

# Colorado

## Water Supply Outlook Report

February 1, 2016



Snow surveyors Jerry Archuleta and Sterling Moss explain the workings of the Upper San Juan SNOTEL site to a group of high school students from Pagosa Springs. The students, as a part of a Global Science Class, are studying how the strength of El Nino events may affect snowpack in the area.

Date: 1/28/2016

Photo By: JD Kurz

**REMINDER:** We are soliciting field work photos from our snow surveyors again this year. Each month we will pick one to grace the cover of this report! Please include information on where, when and of who/what the photo was taken.

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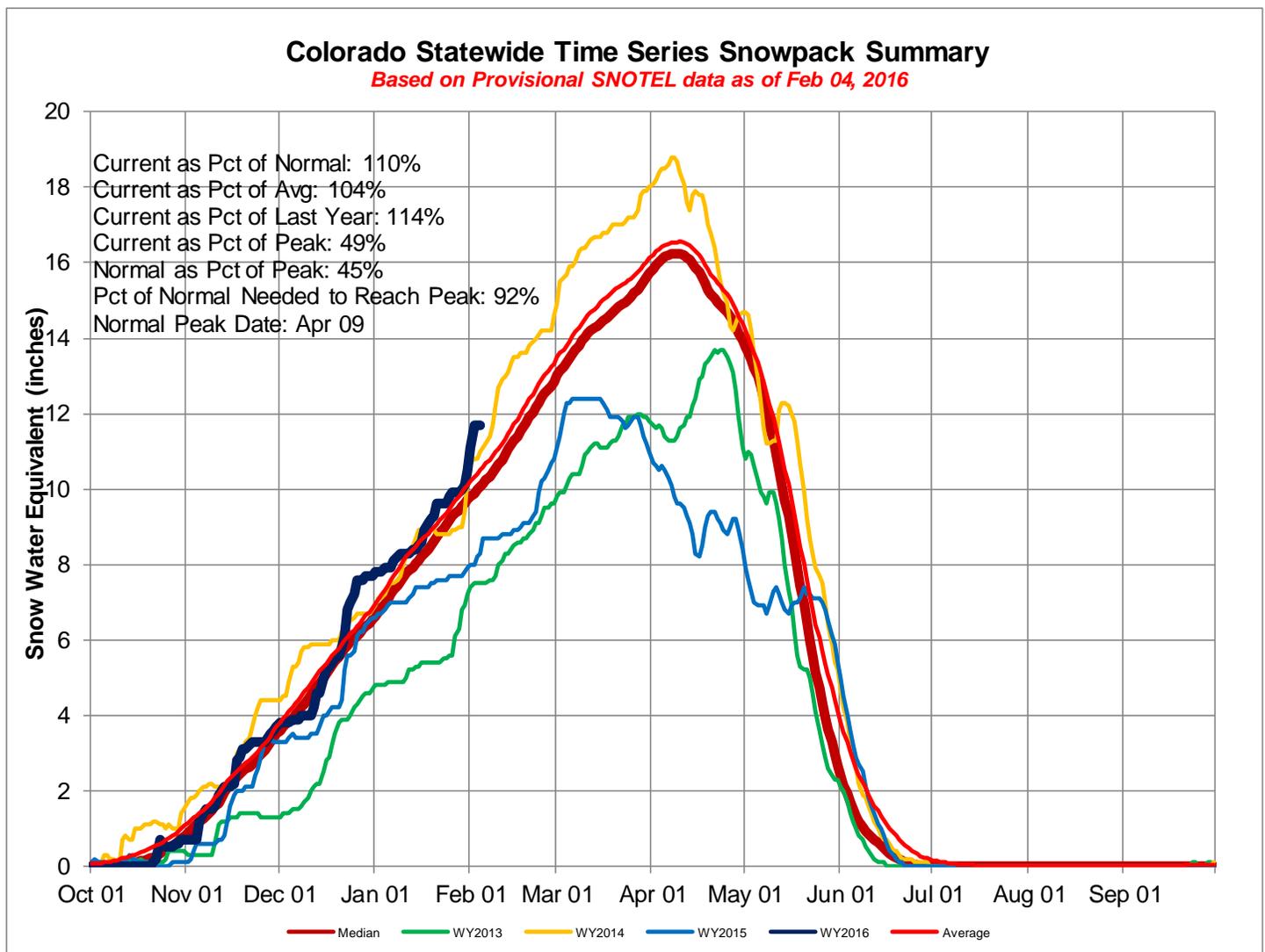
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# Statewide Water Supply Conditions

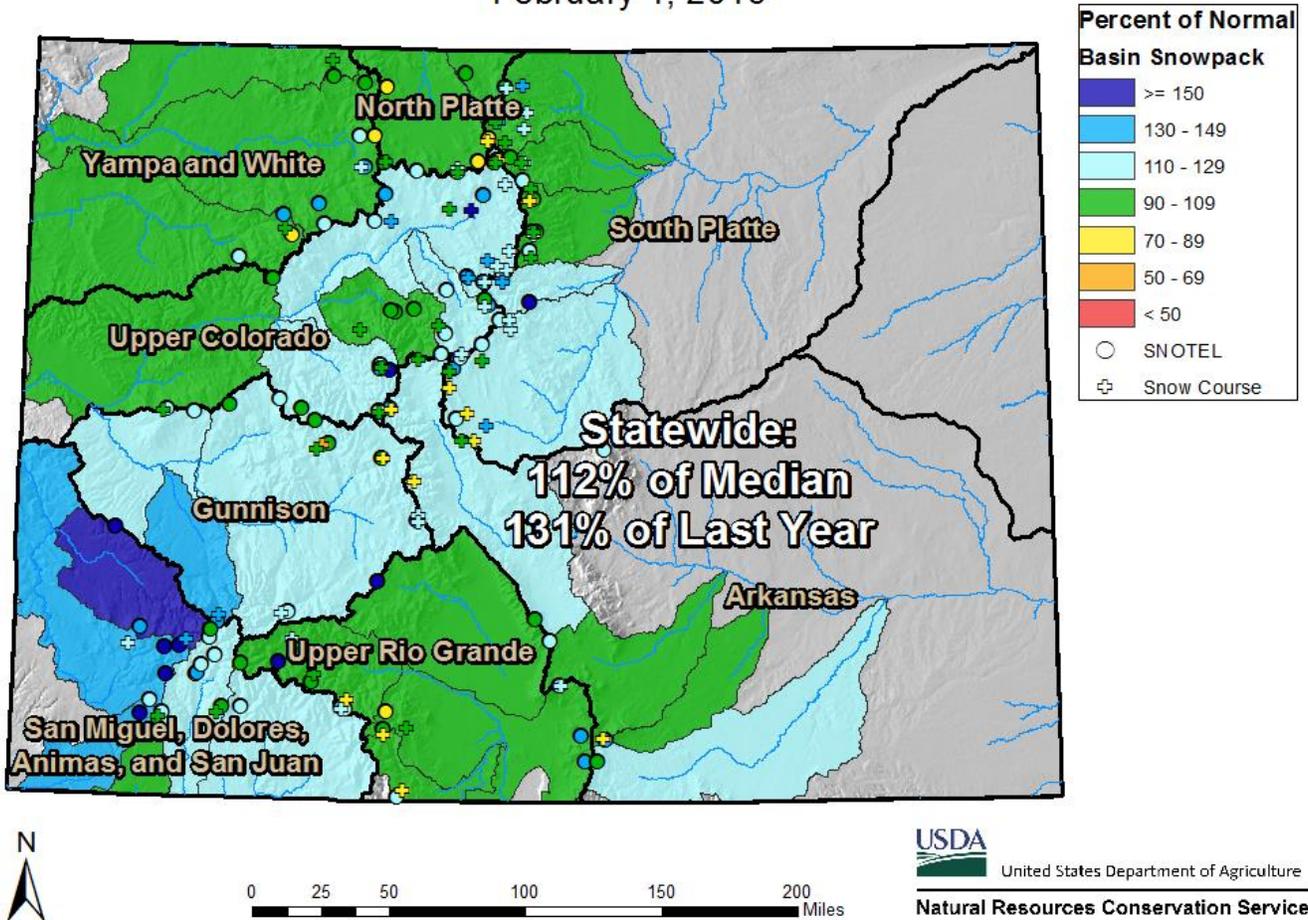
## Summary

Two late January storms helped bridge the monthly precipitation gap that existed across the state at the end of last month, and January finished at 98 percent of average. Had the aforementioned storms not occurred, January precipitation may have been near 70 percent of average. While statewide numbers ended the month close to normal, basin-wide totals were more diverse ranging from as low as 73 percent of average January precipitation in the Upper Rio Grande watershed to as high as 114 percent of average in the combined Yampa, White and North Platte River basins. Statewide year-to-date precipitation as well remains close to average at 109 percent, down only slightly from January 1<sup>st</sup> at 113 percent of normal. Snowpack followed that same trend with a statewide total of 112 percent of median on February 1<sup>st</sup> down slightly from 118 percent of median on January 1<sup>st</sup>. Current reservoir levels in every basin are nearly unchanged from last month to this month. Statewide storage is 110 percent of average on February 1<sup>st</sup>, just as it was on January 1<sup>st</sup>. All in all, statewide snowpack, precipitation and reservoirs are all in good standing slightly at above normal. With about one-third of the winter remaining in the mountains of Colorado, uncertainty remains regarding future weather. However, accounting for all four factors - snowpack, precipitation, reservoirs and future weather uncertainty - streamflow forecasts are still favorable in most locations of Colorado.



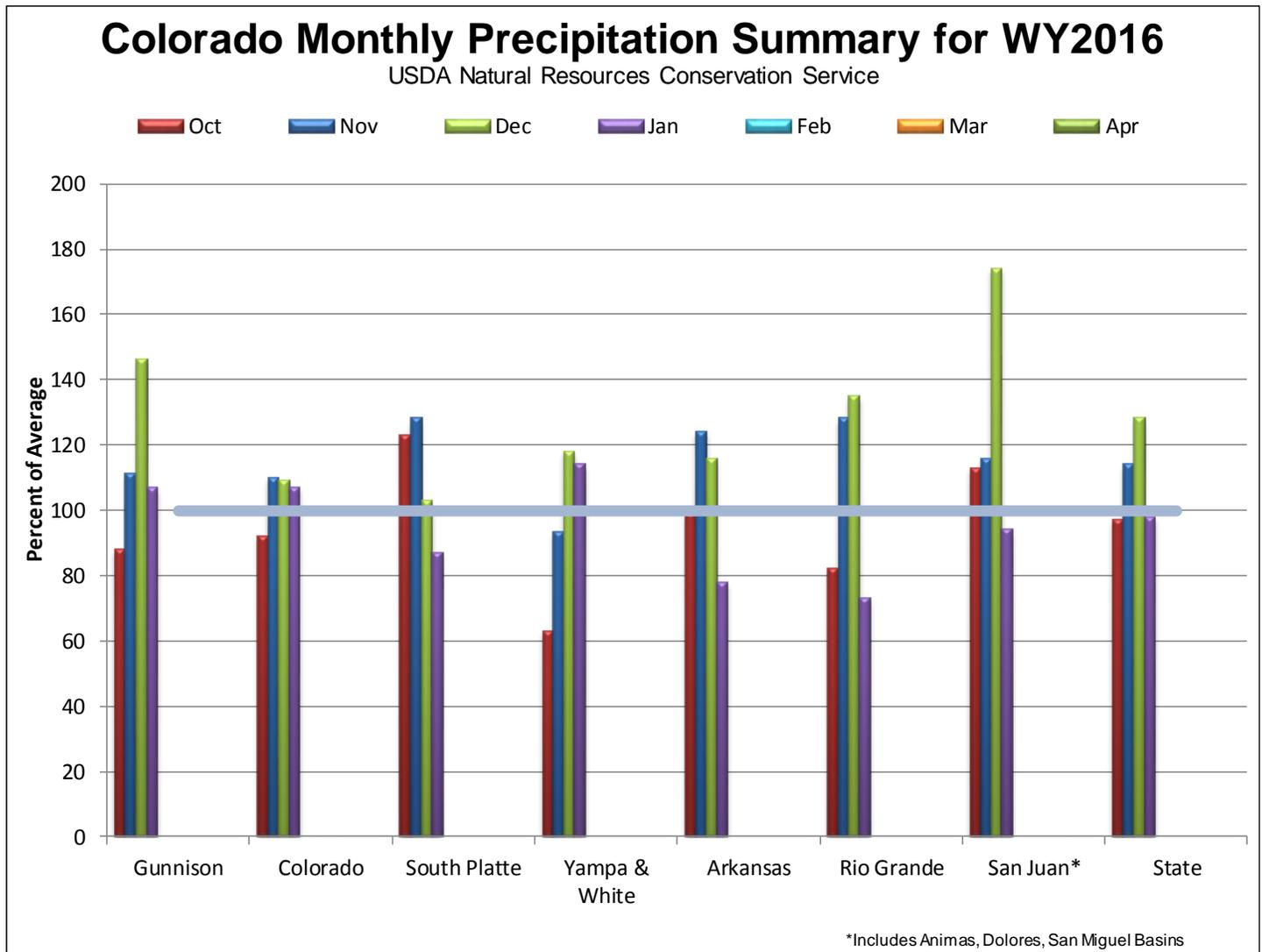
# Snowpack

## Colorado Monthly Snowpack Summary February 1, 2016



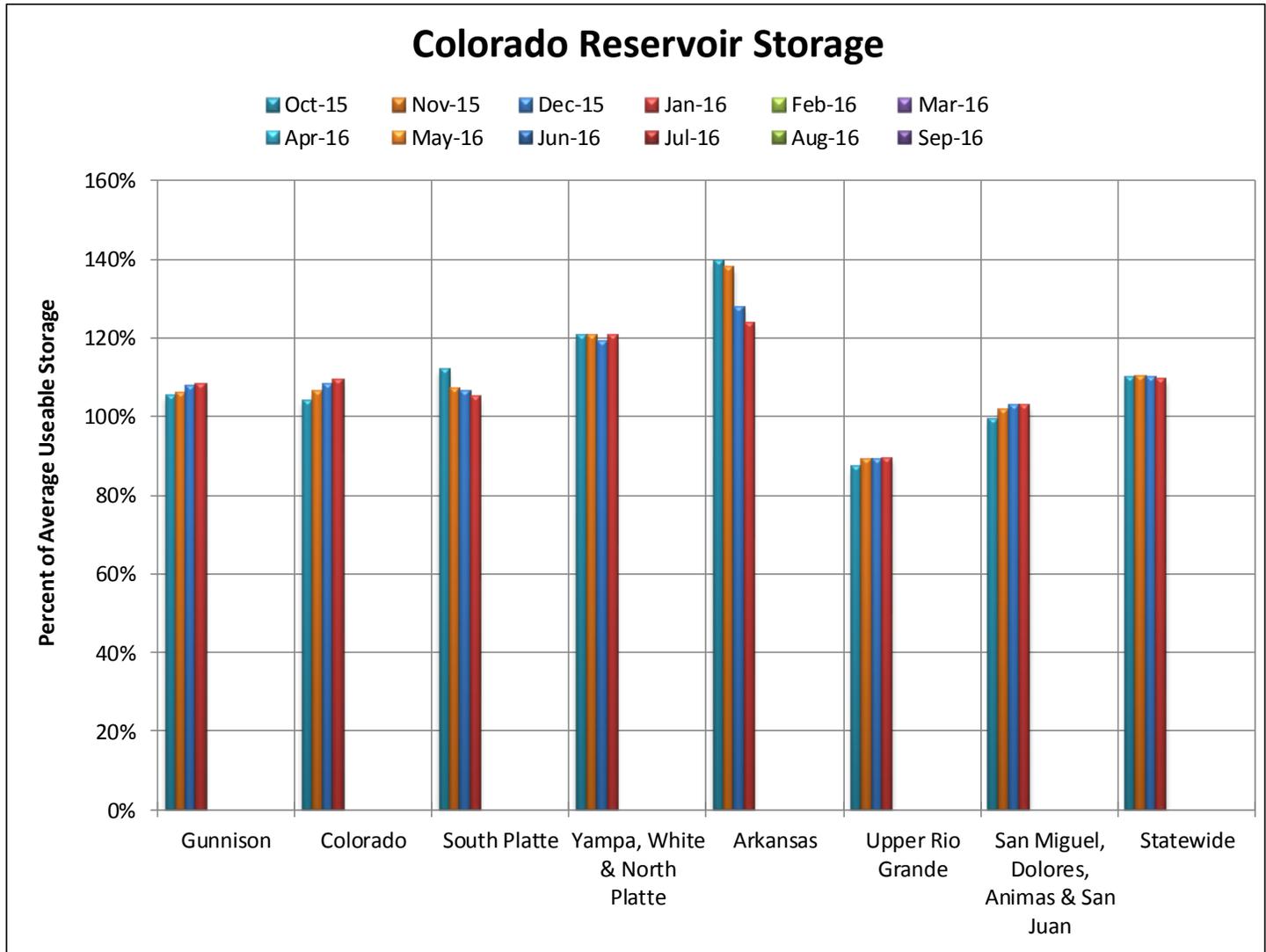
Colorado's snowpack remains at above normal levels heading into February. A stream of moisture brought heavy snow to much of the state over the last few days of January, favorably amplifying the snowpack in all major river basins. Preceding this storm, many SNOTEL stations in the southwest basins and along the Continental Divide had received less than normal snowpack accumulations. However, the latest storm produced between 1 and 4 inches of SWE for the majority of Colorado's SNOTEL sites. Although there are a few individual mountain locations that maintain a snowpack that is below the median, all of Colorado's major river basins are at above normal levels. The combined San Juan, Dolores, Animas, and San Juan River basin holds the greatest snowpack, with respect to normal, at 122 percent of median, in part due to the bountiful snowpack in the San Miguel River basin, which is the highest in the state at 150 percent of median. This is in stark contrast to last year at this time when the combined southwest basins' snowpack only amounted to 66 percent of the median. The combined Yampa, White, and North Platte basin ranks lowest among the major river basins, but is still above normal with a snowpack at 103 percent of median. Although there is a substantial portion of the winter still ahead, most of Colorado's basins are currently on track to have a healthy snow accumulation season.

## Precipitation



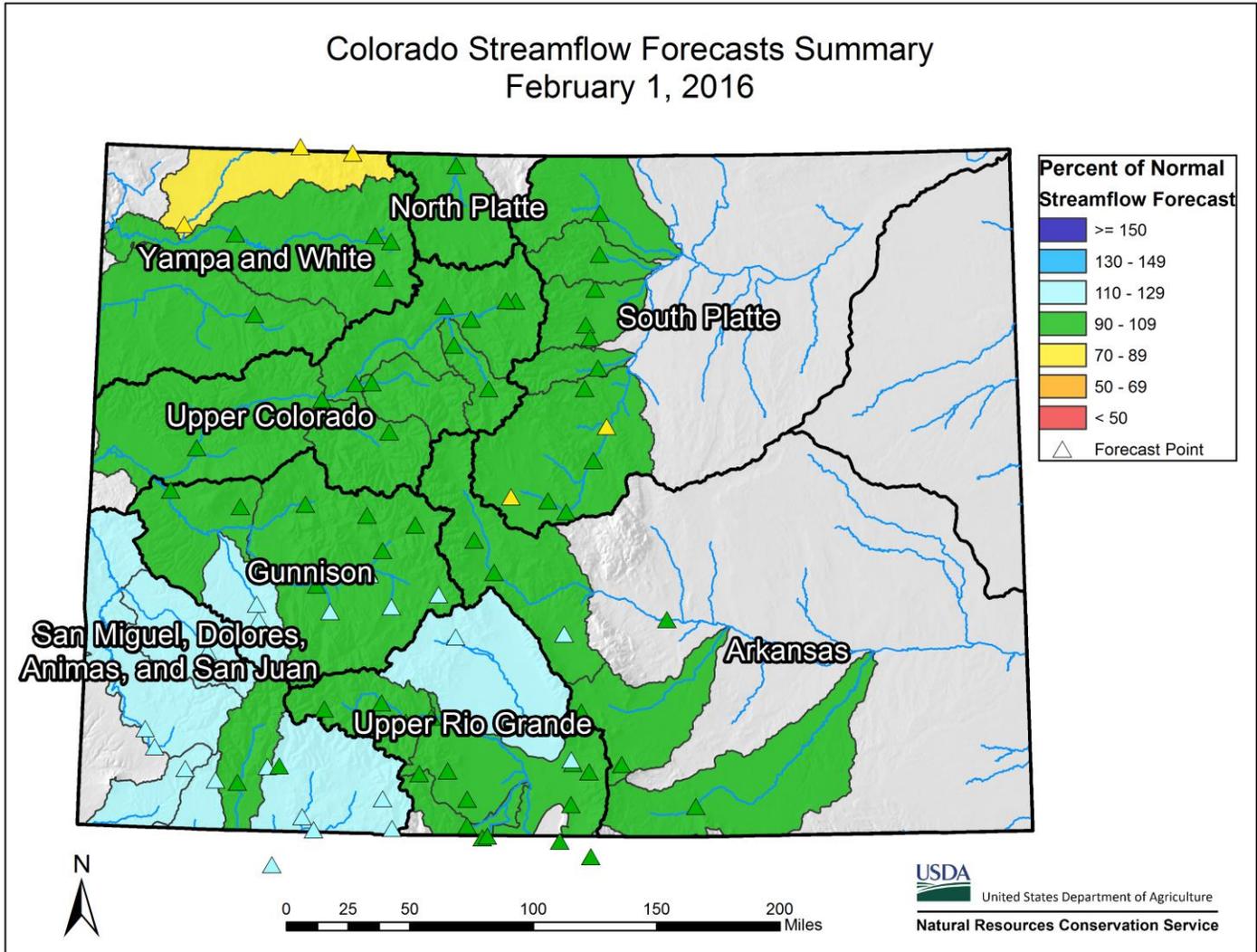
Thanks to a storm that impacted Colorado over the last few days of January, statewide mountain precipitation for the water year remains above normal. As of February 1<sup>st</sup>, water year-to-date precipitation (WYTD) for Colorado is at 109 percent of average. January precipitation was divided among the major river basins in Colorado; basins east of the Continental Divide generally received less than average precipitation while basins west of the divide received near or above average accumulations. The Rio Grande River basin had the lowest January precipitation relative to average at 73 percent. The Arkansas and South Platte basins were also below average at 78 and 87 percent respectively. However, this lack of precipitation was not enough to diminish the benefits from the wet December that these basins experienced, and all still have above average WYTD precipitation. The combined Yampa, White, North Platte River basin experienced the greatest January precipitation with respect to normal and received 114 percent of its average monthly levels. This boosted the basin's WYTD precipitation to 99 percent of average. The Gunnison and Colorado River basins also saw above average January precipitation each at 107 percent and the combined San Miguel, Dolores, Animas, San Juan River basin was slightly below normal at 94 percent of average. Each of these river basins also have WYTD precipitation that is well above average, continuing the positive precipitation trends for Colorado.

