COLORADO WATER SUPPLY CONDITIONS UPDATE

FROM THE OFFICE OF THE STATE ENGINEER: COLORADO DIVISION OF WATER RESOURCES ROOM 818, 1313 SHERMAN ST., DENVER, CO 80203 303-866-3581; <u>www.water.state.co.us</u>

December 1, 2015

The Surface Water Supply Index (SWSI) is used as an indicator of water supply conditions in the seven major river basins of the state and in each of the 41 smaller watersheds, or HUCs. The Colorado Water Conservation Board (CWCB) completed a major revision to the Colorado Drought Plan in 2010. At that time, Colorado adopted a new SWSI analysis based on the components shown below, which vary depending on the time of year. The new SWSI is based on a ranking of total volume in a HUC or major river basin ranked against similar volumes in historical years. For instance, in January, the total volume in a HUC is based on the forecasted runoff at specific locations plus the volume in storage in specific reservoirs. That total volume is ranked against similar total volumes that occurred each January between 1970 and 2010.

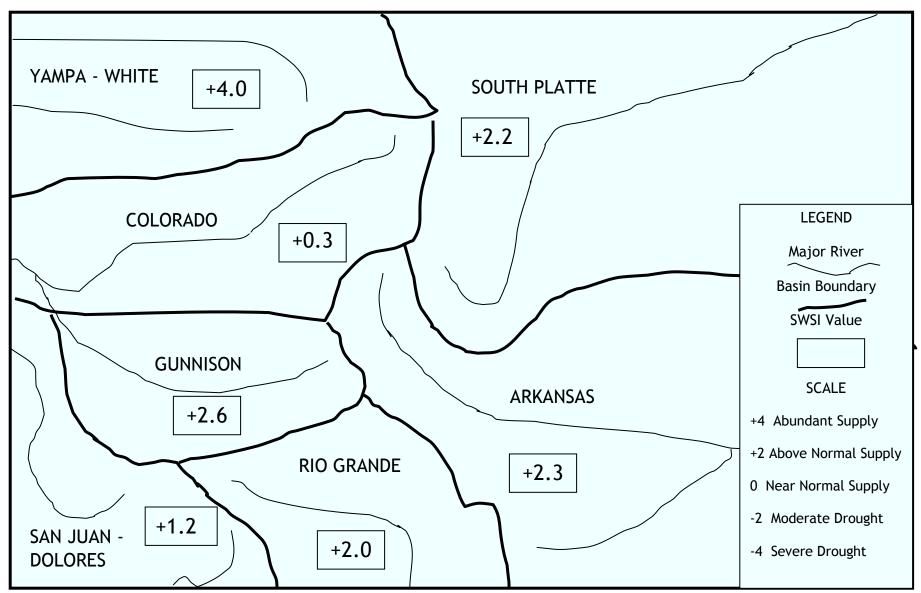
Time Period	SWSI Components
January 1 - June 1	Forecasted Runoff + Reservoir Storage
July 1 - September 1	Previous Month's Streamflow + Reservoir Storage
October 1 - December 1	Reservoir Storage

Recently, CWCB and the Division of Water Resources (DWR) (both Divisions of the Colorado Department of Natural Resources) completed a software project to implement an automated calculation of the SWSI and to document the underlying hydrologic data. July 1, 2015 was the first month that the new DNR SWSI was published. The results are summarized within this monthly report and additional information, maps & data are available at: <u>http://water.state.co.us/DWRDocs/Reports/Pages/SWSIReport.aspx</u>. This document also contains reports about regional conditions prepared by each DWR Division Office.

The SWSI calculation for the fall season is based only on reservoir storage. For some HUCs, there is not a reservoir that is considered in the SWSI, and those HUCs do not have a SWSI calculated in the fall. The statewide SWSI values for November (December 1) range from 0.3 in the Colorado River Basin to 4.0 in the Yampa-White River Basin. The following SWSI values were computed for each of the seven major basins for December 1, 2015.

Basin	December 1 SWSI	Change from Previous Month	Change from Previous Year
Arkansas	2.3	0.0	1.4
Colorado	0.3	0.5	-1.8
Gunnison	2.6	0.8	1.3
Rio Grande	2.0	0.4	1.1
San Juan-Dolores	1.2	-0.1	0.9
South Platte	2.2	-0.2	-1.8
Yampa-White	4.0	0.0	0.1

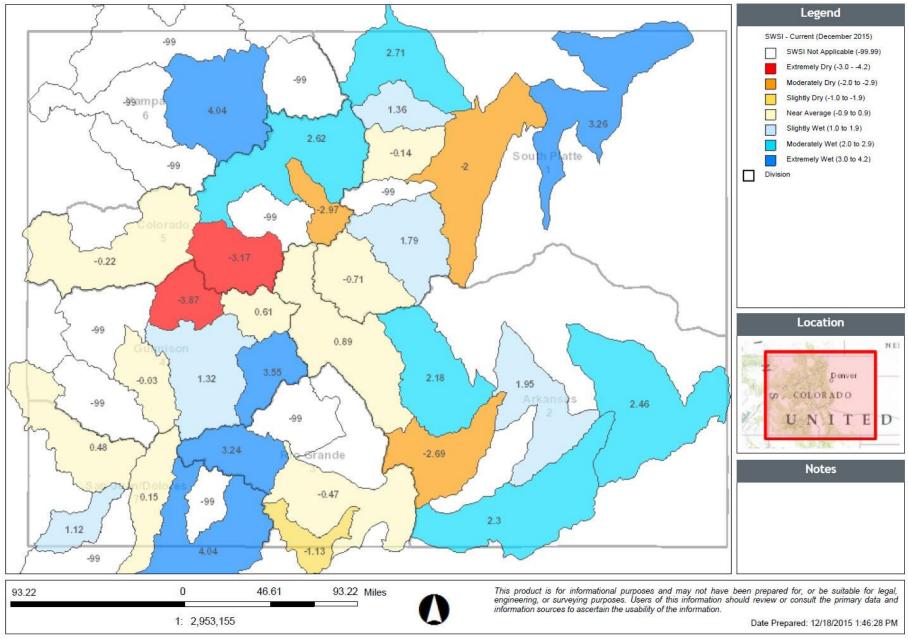
				SWSI Scale				
-4	-3	-2	-1	0	1	2	3	4
Severe		Moderate		Near Normal		Above Normal	At	oundant
Drought		Drought		Supply		Supply		Supply



