USDA United States Department of Agriculture
Natural Resources Conservation Service

Colorado
Water Supply Outlook Report
May 1st, 2023

A deep persistent snowpack remains in much of western Colorado including at lower elevations. On May 1st, the San Juan Mountains, shown in the above photo, maintained significant above normal snowpack at 193 percent of median. Photo By: Karl Wetlaufer

REMINDER: We are soliciting field work photos from the field 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.

Contents

Colorado Statewide Water Supply Conditions 3

Summary 3

Snowpack 4

Precipitation 5

Reservoir Storage 6

Streamflow 7

GUNNISON RIVER BASIN 8

COLORADO HEADWATERS RIVER BASIN 12

SOUTH PLATTE RIVER BASIN ..... **Error! Bookmark not defined.**

YAMPA-WHITE-LITTLE SNAKE AND LARAMIE-NORTH PLATTE RIVER BASINS 19

ARKANSAS RIVER BASIN ..... **Error! Bookmark not defined.**

UPPER RIO GRANDE RIVER BASIN 29

SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN COMBINED RIVER BASIN 32

New 1991-2020 Statistical Normals 36

How to Read Snowpack Graphs 37

How Forecasts Are Made 38

Interpreting the Forecast Graphics 39

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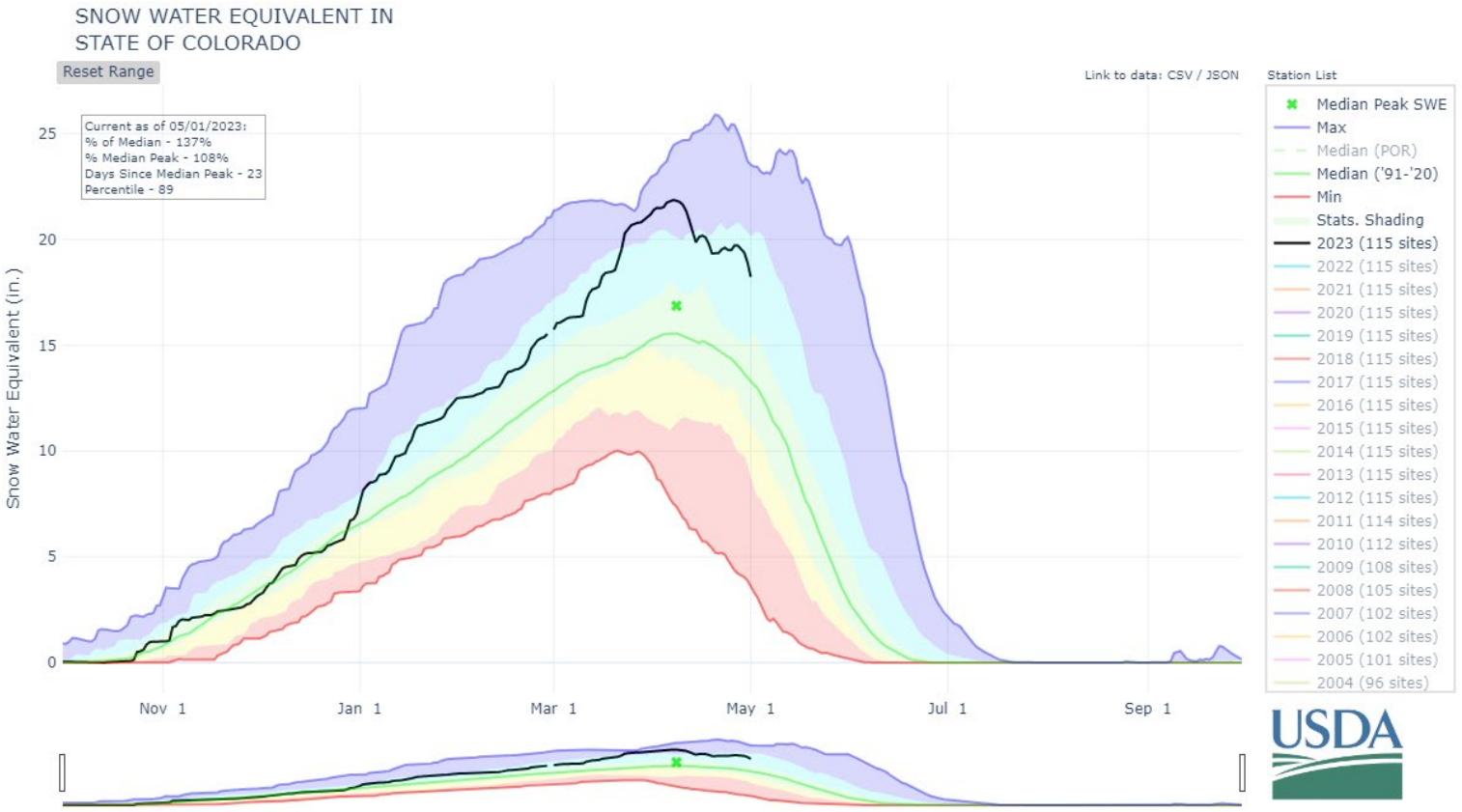
Colorado Statewide Water Supply Conditions for May 1st

