorado River near Cameo ranking 41<sup>st</sup> out of 83 years of record, as close to average as any year can get.



## 2016 Division 5 Annual Report

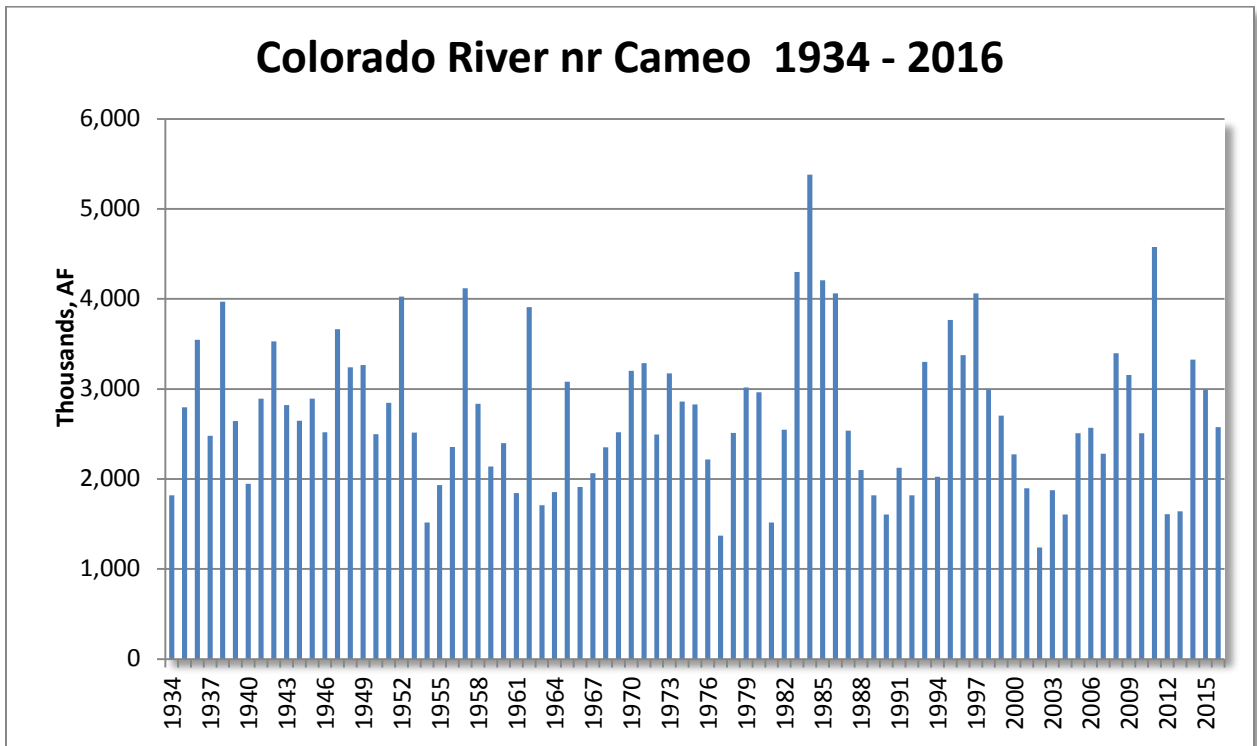
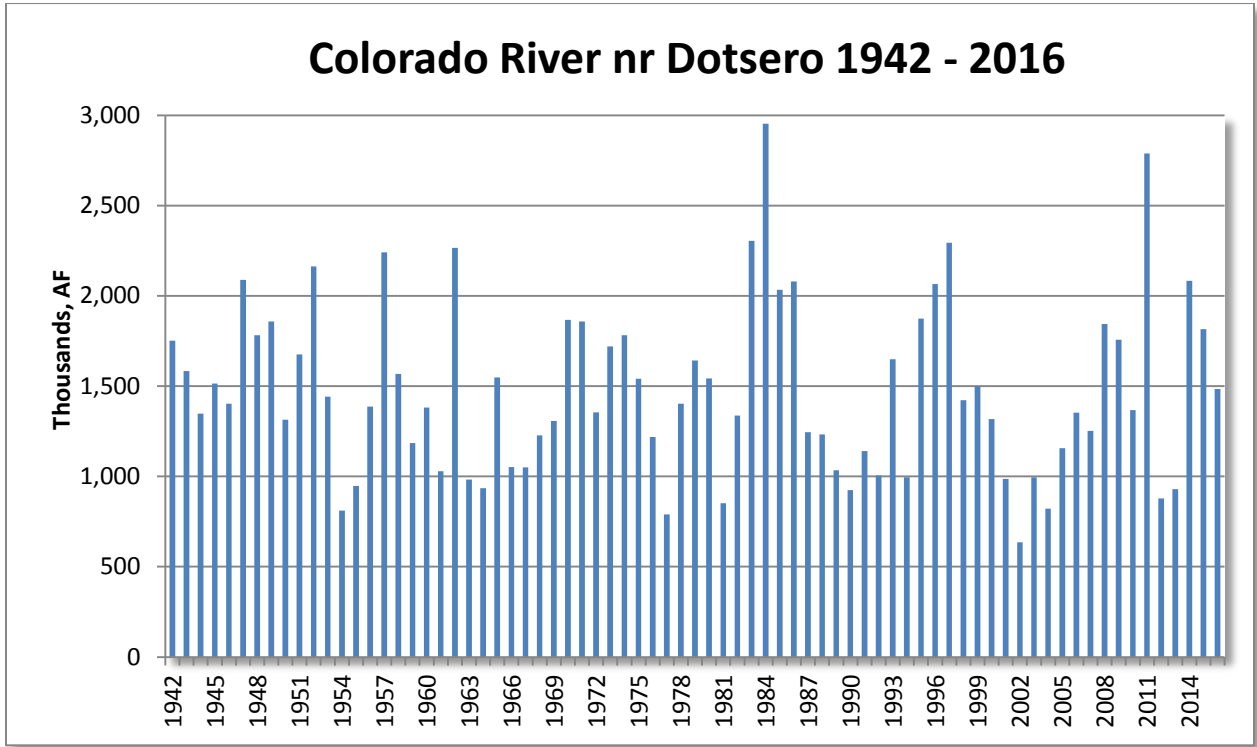
Green Mountain Reservoir start of fill by decree is declared between April 1 and May 15 of each year. Generally, the wetter the year the later start of fill is declared. For 2016 the start of fill was declared on May 9 with 74,870 acre-feet in storage. However, the low for storage in the spring of 2016 was 60,454 acre-feet on April 11, 2016. Storage between April 11<sup>th</sup> and the May 9<sup>th</sup> start of fill was done under the prior year's refill right. The reservoir attained a paper fill on June 24, 2016 with an owed- to-account from Denver Water and Colorado Springs Utilities of 9,022 acre-feet. The owed to account was eliminated using the provision in the Green Mountain Reservoir Fill Protocol allowing storage under a 1955 priority after a paper fill of its senior 1935 storage right on July 7, 2016, the date the USBR declared they had reached a "desired fill" at 152,602 acre-feet and 0.1 feet below maximum physical storage. The maximum storage at Green Mountain Reservoir for the year occurred on July 21, 2016 at 153,237 acre-feet. Thus all pools within the reservoir were full including, the Colorado-Big Thompson Project replacement pool and the West Slope Power Pool that includes the Historic Users Pool, the Silt Project Pool, and the contract pool.