## Reservoir Storage



Continuing the trend from last, month reservoir storage across the state remains at well above average volumes. As of February 1<sup>st</sup> statewide reservoir storage was 110 percent of average. Storage in the Arkansas basin has dropped some compared to last month but is still holding 124 percent of average, the largest amount in the state, relative to normal. This is followed closely by the combined Yampa, White, and North Platte basins which have 121 percent of average storage. On the opposite end of the spectrum the Upper Rio Grande is currently the only basin in Colorado holding below normal reservoir volumes at 90 percent of average. Both the combined basins of southwest Colorado and the South Platte are currently storing volumes just above their normal values at 103 and 105 percent of average, respectively. In the central and west central part of the state the Gunnison and Colorado River basins are storing 108 and 109 percent of average reservoir volumes. With only one major basin with below average reservoir storage Colorado water managers should have ample flexibility to operate their reservoirs in a very efficient manner, depending on what the rest of winter and spring hold in store.

## Streamflow



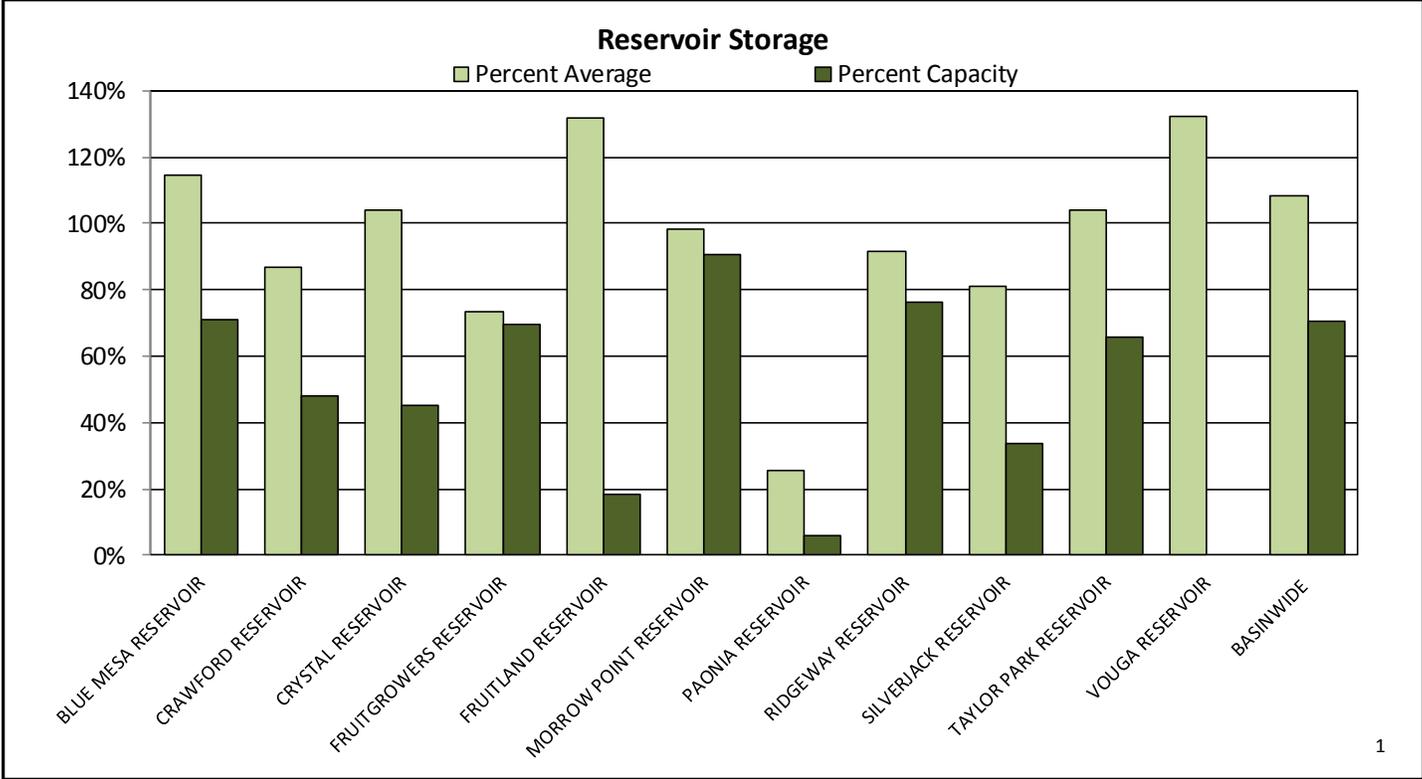
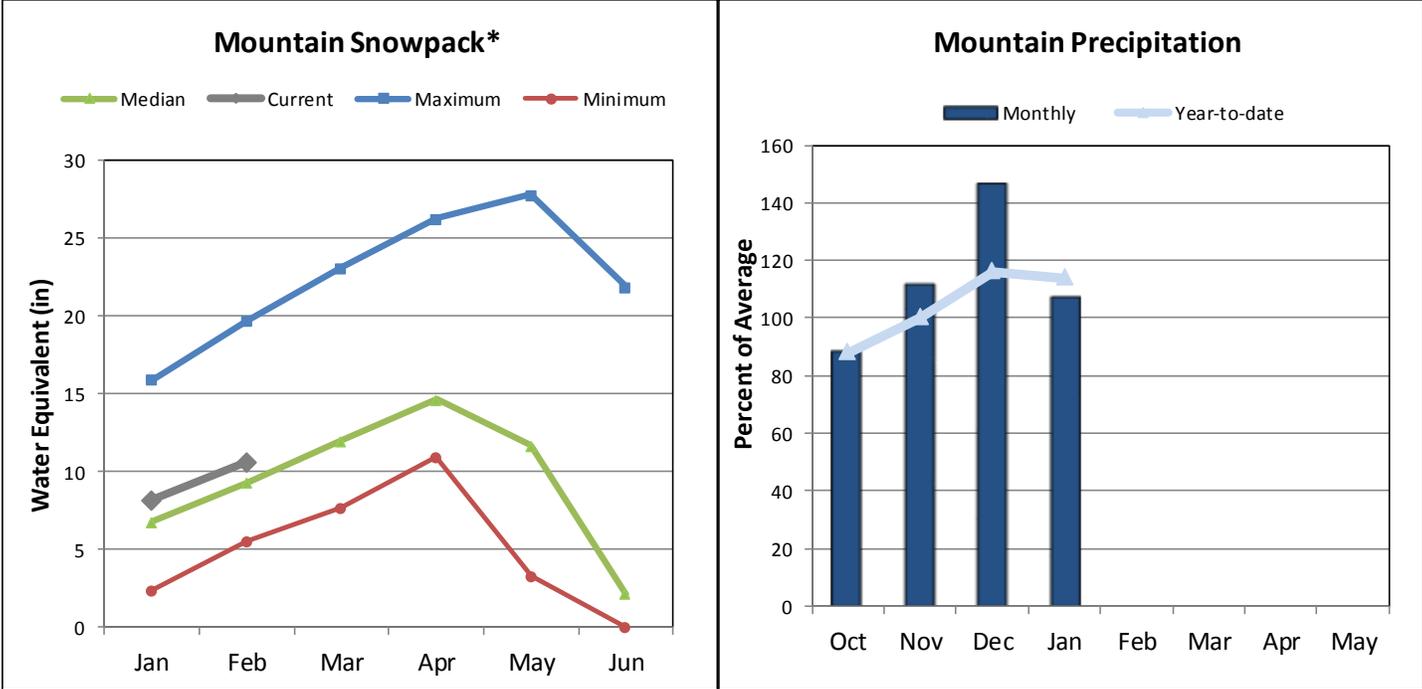
February 1<sup>st</sup> seasonal streamflow forecasts for most major basins in Colorado are predicting near to above normal volumes. Forecasts for rivers flowing from the San Juan Mountains of southwest Colorado are consistently the highest forecasts in the state. Vallecito Reservoir inflow has the smallest forecast in the region at 108 percent of normal and Gurley Reservoir inflow has the highest, at 122 percent. The Upper Rio Grande, also in southwest Colorado, follows close behind and has no points forecast to have below normal streamflow volumes with the highest being Saguache Creek near Saguache at 116 percent. The rest of the major basins in the state have forecasts surrounding, but generally near, normal values with a slightly decreasing trend from south to north throughout the state. The lowest percent of normal streamflow forecasts are currently on the Little Snake River, a major tributary to the Yampa that flows in northwest Colorado, but has much of its snow accumulating headwaters in Wyoming. Forecasts on the Little Snake range from 80 to 87 percent of normal. This general south to north decreasing trend also follows the snowpack accumulation trend, which is commonly observed during strong El Niño cycles, such as the one which has been experienced so far this winter.

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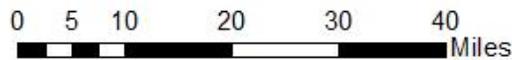
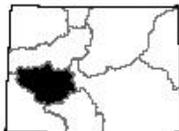
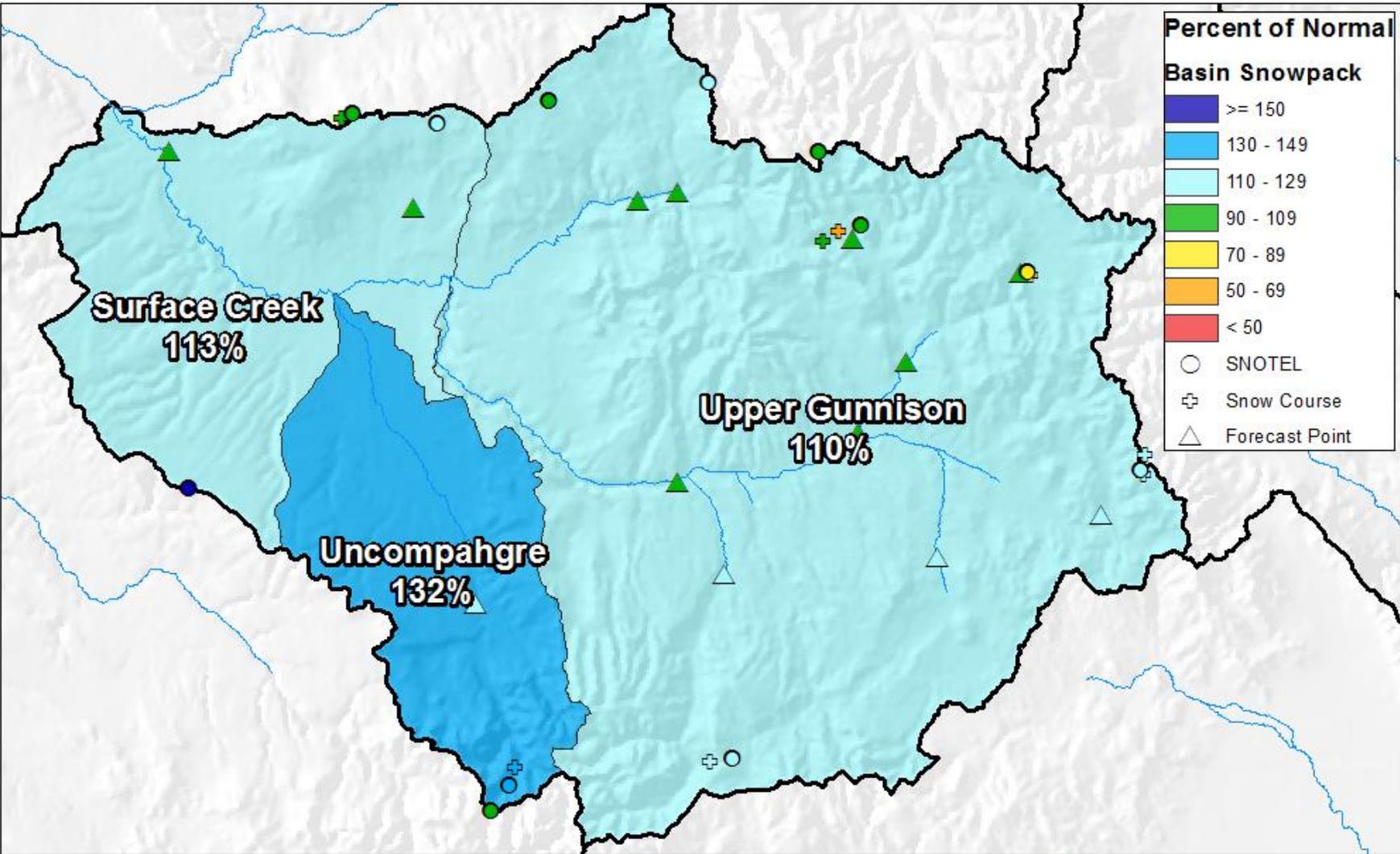
# GUNNISON RIVER BASIN

February 1, 2016

Snowpack in the Gunnison River basin is above normal at 114% of the median. Precipitation for January was 107% of average which brings water year-to-date precipitation to 114% of average. Reservoir storage at the end of January was 108% of average compared to 106% last year. Current streamflow forecasts range from 117% of average for Tomichi Creek at Sargents to 95% for the North Fork of the Gunnison River at Somerset.



# Gunnison River Basin Snowpack and Streamflow Forecasts February 1, 2016



## Gunnison River Basin Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

GUNNISON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Taylor Park Reservoir Inflow	APR-JUL	65	84	99	100%	114	139	99
Slate R nr Crested Butte	APR-JUL	60	72	81	98%	90	105	83
East R at Almont	APR-JUL	118	151	176	97%	205	245	182
Gunnison R near Gunnison <sup>2</sup>	APR-JUL	230	305	365	99%	430	530	370
Tomichi Ck at Sargents	APR-JUL	18.2	28	35	117%	43	57	30
Cochetopa Ck bl Rock Ck nr Parlin	APR-JUL	7.1	12.5	17	113%	22	31	15
Tomichi Ck at Gunnison	APR-JUL	35	62	85	115%	112	157	74
Lake Fk at Gateview	APR-JUL	94	119	137	111%	157	188	123
Blue Mesa Reservoir Inflow <sup>2</sup>	APR-JUL	435	580	690	102%	810	1000	675
Paonia Reservoir Inflow	MAR-JUN	51	74	92	96%	112	146	96
	APR-JUL	48	73	93	96%	115	152	97
NF Gunnison R nr Somerset <sup>2</sup>	APR-JUL	176	230	275	95%	320	390	290
Surface Ck at Cedaredge	APR-JUL	12	14.9	17	101%	19.3	23	16.8
Ridgway Reservoir Inflow	APR-JUL	78	99	115	114%	132	159	101
Uncompahgre R at Colona <sup>2</sup>	APR-JUL	92	129	157	115%	188	240	137
Gunnison R nr Grand Junction <sup>2</sup>	APR-JUL	970	1300	1550	105%	1820	2270	1480

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

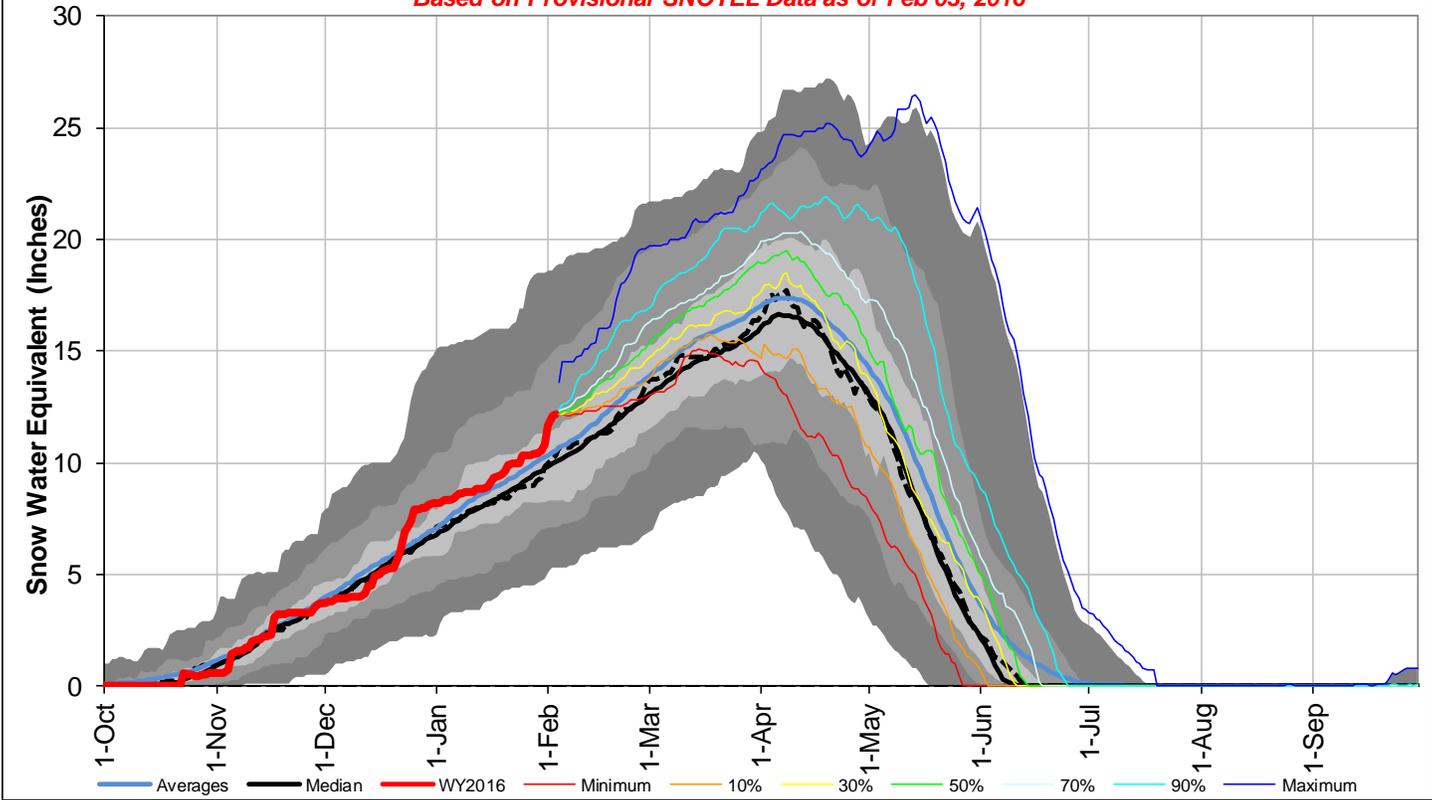
3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Blue Mesa Reservoir	590.1	546.7	514.6	830.0
Crawford Reservoir	6.7	7.1	7.7	14.0
Crystal Reservoir	7.9	7.2	7.6	17.5
Fruitgrowers Reservoir	2.5	3.5	3.4	3.6
Fruitland Reservoir	1.7	1.0	1.3	9.2
Morrow Point Reservoir	109.6	110.6	111.4	121.0
Paonia Reservoir	0.9	0.6	3.5	15.4
Ridgway Reservoir	63.5	77.0	69.2	83.0
Silverjack Reservoir	4.3	6.9	5.3	12.8
Taylor Park Reservoir	69.7	79.0	66.9	106.0
Vouga Reservoir	0.9	0.9	0.7	0.9
Basin-wide Total	857.8	840.5	791.6	1213.4
# of reservoirs	11	11	11	11

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
UPPER GUNNISON BASIN	17	110%	82%
SURFACE CREEK BASIN	3	113%	62%
UNCOMPAHGRE BASIN	4	132%	92%
GUNNISON RIVER BASIN	21	114%	84%

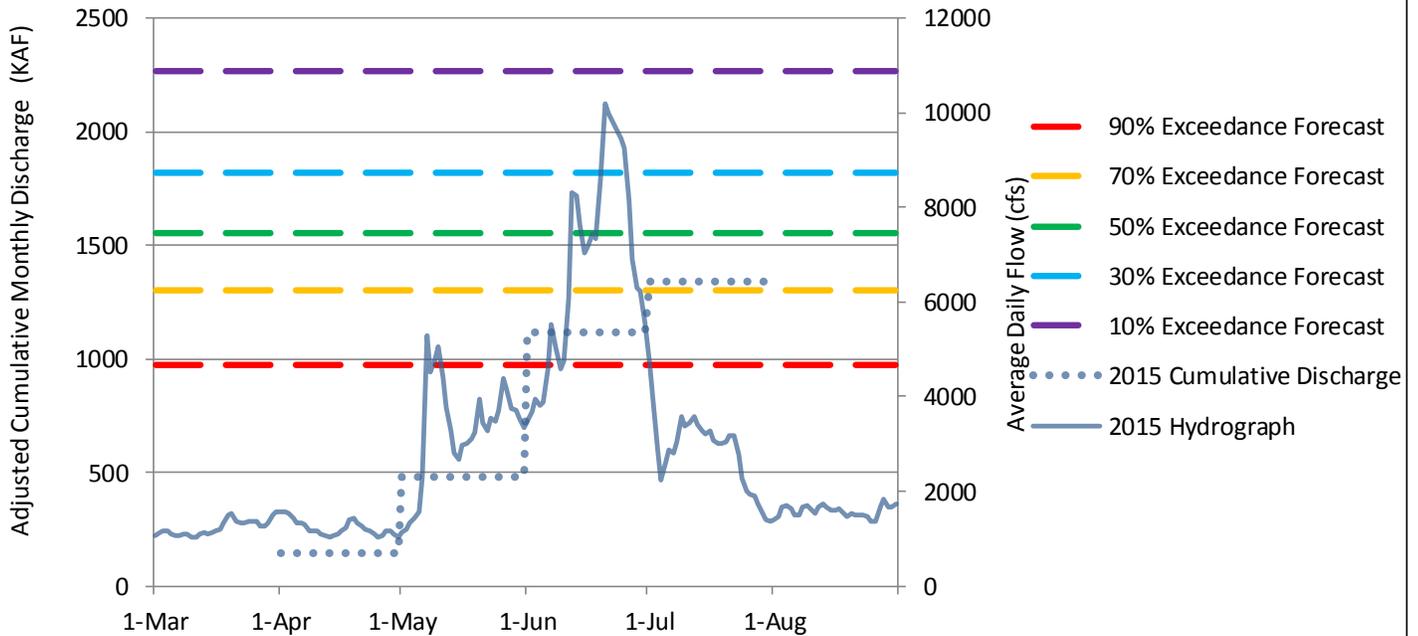
### Gunnison River Basin with Non-Exceedence Projections