SURFACE WATER SUPPLY INDEX FOR COLORADO BY MAJOR RIVER BASIN

December 1, 2015

SURFACE WATER SUPPLY INDEX FOR COLORADO BY HUC



December 1, 2015

	HUC ID	HUC Name	swsi	Reservoir Storage NEP	Total HUC Volume (AF)	
	11020001	Arkansas Headwaters	0.9	61	200,900	
	11020002	Upper Arkansas	2.2	76	196,200	
Isas	11020005	Upper Arkansas-Lake Meredith	2.0	73	32,000	
Arkansas	11020006	Huerfano	-2.7	18	0*	
A	11020009	Upper Arkansas-John Martin Reservoir	2.5	80	263,200	
	11020010	Purgatoire	2.3	78	23,800	
	14010001	Colorado Headwaters	2.6	82	124,600	
р	14010002	Blue	-3.0	14	66,800	
Colorado	14010003	Eagle	N	o reservoirs considered,	· ·	
Col	14010004	Roaring Fork	-3.2	12	73,100	
	14010005	Colorado Headwaters-Plateau	-0.2	47	9,600	
	14020001	East-Taylor	0.6	57	70,800	
	14020002	Upper Gunnison	1.3	66	765,200	
u	14020003	Tomichi	3.6	93	800	
Gunnison	14020004	North Fork Gunnison	-3.9	3	900	
Gur	14020005	Lower Gunnison	N	o reservoirs considered,	no SWSI calculated	
	14020006	Uncompahgre	0.0	50	61,300	
	14030003	San Miguel	No reservoirs considered, no SWSI calculated			
	13010001	Rio Grande Headwaters	3.2	89	46,300	
Rio Grande	13010002	Alamosa-Trinchera	-0.5	44	5,649	
Rio Granc	13010004	Saguache	N	o reservoirs considered,	no SWSI calculated	
Ŭ	13010005	Conejos	-1.1	36	14,400	
Se	14030002	Upper Dolores	0.5	56	260,800	
lor	14080101	Upper San Juan	4.0	99	82,800	
San Juan-Dolores	14080102	Piedra	No reservoirs considered, no SWSI calculated			
uan	14080104	Animas	0.2	52	20,300	
l ni	14080105	Middle San Juan	0.0	50	146**	
Sc	14080107	Mancos	1.1	64	5,100	
	10190001	South Platte Headwater	-0.7	41	137,200	
	10190002	Upper South Platte	1.8	72	307,900	
tte	10190003	Middle South Platte-Cherry Creek	-2.0	26	61,300	
South Platte	10190004	Clear	N	o reservoirs considered,	no SWSI calculated	
uth	10190005	St. Vrain	-0.1	48	61,900	
Sol	10190006	Big Thompson	1.4	66	506,800	
	10190007	Cache La Poudre	2.7	83	142,700	
	10190012	Middle South Platte-Sterling	3.3	89	151,500	
te	10180001	North Platte Headwaters	N	o reservoirs considered,	no SWSI calculated	
Vhi	14050001	Upper Yampa	4.0	99	42,200	
Yampa-White	14050002	Lower Yampa	N	o reservoirs considered,	no SWSI calculated	
amp	14050003	Little Snake	N	o reservoirs considered,	no SWSI calculated	
×	14050005	Upper White	N	o reservoirs considered,	no SWSI calculated	

December 1, 2015 SWSI Values by HUC and Non Exceedance Probabilities (NEP)

Image: Image:

**Long Hollow Reservoir is newly constructed and therefore does not have a history of storage for comparison

December	1, 2015 SWSI Component Information By	HUC

HUC ID	HUC Name	Component Name	Component Volume (AF)	Component NEP for Month
		CLEAR CREEK RESERVOIR	6,600	62
11020001	Arkansas	TURQUOISE LAKE	103,900	63
	Headwaters	TWIN LAKES RESERVOIR	49,000	41
		HOMESTAKE RESERVOIR	41,400	75
11020002	Upper Arkansas	PUEBLO RESERVOIR	196,200	76
11020005	Upper Arkansas-	MEREDITH RESERVOIR	23,100	69
11020005	Lake Meredith	LAKE HENRY	8,900	99
11020006	Huerfano	CUCHARAS RESERVOIR	0*	18
4400000	Upper Arkansas-	ADOBE CREEK RESERVOIR	48,300	93
11020009	John Martin Reservoir	JOHN MARTIN RESERVOIR	214,900	78
11020010	Purgatoire	TRINIDAD LAKE	23,800	78
14010001	Colorado	WILLIAMS FORK RESERVOIR	80,300	85
14010001	Headwaters	WOLFORD MOUNTAIN RESERVOIR	44,300	75
14010002	Blue	GREEN MOUNTAIN RESERVOIR	66,800	14
14010004	Roaring Fork	RUEDI RESERVOIR	73,100	12
14010005	Colorado Headwaters-Plateau	VEGA RESERVOIR	9,600	47
14020001	East-Taylor	TAYLOR PARK RESERVOIR	70,800	57
	Upper Gunnison	BLUE MESA RESERVOIR	658,400	81
		MORROW POINT RESERVOIR	97,200**	1
14020002		FRUITLAND RESERVOIR	500	48
		CRAWFORD RESERVOIR	5,400	39
		SILVER JACK RESERVOIR	3,700	38
14020003	Tomichi	VOUGA RESERVOIR NEAR DOYLEVILLE	800	93
14020004	North Fork Gunnison	PAONIA RESERVOIR	900	3
14020006	Uncompahgre	RIDGEWAY RESERVOIR	61,300	50
		RIO GRANDE RESERVOIR	25,300	88
13010001	Rio Grande Headwaters	SANTA MARIA RESERVOIR	19,200	90
		CONTINENTAL RESERVOIR	1,800	38
13010002	Alamosa-Trinchera	TERRACE RESERVOIR	3,000	36
13010002	Aldinosa- minchera	MOUNTAIN HOME	2,649	63
13010005	Conejos	PLATORO RESERVOIR	14,400	36
14030002	Upper Dolores	GROUNDHOG RESERVOIR	18,700	99
14030002		MCPHEE RESERVOIR	242,100	54
14080101	Upper San Juan	VALLECITO RESERVOIR	82,800	99
14080104	Animas	LEMON RESERVOIR	20,300	52
14080105	Middle San Juan	LONG HOLLOW RESERVOIR	146	50
14080107	Mancos	JACKSON GULCH RESERVOIR	5,100	64
	Courth Distant	ANTERO RESERVOIR	0**	3
10190001	South Platte Headwaters	ELEVENMILE CANYON RESERVOIR	99,300	61
	i leauwalei s	SPINNEY MOUNTAIN RESERVOIR	37,900	76
10190002	Upper South Platte	CHEESMAN LAKE	71,200	75
10170002		DILLON RESERVOIR	236,700	45

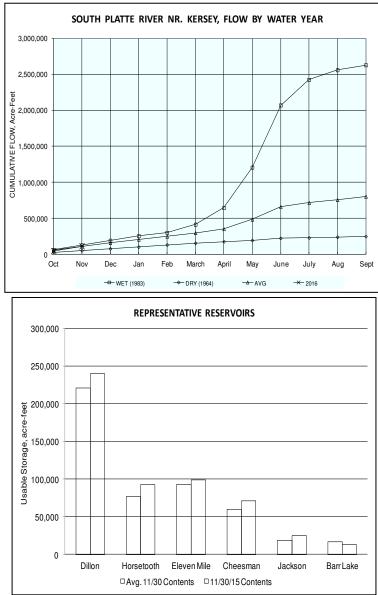
HUC ID	HUC Name	Component Name	Component Volume (AF)	Component NEP for Month
40400000		BARR LAKE	13,400	21
	Middle South Platte-	MILTON RESERVOIR	6,000**	17
10190003	Cherry Creek	STANDLEY RESERVOIR	37,700	78
		HORSECREEK RESERVOIR	4,200	27
		GROSS RESERVOIR	31,800	70
		MARSHALL RESERVOIR	5,900	84
10190005	St. Vrain	BUTTONROCK (RALPH PRICE) RESERVOIR	6,400	1
		TERRY RESERVOIR	5,800	77
		UNION RESERVOIR	12,000	80
		BOYD LAKE	31,100	59
		CARTER LAKE	43,300	17
	Big Thompson	LAKE LOVELAND RESERVOIR	3,700	13
10190006		LONE TREE RESERVOIR	4,300	46
		MARIANO RESERVOIR	1,100	17
		LAKE GRANBY	417,400	72
		WILLOW CREEK RESERVOIR	5,900	39
	Cache La Poudre	BLACK HOLLOW RESERVOIR	3,000	54
		CACHE LA POUDRE	8,500	97
		CHAMBERS LAKE	4,300	76
10190007		COBB LAKE	18,600	75
10170007		FOSSIL CREEK RESERVOIR	7,200	72
		HALLIGAN RESERVOIR	5,800	98
		HORSETOOTH RESERVOIR	85,900	68
		WINDSOR RESERVOIR	9,400	84
	Middle South Platte- Sterling	EMPIRE RESERVOIR	15,300	54
		JACKSON LAKE RESERVOIR	24,000	82
10190012		JULESBURG RESERVOIR	16,500	54
		POINT OF ROCKS RESERVOIR	37,800	65
		PREWITT RESERVOIR	21,100	87
		RIVERSIDE RESERVOIR	36,800	91
14050001	Upper Yampa	STAGECOACH RESERVOIR NR OAK CREEK	35,500	99
100001		YAMCOLO RESERVOIR	6,700	87

*Cucharas Reservoir is empty due to Division Engineer filling restriction **Water level low for maintenance

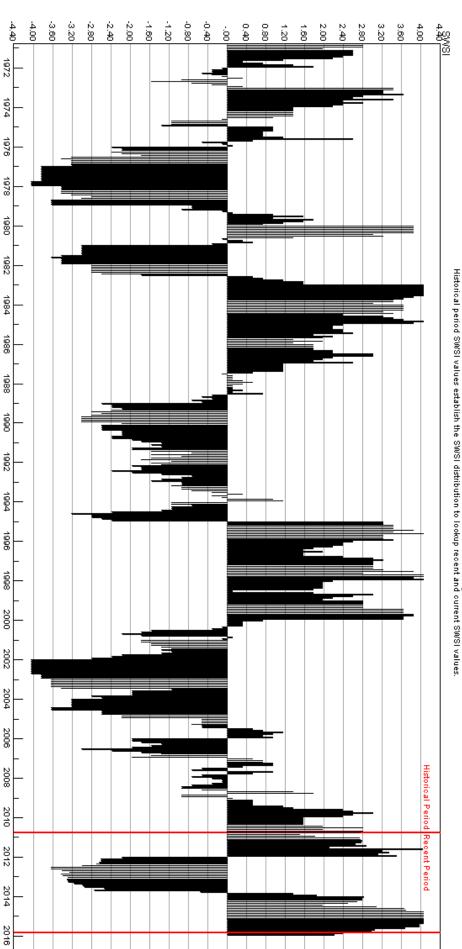
The SWSI value for the month was 2.2. November kicked off the 2016 Irrigation Year in fine fashion. Precipitation over the basin was generally near to, and in some areas, well above normal. Temperatures were near normal over the entire basin. The combination of these two factors led to good water supply conditions over the entire basin during November.