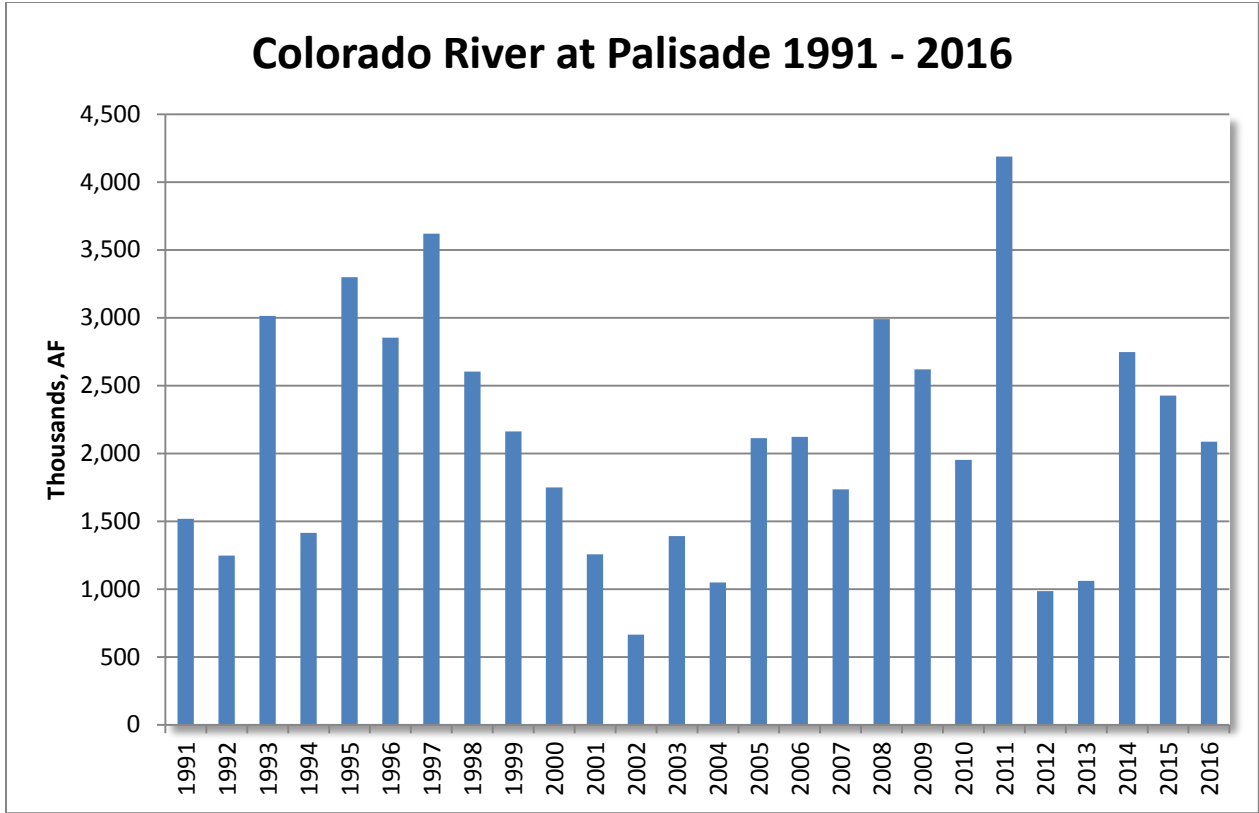
Ruedi Reservoir maximum storage occurred on July 7, 2016 with 102,004 acre-feet at 0.36 feet below spill, slightly above the desired maximum fill at 0.4 feet below spill. Physical fill is at 102,369 acre-feet. After limiting storage for dam safety concerns to 10 feet below the spillway for the past two years, Wolford Mountain Reservoir physically filled on May 29, 2016 at 66,000 acre-feet and reached a maximum content on June 2<sup>nd</sup> at 67,343 acre-feet. Six years of studying and monitoring settlement and deformation by the dam a risk-failure analysis has found no compelling reason for mitigation of the settlement and deformation and normal operation resumed. Williams Fork Reservoir filled to its decreed capacity on June 13<sup>th</sup> at 93,637 acre-feet also filled in 2016 and reached a maximum content on July 1<sup>st</sup> at 96,708 acre-feet. Dillon Reservoir filled to its decreed capacity on June 12, 2016, at 252,678 acre-feet and reached a maximum content on July 2<sup>nd</sup> of 261,315 acre-feet. At Granby Reservoir the spillway gates were operated from June 21<sup>st</sup> through July 5<sup>th</sup> to prevent an uncontrolled spill. The reservoir reached maximum storage on July 3<sup>rd</sup> at 536,139 acre-feet, below the capacity of 543,758 acre-feet. Total spill for 2016 was 11,630 acre-feet. Vega and Rifle Gap Reservoirs, facilities to two separate irrigation projects in Water Division 5, each filled in 2016. Repair work at Homestake Reservoir that began in 2011 completed in 2014 and nearly filled in 2015, did fill in 2016 at 42,900 acre-feet.

