Colorado Division of Water Resources

2015 Annual Report

Water Division 5

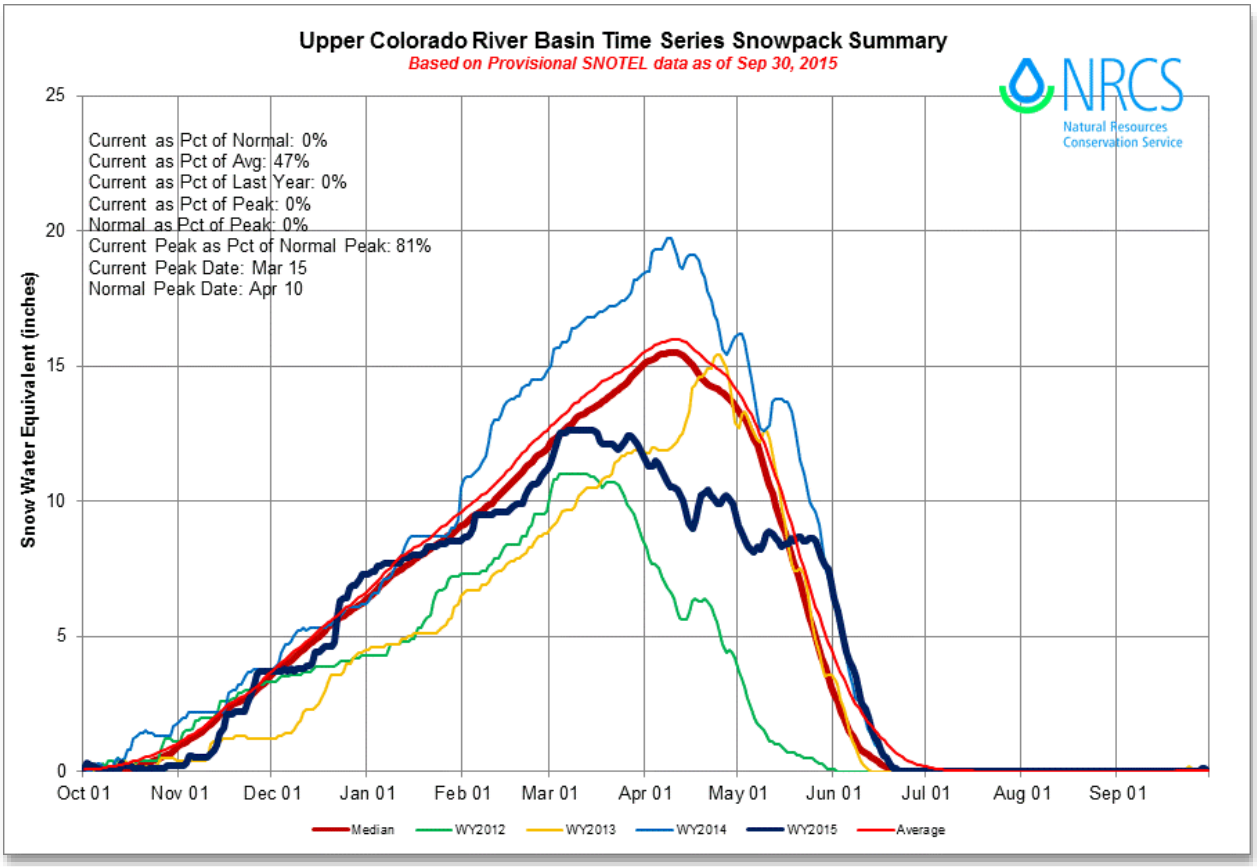
Lake Granby Spill June 2015

Colorado River Basin

Alan C Martellaro
Division Engineer

Surface Water Supply

The 2015 Irrigation Year began with near to above average stream flows, and above average reservoir carryover storage. Storage in the basin's major reservoirs was 93% of average on September 30, 2013, while on September 30, 2014 storage improved to 112% of average for that date. With little space on the east slope to move west slope storage associated with transmountain diversions, and minimized discretionary power releases to make space for spring runoff due to the expected below average runoff, storage conditions continued to improve throughout the winter to 124% of average on April 1, 2015. Precipitation throughout the fall and winter varied between much below average in October and March to slightly above average in November and December with slightly below average in the remaining months. The result was an April 1, 2015 snowpack of 77% of average from 86% of average precipitation, and reservoir storage at 124% of normal. April provided only 74% of normal precipitation leaving a May 1st snowpack at 68% from a water year total of 84% of normal precipitation. The trend of improving storage continued with May 1, 2015 storage at 129% of average. The "Miracle May" of 2015 dramatically changed statewide snowpack and runoff forecasts. The SNOTEL sites in the Colorado River Basin received 204% of normal precipitation for the month, bringing the total Water Year to date precipitation up to 96% and snowpack on May 31 at 223% for that date. Graphically, the Time Series Snowpack Summary depicts the May event as a cessation of loss of snowpack to a slight increase until late in the month. The snowpack improved to above average by mid-month. Ultimately equally the incredible 2014 snowpack on the descending limb of the snowmelt in late May.



	30-Sep 2012	30-Sep 2013	30-Sep 2014	28-Sep 2015
Dillon Reservoir	198,924	245,855	247,209	251,680
Granby Reservoir	333,593	371,008	522,187	500,314
Green Mtn Res	76,719	107,058	115,215	112,410
Ruedi Reservoir	66,071	86,080	87,909	81,779
Williams Fork R	48,379	73,041	88,275	88,530
Total	723,686	883,042	1,060,795	1,034,713

End of Water Year storage for some of Division 5's major reservoirs.