The good November water supply conditions are reflected in the above normal mainstem river flows at the two key index river flow gages at Kersey and Julesburg. The overall November Kersey gage mean flow was approximately 1009 cfs or 135% of the long term November mean flow of 747 cfs. The November Julesburg mean gage flow was approximately 560 cfs or 167% of the long term November mean flow of 335 cfs.

The call regime on the South Platte during November was very stable. The South Platte mainstem remained under free river conditions for the entire month, which is unusual, but not a surprise given the favorable hydrologic conditions. There were calls in three of the major Front Range tributary basins (Big Thompson River, Boulder Creek, and Clear Creek) for some or all of the month. However, calls in these basins are not unusual in November and the November 2015 calls were generally close to, or more junior than, the seniority of calls generally expected in these basins in November.



South Platte-DataComposite-SWSI



South Platte Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

The SWSI value for the month was 2.3.

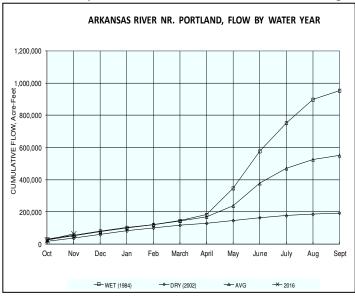
Outlook

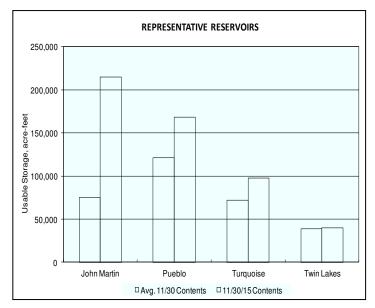
Winter Compact storage began in John Martin Reservoir on November 1, 2015. The Pueblo Winter Water Program began operation on November 15, 2015 with storage taking place initially in Pueblo and John Martin Reservoirs and under the Fort Lyon Canal system in Adobe Reservoir. Storage in John Martin Reservoir during November totaled approximately 9,664 acre-feet for Conservation Storage and 1,793 acre-feet for Winter Water participants. Storage overall under the Pueblo Winter Water Program in November totaled approximately 24,508 acre-feet in all storage locations. These storage levels are improvements from last year.

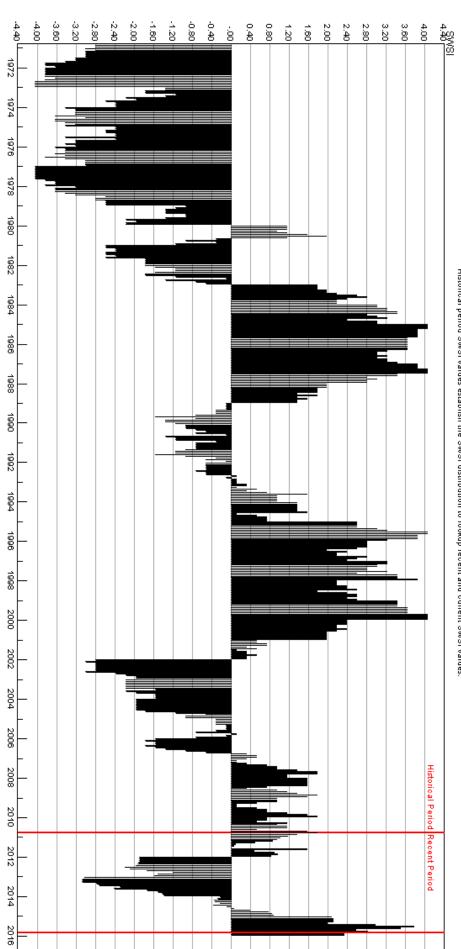
Administrative/Management Concerns

The Off-Channel storage for the Fort Lyon Canal and Amity Canal began with the unique operation for 2015-16 under an approved substitute water supply plan that allowed Amity Canal's Great Plains Reservoir storage

to be diverted at the Fort Lyon Storage Canal to Adobe Reservoir then later released to the Fort Lyon Canal just above the Kickingbird Canal bifurcation. From the Kickingbird Canal bifurcation, Amity's water can then be delivered on to the Great Plains Reservoirs. This arrangement and SWSP approval was required because Fort Lyon Canal is undergoing significant maintenance operations during the winter period to replace the Horse Creek flume crossing for the Fort Lyon Canal. Diversions for Amity Canal's Great Plains Reservoir storage are normally done through the Fort Lyon Canal







Arkansas Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

Arkansas-DataComposite-SWSI

The SWSI value for the month was 2.0. Flow at the gaging station Rio Grande near Del Norte averaged 278 cfs (103% of normal). The Conejos River near Mogote had a mean flow of 66 cfs (73% of normal). The Alamosa River, La Jara Creek, and Conejos River drainages continue to languish with below average precipitation and streamflow.

The past three months have been relatively dry on the Valley floor. Thus, soil moisture conditions are fair.