In summary, the 2016 Division 5 over-all runoff was very average with above average flows in the upper reaches of the basin and below average inflows in the lower tributaries. Water supplies throughout the basin were boosted by full reservoirs and the continued good conditions on the East Slope leaving undiverted transmountain water in the Colorado River. The total annual volumetric flow for 2016 ranked 41<sup>st</sup> in 83 years of record for the Colorado River near Cameo gage, while the Colorado River near Dotsero ranked slightly better at 34<sup>th</sup> in 73 years of record (see histograms of annual gaged flow). Thus, the "Super El Niño" of 2016 and its forecast for well above average precipitation is a forgotten memory short of expectations.

2016 Division 5 Annual Report

Colorado River near Dotsero, Colorado River near Cameo, and Colorado River blw Grand Valley Canal at Palisade gaged flow histograms for comparison of the 2016 irrigation year with previous years of record.





**Surface Water Administration**

The Shoshone Power Plant operations maintained a call throughout the winter of 2015-16. The Shoshone call was removed on April 11, 2016 for spring runoff and remained off until July 31<sup>st</sup>. Except for two short period of maintenance the call continued through the end of the irrigation season. The total call days from Shoshone during the 2016 irrigation year was 237 days. The Cameo call was not implemented in 2016 until it was exercised under paragraph 3(a)(1) of the stipulation in Case No. 91CW247, the on September 15, 2016. This is the first time this provision of the “Orchard Mesa Check Case” has been used. The check case limits the call to the 1950 cfs of the irrigation rights in the Government Highline Canal and the the Grand Valley Irrigation Company Canal combined. However, whenever irrigation demand is less than 1310 cfs in the Government Highline Canal the power right can be exercised to maintain 1310 cfs. The Cameo call continued through October 11<sup>th</sup> for a total of 27 call days in 2016. Green Mountain Reservoir storage replacement releases for the Historic User’s Pool were only 7,480 acre-feet, providing a significant surplus for the endangered fish recovery program.

2015 was the second year the fill of Green Mountain Reservoir was administered pursuant to the Green Mountain Reservoir Fill Protocol. However, continued operation pursuant to the Fill Protocol requires progress and ultimately final decrees in the pending water court application in state water court, and pending motion for a Federal Court finding that the Protocol is within the intent of the Blue River Decrees. There was no activity associated



2016 Division 5 Annual Report

with the litigation of these decrees in 2016. A principle of the protocol is a “Fill Plan” prepared by the USBR, allowing the Green Mountain Power Plant to operate without those operations accounting against a paper fill of the reservoir. Under all scenarios of the 2016 Fill Plan, Green Mountain inflows were allocated to power in excess of need to complete a fill of the reservoir. With inflows allocated to power, Denver Water and Colorado Springs Utilities diverted pursuant to their rights to power interference under the Blue River Decrees, also without those diversions accounting against Green Mountain Reservoir’s fill.

The majority of Division 5’s surface water administration will always be on the many tributaries with more senior calling rights than the mainstem. The calls administered for these tributaries can be found in the Division’s call chronology in CDSS. The total number of call changes on Division 5 tributaries for 2016 was 341.

There were a total of 11 administrative orders install or repair lockable headgates, measuring devices, and to provide accounting.

A total of 15 administrative exchanges were approved pursuant to CRS §37-83-104 in Division 5 for the 2016 Irrigation Year. They include the annually approved exchanges for snowmaking, and to store Goose Pasture Tarn and Clinton Reservoir water in Dillon, exchanging it back up after runoff, to one time approvals for construction or pending water court cases.

SUMMARY OF COLORADO RIVER MAIN STEM CALLS  
2016 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
11-01-15	04-10-16	162	Shoshone Power Plant	1,250 cfs	----	20427.18999	
04-11-16	07-31-16	112	Free River	---	---	---	
08-01-16	08-08-16	8	Shoshone Power Plant	158 cfs	---	33023.28989	
08-09-16	08-16-16	8	Free River	---	---	---	Shoshone Power Plant not Operational
08-17-16	08-20-16	4	Shoshone Power Plant	158 cfs	---	33023.28989	
08-21-16	09-01-16	12	Shoshone Power Plant	1,250 cfs	CBT Project	31258.00000	
09-02-16	10-18-16	47	Shoshone Power Plant	1,250 cfs	----	20427.18999	
10-19-16	10-27-16	9	Free River	---	---	---	Shoshone Power Plant not Operational
10-28-16	10-31-16	4	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
11-01-15	09-14-16	319	Free River	---	---	---	
09-15-16	10-11-16	27	Grand Valley Proj. Power Plant	400 cfs	----	30895.21241	Pursuant to 3.a.1 of Check Case Stip.
10-12-16	10-31-16	20	Free River	---	---	---	

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

### **Administration of Unused Diversions**

*“The abundance of water during the season has given cause for wasting in some localities, and notably in the section watered by Sopris and Capitol Creeks, in Water District No. 38, it became necessary to warn water users from wasting water. The county commissioners of Pitkin County issued a notice to that effect, since their roads were considerably damaged, and I co-operated with them by publishing a separate notice, wherein the consequences of willful water were set forth. Since then no complaint has been heard from that quarter.”* 1909 Division 5 Annual Report, Theodore Rosenberg, Irrigation Division Engineer