The runoff forecast degraded throughout the winter reaching a low on May 1st for all forecasted gages in the basin. As with the previous 3 years the northern and eastern sub-basins of the Upper Colorado experience greater snowfall and higher forecasts than the more westerly and southerly basins. For example, on May 1st the mostly probable runoff forecasted for the Roaring Fork River was 65% of normal, while for Willow Creek it was 79%. The degradation of runoff conditions from the upper reaches to the lower can be also observed in the May 1st forecasts of 86% forecast for the Dotsero gage, and then subsequent to lower tributary contributions the forecast for the Colorado River near Cameo was only 74%.

Colorado River nr Dotsero, and nr Cameo

2015 forecast (most probable undepleted runoff), April-July in KAF

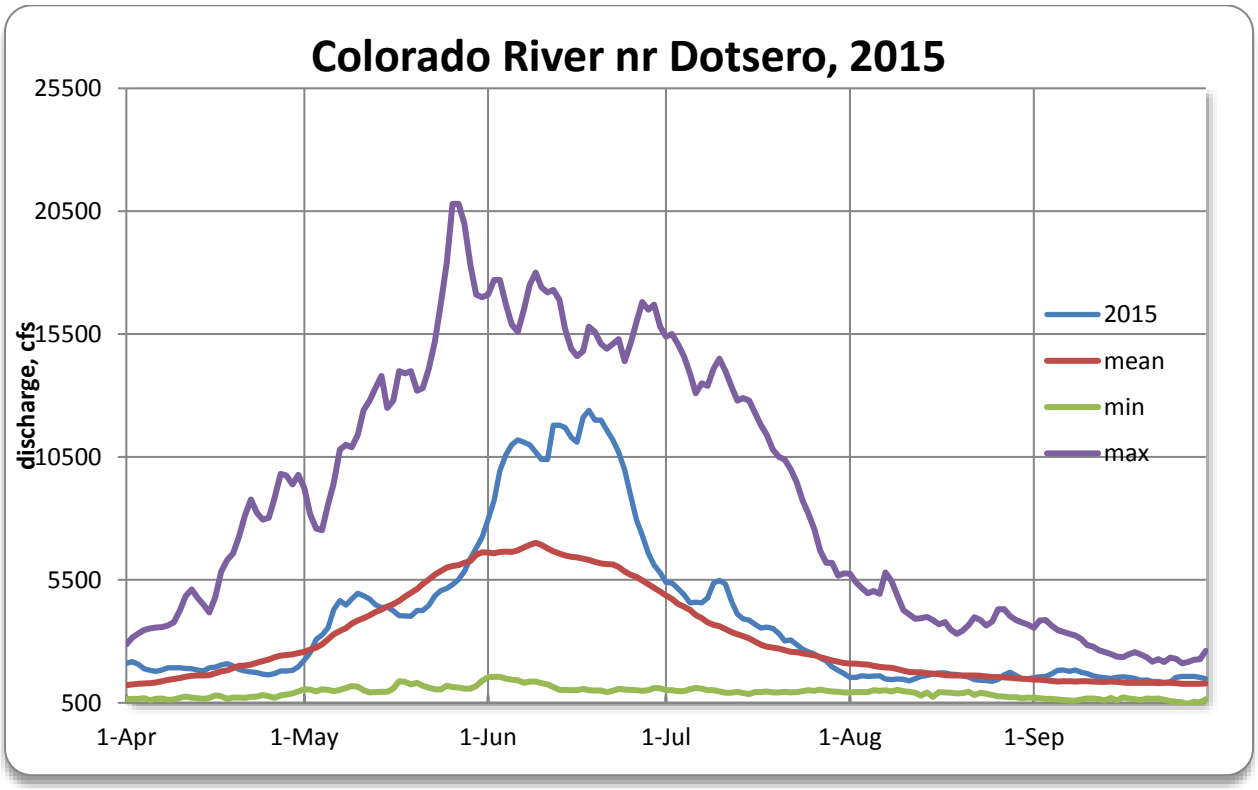
	March 1st		April 1st		May 1st		June 1st		Average Undepleted
	Flow	% avg	Flow	% avg	Flow	% avg	Flow	% avg	
Dotsero	1440	103%	1220	87%	1200	86%	1460	104%	1400
Cameo	2108	93%	1800	77%	1730	74%	2200	94%	2350