*Based on Provisional SNOTEL Data as of Feb 03, 2016*



### Gunnison River near Grand Junction, CO

**Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)**

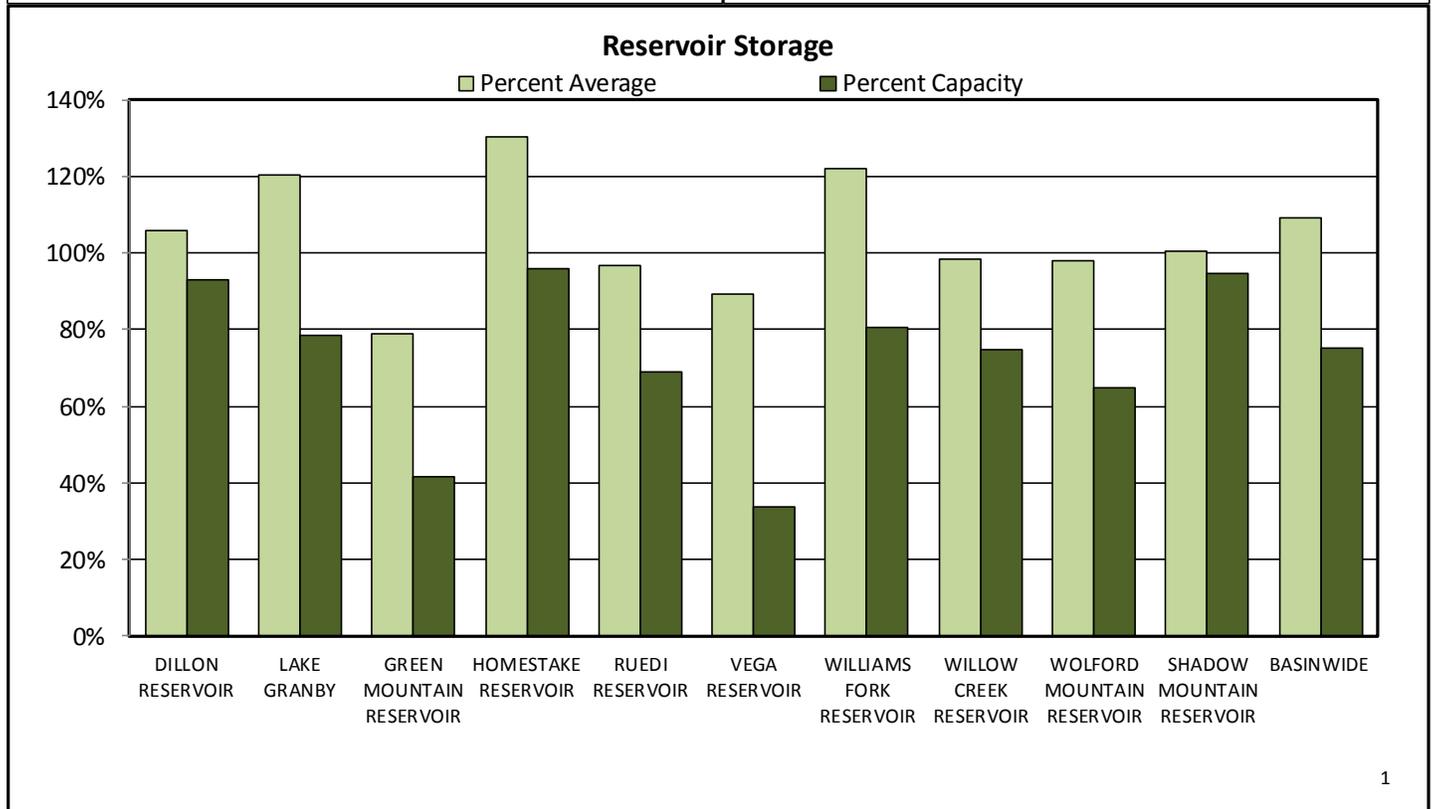
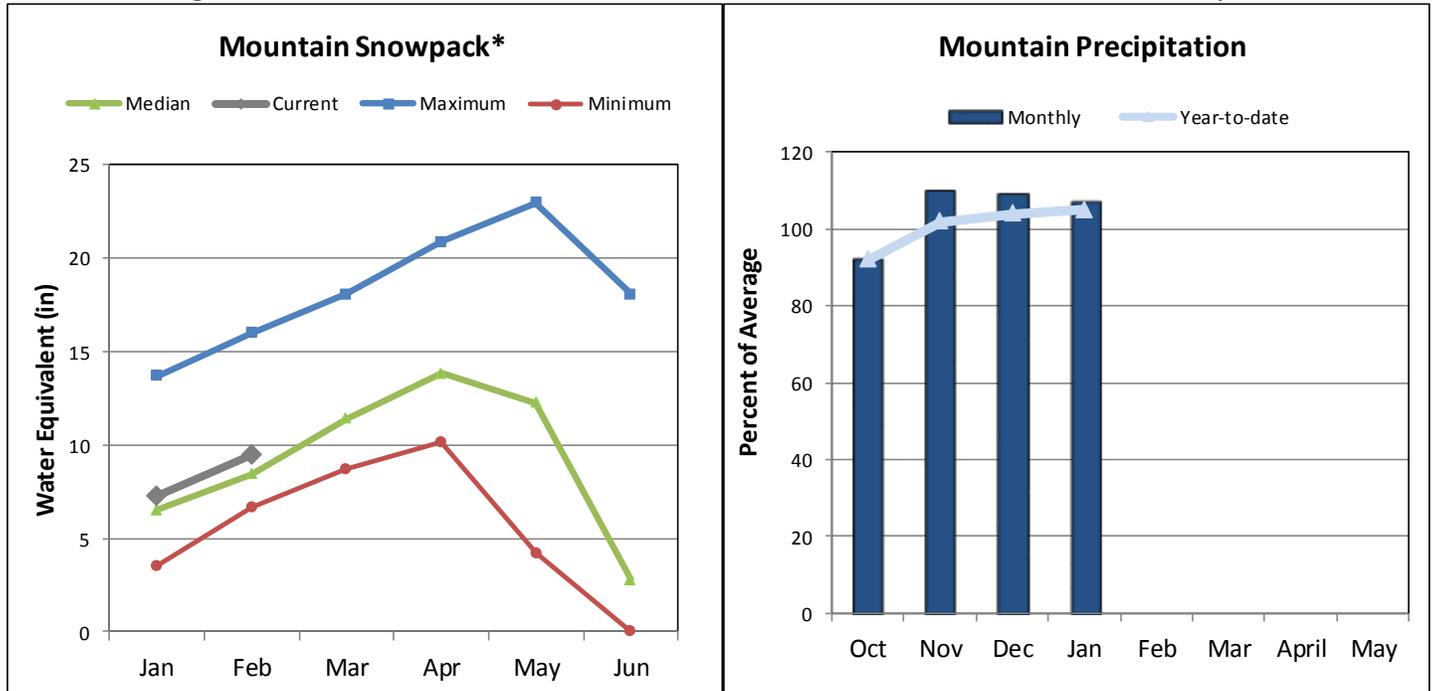


Please refer to the sections at the end of this report for further explanation concerning these graphs.

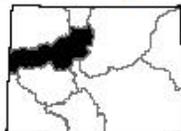
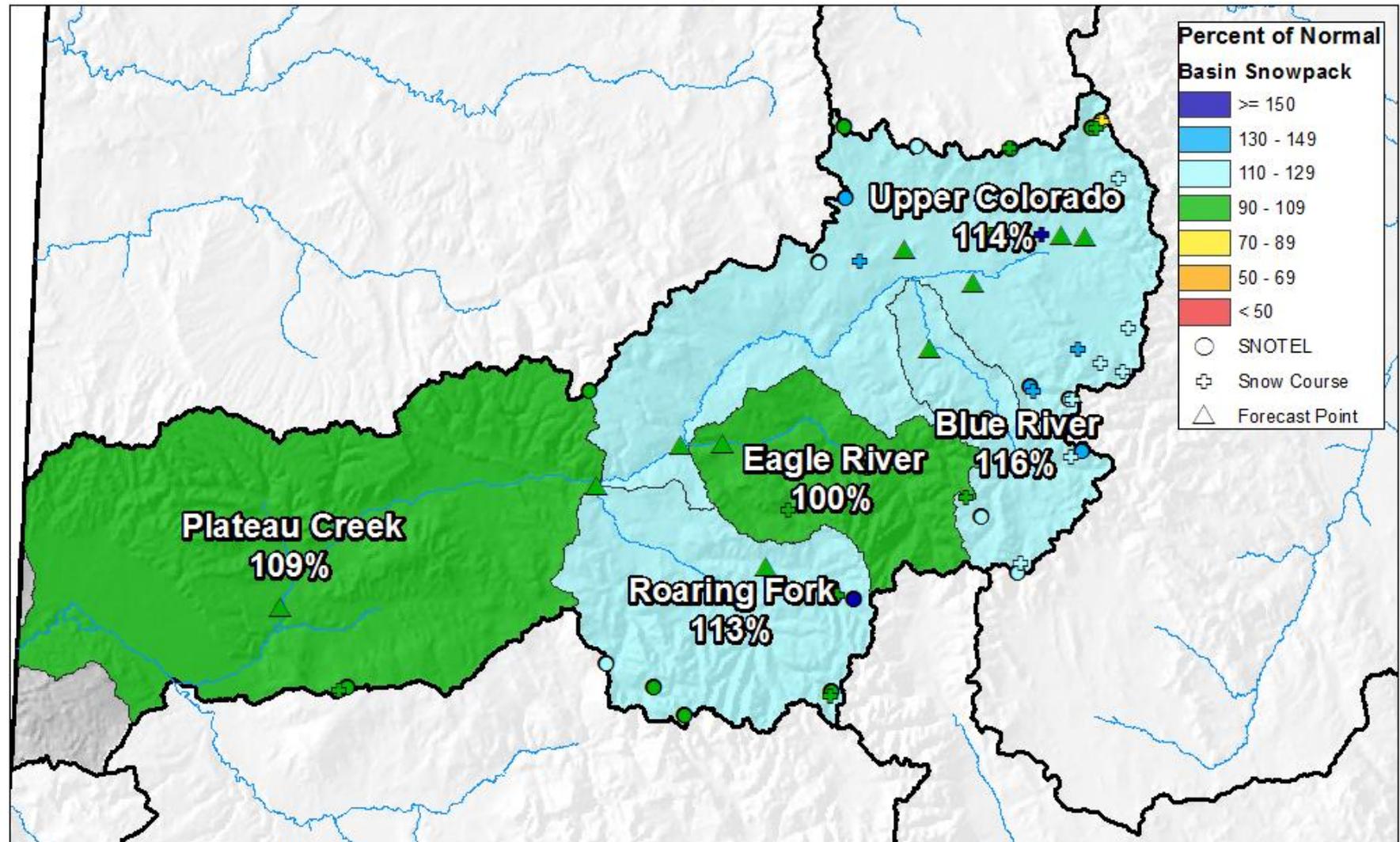
# UPPER COLORADO RIVER BASIN

February 1, 2016

Snowpack in the Colorado River basin is above normal at 113% of the median. Precipitation for January was 107% of average which brings water year-to-date precipitation to 105% of average. Reservoir storage at the end of January was 109% of average compared to 117% last year. Current streamflow forecasts range from 106% of average for the inflow to Willow Creek Reservoir to 90% for the inflow to Lake Granby.



# Upper Colorado River Basin Snowpack and Streamflow Forecasts February 1, 2016



0 5 10 20 30 40  
Miles



United States Department of Agriculture  
Natural Resources Conservation Service

## Upper Colorado River Basin Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

UPPER COLORADO RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Lake Granby Inflow <sup>2</sup>	APR-JUL	135	170	197	90%	225	270	220
Willow Ck Reservoir Inflow	APR-JUL	30	41	50	106%	59	75	47
Williams Fk bl Williams Fk Reservoir <sup>2</sup>	APR-JUL	67	87	101	104%	117	142	97
Wolford Mtn Reservoir Inflow	APR-JUL	35	45	53	98%	62	75	54
Dillon Reservoir Inflow <sup>2</sup>	APR-JUL	113	145	170	104%	197	240	163
Green Mountain Reservoir Inflow <sup>2</sup>	APR-JUL	191	245	290	105%	330	405	275
Eagle R bl Gypsum <sup>2</sup>	APR-JUL	215	280	330	99%	385	470	335
Colorado R nr Dotsero <sup>2</sup>	APR-JUL	895	1180	1390	99%	1620	2000	1400
Ruedi Reservoir Inflow <sup>2</sup>	APR-JUL	100	125	143	103%	163	195	139
Roaring Fk at Glenwood Springs <sup>2</sup>	APR-JUL	470	590	675	98%	770	920	690
Colorado R nr Cameo <sup>2</sup>	APR-JUL	1580	2000	2310	98%	2650	3190	2350

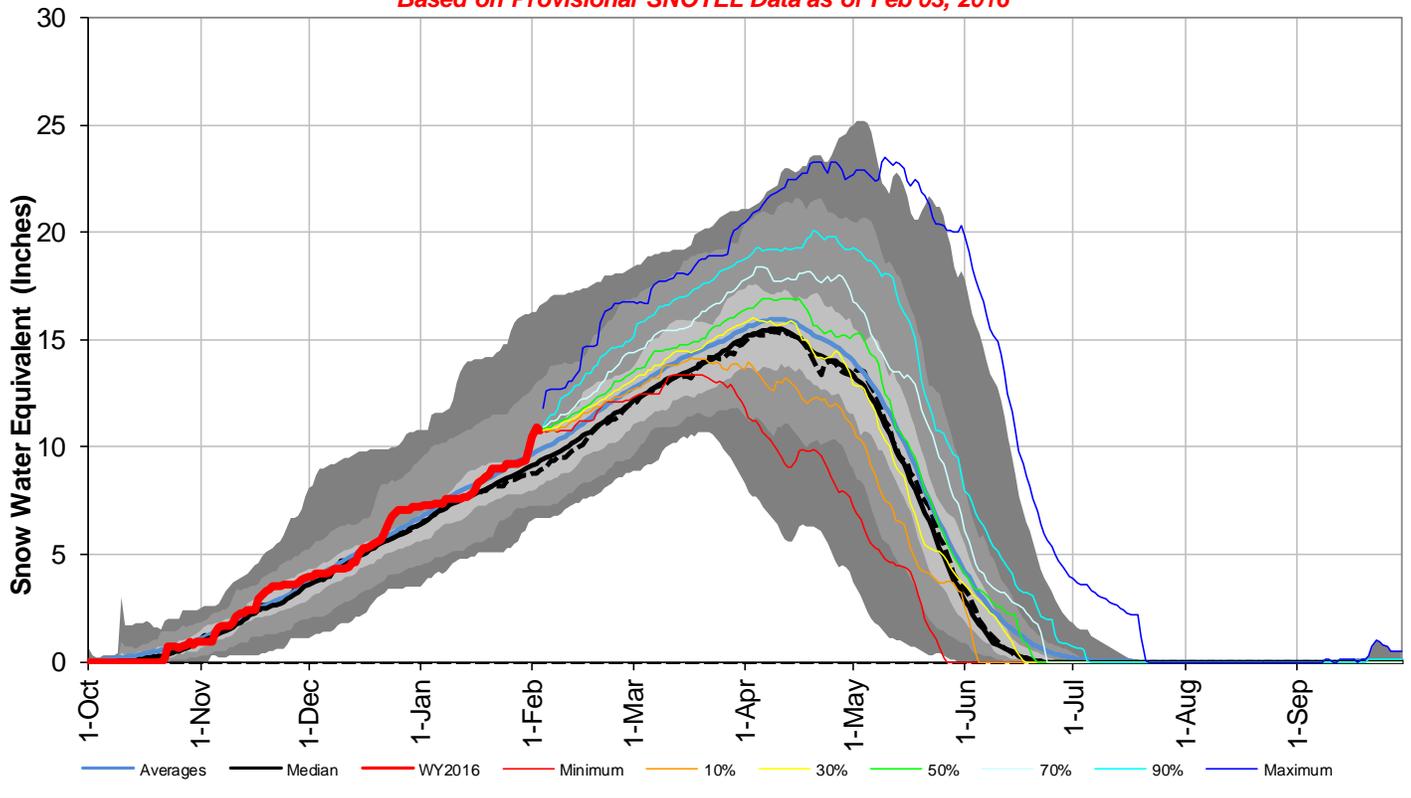
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dillon Reservoir	236.8	250.1	223.3	254.0
Green Mountain Reservoir	61.0	67.8	77.1	146.8
Homestake Reservoir	41.3	20.4	31.7	43.0
Lake Granby	365.4	423.7	302.9	465.6
Ruedi Reservoir	70.2	81.6	72.4	102.0
Shadow Mountain Reservoir	17.4	3.7	17.3	18.4
Vega Reservoir	11.1	14.0	12.4	32.9
Williams Fork Reservoir	78.0	78.5	63.8	97.0
Willow Creek Reservoir	6.8	7.4	6.9	9.1
Wolford Mountain Reservoir	42.7	45.7	43.6	65.9
Basin-wide Total	930.7	992.8	851.4	1234.7
# of reservoirs	10	10	10	10

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
BLUE RIVER BASIN	8	116%	122%
HEADWATERS COLORADO RIVER	36	114%	100%
MUDDY CREEK BASIN	5	116%	92%
EAGLE RIVER BASIN	5	100%	102%
PLATEAU CREEK BASIN	3	113%	62%
ROARING FORK BASIN	9	113%	91%
WILLIAMS FORK BASIN	5	128%	104%
WILLOW CREEK BASIN	5	121%	82%
UPPER COLORADO RIVER BASIN	48	113%	95%

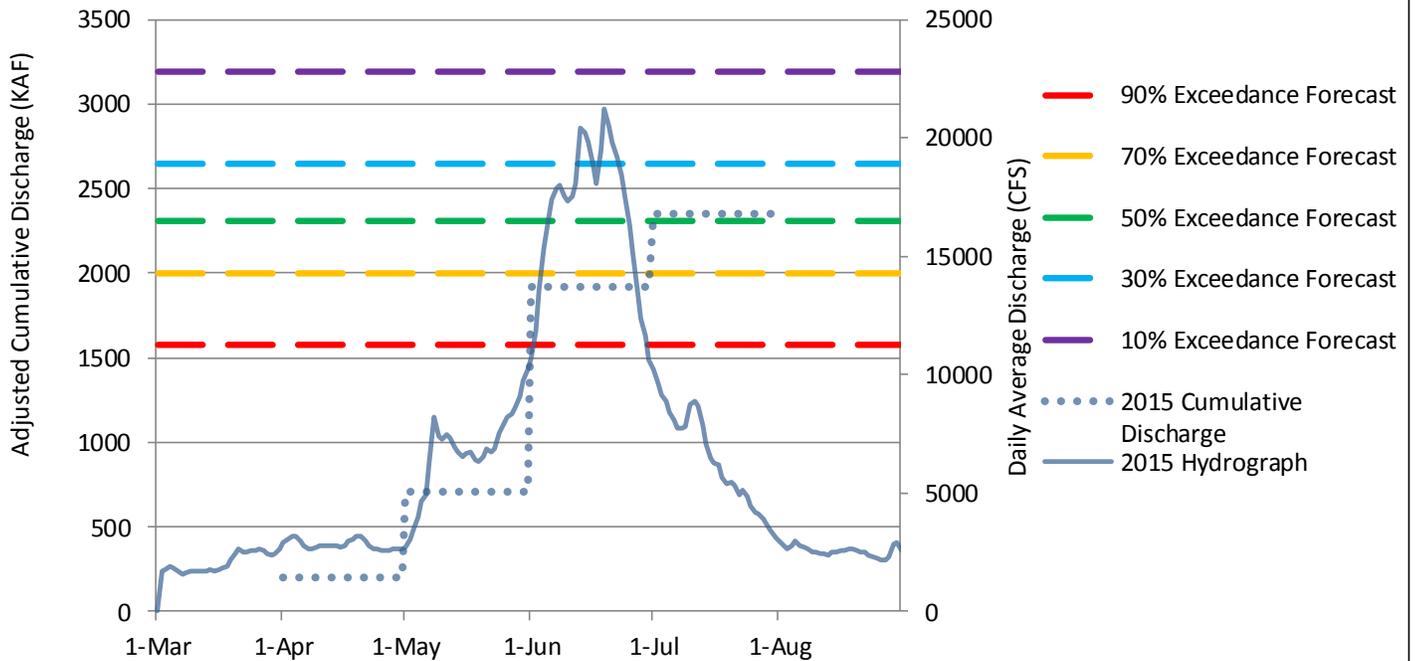
## Upper Colorado River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Feb 03, 2016