Complaints of waste by irrigation ditches along the Roaring Fork and Crystal Rivers were raised by citizens in the area, the Roaring Fork Conservancy, and newspaper reporters. Waste is not a new issue, as was highlighted in the 1909 Division 5 Annual Report quoted above. The Water Commissioner for several years has been working with the water users in the area to educate them on beneficial use and our authority to curtail waste. Outreach to the community includes attending all general Roaring Fork Conservancy meetings and all meetings relating to the Crystal River Stream Management Plan. In 2016, the State Engineer gave a presentation for the Roaring Fork Conservancy on “Use it or lose it”, encouraging water users to only divert what is needed for beneficial use. Many of the water users on the Roaring Fork and Crystal Rivers that may be diverting their decreed amount even when not needed for beneficial use were in attendance. During the summer the Division Engineer, Assistant DE and Water Commissioner met with the Town of Carbondale to discuss their operations and walked the entire Town of Carbondale Ditch, observing the Town’s issues with delivering water in an open ditch to residents for irrigation of lawns and parks. The Water Commissioner had “ditch bank meetings” and many follow-up meetings with several agricultural operators and the River Valley Ranch Golf Course to discuss waste and encourage efforts to self reduce headgates when not needed. Several ditches did reduce headgates on own accord. Only the East Mesa Ditch required curtailment for waste by the Water Commissioner. It should be noted that most on the ditch wanted it to be reduced. Water was conserved in 2016 and left in the river to either meet the needs of a minimum stream flow call, or to mitigate low flows. At this time at least one water user is working on a conservation plan. It is hoped that others will follow. Much remains to be done, including changes to structures and attitudes. Division 5 will continue to work with water users to limit waste, hopefully without issuing orders.

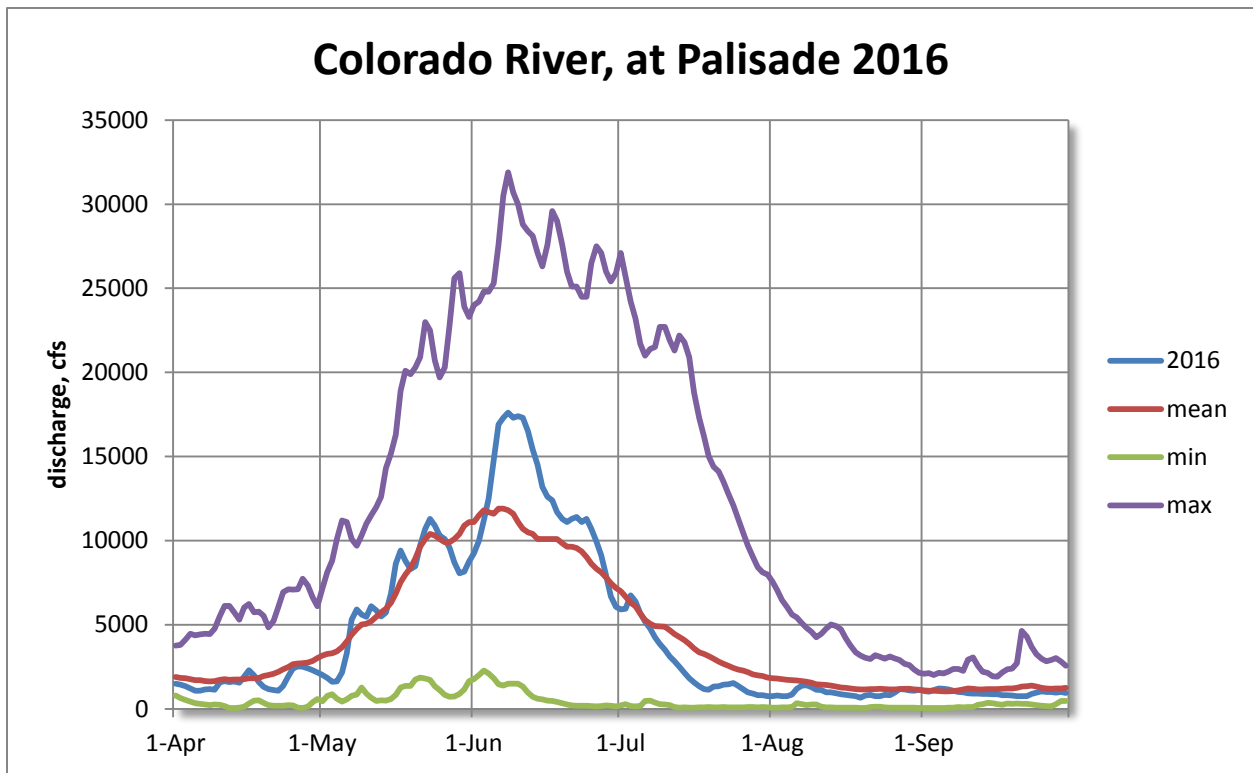
### **Endangered Fish Recovery Program**