<u>Outlook</u>

The recently-released National Weather Service 90-day precipitation and temperature outlooks forecast predicts above normal precipitation for Winter - Spring 2016. This is very welcome news for the San Luis Valley.

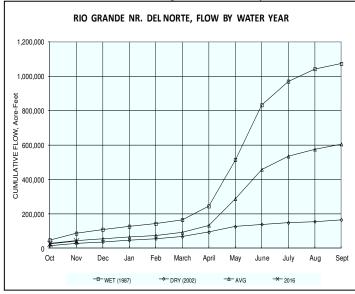
Administrative/Management Concerns

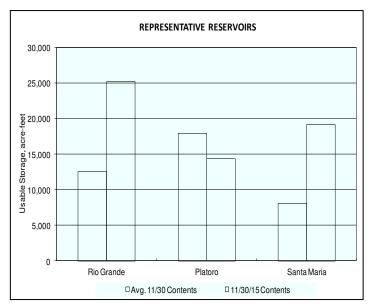
Local water administrators are busy finishing up the 2015 record for surface and groundwater diversions. Metered well use is required under Case No. 05CW12 - the State Engineer's Groundwater Measurement Rules. Reporting of groundwater diversions are to be received by December 1 of each year. The data is used for updating the RGDSS model and groundwater management subdistrict No. 1 accounting of annual depletive effects to the Rio Grande.

The State Engineer filed the "Rules Governing the Withdrawal of Groundwater in Water Division No. 3" in Case No. 15CW3024 on September 23rd. To date, 22 statement of opposition have been filed - many of which are actually statements of support. The opposition period closed for all but Saguache County on November 30. In anticipation of promulgation of the rules, formation of additional subdistricts of the Rio Grande Water Conservation District has sped up.

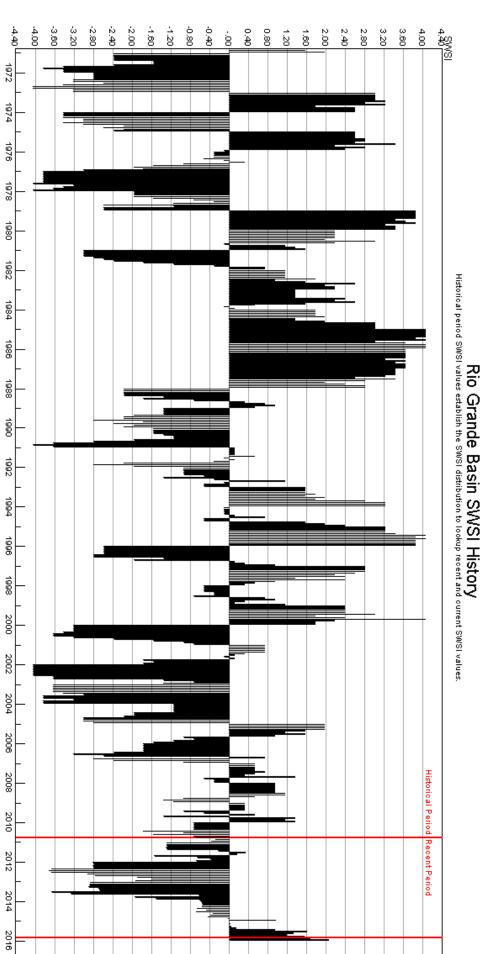
Public Use Impact

The weather patterns have been very comfortable and snowpack in the higher elevations is off to a good start.









The SWSI value for the month was 2.6. November precipitation in the Gunnison basin was above average (110-129% of average) in most areas except the East River and Tomichi Creek drainages where it fell between 70 and 90% of average. Snowpack reflects this with stations such as the Crested Butte Snotel dropping to 60% of the median on December 1st while the drainage above Ridgway Reservoir still contains 98% of the 30 year median. Overall, snowpack in the Gunnison basin was also at 98% of the 30 year median on December 1st. The area with the best snowpack is the Uncompany Plateau, where the Columbine Pass Snotel gage had 204% of median on December 1st.

<u>Outlook</u>

The Gunnison basin is within an area expected to receive El Nino enhanced precipitation during the December through February period. Originally forecasters expected that southern areas of Colorado, including the Gunnison basin, would receive greater early season and late spring precipitation based upon the past two strong El Nino episodes. The much greater than average early season precipitation didn't materialize so hopefully mid winter and spring accumulation will be better than average.

Administrative/Management Concerns

By December 1st approximately 6,000 acre-feet have accumulated in the Taylor Park second fill account, while 7,500 acre-feet of the first fill account have been moved to the Aspinall Unit per the conditions in the 86CW203 decree.

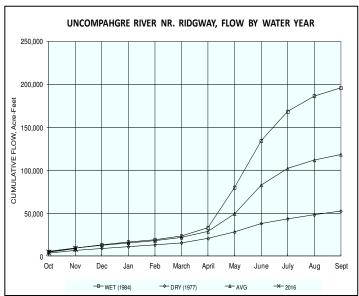
The Town of Telluride treated water from their Bridal Veil system for the first time in 2015. The Town's Bridal Veil

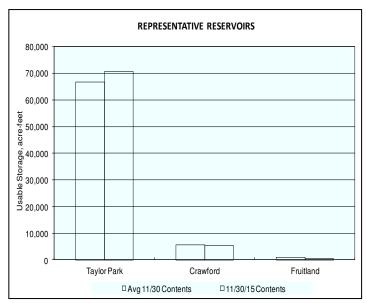
system includes water rights in Blue Lake Reservoir and associated direct flow pipelines that were previously held solely by Newmont Mining and the owner of the Bridal Veil powerplant. This addition to their water supply has been in the works for years and is critical to providing a reliable water supply for Town residents, especially during dry years when their Mill Creek and Stillwell diversion points have limited supply.