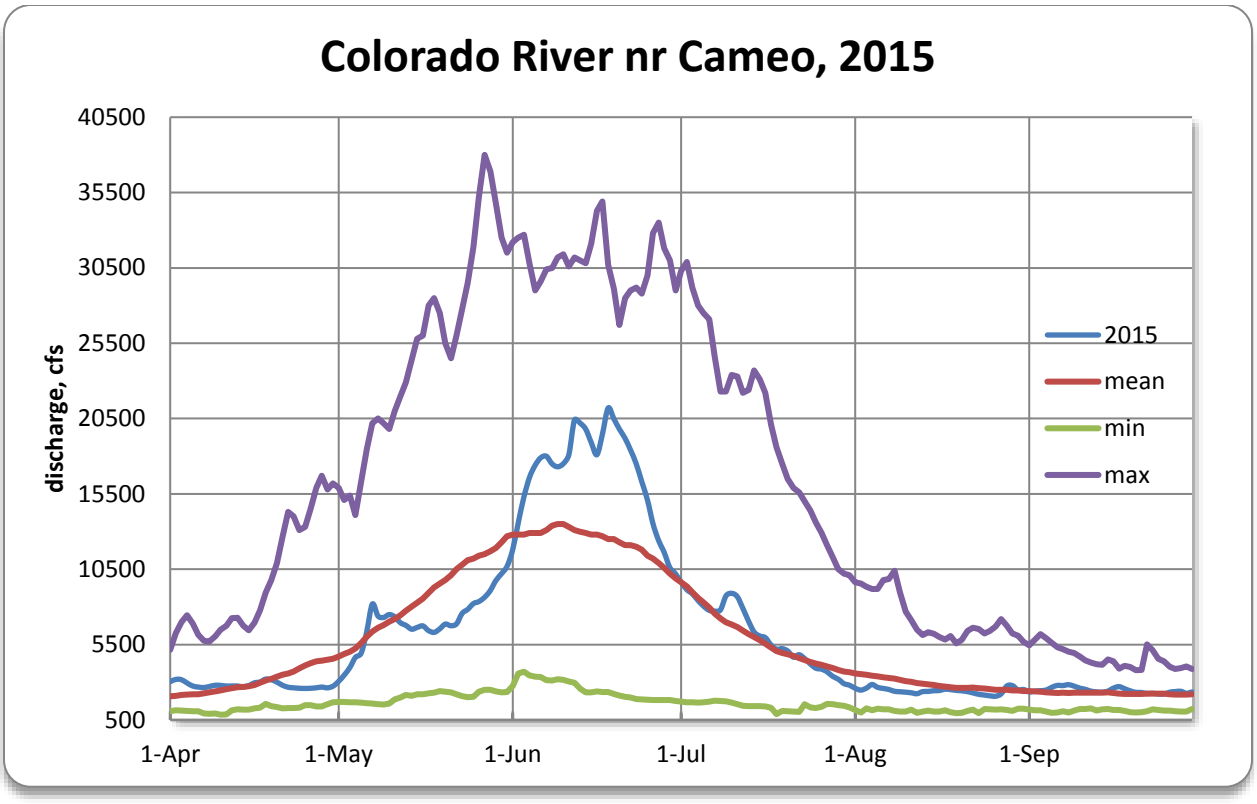
Relatively wet weather continued in June and early July, giving way to normal precipitation the remainder of the summer. Ultimately, actual gaged flow for April through July as a percent of average was much higher than the June 1 runoff undepleted flow forecast. For comparison of gaged flow with the June 1st 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
2015 Gaged (depleted) flows

	April-July			April-September		
	Flow, AF	%of avg	Historic avg	Flow, AF	%of avg	Historic avg
Dotsero	1230643	128%	959915	1418817	124%	1146146
Cameo	1976835	109%	1815061	2273091	107%	2127542

The following hydrographs of daily average flows for the Colorado River near Dotsero, and the Colorado River near Cameo depict for 2015 near average flows until late May, when snowmelt runoff was well above average through June. The hydrographs also show a high water peak occurring two weeks after the average peak day. After snowmelt runoff, stream flow hovered around average through the end of the irrigation season. The irrigation season ended with forecasts of a "Super El Niño" peaking in the spring of 2016, giving hope to a very good snowpack for next year.