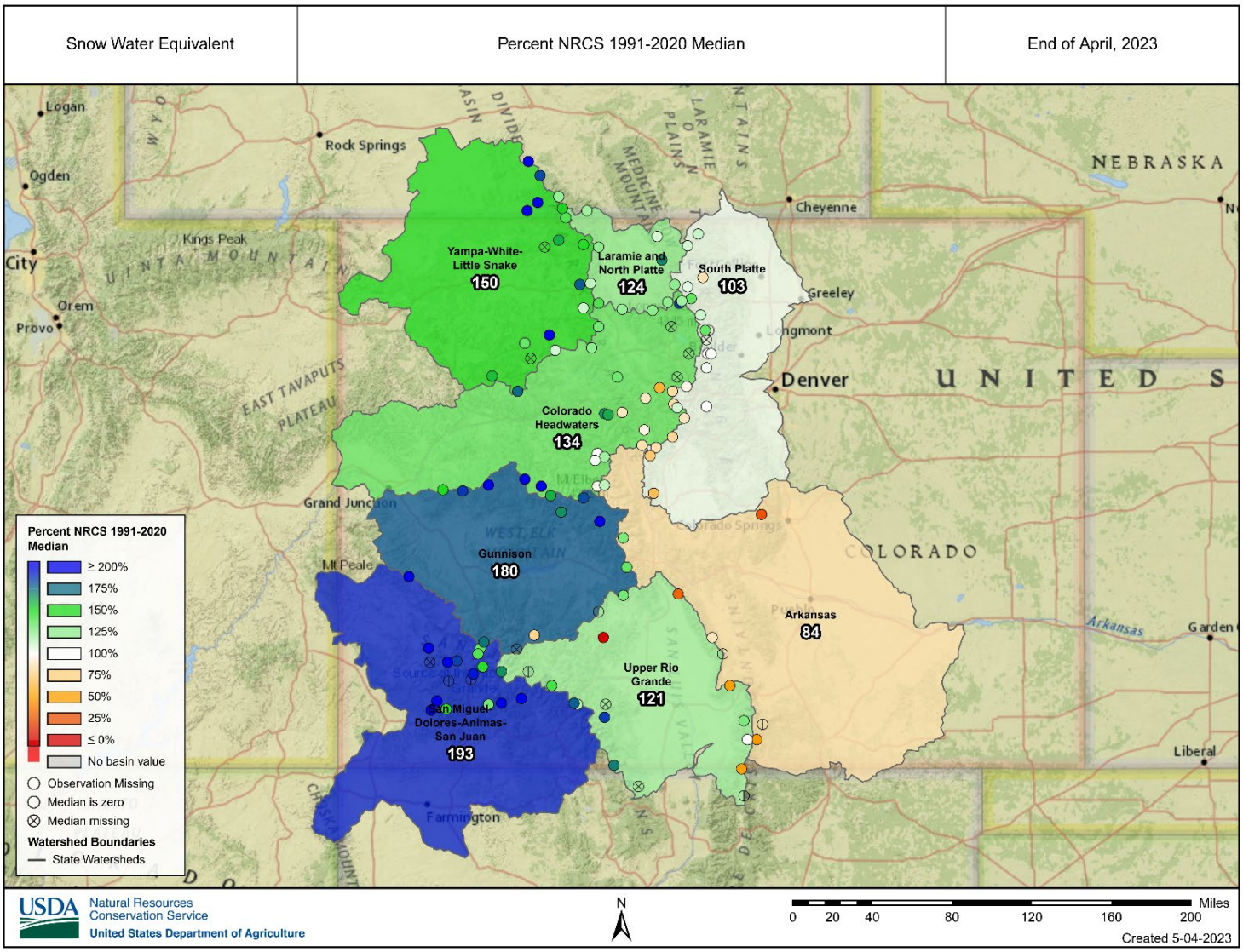
Summary



*For the above graph, snow water equivalent (SWE) values are calculated using daily SNOTEL data only. SWE numbers presented in the text are values from the first of the month and include manual Snow Course measurements along with SNOTEL data.

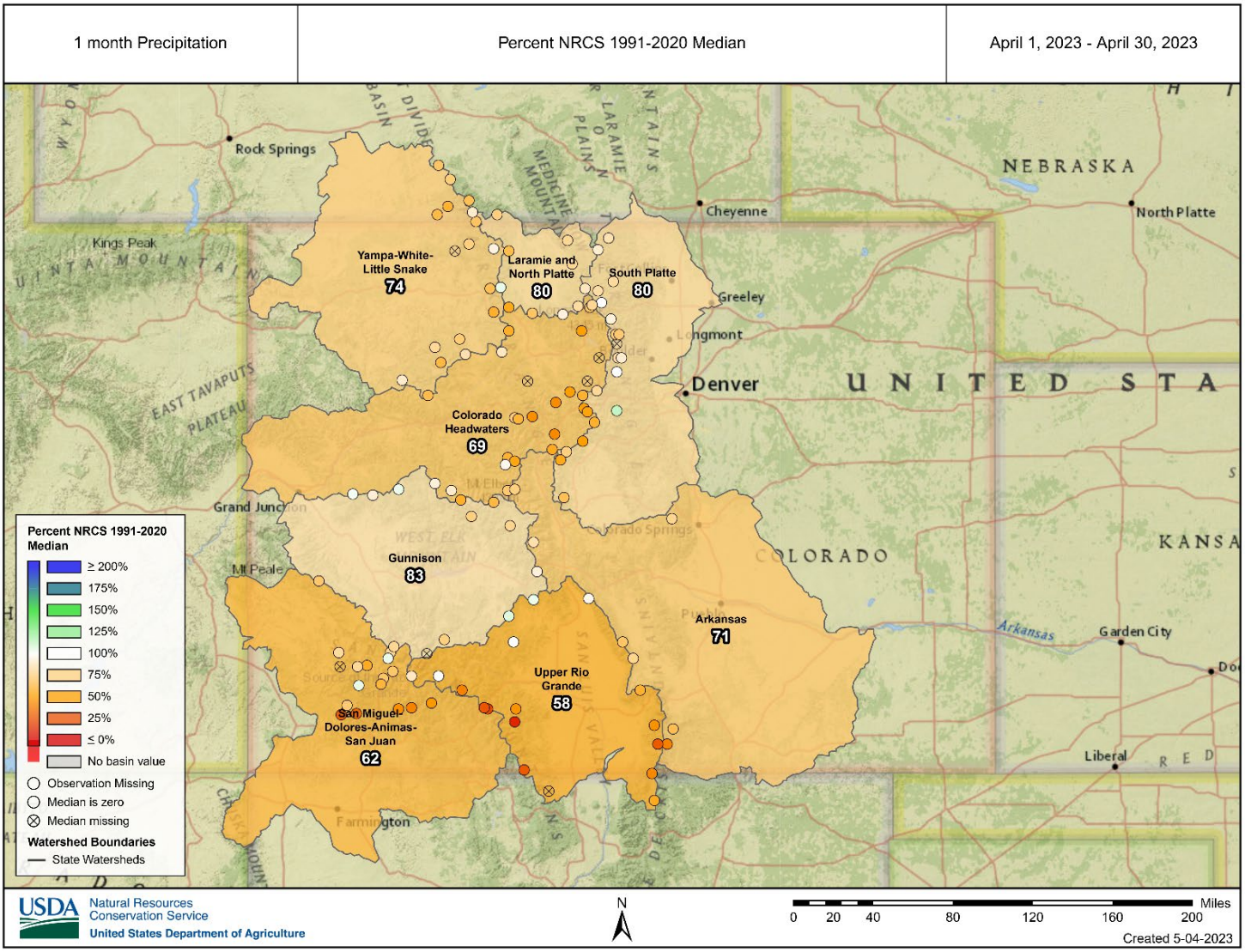
Despite below average precipitation in April, substantial snowpack remains in river basins near and west of the continental divide. Much of Colorado's above normal water year-to-date precipitation and snowpack was delivered from intense atmospheric rivers that impacted the southwest through much of February and March. Wetter soil conditions from last year's active monsoon season combined with higher snow totals have bolstered streamflow runoff forecasts in the coming months. Intense runoff has already begun in the southwestern parts of the state leading to some localized flooding. East of the divide there is a stark gradient in snowpack totals, from above median snowpack in the northern Front Range to well below median snow totals in the northern Sangre de Cristo Mountains of Colorado. These trends persist despite some moderate precipitation received at the end of April. The Upper Rio Grande and Arkansas River basins above normal basin-wide streamflow is mostly driven from substantial snowpack in the headwater regions of those basins. In contrast, the headwaters of the South Platte River basin in South Park have seen below median snowpack; driving below median runoff volume forecasts in the greater basin. This is despite above median snowpack and forecasted runoff volumes in the northern Front Range. For the Colorado western slope, substantial runoff volumes will help the water supply outlook in Colorado and further downstream, replenishing reservoirs. This is exemplified in southwestern Colorado, where many reservoirs have had significant improvements to reservoir storage as a percent of median over the last month. With substantial snowpack remaining west of the continental divide, flooding will continue to be a concern as snow melt intensifies.