## Colorado River near Cameo, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

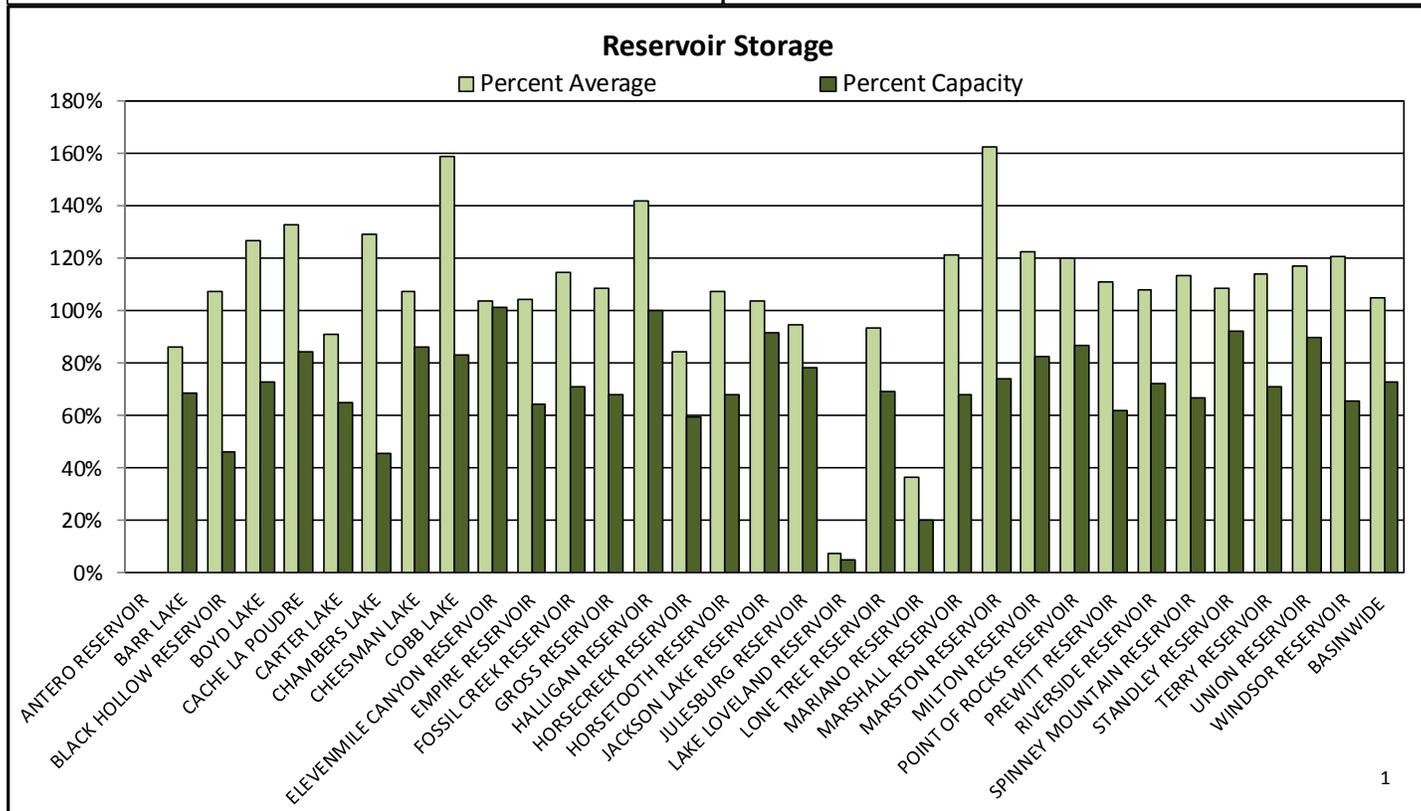
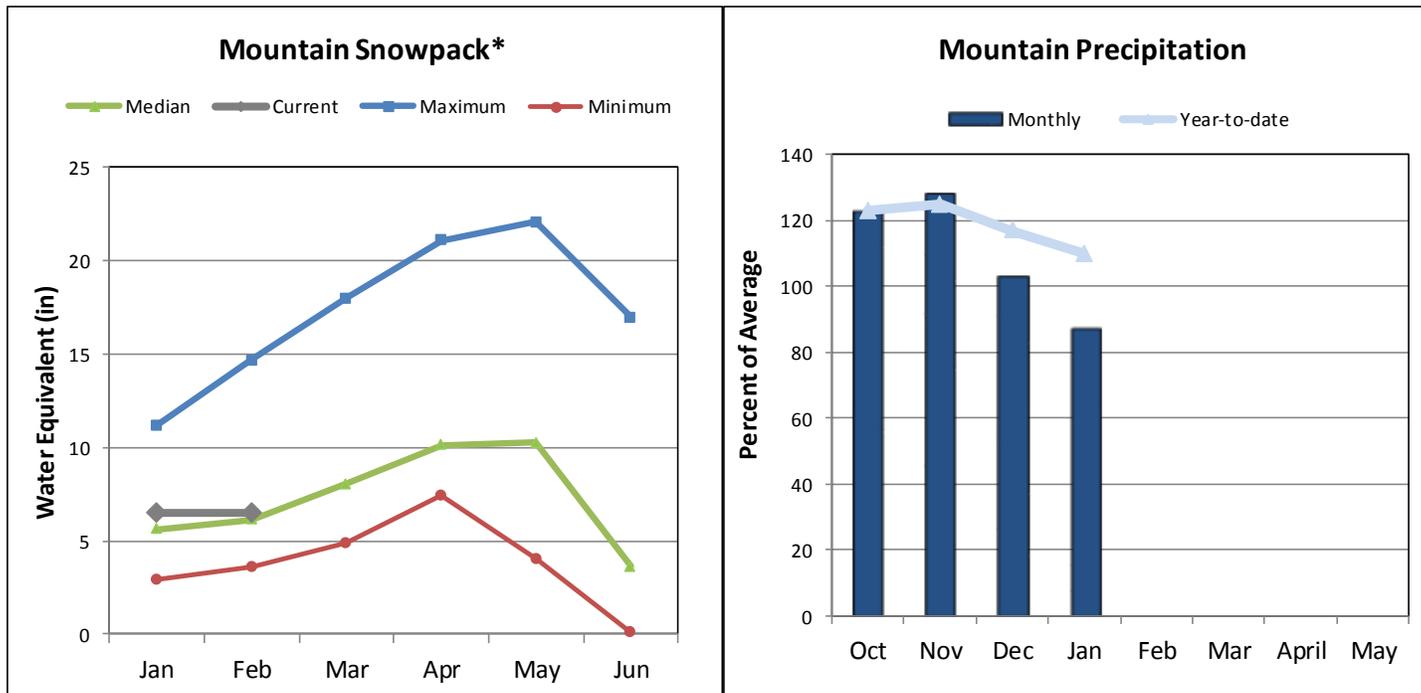


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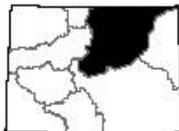
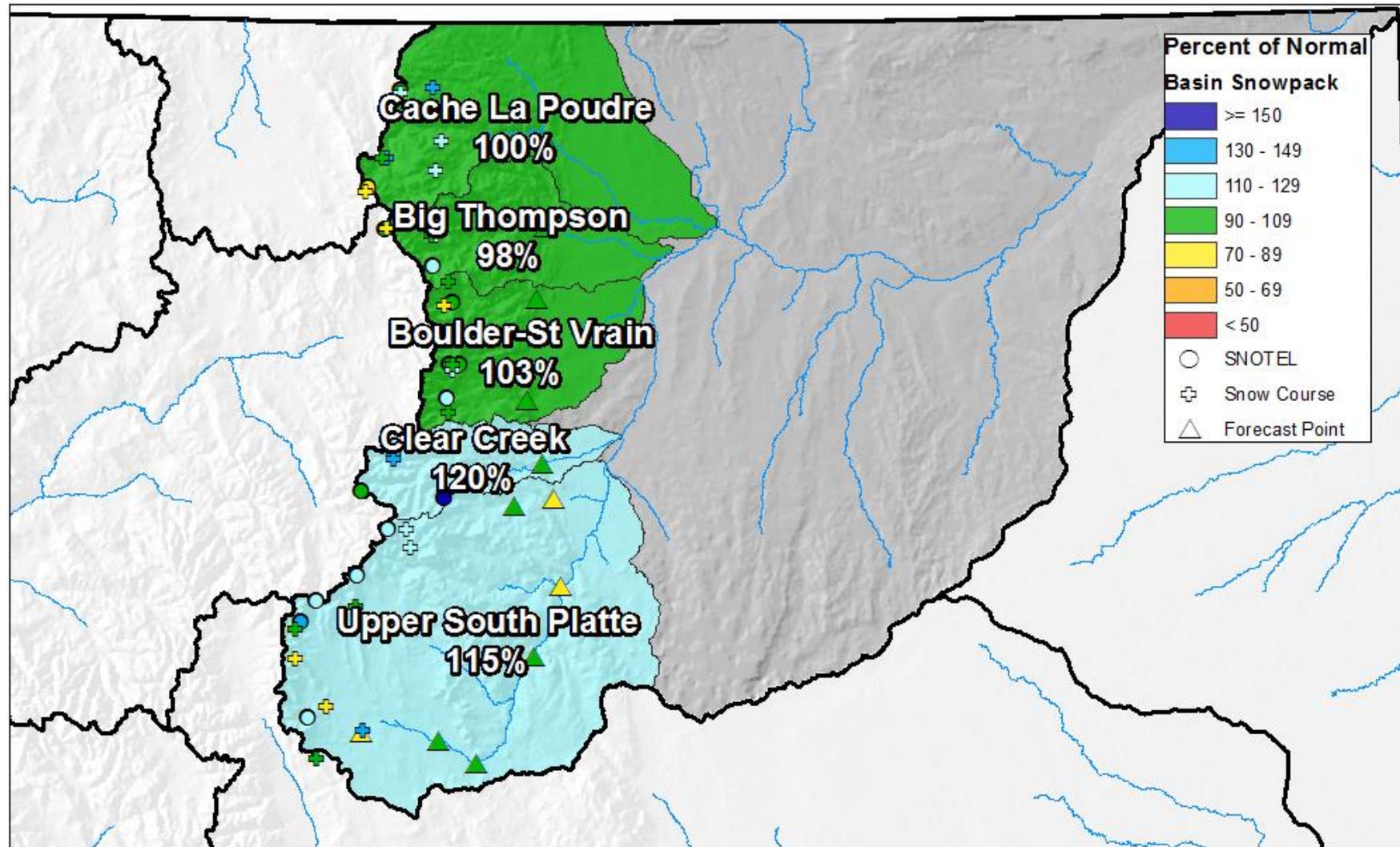
# SOUTH PLATTE RIVER BASIN

February 1, 2016

Snowpack in the South Platte River basin is above normal at 106% of the median. Precipitation for January was 87% of average which brings water year-to-date precipitation to 110%. Reservoir storage at the end of January was 105% of average compared to 119% last year. Streamflow forecasts range from 102% of average for Boulder Creek near Orodell at Golden to 89% for the South Platte River at South Platte.



# South Platte River Basin Snowpack and Streamflow Forecasts February 1, 2016



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

### South Platte River Basin Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

SOUTH PLATTE RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Antero Reservoir Inflow <sup>2</sup>	APR-JUL	6.4	10.3	13	90%	15.7	19.6	14.5
	APR-SEP	8.5	13	16	90%	19	23	17.8
Spinney Mountain Reservoir Inflow <sup>2</sup>	APR-JUL	22	34	45	94%	60	91	48
	APR-SEP	27	42	57	93%	77	119	61
Elevenmile Canyon Reservoir Inflow <sup>2</sup>	APR-JUL	22	34	46	92%	62	96	50
	APR-SEP	27	43	59	92%	81	130	64
Cheesman Lake Inflow <sup>2</sup>	APR-JUL	42	66	90	90%	122	193	100
	APR-SEP	52	83	113	90%	155	245	126
South Platte R at South Platte <sup>2</sup>	APR-JUL	69	114	160	89%	225	370	180
	APR-SEP	86	142	200	89%	280	465	225
Bear Ck ab Evergreen	APR-JUL	6.8	11.1	15.6	95%	22	36	16.4
	APR-SEP	9.1	14.6	20	95%	27	44	21
Clear Ck at Golden	APR-JUL	74	91	103	98%	115	132	105
	APR-SEP	90	111	126	98%	140	162	128
St. Vrain Ck at Lyons <sup>2</sup>	APR-JUL	64	76	85	97%	94	106	88
	APR-SEP	74	89	99	96%	109	124	103
Boulder Ck nr Orodell <sup>2</sup>	APR-JUL	40	49	55	102%	62	71	54
	APR-SEP	45	56	63	100%	71	82	63
South Boulder Ck nr Eldorado Springs <sup>2</sup>	APR-JUL	29	34	37	95%	40	45	39
	APR-SEP	31	37	41	95%	45	51	43
Big Thompson R at Canyon Mouth <sup>2</sup>	APR-JUL	60	75	85	94%	95	110	90
	APR-SEP	72	90	102	95%	114	132	107
Cache La Poudre at Canyon Mouth <sup>2</sup>	APR-JUL	133	179	210	93%	240	285	225
	APR-SEP	144	195	230	92%	265	315	250

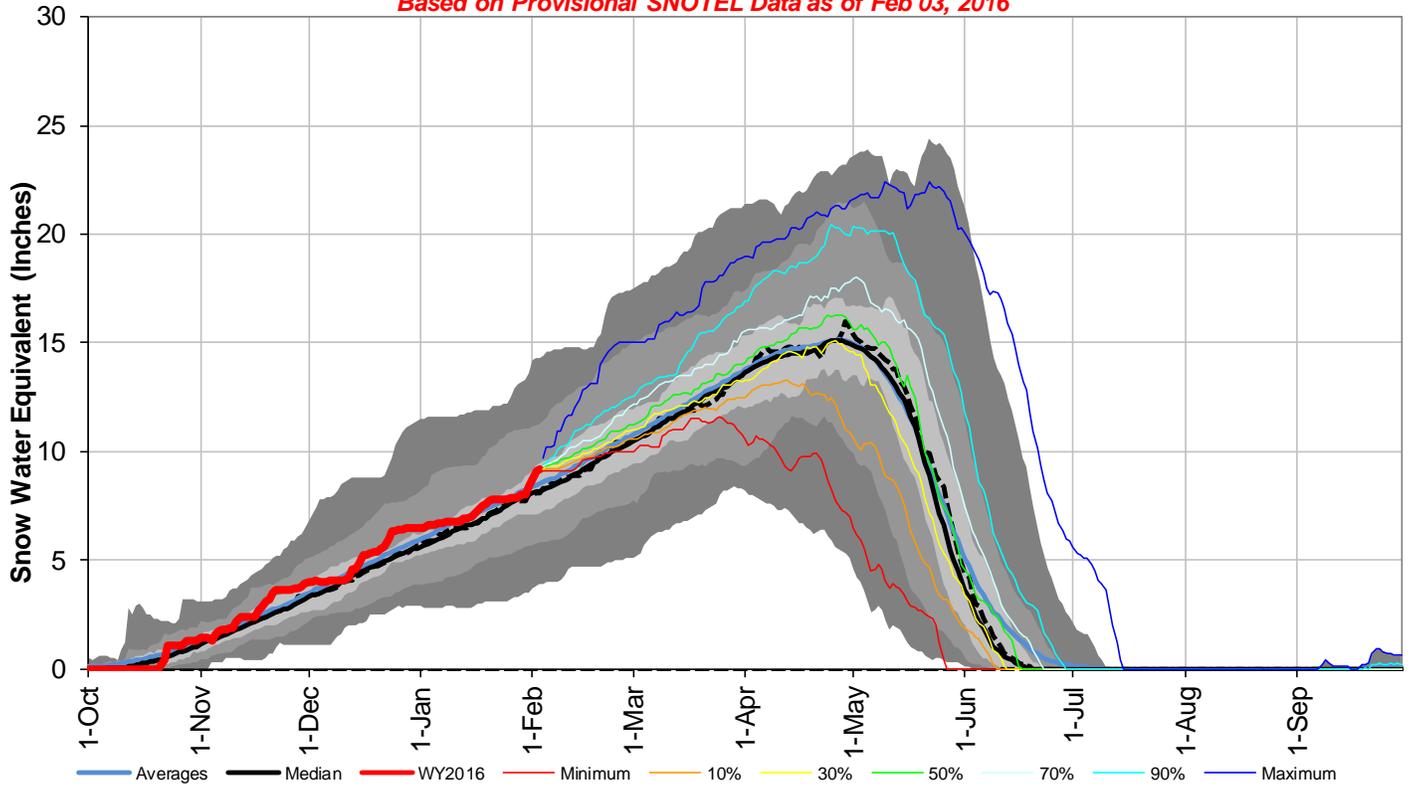
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- 3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Antero Reservoir	0.0	16.1	15.3	19.9
Barr Lake	20.7	23.4	24.0	30.1
Black Hollow Reservoir	3.0	4.4	2.8	6.5
Boyd Lake	35.2	30.5	27.8	48.4
Cache La Poudre	8.5	9.2	6.4	10.1
Carter Lake	71.1	100.6	78.3	108.9
Chambers Lake	4.0	7.5	3.1	8.8
Cheesman Lake	68.3	70.4	63.7	79.0
Cobb Lake	18.6	19.6	11.7	22.3
Elevenmile Canyon Reservoir	99.5	99.1	95.9	98.0
Empire Reservoir	23.6	24.2	22.6	36.5
Fossil Creek Reservoir	7.9	9.3	6.9	11.1
Gross Reservoir	28.5	27.8	26.3	41.8
Halligan Reservoir	6.4	6.4	4.5	6.4
Horseshoe Reservoir	8.8	9.6	10.4	14.7
Horsetooth Reservoir	102.0	129.3	94.7	149.7
Jackson Lake Reservoir	24.0	22.9	23.1	26.1
Julesburg Reservoir	16.0	15.8	16.9	20.5
Lake Loveland Reservoir	0.5	8.9	6.8	10.3
Lone Tree Reservoir	6.0	6.8	6.4	8.7
Mariano Reservoir	1.1	3.9	3.0	5.4
Marshall Reservoir	6.8	9.0	5.6	10.0
Marston Reservoir	9.6	0.0	5.9	13.0
Milton Reservoir	19.4	18.7	15.8	23.5
Point Of Rocks Reservoir	61.5	67.7	51.1	70.6
Prewitt Reservoir	17.4	15.5	15.7	28.2
Ralph Price Reservoir	6.4	12.9		16.2
Riverside Reservoir	40.4	46.5	37.3	55.8
Spinney Mountain Reservoir	32.9	41.8	29.0	49.0
Standley Reservoir	38.8	40.0	35.7	42.0
Terry Reservoir	5.7	6.3	5.0	8.0
Union Reservoir	11.7	11.5	10.0	13.0
Windsor Reservoir	10.0	10.5	8.3	15.2
Basin-wide Total	807.9	913.1	770.0	1091.5
# of reservoirs	32	32	32	32

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
BIG THOMPSON BASIN	7	98%	101%
BOULDER CREEK BASIN	6	105%	88%
CACHE LA POUFRE BASIN	10	100%	92%
CLEAR CREEK BASIN	4	120%	106%
SAINT VRAIN BASIN	2	90%	127%
UPPER SOUTH PLATTE BASIN	16	115%	98%
SOUTH PLATTE RIVER BASIN	45	106%	97%

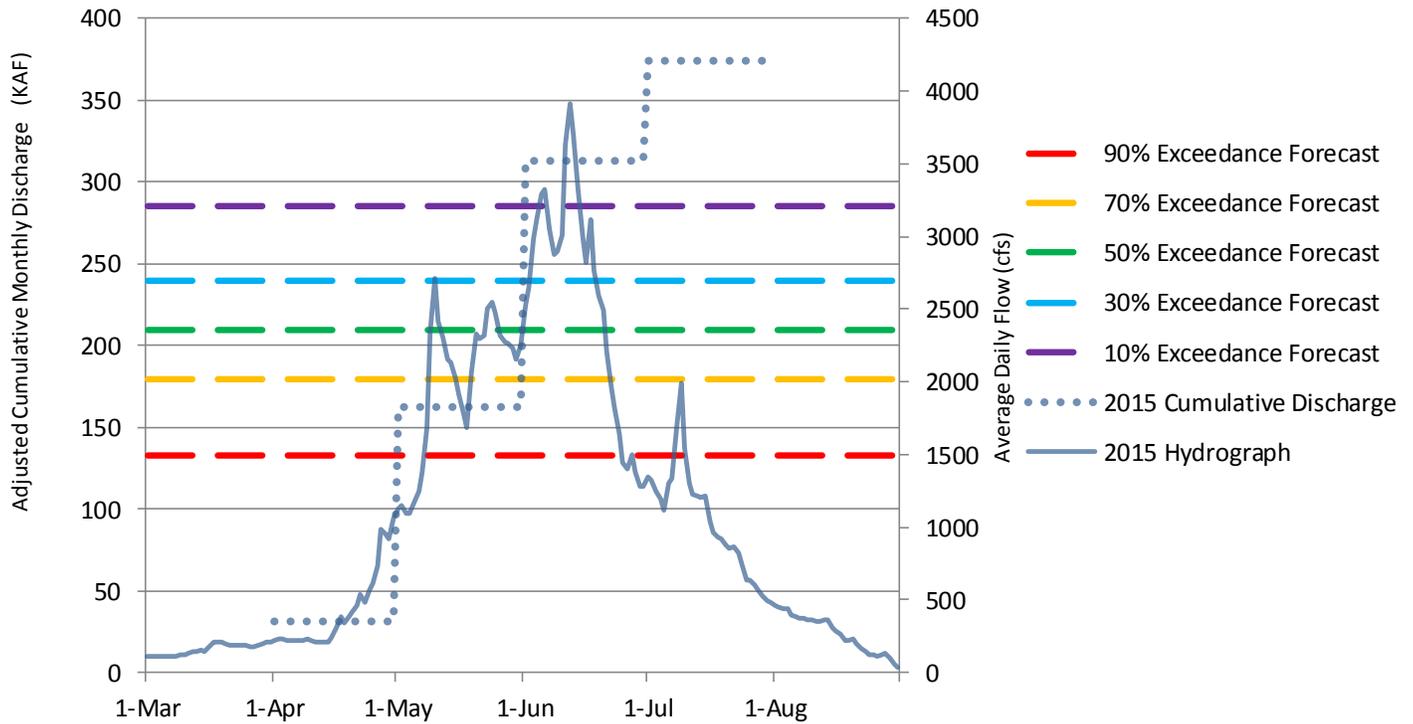
### South Platte River Basin with Non-Exceedance Projections