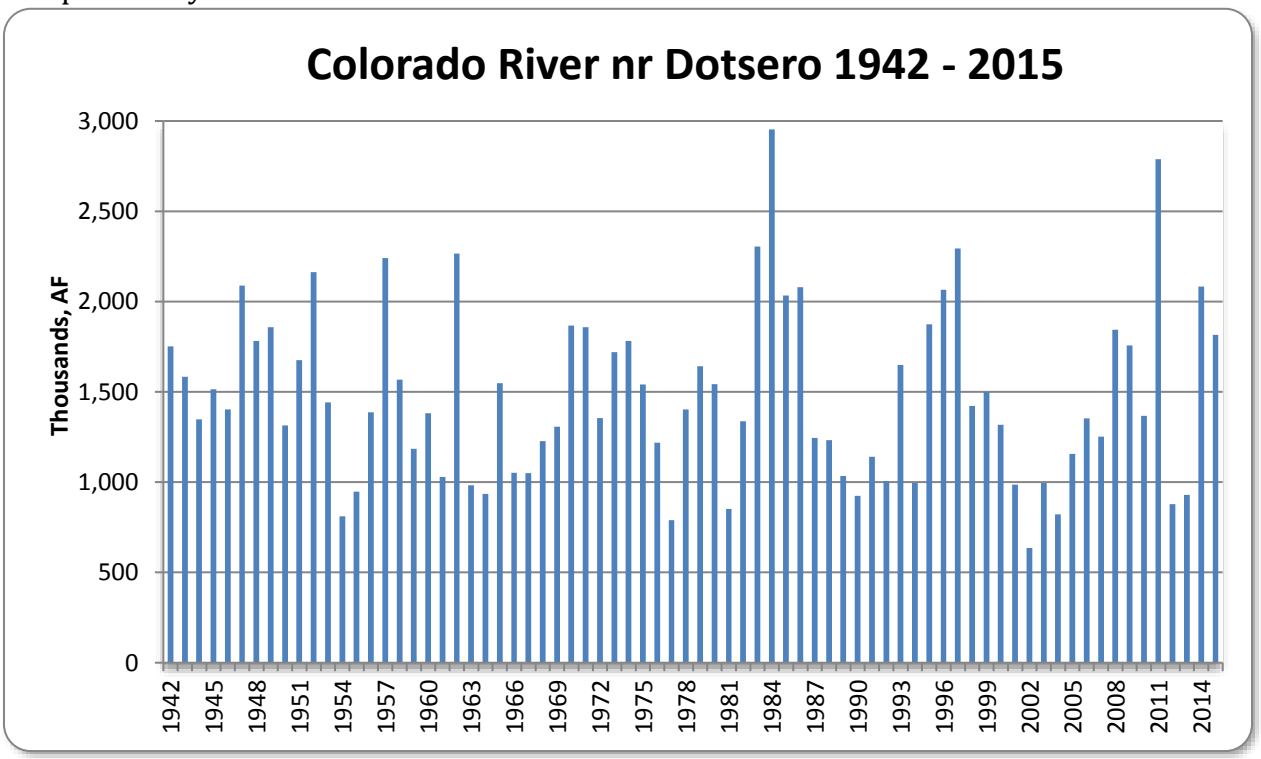


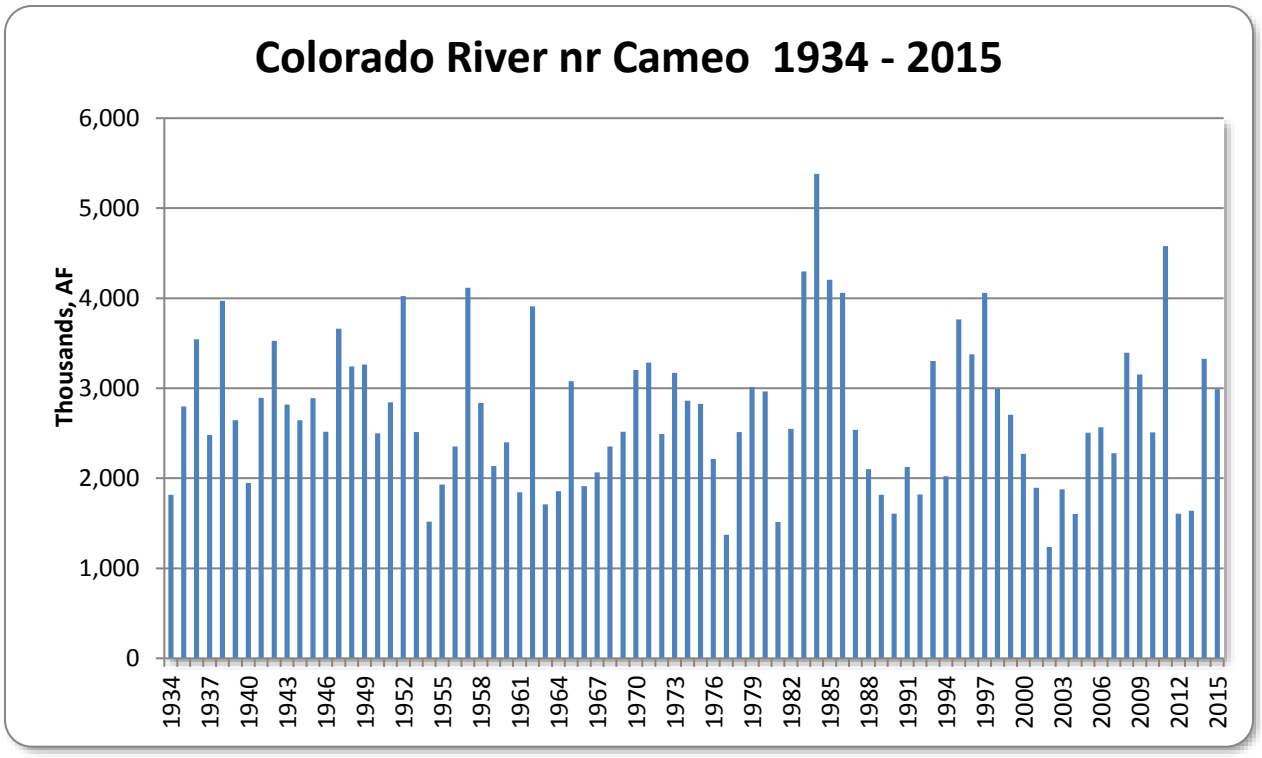
Green Mountain Reservoir start of fill by decree is declared between April 1 and May 15 of each year. Generally, the wetter the year the later start of fill is declared. For 2014 the start of fill was declared on May 15 with 88,174 acre-feet in storage. The reservoir attained a paper fill on June 16, 2014 with an owed- to-account from Denver Water and Colorado Springs Utilities of 13,974 acre-feet. The owed to account was eliminated by July 4, 2016 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. Eventually Green Mountain Reservoir was physical full at 152,635 acre-feet on July 8th. 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 physically filled on July 9, 2015 with 102,369 acre-feet. Wolford Mountain Reservoir reached a maximum content on May 29th at 52,794 acre-feet. Storable inflow was sufficient to fill the reservoir, however, for monitoring settlement and deformation of the dam maximum storage was kept 10 feet below the spillway. Williams Fork Reservoir also filled in 2015 with maximum content on June 9th at 96,689 acre-feet. Dillon Reservoir filled on June 29, 2015, reaching a maximum content on July 3rd of 255,812 acre-feet. Most significant for Division 5 was storage at Granby Reservoir where large releases were made in June and July to prevent a major spill. The reservoir a reached maximum storage on July 17 at 536,565 acre-feet and spilled from June 16 through August 11. Vega and Rifle Gap Reservoirs, facilities to two separate irrigation project in Water Division 5, each filled in 2014. Repair work at Homestake Reservoir that began in 2011