Snowpack



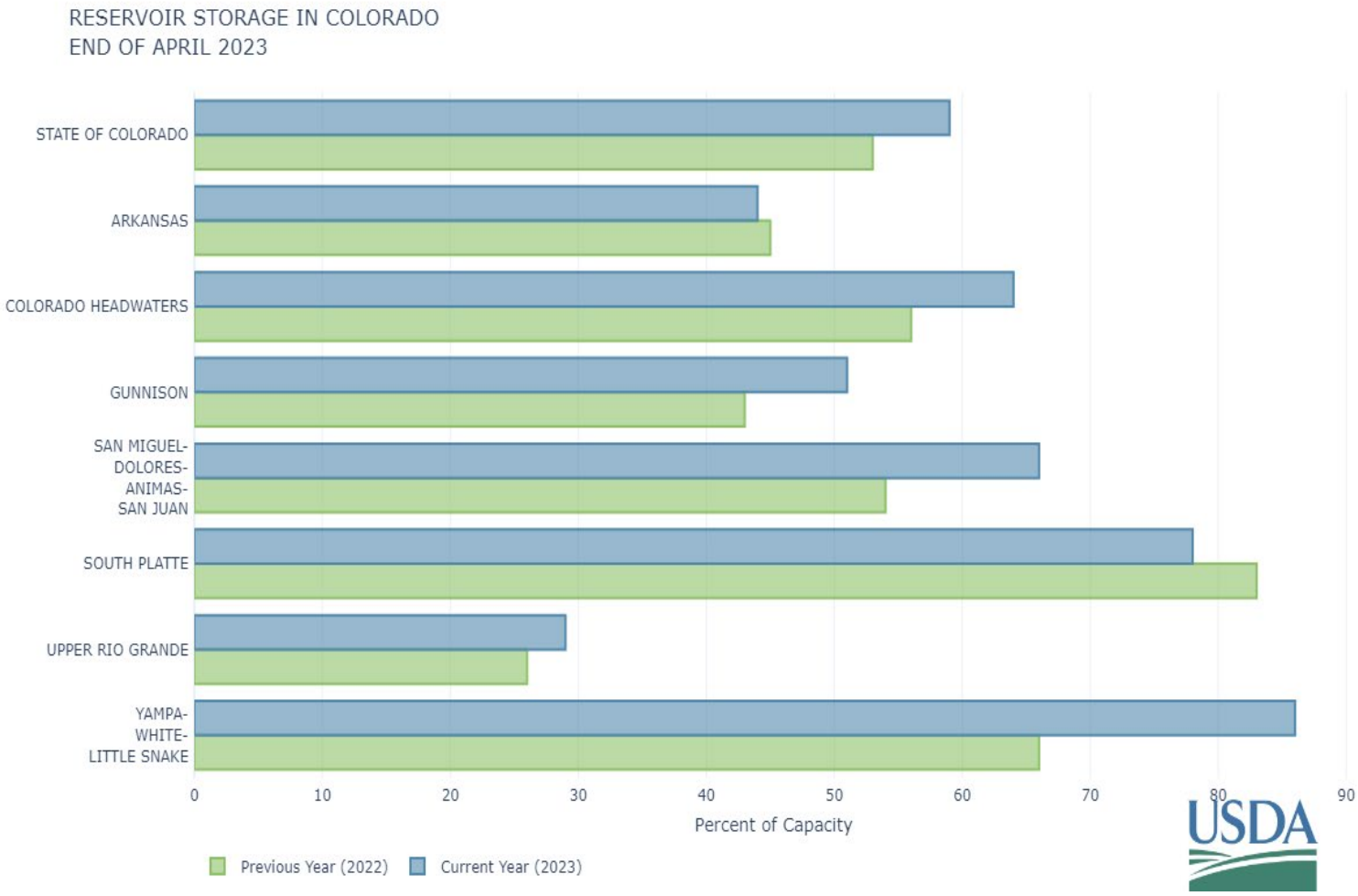
As spring sets in across the state, snowpack totals remained strong to end April; largely driven by later persistence of lower elevation snowpack. Statewide, stations 10500 feet or above recorded 118 percent of median whereas stations lower than 10500 feet had 152 percent of median snowpack. This pattern is especially apparent in the combined San Miguel-Dolores-Animas-San Juan River basin; stations above 10500 feet ended April with 163 percent of median in contrast to lower elevation stations which ended April at 225 percent of median. In general basins west of the continental divide maintained above normal snowpack ranging from 134 to 193 percent of normal. Due to the large persistent snowpack on the western slope and an increased chance of above normal temperatures for much of Colorado in the coming months, risks for flooding is a real concern. As of May 1st, only the Arkansas river basins had below normal snowpack at 84 percent of normal, largely driven by the northern Sangre de Cristo Mountains which have maintained below normal snowpack most of the water year. Further north the South Platte River basin has a stark gradient where snowpack in the in the headwaters of the South Platte remains below normal compared to above normal snowpack in the northern Front Range. The healthy snowpack in the northern Front Range helps the basin end April with slightly above normal snowpack at 103 percent of median.