*Based on Provisional SNOTEL Data as of Feb 03, 2016*



### Cache La Poudre River at Canyon Mouth

**Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)**

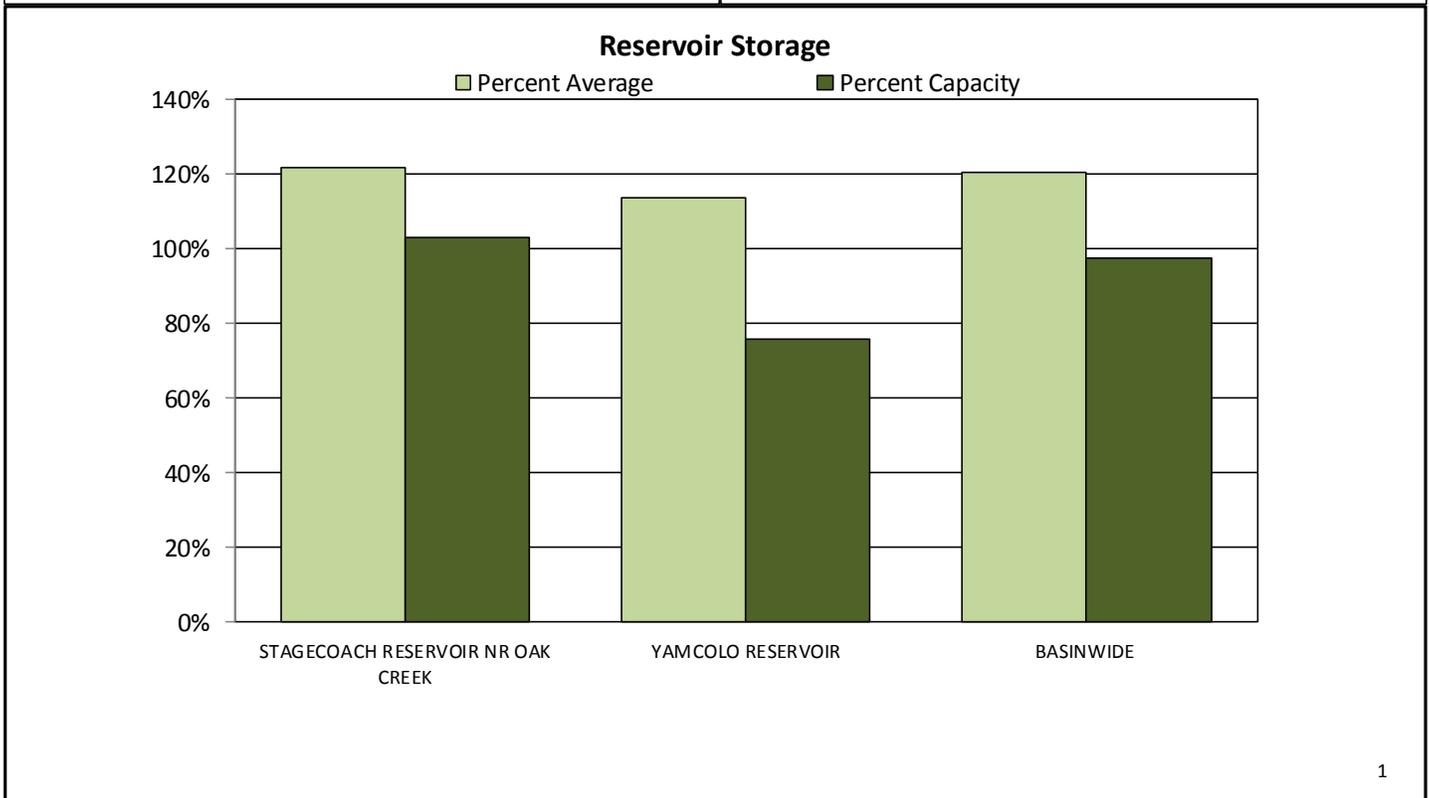
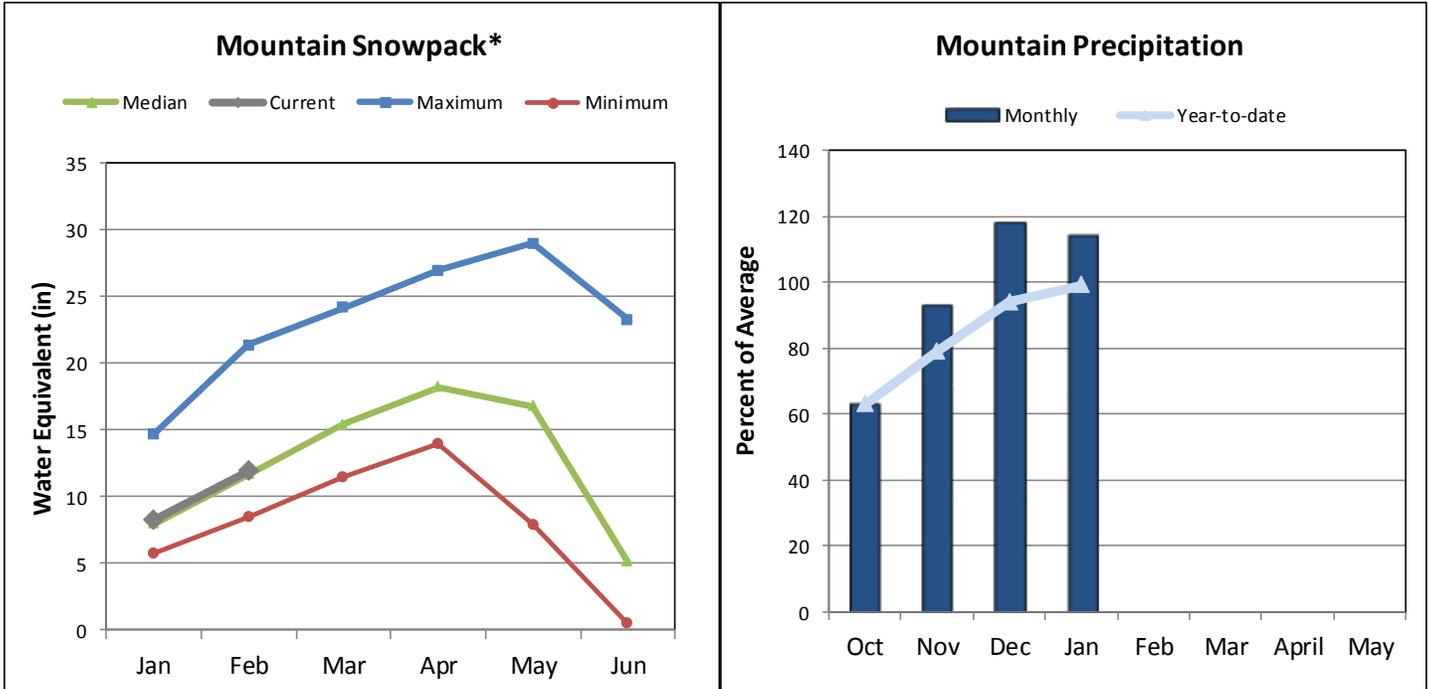


Please refer to the sections at the end of this report for further explanation concerning these graphs.

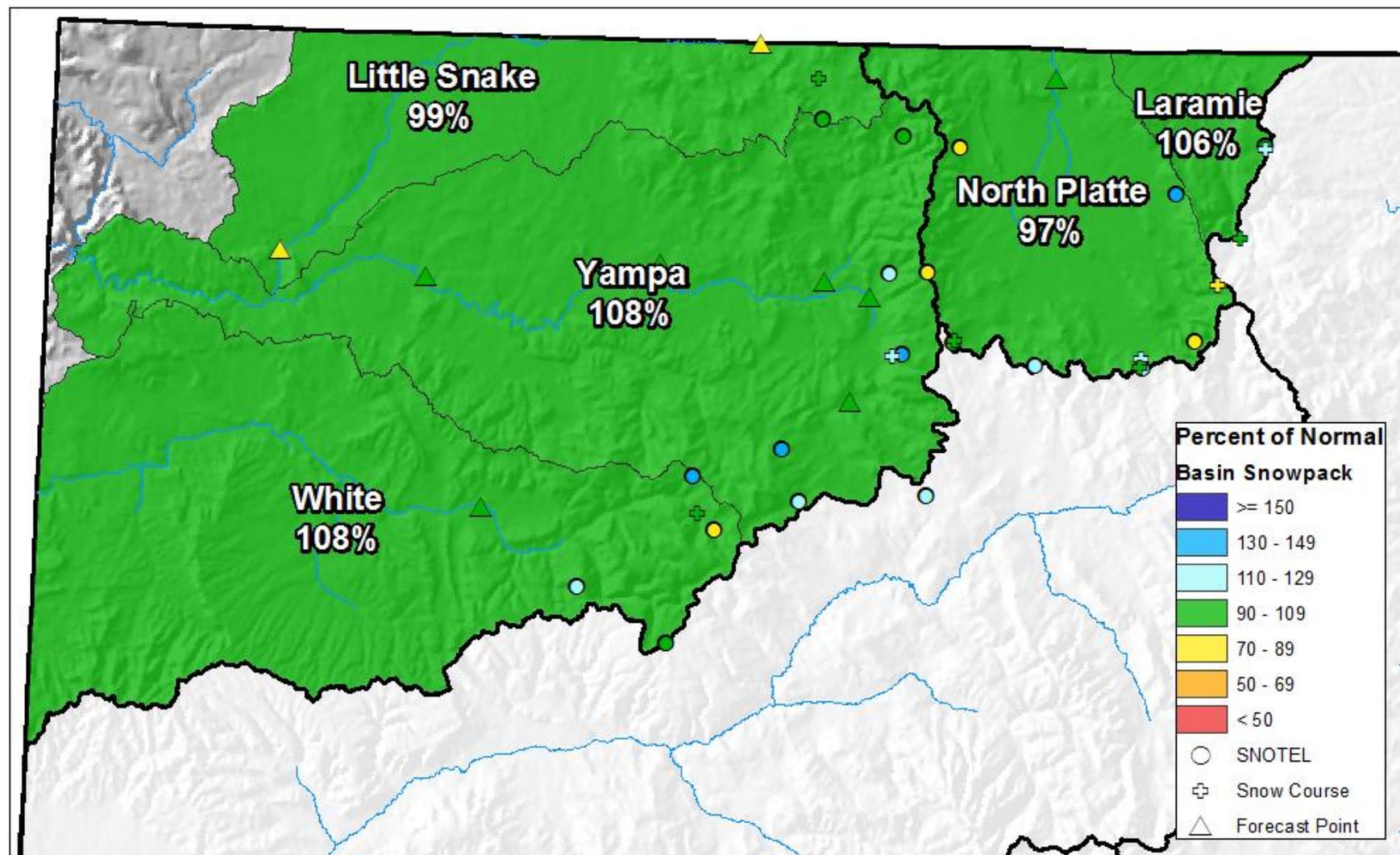
# YAMPA, WHITE, NORTH PLATTE AND LARAMIE RIVER BASINS

February 1, 2016

Snowpack in the Yampa, White & North Platte basins is above normal at 106% of the median. Precipitation for January was 114% of average and water year-to-date precipitation is at 99% of average. Reservoir storage at the end of January was 121% of average compared to 117% last year. Streamflow forecasts range from 109% of average for the Yampa River above Stagecoach Reservoir to 80% for the Little Snake River near Dixon.



# Yampa, White, and North Platte River Basins Snowpack and Streamflow Forecasts February 1, 2016



0 10 20 40 60 80 Miles



United States Department of Agriculture

**Natural Resources Conservation Service**

## Yampa-White-North Platte River Basins Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

YAMPA-WHITE-NORTH PLATTE RIVER BASINS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
North Platte R nr Northgate	APR-JUL	115	185	230	102%	280	350	225
	APR-SEP	126	205	255	102%	305	385	250
Laramie R nr Woods <sup>2</sup>	APR-JUL	77	101	117	102%	132	156	115
	APR-SEP	86	111	128	102%	146	171	126
Yampa R ab Stagecoach Reservoir <sup>2</sup>	APR-JUL	14.5	20	25	109%	30	39	23
Yampa R at Steamboat Springs <sup>2</sup>	APR-JUL	184	225	255	98%	285	335	260
Elk R nr Milner	APR-JUL	200	265	310	97%	360	440	320
Elkhead Ck ab Long Gulch	APR-JUL	38	56	70	96%	86	112	73
Yampa R nr Maybell <sup>2</sup>	APR-JUL	550	735	875	94%	1030	1270	935
Little Snake R nr Slater <sup>2</sup>	APR-JUL	89	115	135	87%	156	190	156
Little Snake R nr Dixon <sup>2</sup>	APR-JUL	150	220	275	80%	335	435	345
Little Snake R nr Lily <sup>2</sup>	APR-JUL	153	225	285	83%	350	455	345
White R nr Meeker	APR-JUL	181	230	265	95%	305	370	280

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

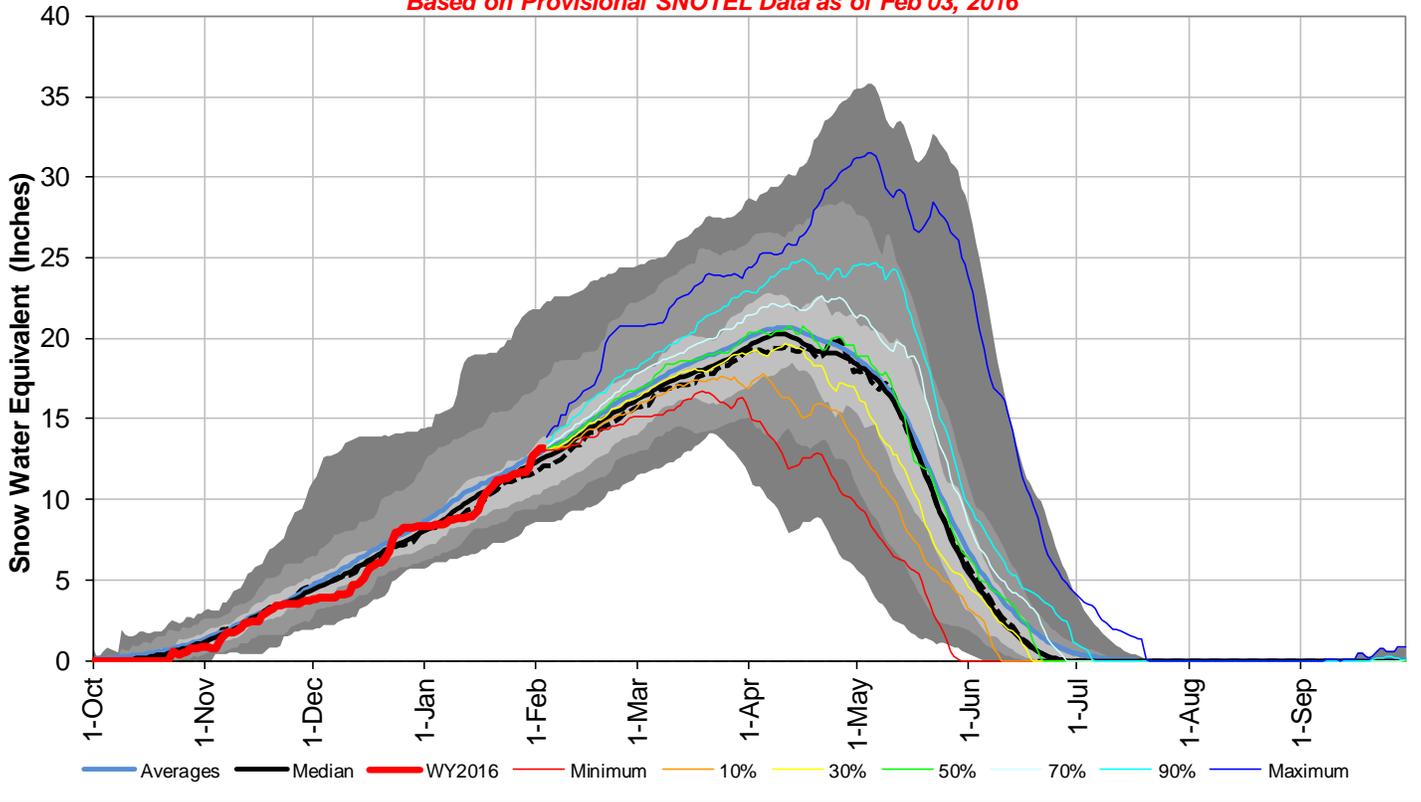
3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Stagecoach Reservoir nr Oak Creek	34.4	33.6	28.2	33.3
Yamcolo Reservoir	6.6	6.3	5.8	8.7
Basin-wide Total	41.0	39.9	34.0	42.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
LARAMIE RIVER BASIN	4	106%	82%
NORTH PLATTE RIVER BASIN	12	97%	78%
LARAMIE & NORTH PLATTE RIVER BASINS	16	99%	79%
ELK RIVER BASIN	2	94%	71%
YAMPA RIVER BASIN	11	108%	81%
WHITE RIVER BASIN	5	108%	79%
YAMPA & WHITE RIVER BASINS	15	106%	79%
LITTLE SNAKE RIVER BASIN	9	99%	72%
YAMPA-WHITE-NORTH PLATTE RIVER BASINS	36	103%	78%

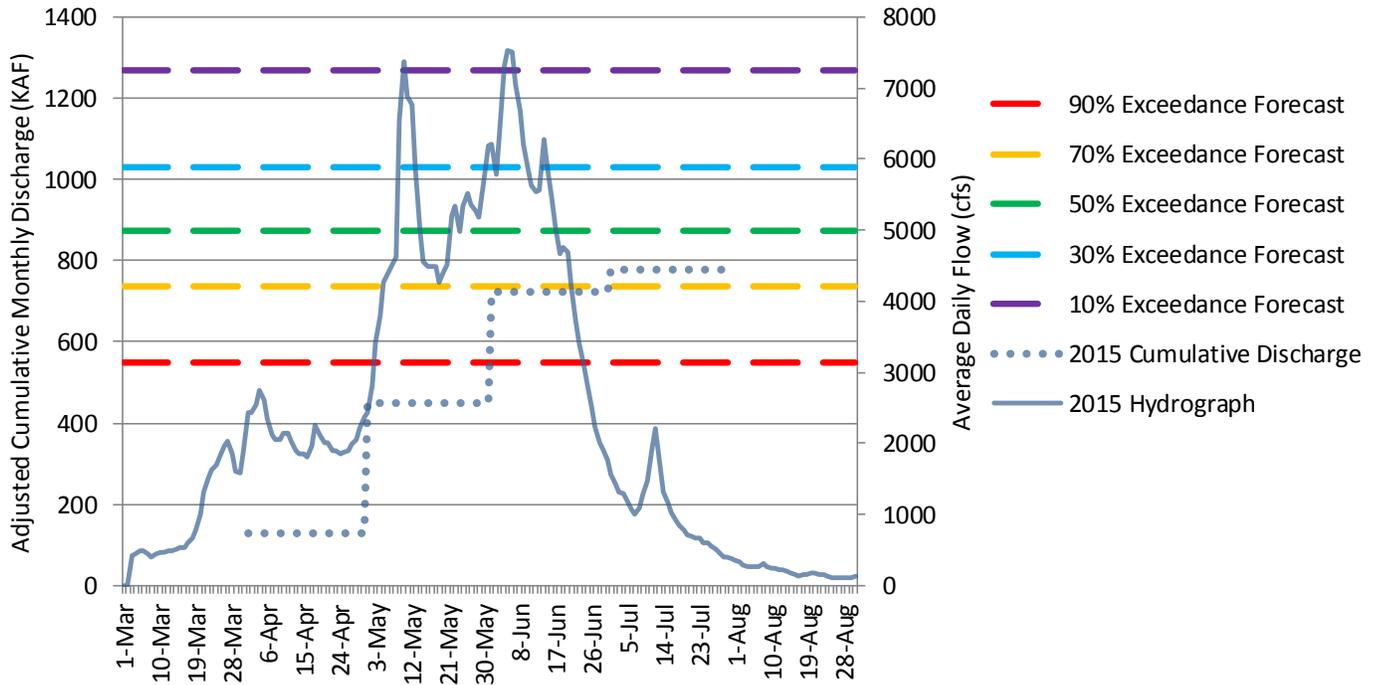
### Yampa, White & North Platte River Basins with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Feb 03, 2016



### Yampa River near Maybell

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

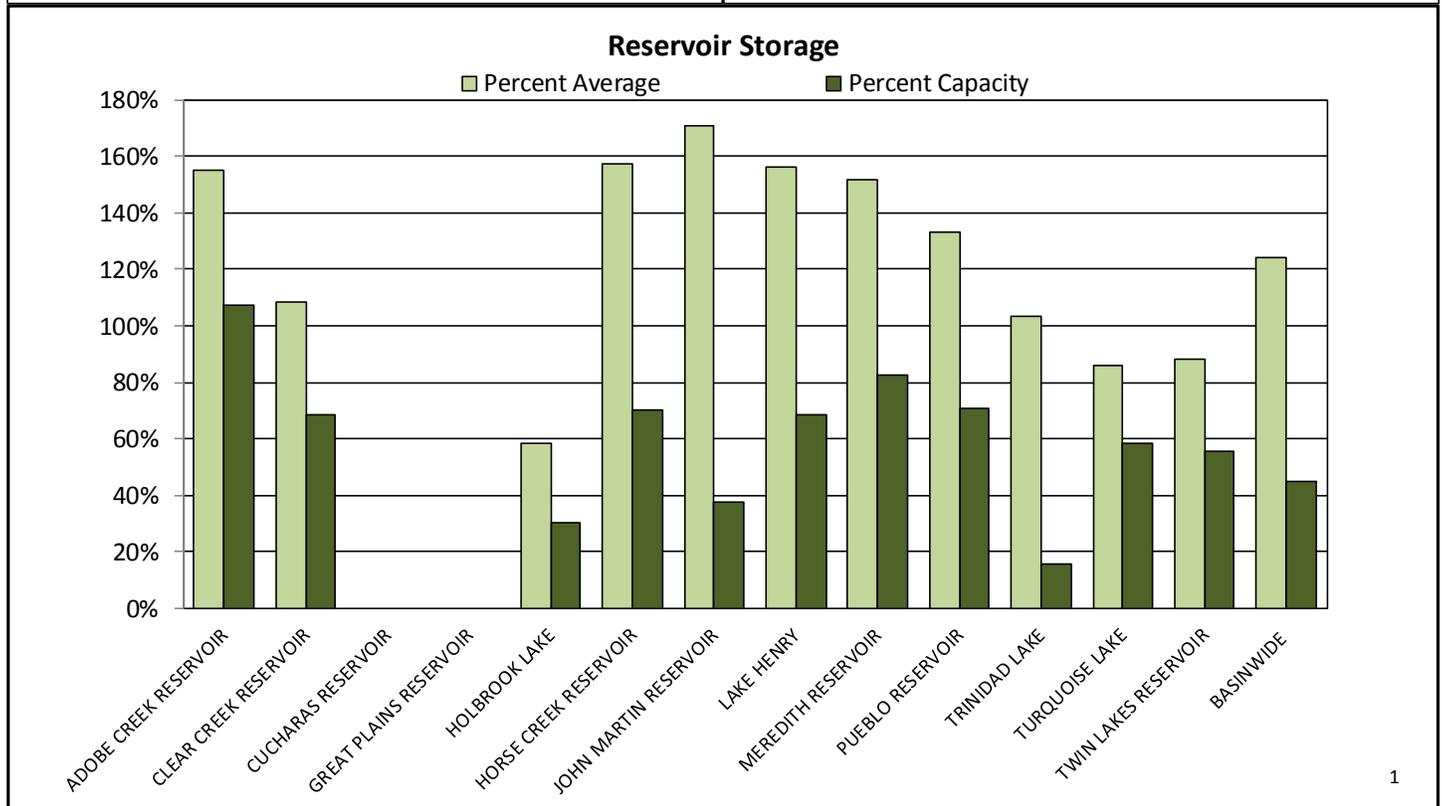
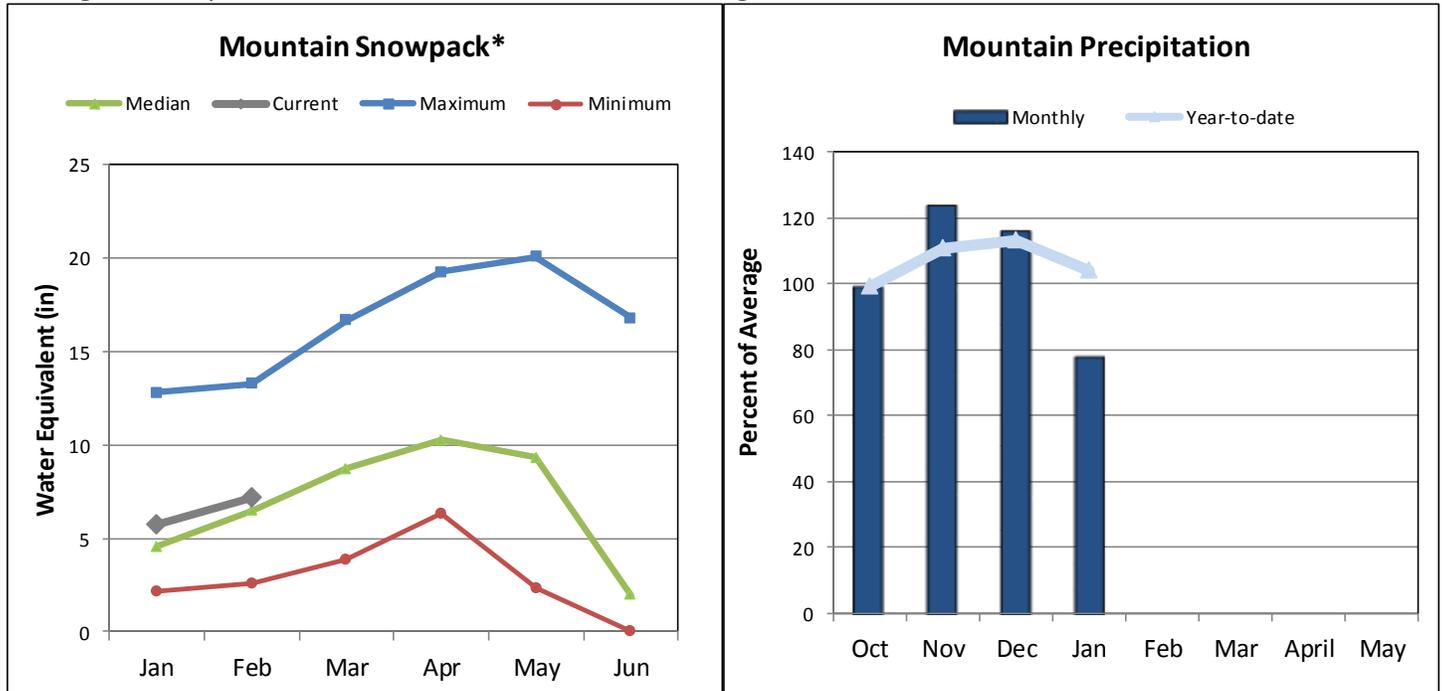


Please refer to the sections at the end of this report for further explanation concerning these graphs.