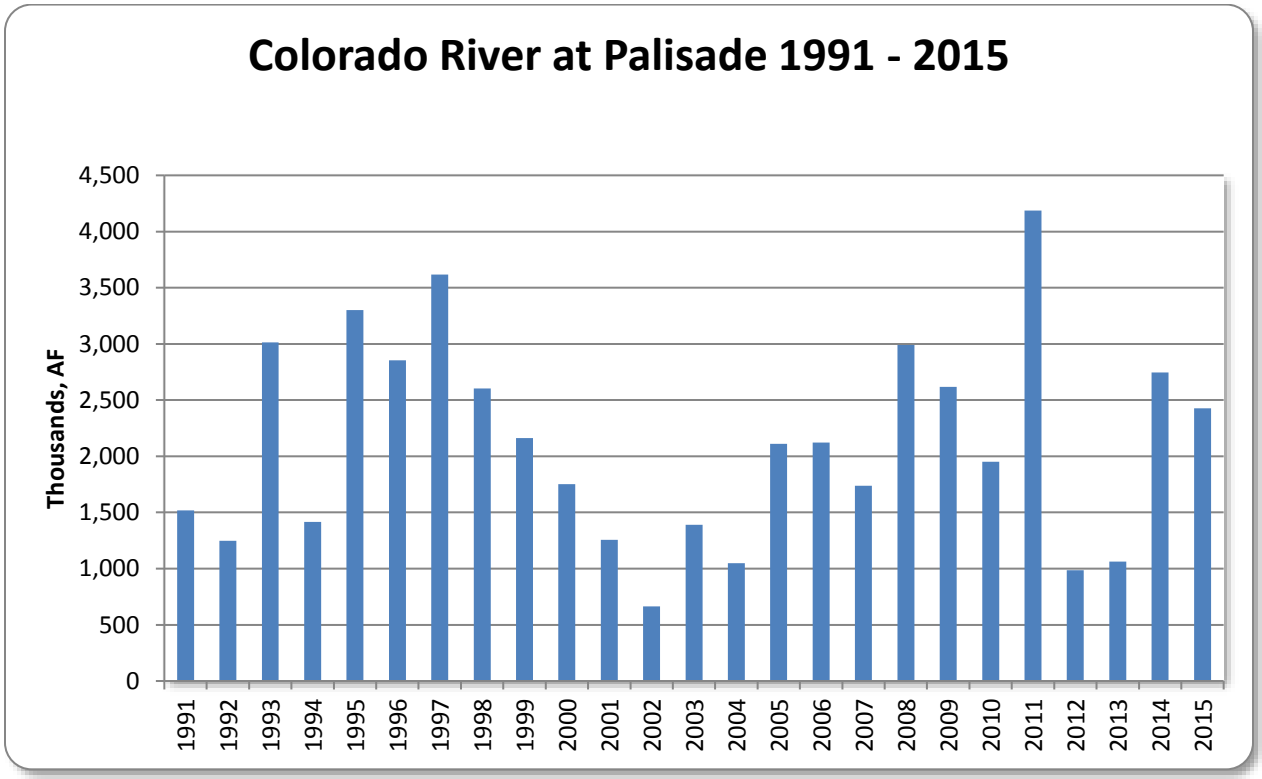
was completed in 2014. In May and then in July the Dam Safety Branch approved two interim storage levels as work was completed below those levels. The reservoir reached maximum storage for the year on July 15th, at 42,530 acre-feet just short of full storage at 42,900 acre-feet. The final acceptance of construction letter was issued on January 16, 2016.

In summary, 2015 did not provide the significant flows of 2014, but was a very good year. Great conditions on the East Slope left undiverted transmountain water in the Colorado River. The total annual volumetric flow for 2015 ranked 28th in 82 years of record for the Colorado River near Cameo gage, while the Colorado River near Dotsero 2015 total annual volumetric flow ranked 18th in 72 years of record. The gaged flows for the entire Water Year were 110% of historic average at the Colorado River near Cameo gage, and 123% of average at the Colorado River near Dotsero gage (see histograms of annual gaged flow).

Colorado River near Dotsero, Colorado River near Cameo, and Colorado River blw Grand Valley Canal at Palisade gaged flow histograms for comparison of the 2015 irrigation year with previous years of record.




Colorado River nr Cameo 1934 - 2015
Thousands, AF
6,000
5,000
4,000
3,000
2,000
1,000
0
1934
1937
1940
1943
1946
1949
1952
1955
1958
1961
1964
1967
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
2015


Colorado River at Palisade 1991 - 2015
Thousands, AF
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

Surface Water Administration

The Shoshone Power Plant began the 2015 irrigation year offline for scheduled maintenance, but was back online on December 1, 2014. The Shoshone call continued throughout the winter, and then was removed on March 19, 2015 as river flows exceeded power plant capacity. Due to very good water supply the call remained off until early August. The total call days from Shoshone during the 2015 irrigation year was 181 days. The Cameo call was implemented for only 42 days, with a call only by the most junior right of the Cameo Demand. As often happens at times during the summer a series of storms during early September removed the call at Shoshone from September 8-20, and from Cameo from September 2-20. With the great water supply Green Mountain Reservoir storage replacement releases for the Historic User's Pool were only 4,178 acre-feet, providing a significant surplus for the endangered fish recovery program.

SUMMARY OF COLORADO RIVER MAIN STEM CALLS
2015 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
11-01-14	11-30-14	30	Free River	---	---	---	Free River
12-01-14	03-18-15	108	Shoshone Power Plant	1,250 cfs	----	20427.18999	
03-19-15	08-06-15	141	Free River	---	---	---	Free River
08-07-15	08-10-15	4	Shoshone Power Plant	158 cfs	---	33023.28969	
08-11-15	08-18-15	8	Shoshone Power Plant	1,250 cfs	Moffat Water Tunnel	30870.26117	
08-19-15	08-23-15	5	Shoshone Power Plant	158 cfs	---	33023.28969	
08-24-15	08-24-15	1	Shoshone Power Plant	1,250 cfs	Moffat Water Tunnel	30870.26117	
08-25-15	09-07-15	14	Shoshone Power Plant	1,250 cfs	----	20427.18999	
09-08-15	09-20-15	13	Free River	---	---	---	Free River
09-21-15	09-30-15	10	Grand Valley Canal	119 cfs	----	30895.23491	Controlled by Cameo Call
10-01-15	10-31-15	31	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
11-01-14	08-25-15	298	Free River	---	---	---	
08-26-15	09-01-15	7	Grand Valley Canal	119 cfs	----	30895.23491	
09-02-15	09-20-15	19	Free River	---	---	---	
09-21-15	10-25-15	35	Grand Valley Canal	119 cfs	----	30895.23491	
10-26-15	10-31-15	6	Free River	---	---	---	