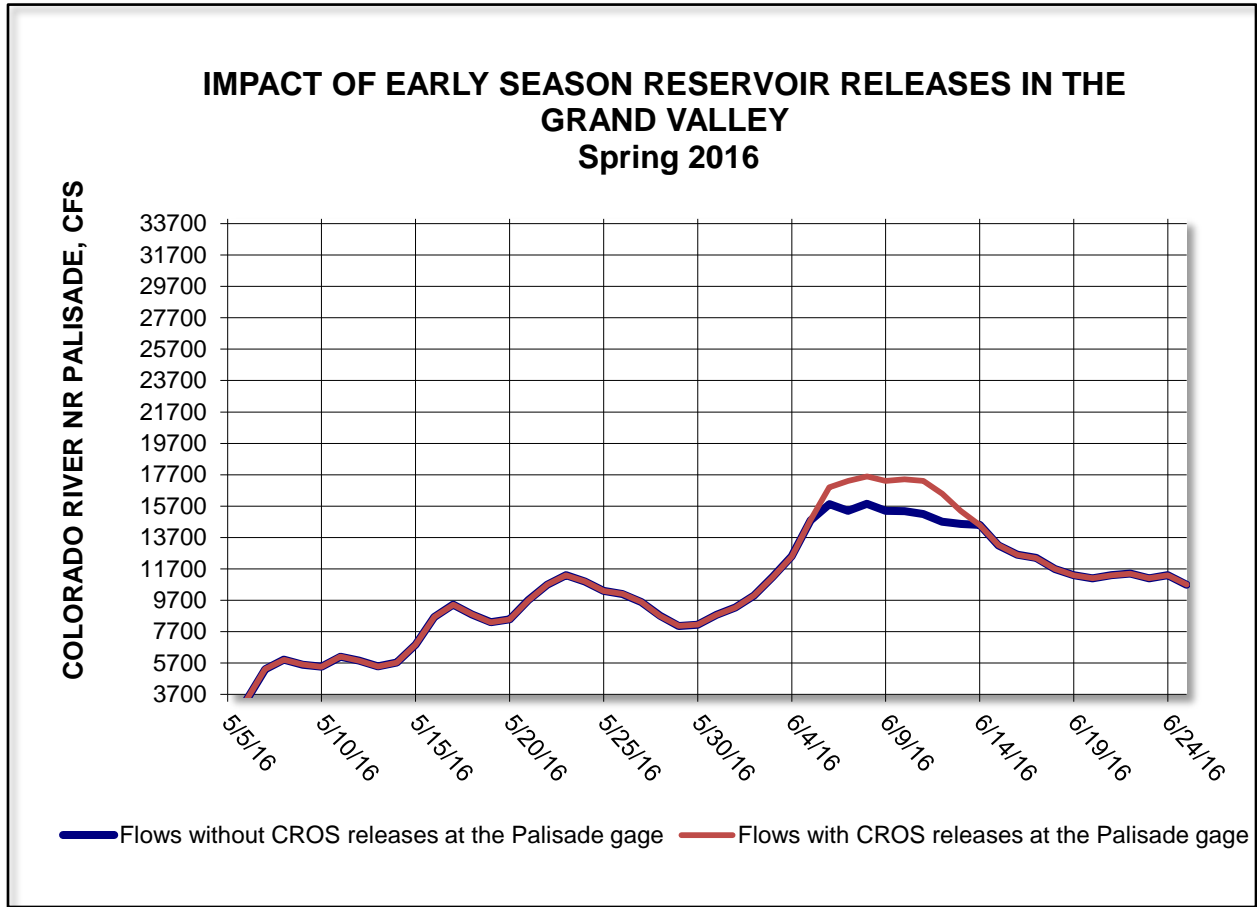
The Coordinated Reservoir Operations (CROS) program was established in 1995 as part of the Upper Colorado River Endangered Fish Recovery Program. Its purpose is to enhance spring peak flows for a 10 day period in a section of the Colorado River upstream of Grand Junction, CO, determined critical to the survival of four endangered fish species: the Humpback Chub, Razorback Sucker, Bonytail and the Colorado Pikeminnow. In years with sufficient snowpack, surplus inflows to the reservoirs can be passed on downstream to benefit these fish without impacting reservoir yield. Preparation for CROS generally begins in March, the assure the

“April Hole” of 2013 was not repeated. Meetings become weekly as peak snowmelt runoff approaches. The goal is to time the bypass of storable inflows, release of storage, or other divertable flows at participating reservoirs and operators to enhance the peak at the Colorado River near Cameo gage, such the enhancement will result in flows that exceed 12,900 cfs, the minimum deemed to benefit the habitat, but will not exceed 25,000 cfs, which is bank full in the Palisade-Grand Junction area. The decision to trigger CROS operations is made after managers of participating reservoirs are confidence 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.