DWR staff continues to work with the Uncompahyre Valley Water Users Association (UVWUA) on adding the continuous recorders on all their main canals to the satellite monitoring program. Adding the main canals for the biggest water user in Division 4 to this system will allow the UVWUA to more efficiently manage their system and improve the information available to the public regarding water management in the Uncompahyre Valley.

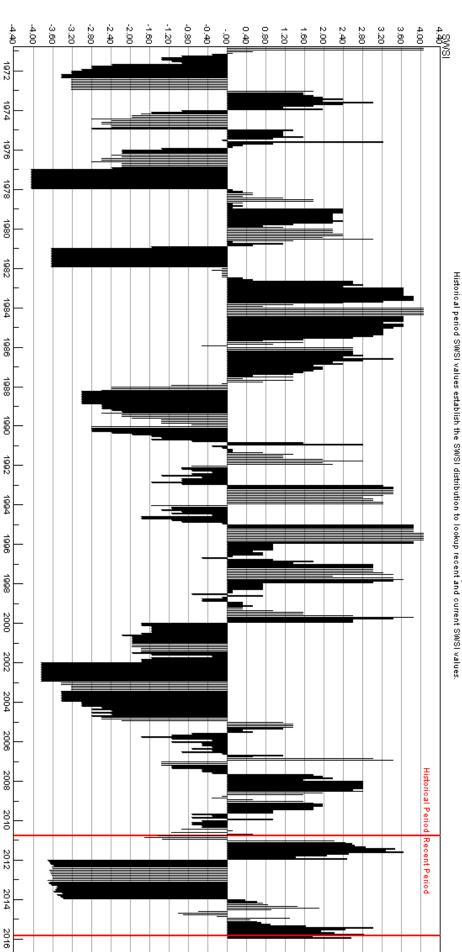
Public Use Impacts

Snow conditions at area resorts were average for Thanksgiving and have declined since that time due to lack of snowfall. Crested Butte has made significant amounts of snow with their water rights, which has helped them to open areas.









Gunnison Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

<u>Basinwide Conditions Assessment</u> The SWSI value for the month was 0.3.

<u>Outlook</u>

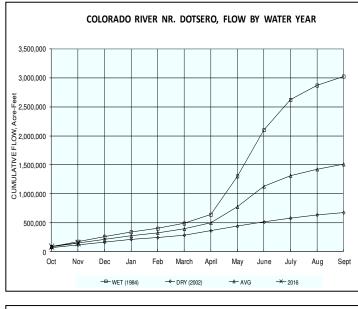
Colorado River flows continue near average or slightly below average with tributary flows running near or below average throughout December. As of December 8, the Upper Colorado River Basin snowpack was 104 percent of median snow water equivalent and 92 percent of average precipitation. Forecasts call for normal to slightly above precipitation with normal temperatures for western Colorado through December.

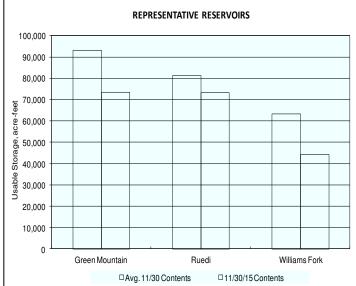
Administrative/Management Concerns

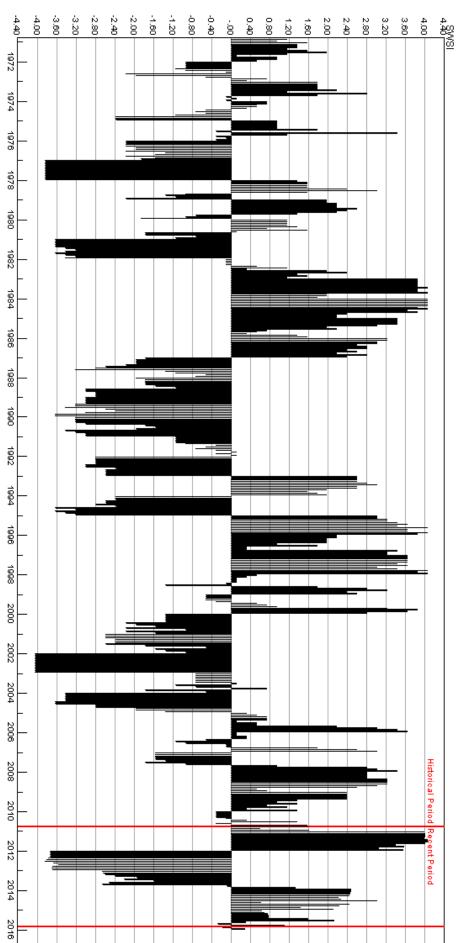
The call on the Colorado River main stem remains the Shoshone Hydro Power right for 1250cfs. Accordingly, Green Mountain Reservoir is releasing to pass inflows, provide contract and HUP obligations and make C-BT replacements. Wolford Reservoir is bypassing inflows and releasing for contracts.

Public Use Impacts

Floodplain changes threaten insurance rates in Garfield County. As the Federal Emergency Management Agency redraws Garfield County's 100-year floodplain boundaries, residents and local businesses may end up paying larger insurance bills. Part of the change results from advanced mapping technology and part of the change results in no longer considering I-70 as a flood mitigation structure.







Colorado Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

Colorado-DataComposite-SW/SI

The SWSI value for the month was 4.0. November precipitation was slightly below average in the Yampa, White, and North Platte River basins. Precipitation for the month, as measured at the SNOTEL sites operated by NRCS, was reported at 91% of average for the combined Yampa, White, and North Platte River basins. Total precipitation for the water year as a percent of average to date in the combined basins at the end of November was 78%.