Precipitation



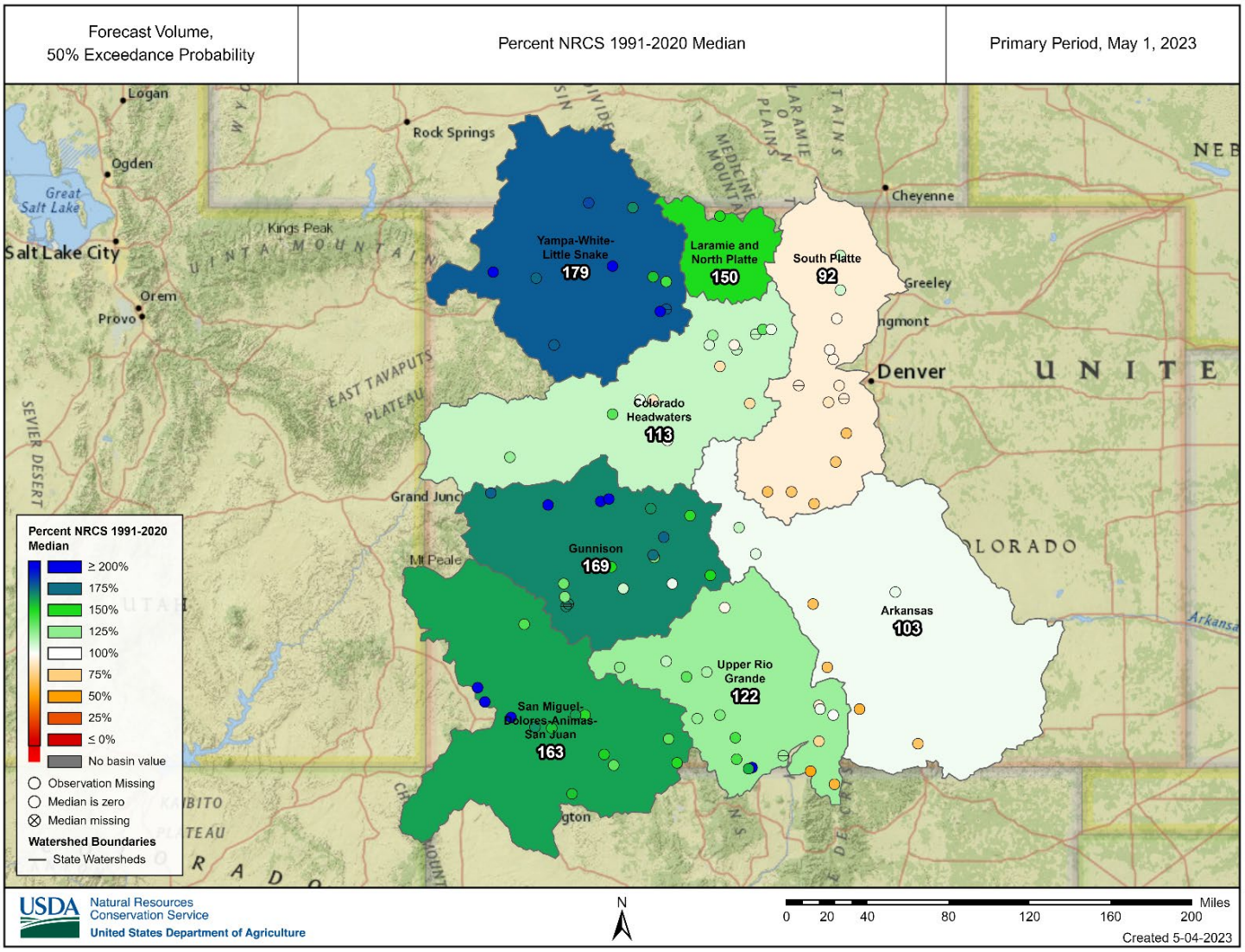
After record precipitation fell in March, all major basins received below normal precipitation during April. Despite below normal precipitation last month, all major basins west of the continental divide maintain above the median water-year-to-date precipitation. Statewide water year-to-date precipitation ended April at 112 percent of median. Eight SNOTEL stations recorded the driest or second driest April on record whereas a month ago, 34 stations recorded record precipitation for March. Despite some late April storms impacting the front range, both the South Platte and Arkansas river basins received below average precipitation at 80 and 71 percent of median, respectively. In general, the least precipitation was received in the combined San Miquel-Dolores-Animas-San and the Upper Rio Grande River basins ending April at 62 and 58 percent of median, respectively. Further north, the Gunnison, Colorado Headwaters, the combined Yampa-White-Little Snake, and the combined Laramie-North Platte ranged from 69 to 83 percent of median. All river basins west of the continental divide maintained above normal water year-to-date precipitation despite the dry April.