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

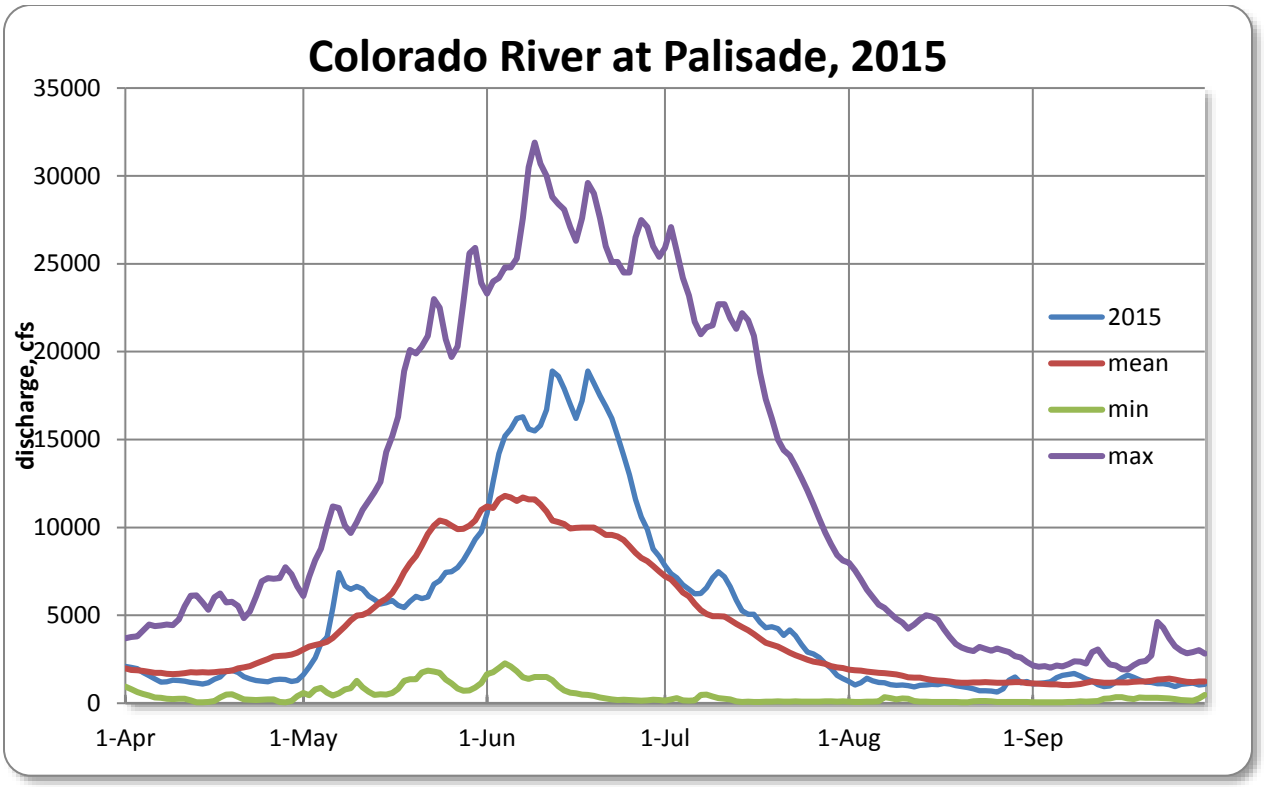
Beginning in 2004 the filling of Green Mountain Reservoir was accomplished through the SEO's Interim Policies issued for each individual year. 2015 was the first year the fill of Green Mountain Reservoir was administered pursuant to the Green Mountain Reservoir Fill Protocol. However, continued operation pursuant to the Fill Protocol requires progress and ultimate 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. The Protocol is the result of 12 years of negotiations. As a year with a good water supply the initial implementation in 2015 was without dispute over details of the Protocol that may come in future years. Principle to the protocol is a "Fill Plan" prepared by the USBR. Under all scenarios of the 2015 Fill Plan, Green Mountain inflows were allocated to power in excess of was needed to complete a fill of the reservoir. With inflows allocated to power, Denver Water and Colorado Springs Utilities diverted pursuant to their right to power interference under the Blue River Decrees, without those diversions accounting against Green Mountain Reservoir's fill. Pursuant to the Green Mountain Reservoir Fill Protocol the cities requested for 2015 conservative power operations, allowing the reservoir to fill with some water allocated to power and thus fill faster. With this request the cities agree to reimburse the US Treasury for any lost power revenue.