Snowpack for the combined basins stands at 85%. The Laramie River and North Platte basins currently show 109% of and 90% of average respectively.

<u>Outlook</u>

As of December 1st Fish Creek Reservoir was storing approximately 2,420 AF, 58% of capacity. The capacity of Fish Creek Reservoir is 4,167 AF. Yamcolo Reservoir was storing 6,700 AF at the end of December 2015. The capacity of Yamcolo Reservoir is 8,700 AF. On December 1tst, 2015, Stagecoach Reservoir was storing 35,500 AF which is 107% of capacity. On December 1st, Elkhead Creek Reservoir was 60% full and storing 14,797 AF.

Water stored in Fish Creek Reservoir is used primarily for municipal purposes, Yamcolo Reservoir is used for

irrigation purposes and Elkhead Creek Reservoir is used for municipal, industrial, recreational, and fish recovery releases. Stagecoach Reservoir is primarily used for recreation though a significant amount of stored water is allocated for municipal, industrial, irrigation and augmentation uses.

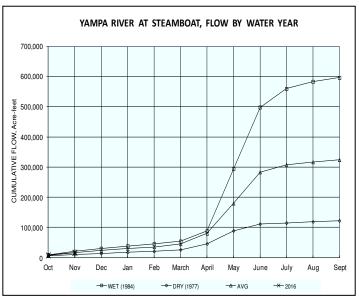
Public Use Impacts

Steamboat Ski Resort opened early on November 21st with good snow coverage due to 70 inches of snowfall since October 1st.

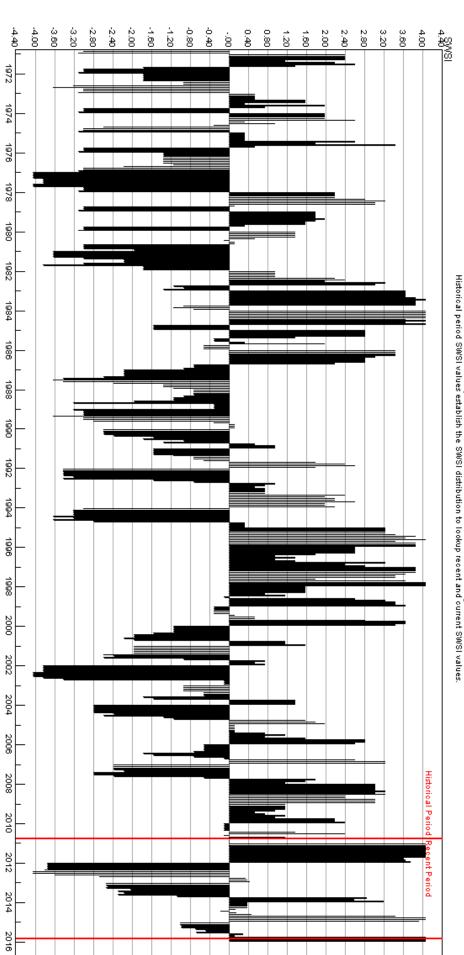
At Stagecoach State Park a good amount of snow has fallen over the park for the 2015 season. However a recent warm spell has caused the snow level to recede. Ice cover is thin and partial making ice fishing not possible at this time.

At Steamboat Lake State Park the boat ramps are now

closed. No open water at the lake currently. There is approximately 4 inches of clear ice covering the lake as of 11/27/2015. Ice fishing is available during winter months. Ice conditions can vary so please use caution.







Yampa-White Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

SAN JUAN-DOLORES BASIN

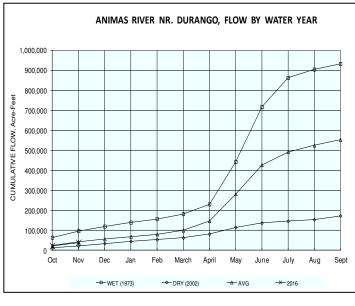
Basinwide Conditions Assessment

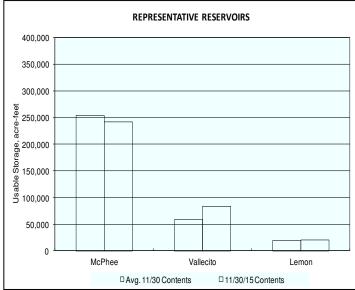
The SWSI value for the month was 1.2. Flow at the Animas River at Durango averaged 284 cfs (99% of average). The flow at the Dolores River at Dolores averaged 85 cfs (103% of average). The La Plata River at Hesperus averaged 13.5 cfs (128% of average). Precipitation in Durango was 1.65 inches for the month, 95% of the 30-year average of 1.74 inches. Precipitation was the 37 highest amount recorded in November, in Durango, out of 121 years of record. Precipitation to date in Durango, for the water year, is 5.53 inches, 166% of the 30-year average of 3.32 inches. End of last month precipitation to date, for the water year was 201% of average. The average high and low temperatures for the month of November in Durango were 530 and 240. In comparison, the 30-year average high and low for the month is 520 and 240. At the end of the month Vallecito Reservoir contained 83,630 acre-feet compared to its average content of 53,592 acre-feet (156% of average). McPhee Reservoir was up to 242,145 acre-feet compared to its average content of 258,755 (94% of average), while Lemon Reservoir was up to 20,680 acre-feet as compared to its average content of 19,460 acre-feet (106% of average).