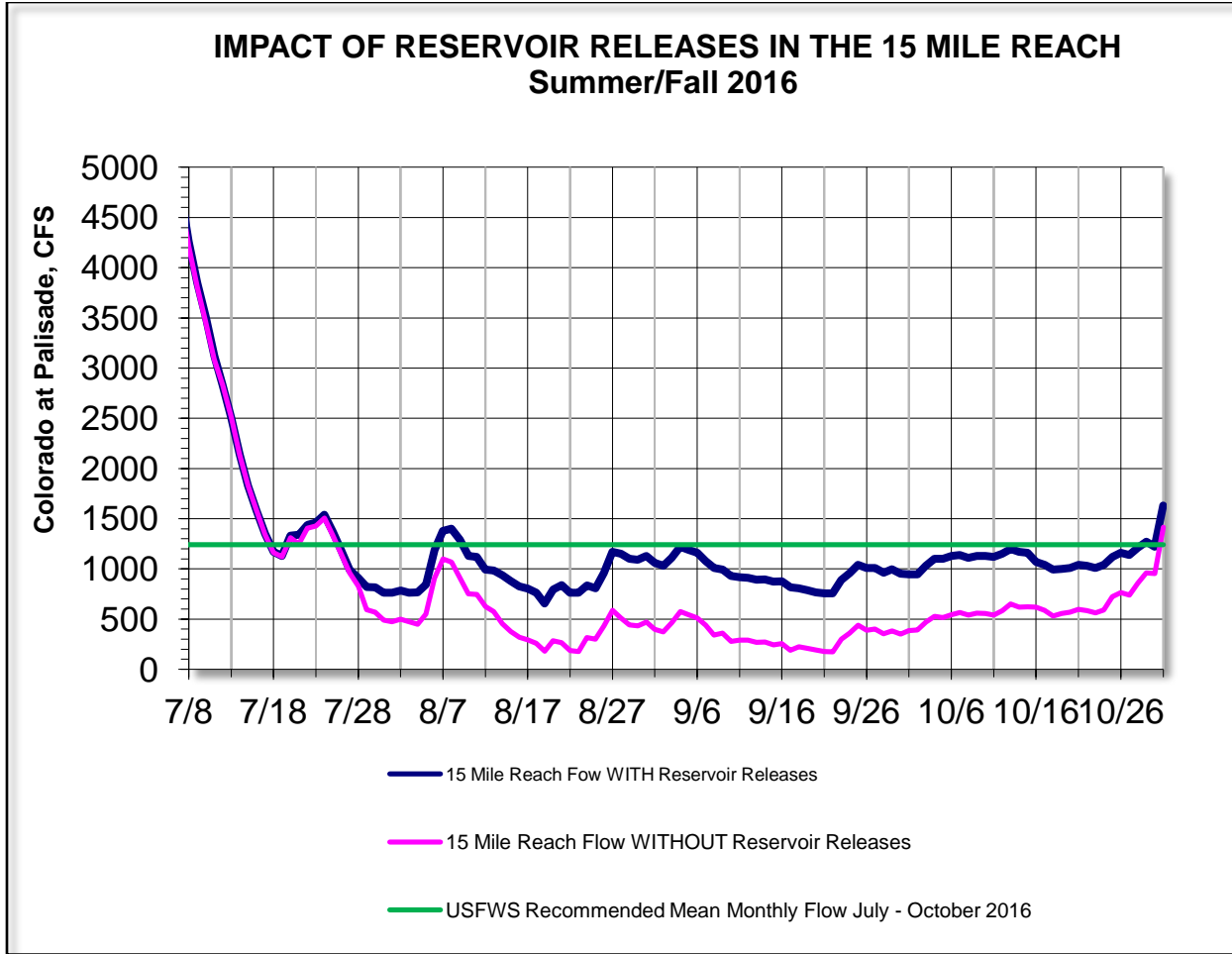
No action was necessary in 2016 to avert an “April Hole.”

CROS operations did occur in 2016 for the second consecutive year. Bypassing inflows began on June 3, 2016 and continued through June 11, 2016. Accounting for the various delivery times the flows in the critical reach were enhanced from June 5<sup>th</sup> through June 13<sup>th</sup>. Accounting for transit losses the maximum peak enhancement was on June 11<sup>th</sup> at 2,107 cfs. The actual peak at the Colorado River at Palisade gage did occur during this enhancement on June 10<sup>th</sup> at 17,400 cfs. Total deliveries (bypasses less transit losses) for 2016 were 26,536 acre-feet. The following graphs depict the flows for the Colorado River at Palisade as compared to historic, and the impact of 2016 CROS operations on the peak flow.