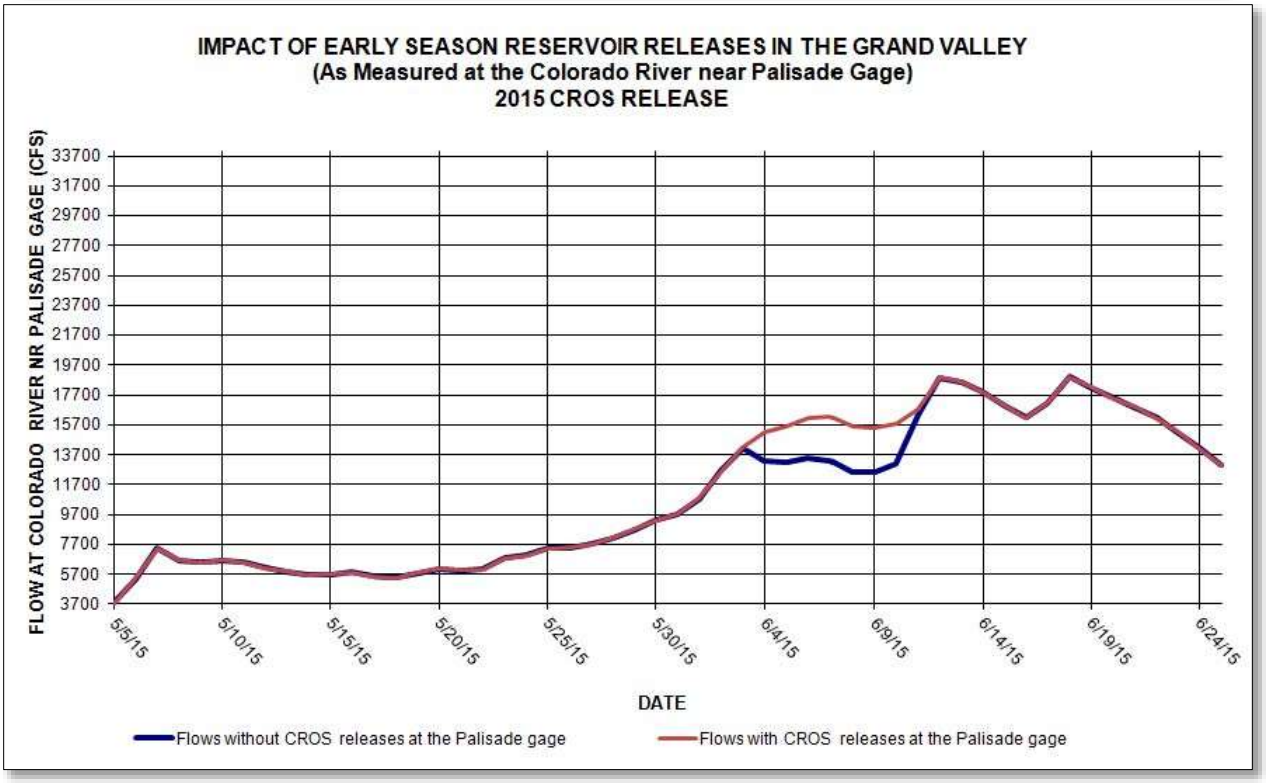
The majority of Division 5's surface water administration will always be on the many tributaries with more senior calling rights than the mainstem. The calls administered for these tributaries can be found in the Division's call chronology in CDSS.

Endangered Fish Recovery Program

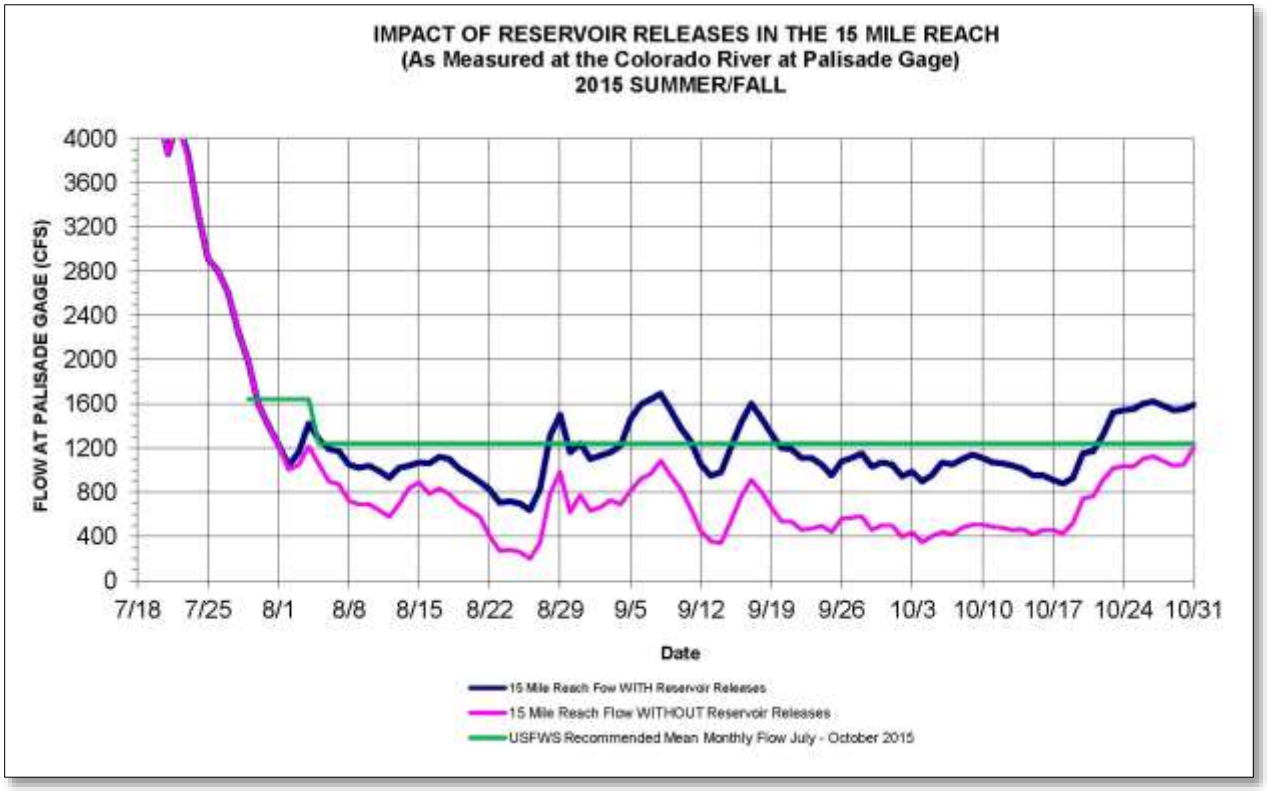
State of the River (SOR) Meetings began in March, as a pre-cursor to Coordinated Reservoir Operations (CROS), began in March to assure the "April Hole" of 2013 was not repeated. Runoff, weather, and water demands were cooperative and no action was needed.