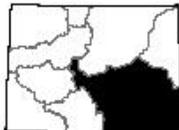
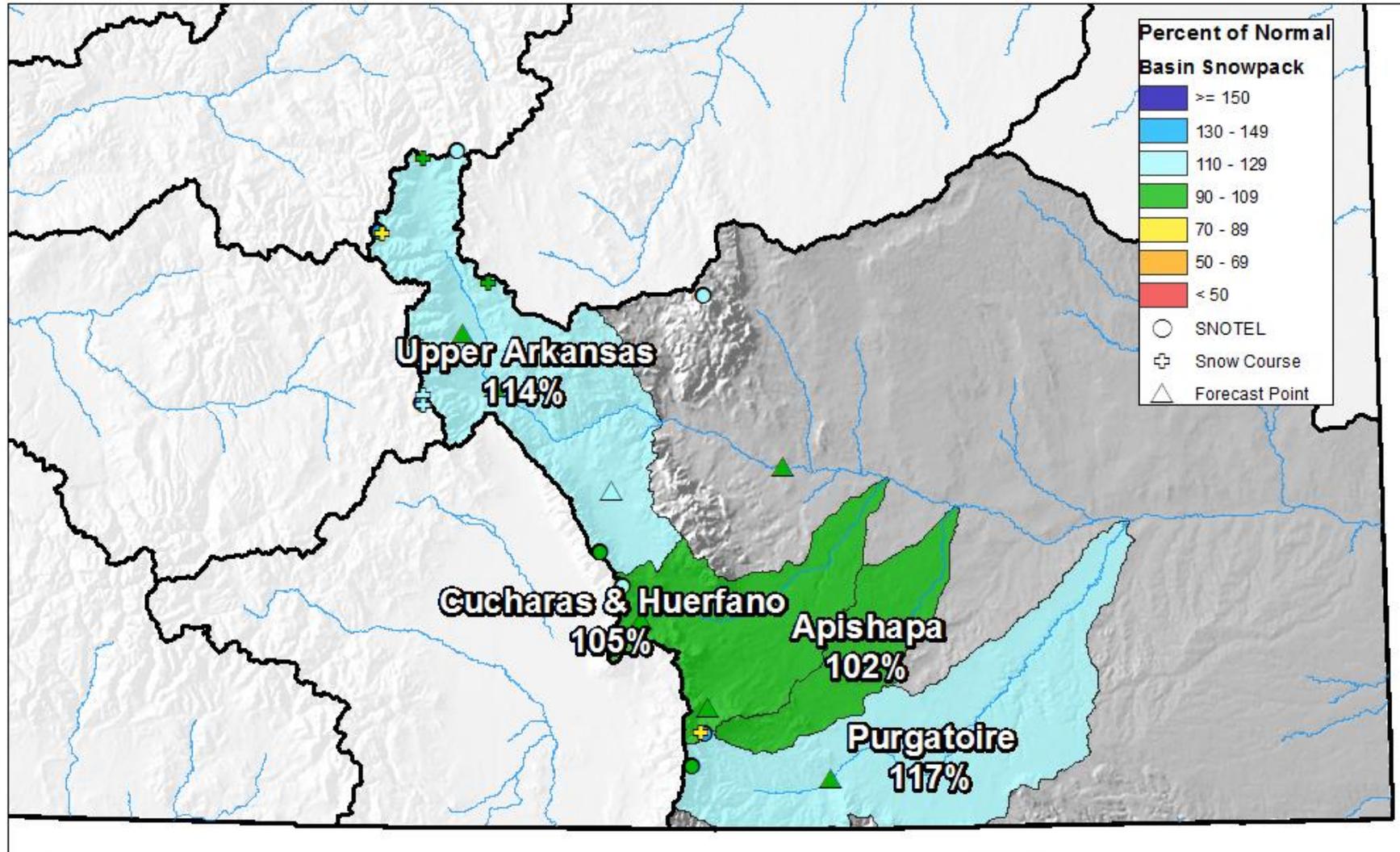
# ARKANSAS RIVER BASIN

February 1, 2016

Snowpack in the Arkansas River basin is above normal at 111% of the median. Precipitation for January was 78% of average which brings water year-to-date precipitation to 104% of average. Reservoir storage at the end of January was 124% of average compared to 79% last year. Current streamflow forecasts range from 109% of average for Grape Creek near Westcliffe to 92% of average for the inflow to Trinidad Lake.



# Arkansas River Basin Snowpack and Streamflow Forecasts February 1, 2016



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

## Arkansas River Basin Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

ARKANSAS RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Chalk Ck nr Nathrop	APR-JUL	10.4	15.7	20	95%	25	33	21
	APR-SEP	13.7	20	25	96%	31	40	26
Arkansas R at Salida <sup>2</sup>	APR-JUL	173	215	245	102%	280	330	240
	APR-SEP	210	260	300	102%	340	405	295
Grape Ck nr Westcliffe	APR-JUL	4.1	10.9	17.4	109%	25	40	15.9
	APR-SEP	7.6	15.3	22	112%	30	44	19.6
Pueblo Reservoir Inflow <sup>2</sup>	APR-JUL	230	315	380	106%	450	570	360
	APR-SEP	300	405	480	105%	565	700	455
Huerfano R nr Redwing	APR-JUL	7.2	10.2	12.6	106%	15.2	19.5	11.9
	APR-SEP	10	13.7	16.5	109%	19.6	25	15.2
Cucharas R nr La Veta	APR-JUL	4.5	8.1	11.2	92%	14.8	21	12.2
	APR-SEP	5.7	9.7	13	92%	16.8	23	14.1
Trinidad Lake Inflow <sup>2</sup>	MAR-JUL	12.4	24	34	92%	46	66	37
	APR-SEP	16.6	31	43	91%	57	82	47

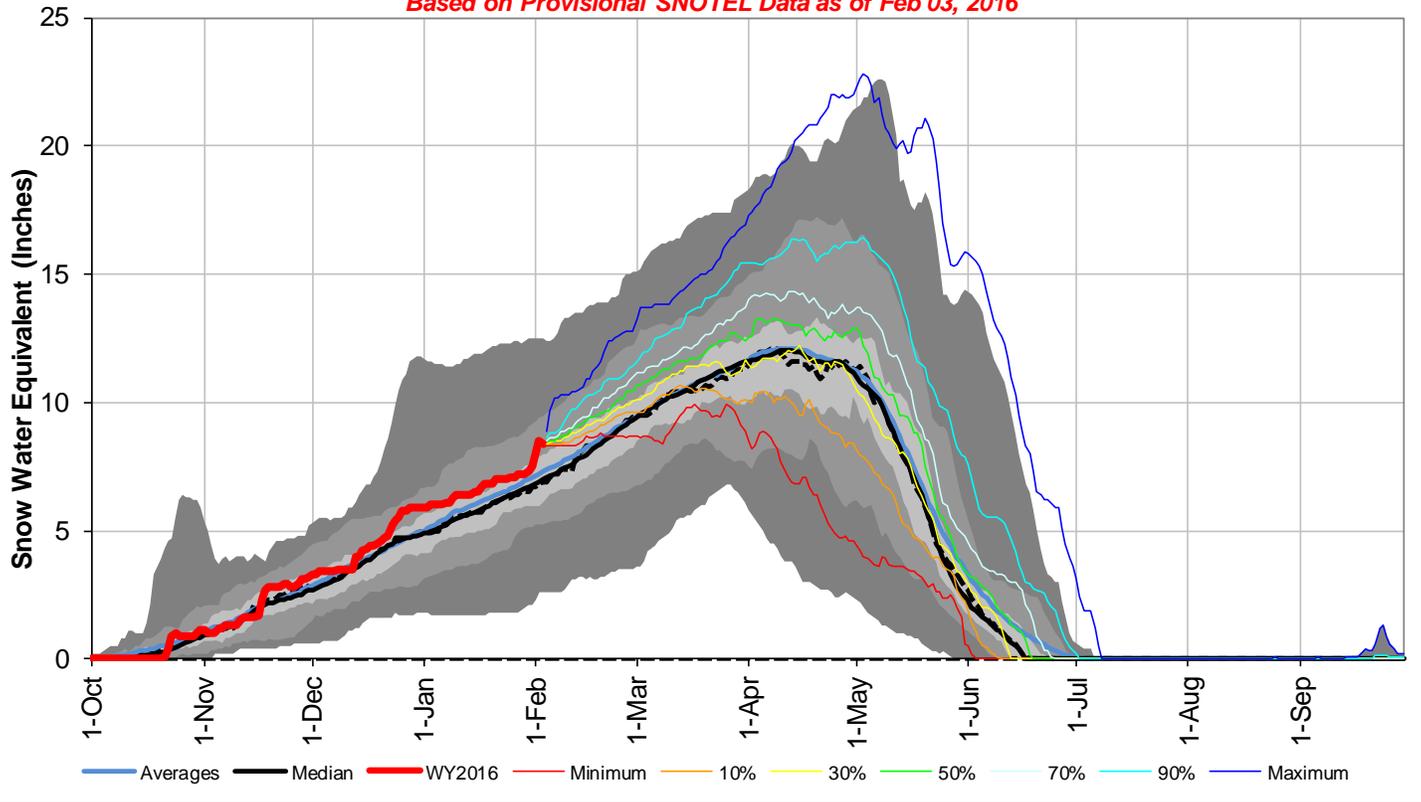
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Adobe Creek Reservoir	66.6	35.1	42.9	62.0
Clear Creek Reservoir	7.8	8.4	7.2	11.4
Cucharas Reservoir	0.0	0.0	5.5	40.0
Great Plains Reservoir	0.0	0.0	30.7	150.0
Holbrook Lake	2.1	3.0	3.6	7.0
Horse Creek Reservoir	18.9	0.0	12.0	27.0
John Martin Reservoir	232.0	30.0	135.9	616.0
Lake Henry	6.4	6.4	4.1	9.4
Meredith Reservoir	34.7	29.7	22.9	42.0
Pueblo Reservoir	249.6	232.4	187.5	354.0
Trinidad Lake	26.4	16.2	25.6	167.0
Turquoise Lake	74.3	78.1	86.3	127.0
Twin Lakes Reservoir	47.9	52.1	54.3	86.0
Basin-wide Total	766.7	491.4	618.5	1698.8
# of reservoirs	13	13	13	13

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
UPPER ARKANSAS BASIN	9	114%	108%
CUCHARAS & HUERFANO BASINS	4	105%	64%
PURGATOIRE RIVER BASIN	2	117%	73%
ARKANSAS RIVER BASIN	15	111%	95%

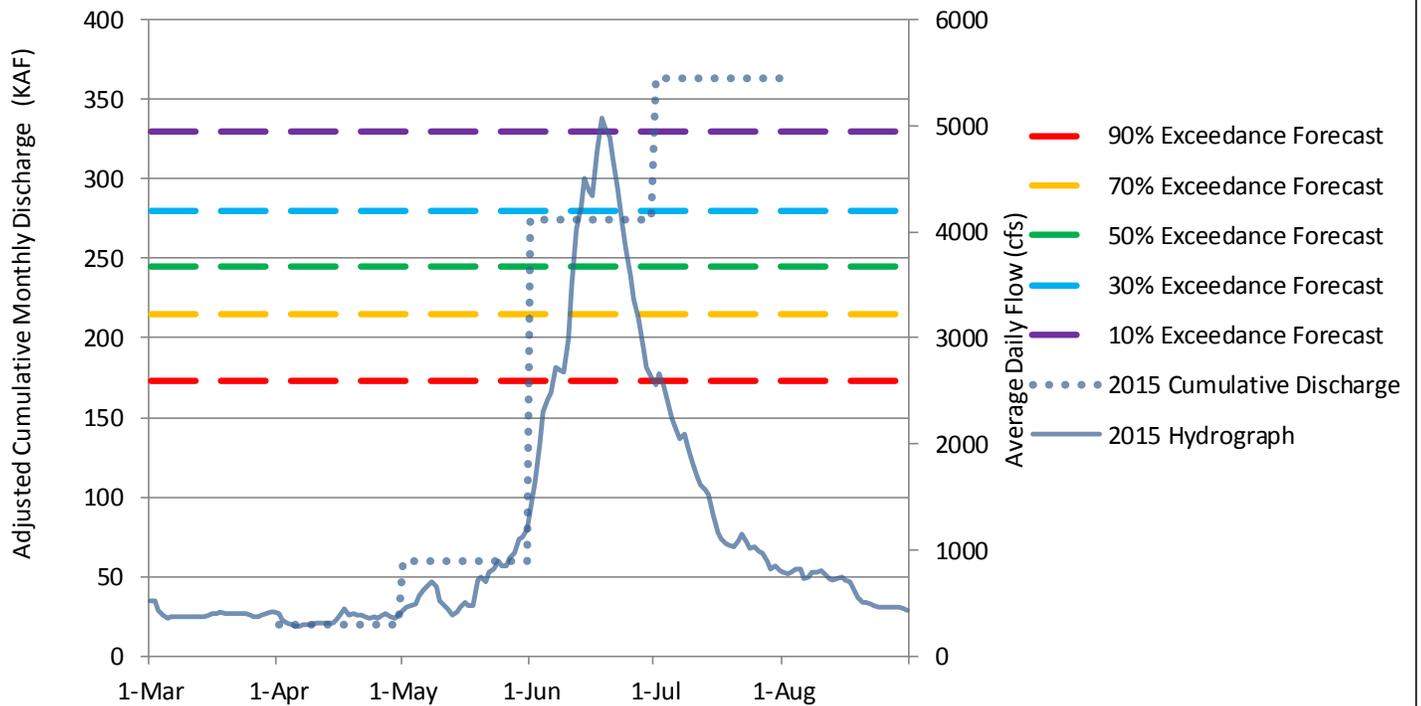
### Arkansas River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Feb 03, 2016



### Arkansas River at Salida, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

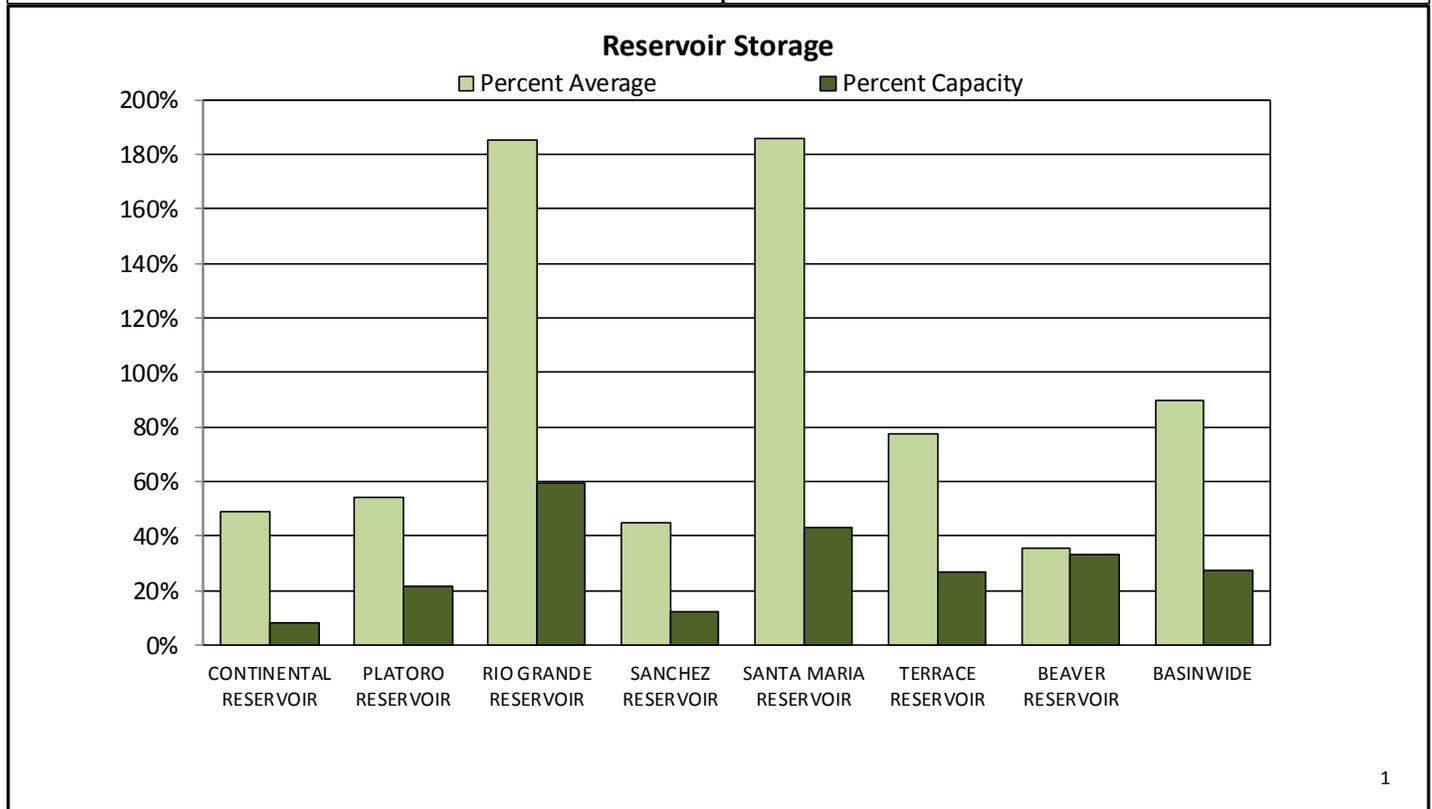
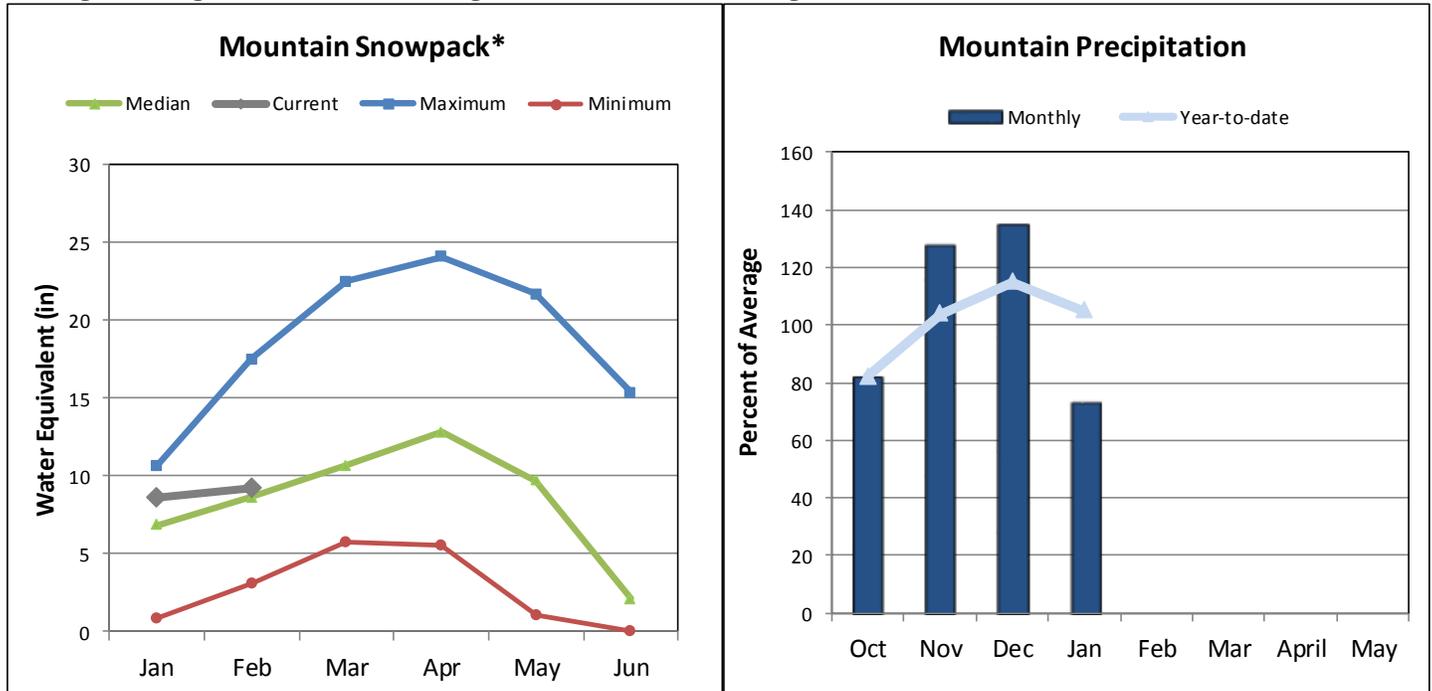


Please refer to the sections at the end of this report for further explanation concerning these graphs.