The USFWS set the Endangered Fish Recovery Program target flow for the Colorado River at Palisade gage at 1,240 cfs set on July 1<sup>st</sup> for the entire summer base flow augmentation period. This is the target the USFWS uses for average flow conditions. Once the target was set for 2016 it remained unchanged for the season. Though flows were well above the target, Palisade Pipeline bypasses were accounted to flow augmentation beginning on July 1<sup>st</sup>. The initial reservoir release was made from Ruedi Reservoir on July 20<sup>th</sup>. All pools for the recovery program were filled in 2016, making 26,824 acre-feet available for the program. On August 8<sup>th</sup> a surplus was declared in Green Mountain Reservoir’s HUP making any portion of the 66,000 acre-foot pool not needed for its beneficiaries available for the program. Additionally, the Ute Water Conservancy District leased to the Colorado Water Conservation Board up to 12,000 acre-feet of its Ruedi Reservoir storage for use by the recovery program. By October 31, 2016 surplus releases from the HUP totaled 55,390 acre-feet. A total of 94,216 acre-feet was released from Green Mountain, Ruedi, Wolford Mountain, Williams Fork, and Granby Reservoirs. The total augmentation water delivered to the 15 mile reach, accounting for transit losses and 12,210 acre-feet of bypasses by the Palisade Pipeline, were 97,192 acre-feet. The 2016 augmentation of flow in the 15 mile reach is depicted in the flowing graph.



**Water Court**

There was one Supreme Court Cases of interest involving Division 5 water rights. Case No. 14SA303 *Grand Valley Water Users Ass’n v. Busk-Invanhoe Inc.* involved a change of water right of a transmountain diversion. The court found that: a) the right was not decreed to be stored on the east slope and any use subsequent to storage could not be considered in an HCU analysis, b) that any water used as payment for storage space likewise could not be considered in an HCU analysis, and c) the 22 years of unjustified non-use (in those 22 years the water was diverted and used for undecreed municipal purposes) omitted from the HCU analysis was in error. The Supreme Court remanded the case back to the Division 2 Water Court to make the previously decreed HCU quantification consistent with its findings.

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, no statements of opposition were filed in 2016. Litigation proceeded without our formal entry into cases excluding 2 motions to intervene, though no protest to Referee Rulings were necessary.

For 2016 there were 169 Water Court Applications, where one application was withdrawn, 2 applications were re-referred and had Written Recommendations to the Water Judge, leaving 166 applications needing Summary of Consultations, which were filed as required by the rules of the

## 2016 Division 5 Annual Report

court within 30 days of the consultation meeting with the referee. No extensions of time were requested for filing consultations in 2016.

### **Groundwater**

Groundwater permit applications for exempt and non-exempt wells are reviewed and approved by staff in both the Division 5 and the State Engineers Office. Well permitting activity during 2016 included 561 well permit applications, 217 monitoring/observation hole notifications. These are both increases from 2015, which had 463 well permit applications and 93 monitoring/observation hole notifications. Total permits issued for both exempt and nonexempt new and replacement wells in 2016 also increased with 512 permits issued compared to 451 permits issued during 2015. There were 2 geothermal permit applications and permits issued in 2016. Drilling activity in 2016 saw 233 drillers logs received, which was on par with 2015 when 231 wells were constructed.

### **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 outstanding issues. This year negotiations of the Shoshone Outage Protocol concluded on June 27, 2016 with the signing of the Shoshone Outage Protocol Agreement. Progress was made on Denver's diligence application in 06CW255 with the stipulation of most major parties late in 2016. Case number 06CW255 includes claims for the express purpose of implementing the CRCA that Dillon Reservoir can be used for West Slope purposes, stored any east slope reservoir in Denver's system, and used anywhere in the Denver Metro Area as that area is defined in the CRCA. Remaining for resolution is the litigation of Federal and State decrees related to the Blue River Decree, where no progress was made. The state application was filed in 13CW3077 and remains open pending resolution of the motion to reopen the Blue River Decrees in Federal Court. In addition to the recent execution of the Shoshone Outage Protocol, completed pieces to the CRCA include: the main CRCA agreement signed in 2011; the Green Mountain Fill Protocol and Green Mountain Protocol Agreement; a water court decree in 10CW298 by Grand County for RCID's on the Colorado River; a water court decree in 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; and Denver's "reverse exchange" decree in 11CW21 allowing Dillon storage to be exchanged to Moffatt and Williams Fork.

The 2016 Annual Report is respectfully submitted for the Staff of Water Division 5, by



Alan C Martellaro, Division Engineer  
February 28, 2017