SOR meetings continued in April and May to plan for and make a decision on CROS for 2015. Once managers of participating reservoirs were confidence that bypasses at their individual reservoirs could be made prior to filling to enhance the flow of the Colorado River in the 15 mile reach without impacting the yield of their storage rights, a decision by the group was made to implement CROS. The trigger for operating CROS cannot be pulled unless together with the bypassed flows the forecasted peak flows at Cameo will be below the 25,000cfs and above 12,900cfs. This was the first year of CROS operations since 2010. The flow enhancement did not increase the peak flow day, but did broaden the peak by increasing the number of days above 12,900cfs. Maximum deliveries occurred on June 8th at 3060cfs. Total deliveries (bypasses less transit losses) were 38,022 acre-feet.


Colorado River at Palisade, 2015
discharge, cfs
35000
30000
25000
20000
15000
10000
5000
0
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
2015
mean
min
max


IMPACT OF EARLY SEASON RESERVOIR RELEASES IN THE GRAND VALLEY
(As Measured at the Colorado River near Palisade Gage)
2015 CROS RELEASE
FLOW AT COLORADO RIVER NR PALISADE GAGE (CFS)
33700
31700
29700
27700
25700
23700
21700
19700
17700
15700
13700
11700
9700
7700
5700
3700
5/5/15
5/10/15
5/15/15
5/20/15
5/25/15
5/30/15
6/4/15
6/9/15
6/14/15
6/19/15
6/24/15
DATE
Flows without CROS releases at the Palisade gage
Flows with CROS releases at the Palisade gage

Late summer base flow augmentation for the Endangered Fish Recovery began in late July when the target flow for the Colorado River at Palisade gage of 1600cfs was set. This high target is reserved for the very best years of water supply and stream conditions. The target was lowered on August 5th to the yet high flow of 1250cfs, which remained as the target through the end of the year. The unchanging target was a conscious decision by the USFWS to not chase runoff conditions with the targets as they have in the past. Future plans are to evaluate conditions prior to base flow augmentation, firmly set target and keep it at that level for the balance of the summer. All pools for the recovery program were full at the beginning of August. They total 26,824 acre-feet. The HUP in Green Mountain Reservoir was made available up to 66,000 acre-feet less water released for beneficiaries, when a surplus was declared on August 19th. By October 31, 2015 surplus releases from the HUP totaled 55,245 acre-feet. In addition to the permanent fish pools in Ruedi Reservoir an additional 9,000 acre-feet under contract by Ute Water Conservancy District was subleased to the CWCB and available for the program this year. Releases to meet the 1600cfs target began on August 1st with a 35cfs release from Granby Reservoir. The release at Granby is timed to also meet the goals of Grand County's stream management plan. Ultimately, 98,597 acre-feet was delivered to the 15 mile reach, the fourth most released in 18 years of operations. The 2015 augmentation of flow in the 15 mile reach is depicted in the flowing graph.



Water Court

There were two Supreme Court Cases that originated in Division 5 of interest in 2015. The first was *St. Jude's Ranch vs. Roaring Fork Club*. The case involved multiple issues, but of particular importance was claims for recreational, aesthetic, and piscatorial uses within a direct flow right. The court found these uses to be subjective, without any objective means to quantify the amount needed for beneficial use, and thus are not beneficial uses of water by direct use in a man-made stream. After careful review of the ruling, the DWR position in applying the ruling will be limited to private man-made streams and storage that is released for a private direct flow use, such as a man-made stream. The uses recreational, aesthetic, and piscatorial remain viable uses for in situ purposes within a storage structure, or by direct use for a public man-made stream, or enhancement by a public entity for public purposes of a natural stream.

The second Supreme Court case of interest that originated in Water Division 5 was the *Division Engineer for Water Division 5 vs. Eagle River Water and Sanitation District*. Oral arguments were heard in 2015 and a ruling has yet to be issued. The case involves the "senior's first issue."

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 or motions to intervene were filed in 2015. However, one protest to a referee ruling was filed. The protest was quickly resolved with a proposed decreed that was submitted to the court.

For 2015 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 court within 30 days of the consultation meeting with the referee. No extensions of time were requested for filing consultations in 2015.

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 in 2015 had a modest increase from 2014 with 463 well permit applications received for both exempt and non exempt new and replacement wells, along with 93 monitoring/observation hole notifications also being received. This compares to 443 applications in 2014. Well permit applications continue to be considerably far behind the pace of the late 1990's when 1200 applications were received annually. Total permits issued for both exempt and non exempt new and replacement wells in 2015 also had a modest increase with 451 permits issued, an increase of 8 permits over 2014. There were two geothermal permit applications and permits issued in 2015. Drilling activity in 2015 posted a 15 percent decrease with 231 drillers logs received versus 271 in 2014.

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. Several items remain unresolved to a full implementation of the CRCA. They include the litigation of several state and federal water right applications, and the final negotiation of

the Shoshone Outage Protocol. As a result of the Green Mountain Reservoir Protocol and Protocol Agreement the parties to the Blue River Decrees plus Climax filed concurrent applications for in State and Federal Court. The state application was filed in 13CW3077 and remains open pending resolution of the motion to reopen the Blue River Decrees in Federal Court. The parties focused on the Shoshone Outage Protocol in 2015, hoping for resolution on 2016, and will then refocus on the Federal Court application. Also, remaining incomplete is Denver's diligence application in 06CW255 amended to include 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. 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 decreed 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" decreed in 11CW21 allowing Dillon storage to be exchanged to Moffatt and Williams Fork.

Windy Gap and Moffat Firming

These two projects will provide additional transmountain diversions from the Upper Colorado River into the South Platte. Moffat Firming is integrated into the CRCA, and includes the enlargement of Gross Reservoir. Construction is in final design, but remains in negotiations with Boulder County and other east slope entities. Windy Gap Firming is the construction of a new reservoir on the east slope, Chimney Hollow, and pre-positioning of CBT water from Granby Reservoir to the east slope, making room for additional Windy Gap pumping. The project remains in various stages of negotiations, planning and design.

Respectfully submitted for the Staff of Water Division 5,

Alan C Martellaro, Division Engineer
April 4, 2016