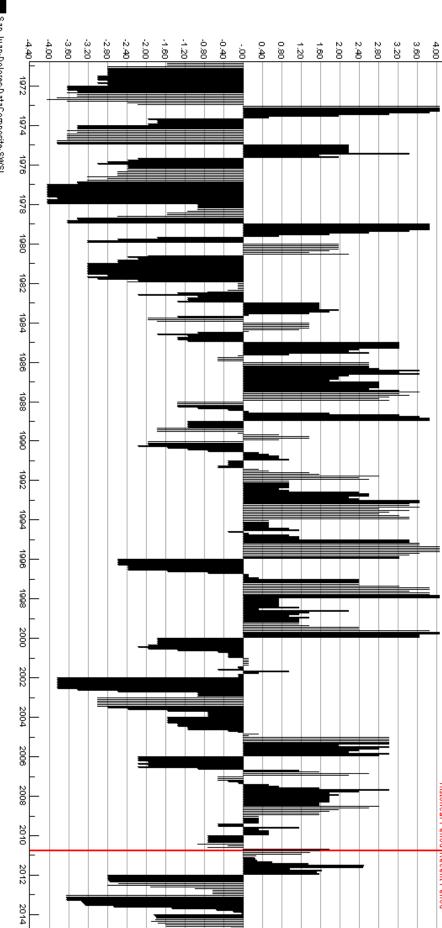
<u>Outlook</u>

Precipitation (1.65 inches) was near average for November in Durango. There were 37 years out of 121 years of record where there was more precipitation than this year. Flows in the rivers within the basin climbed to within average for the month. There were 40 out of 105 years of record where the total flow

past the Animas River at Durango stream gauge was more than this year. There were 33 out of 106 years of record where the total flow past the Dolores stream gauge was more than this year and 22 out of 99 years of record where the total flow past the La Plata River at Hesperus gauge was more than this year.







San Juan-Dolores Basin SWSI History Historical period SWSI values establish the SWSI distribution to lookup recent and current SWSI values.

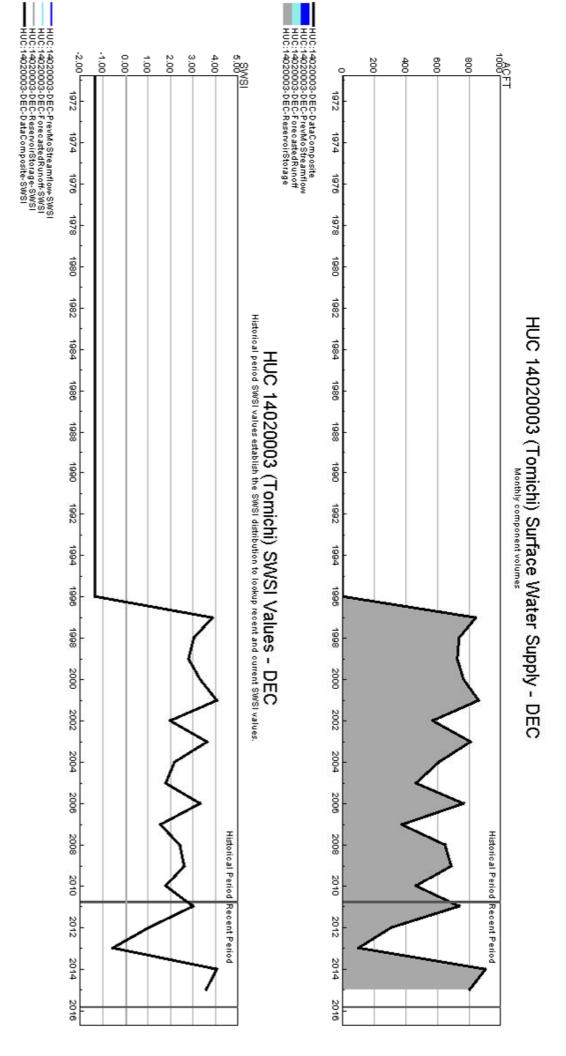
Historical Period

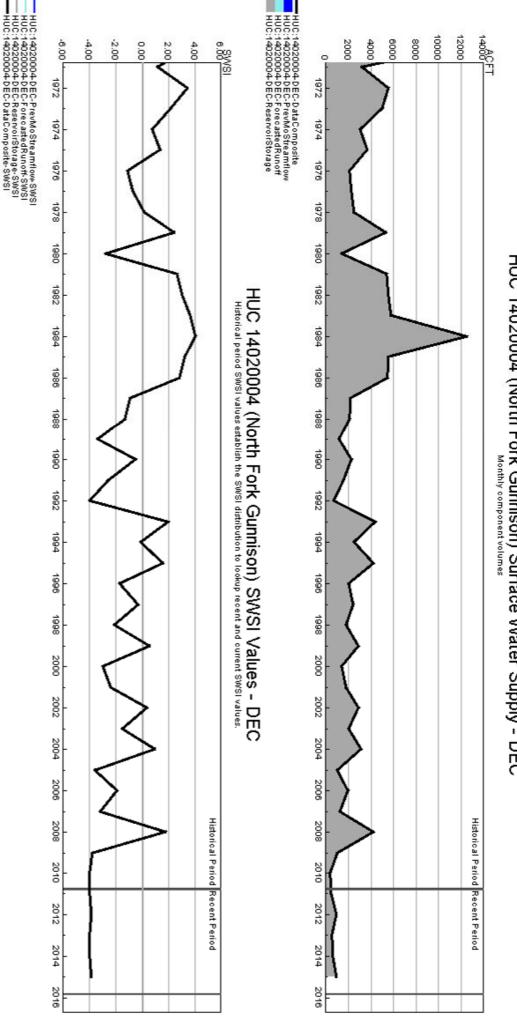
Recent Period

4.48 14 15

San Juan-Dolores-DataComposite-SWSI

2016





HUC 14020004 (North Fork Gunnison) Surface Water Supply - DEC