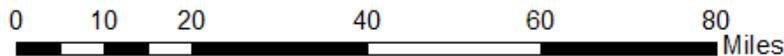
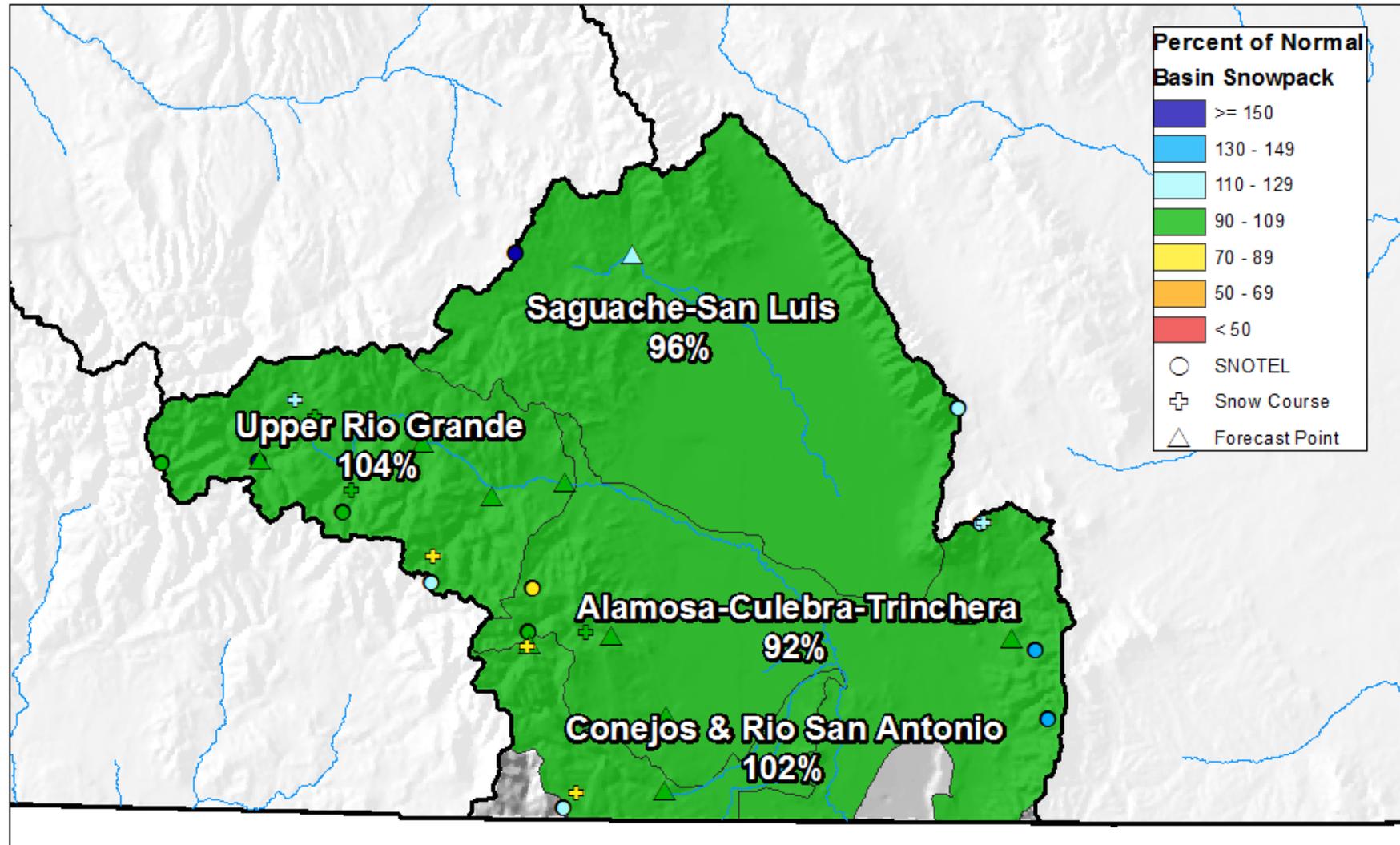
# UPPER RIO GRANDE RIVER BASIN

February 1, 2016

Snowpack in the Upper Rio Grande River basin is above normal at 107% of median. Precipitation for January was 73% of average which brings water year-to-date precipitation to 105% of average. Reservoir storage at the end of January was 90% of average compared to 69% last year. Streamflow forecasts range from 116% of average for Saguache Creek near Saguache to 103% of average for the San Antonio River at Ortiz.



# Upper Rio Grande River Basin Snowpack and Streamflow Forecasts February 1, 2016



United States Department of Agriculture

Natural Resources Conservation Service

## Upper Rio Grande Basin Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

UPPER RIO GRANDE BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Rio Grande at Thirty Mile Bridge <sup>2</sup>	APR-JUL	83	105	122	108%	140	168	113
	APR-SEP	93	119	138	107%	159	192	129
Rio Grande at Wagon Wheel Gap <sup>2</sup>	APR-SEP	240	310	365	107%	425	520	340
SF Rio Grande at South Fork <sup>2</sup>	APR-SEP	93	117	135	106%	154	185	127
Rio Grande nr Del Norte <sup>2</sup>	APR-SEP	360	470	555	108%	645	790	515
Saguache Ck nr Saguache	APR-SEP	20	30	37	116%	45	59	32
Alamosa Ck ab Terrace Reservoir	APR-SEP	50	62	72	106%	82	99	68
La Jara Ck nr Capulin	MAR-JUL	5.6	7.8	9.5	107%	11.4	14.4	8.9
Trinchera Ck ab Turners Ranch	APR-SEP	9.3	11.6	13.4	106%	15.3	18.3	12.6
Sangre de Cristo Ck <sup>2</sup>	APR-SEP	8.2	13.4	17.8	109%	23	31	16.3
Ute Ck nr Fort Garland	APR-SEP	8.1	11.7	14.6	114%	17.8	23	12.8
Platoro Reservoir Inflow	APR-JUL	44	53	60	107%	67	79	56
	APR-SEP	47	57	65	105%	73	87	62
Conejos R nr Mogote <sup>2</sup>	APR-SEP	143	178	205	106%	235	280	194
San Antonio R at Ortiz	APR-SEP	8.5	12.7	16	103%	19.7	26	15.6
Los Pinos R nr Ortiz	APR-SEP	50	65	76	104%	88	108	73
Culebra Ck at San Luis	APR-SEP	13	19.1	24	104%	29	38	23
Costilla Reservoir Inflow	MAR-JUL	7.5	10	11.9	107%	14	17.3	11.1
Costilla Ck nr Costilla <sup>2</sup>	MAR-JUL	16.4	23	28	108%	34	43	26

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

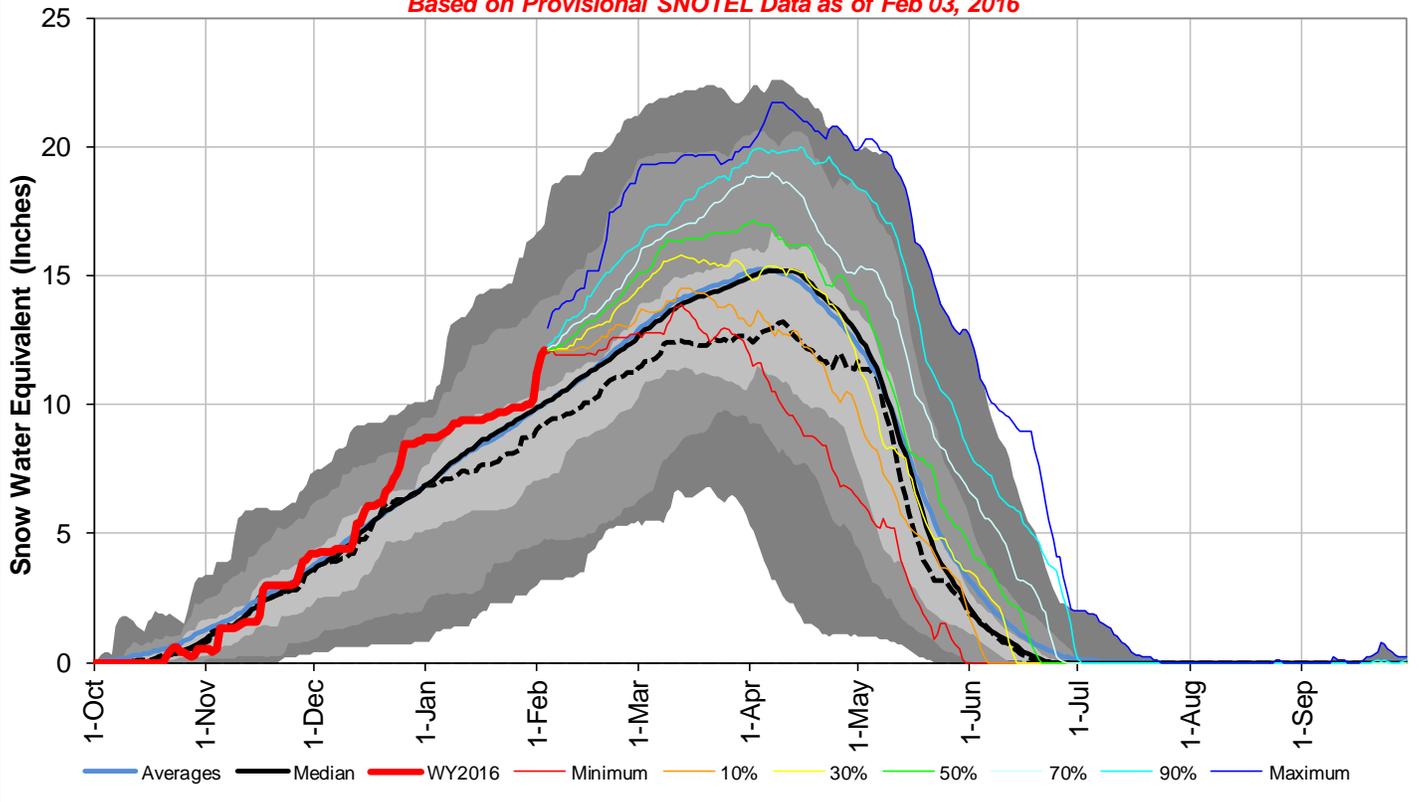
3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Beaver Reservoir	1.5	0.0	4.2	4.5
Continental Reservoir	2.2	7.0	4.5	27.0
Platoro Reservoir	13.0	10.6	24.0	60.0
Rio Grande Reservoir	30.2	24.2	16.3	51.0
Sanchez Reservoir	12.4	3.7	27.6	103.0
Santa Maria Reservoir	19.5	14.7	10.5	45.0
Terrace Reservoir	4.8	4.5	6.2	18.0
Basin-wide Total	83.6	64.7	93.3	308.5
# of reservoirs	7	7	7	7

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
ALAMOSA CREEK BASIN	2	97%	44%
CONEJOS & RIO SAN ANTONIO BASINS	4	102%	55%
CULEBRA & TRINCHERA BASINS	4	124%	77%
HEADWATERS RIO GRANDE RIVER BASIN	11	104%	57%
UPPER RIO GRANDE BASIN	20	107%	60%

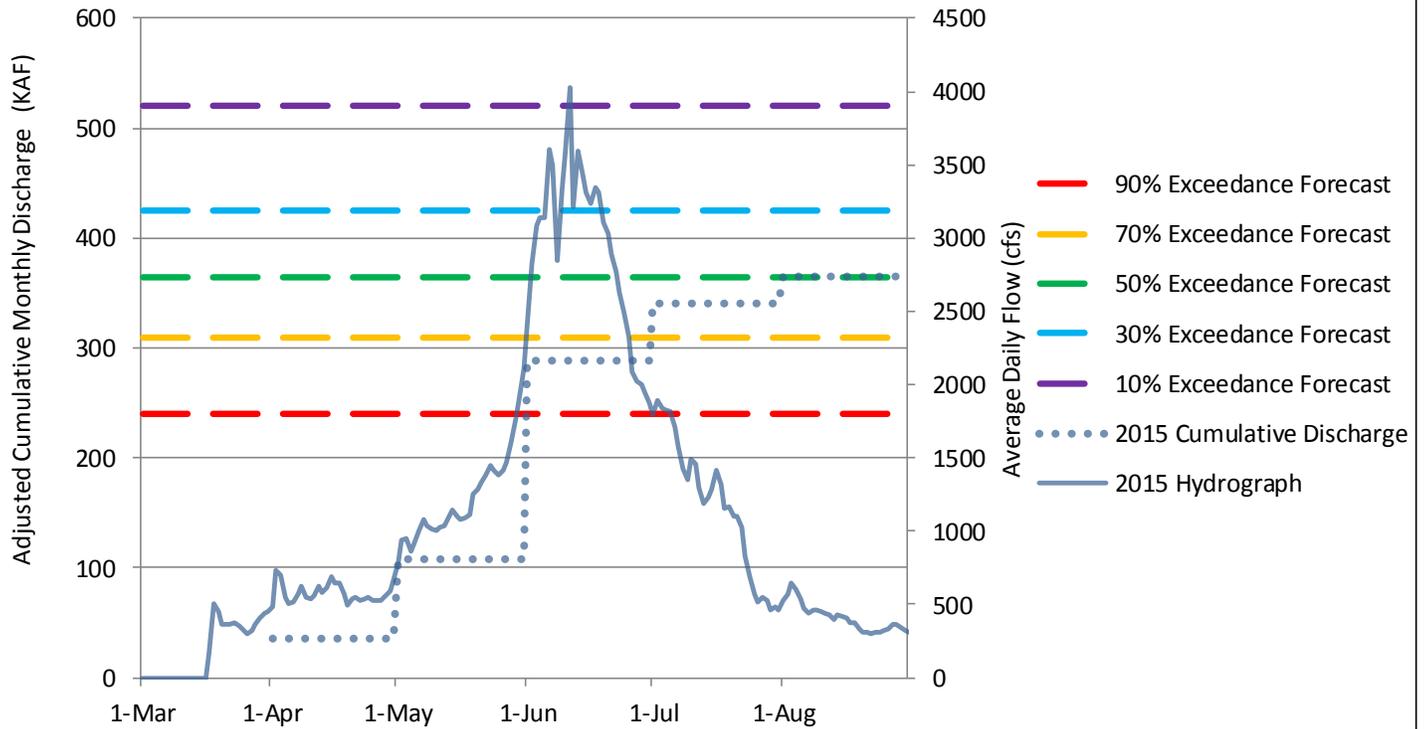
## Upper Rio Grande River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Feb 03, 2016



## Rio Grande at Wagon Wheel Gap

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr-Sep)

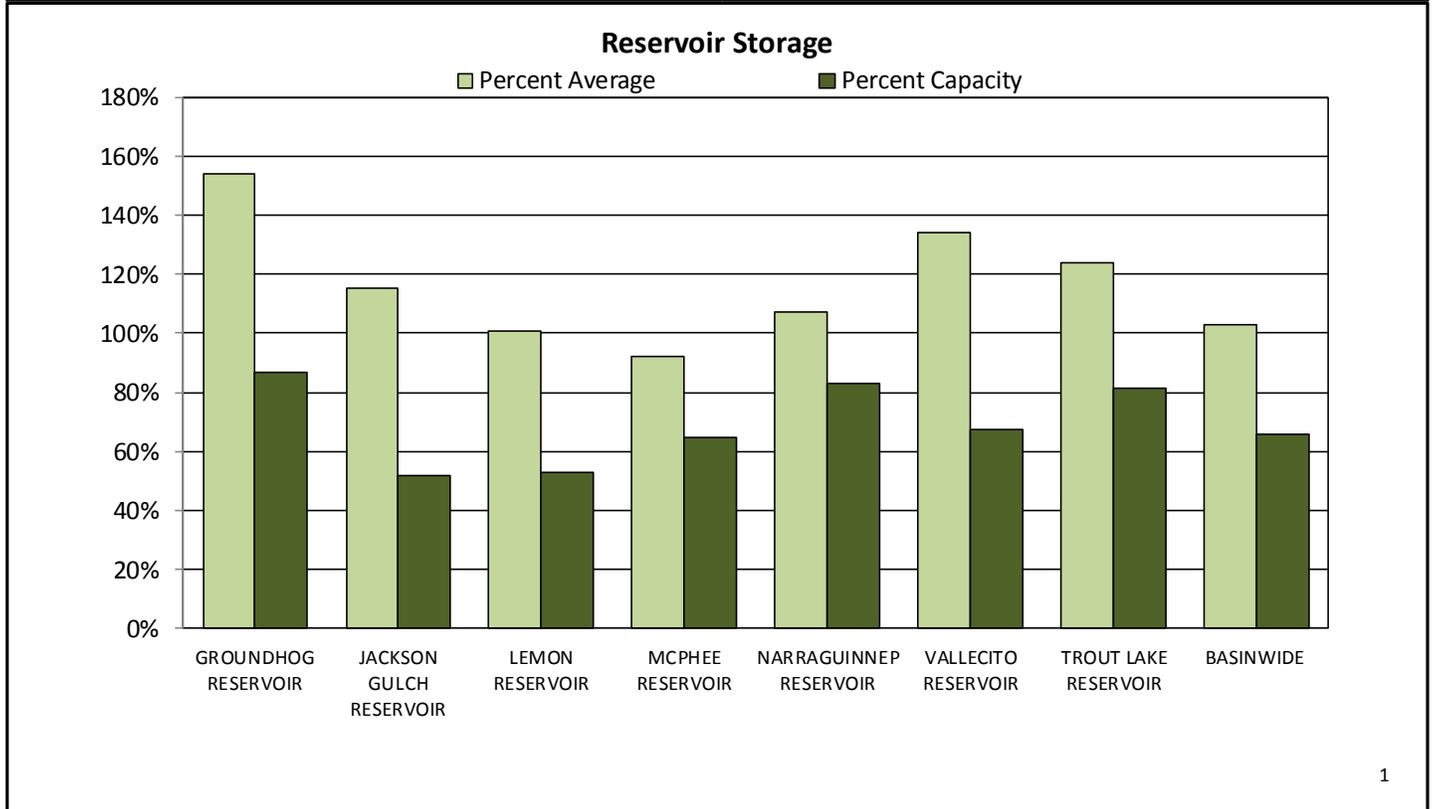
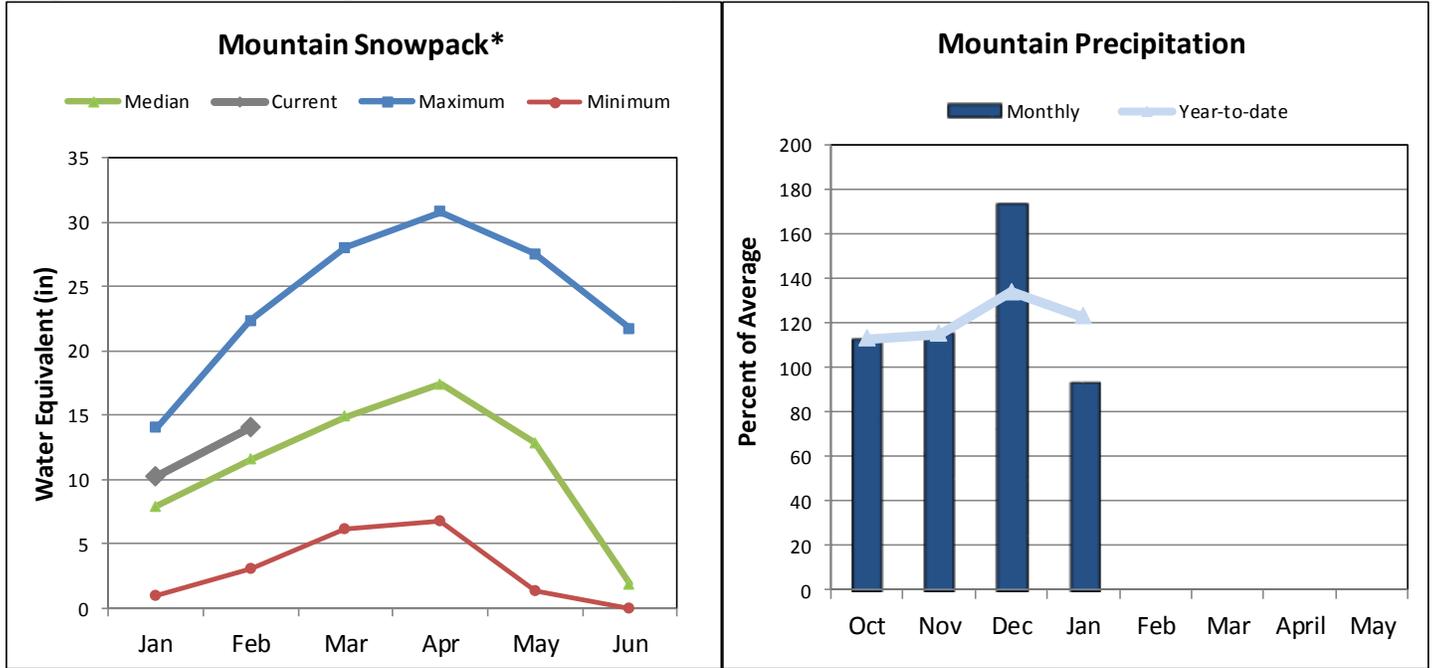


Please refer to the sections at the end of this report for further explanation concerning these graphs.

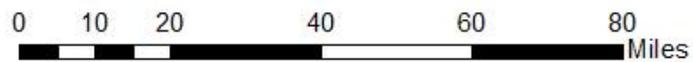
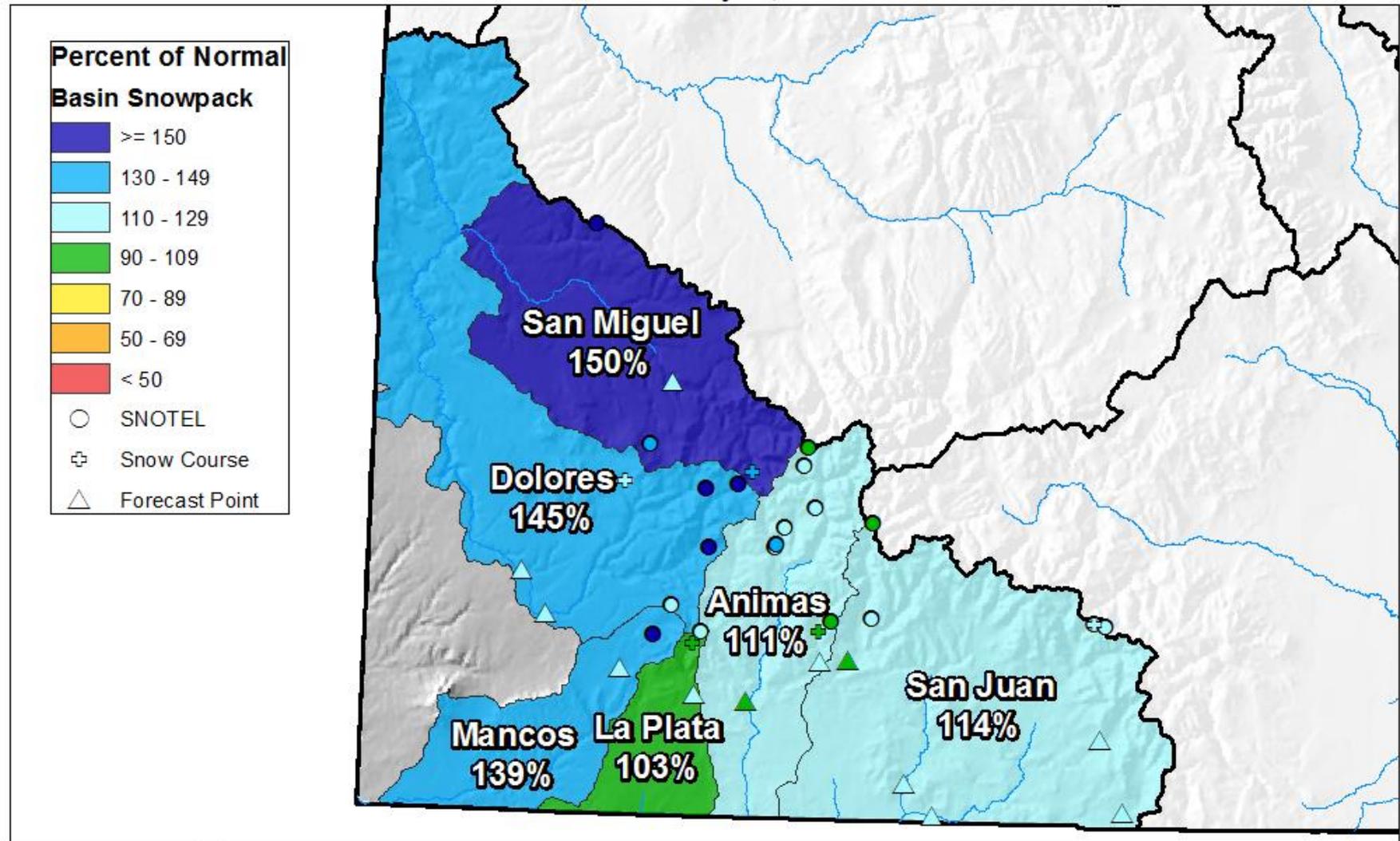
# SAN MIGUEL, DOLORES, ANIMAS, AND SAN JUAN RIVER BASINS

February 1, 2016

Snowpack in the combined southwest river basins is above normal at 122% of median. Precipitation for January was 94% of average which brings water year-to-date precipitation to 123% of average. Reservoir storage at the end of January was 103% of average compared to 88% last year. Current streamflow forecasts range from 122% of average for the inflow to Gurley Reservoir to 108% for the inflow to Vallecito Reservoir.



# San Miguel, Dolores, Animas, and San Juan River Basins Snowpack and Streamflow Forecasts February 1, 2016



USDA

United States Department of Agriculture

Natural Resources Conservation Service

## San Miguel-Dolores-Animas-San Juan River Basins Streamflow Forecasts - February 1, 2016

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dolores R at Dolores	APR-JUL	190	245	290	118%	335	405	245
McPhee Reservoir Inflow	APR-JUL	220	295	350	119%	410	510	295
San Miguel R nr Placerville	APR-JUL	95	125	147	115%	171	210	128
Cone Reservoir Inlet	APR-JUL	2.3	3	3.5	117%	4	4.9	3
Gurley Reservoir Inlet	APR-JUL	14.8	17.8	20	122%	22	26	16.4
Lilylands Reservoir Inlet	APR-JUL	1.13	1.78	2.3	120%	2.9	3.9	1.92
Rio Blanco at Blanco Diversion <sup>2</sup>	APR-JUL	40	52	61	113%	71	87	54
Navajo R at Oso Diversion <sup>2</sup>	APR-JUL	48	63	74	114%	86	106	65
San Juan R nr Carracas <sup>2</sup>	APR-JUL	275	360	430	113%	505	620	380
Piedra R nr Arboles	APR-JUL	158	205	240	114%	280	340	210
Vallecito Reservoir Inflow	APR-JUL	148	184	210	108%	240	285	194
Navajo Reservoir Inflow <sup>2</sup>	APR-JUL	565	720	840	114%	965	1170	735
Animas R at Durango	APR-JUL	320	400	455	110%	515	615	415
Lemon Reservoir Inflow	APR-JUL	40	52	60	109%	69	84	55
La Plata R at Hesperus	APR-JUL	17.4	22	26	113%	30	36	23
Mancos R nr Mancos <sup>2</sup>	APR-JUL	21	29	35	113%	41	52	31

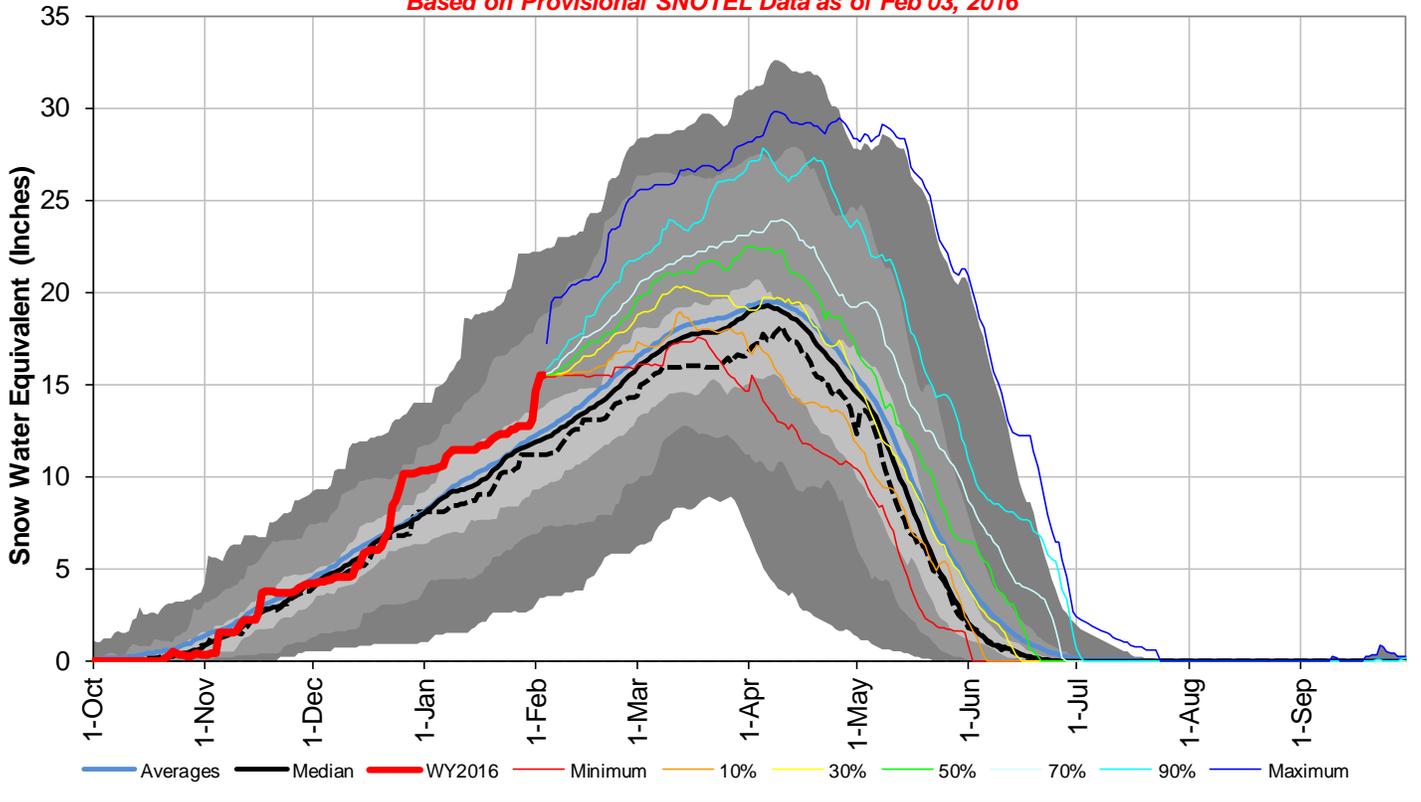
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Reservoir Storage End of January, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Groundhog Reservoir	19.1	16.2	12.4	22.0
Jackson Gulch Reservoir	5.2	3.6	4.5	10.0
Lemon Reservoir	21.1	22.1	20.9	40.0
Mcphee Reservoir	246.3	183.5	266.4	381.0
Narraguinnep Reservoir	15.8	15.9	14.7	19.0
Trout Lake Reservoir	2.6	0.0	2.1	3.2
Vallecito Reservoir	85.1	98.0	63.3	126.0
Basin-wide Total	395.2	339.3	384.3	601.2
# of reservoirs	7	7	7	7

Watershed Snowpack Analysis February 1, 2016	# of Sites	% Median	Last Year % Median
ANIMAS RIVER BASIN	11	111%	68%
DOLORES RIVER BASIN	6	145%	70%
SAN MIGUEL RIVER BASIN	4	150%	77%
SAN JUAN RIVER BASIN	4	114%	54%
SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS	24	122%	65%

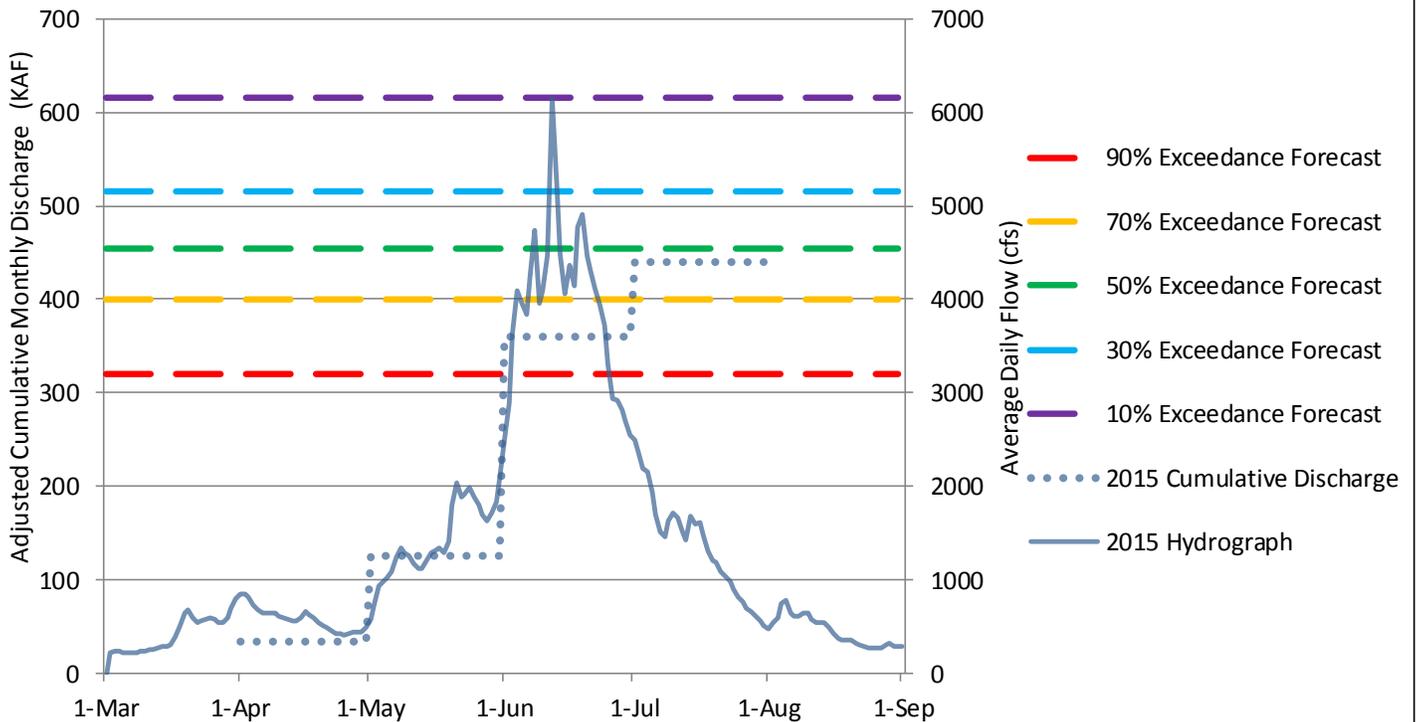
### San Miguel, Dolores, Animas and San Juan River Basin with Non-Exceedence Projections

*Based on Provisional SNOTEL Data as of Feb 03, 2016*



### Animas River at Durango, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)



Please refer to the sections at the end of this report for further explanation concerning these graphs.

# How to Read Non-Exceedance Projections Graphs

The graphs show snow water equivalent (SWE) projections (in inches) for the October 1 through September 30 water year. Basin “observed” SWE values are computed using SNOTEL sites which are characteristic of the snowpack of the particular basin. The SWE observations at these sites are averaged and normalized to produce these basin snowpack graphs. This new graph format uses non-exceedance projections.

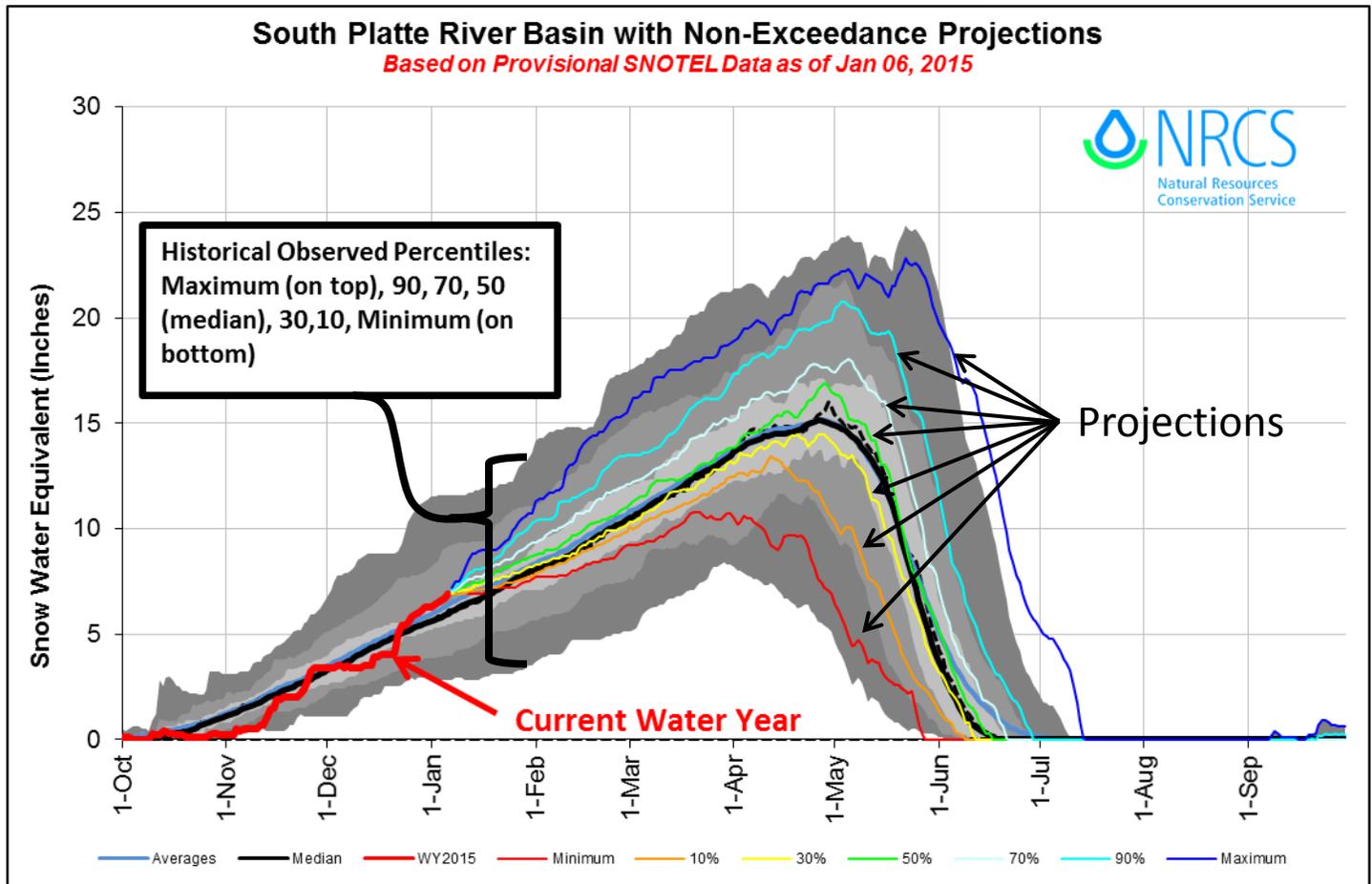
**Current** water year is represented by the heavy red line terminating on the last day the graphic was updated.

**Historical** observed percentile range is shown as a gray background area on the graph. Shades of gray indicate maximum, 90 percentile, 70 percentile, 50 percentile (solid black line), 30 percentile, 10 percentile, and minimum for the period of record.

**Projections** for maximum, 90 percent, 70 percent, 50 percent (most probabilistic snowpack projection, based on median), 30 percent, 10 percent, and minimum exceedances are projected forward from the end of the current line as different colored lines.

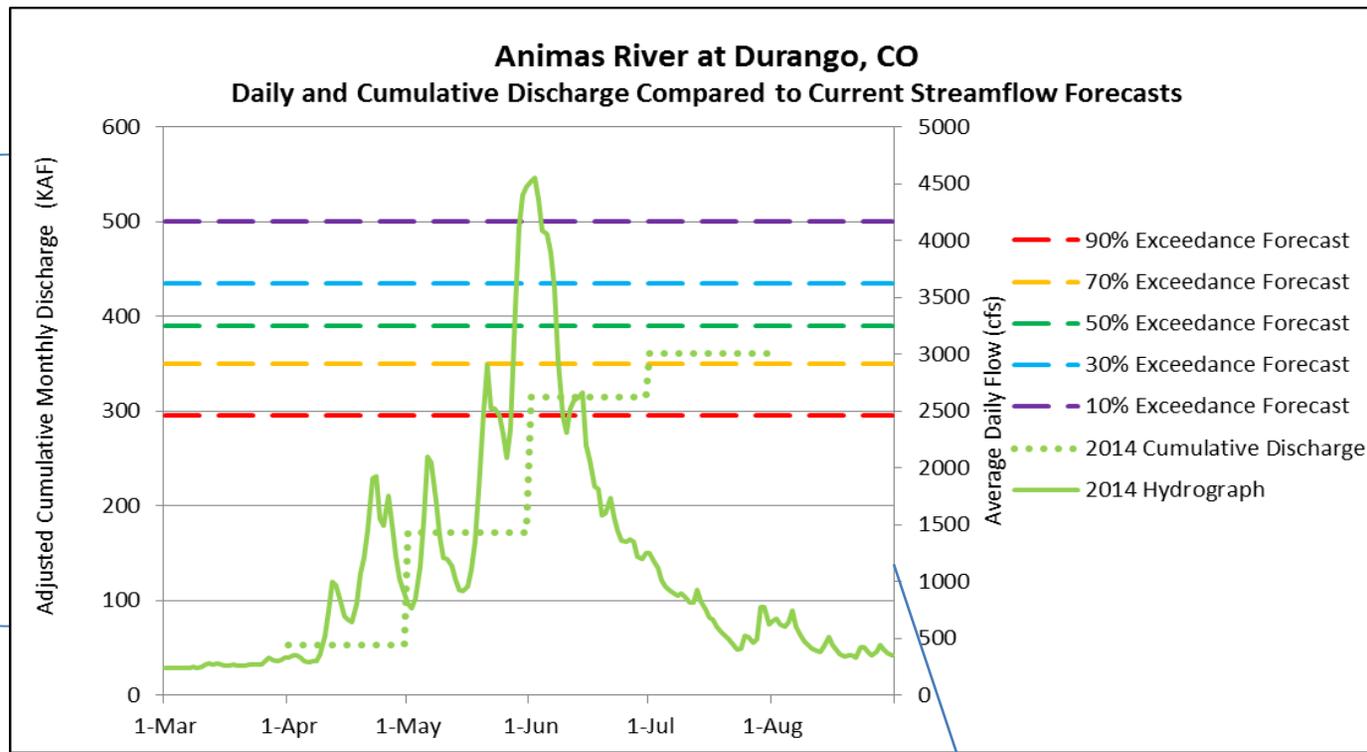
For more detailed information on these graphs visit:

[http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_062291.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_062291.pdf)



# Explanation of Flow Comparison Charts

The flow comparison charts were developed to provide a quick comparison between the previous years' observed hydrograph, cumulative seasonal discharge, the current streamflow forecasts, and the current years' observed discharge (both hydrograph and cumulative discharge, as the season progresses). Forecast points for these products were generally chosen to be lower in the basin to best represent the basin-wide streamflow response for the season; the true degree of representativeness will vary between basins. When making comparisons of how the shape of the hydrograph relates to the monthly (and seasonal) cumulative discharges it is important to note that the hydrograph represents observed daily flows at the forecast point while the cumulative values may be adjusted for changes in reservoir storage and diversions to best represent what would be "natural flows" if these impoundments and diversions did not exist. This product can provide additional guidance regarding how to most wisely utilize the five exceedance forecasts based on past observations, current trends, and future uncertainty for a wide variety of purposes and water users.



The left y-axis represents values of adjusted cumulative discharge (KAF). This axis is to be used for comparing the current and previous years to the current five volumetric seasonal exceedance forecasts. This graphic only displays the previous years data but data for the current water year will be added as the season progresses.

The legend displays the symbology and color schemes for the various parameters represented. Exceedance forecasts represent total cumulative discharge for the April through July time period with the exception of the Rio Grande at Wagon Wheel Gap (Apr-Sep).

The right y-axis represents observed daily average discharge at the forecast point of interest. This graphic only displays the previous years data but data for the current water year will be added as the Season progresses.

## How Forecasts Are Made

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Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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In addition to the water supply outlook reports, water supply forecast information for the Western United States is available from the Natural Resources Conservation Service and the National Weather Service monthly, January through June. The information may be obtained from the Natural Resources Conservation Service web page at <http://www.nrcs.usda.gov/wsf/westwide.html>

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