Reservoir Storage



Reservoir storage continues to improve over last month, especially in the southwestern regions of Colorado. Currently statewide, reservoir storage sites at 87 percent of median compared to 81 percent of median last month. The combined San Miguel-Dolores-Animas-San Juan and the Gunnison River basins saw the most improvement, ending the month at 82 and 77 percent of normal. Last month those basins held 69 and 71 percent of normal relative storage. Other basins in the state only saw slight changes. The combined Yampa-White-Little Snake and the Colorado Headwaters River basins ended April with 90 and 98 percent of median storage, respectively. East of the continental divide, the Upper Rio Grande, Arkansas, and South Platte held 104, 90 and 94 percent of median reservoir storage, respectively. Compared to this time last year, all major river basins except the South Platte have higher amount of water in storage compared to capacity. As runoff season continues, storage in most basins is expected to increase due to the above normal forecasted runoff volumes in much of the state.

Streamflow

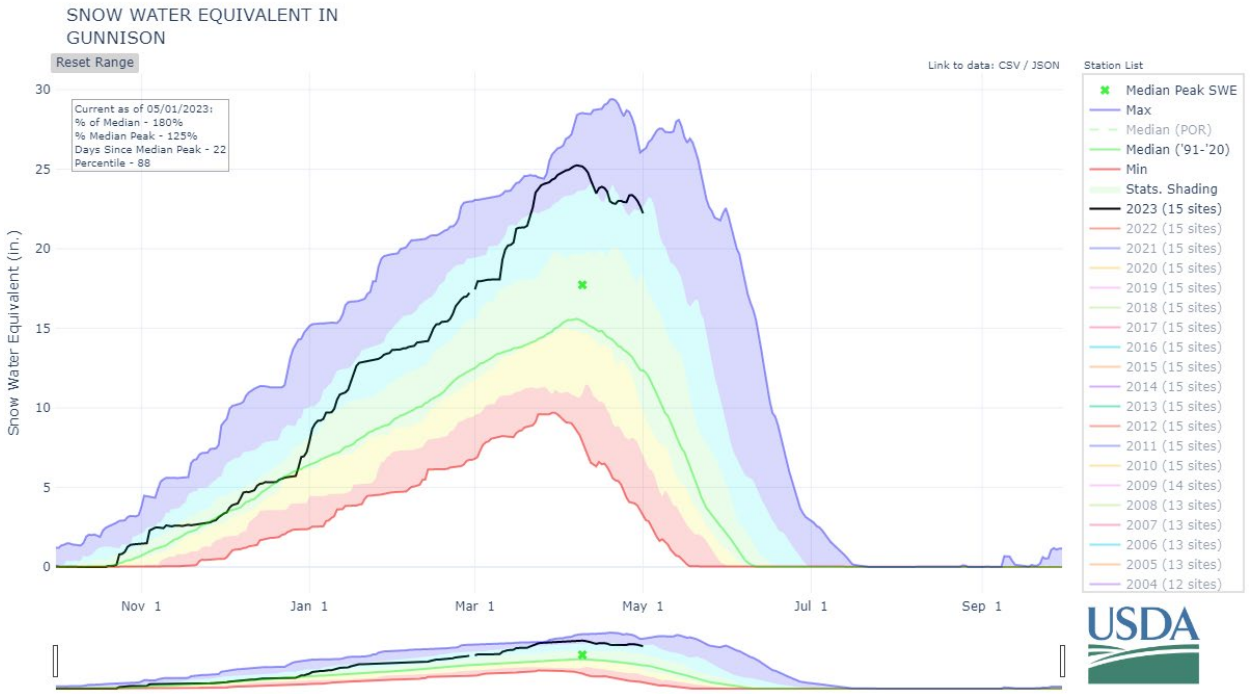


Due to a drier than normal April, there was a slight decrease in forecasted 50 percent exceedance volumes across the state compared to forecasts last month. Despite the moderation, most of the state is expecting well above median runoff in the coming months. A healthy monsoon and wetter soils going into the water year is helping a persistent above normal snowpack translate into much greater runoff volumes then have been seen in recent years. Only the South Platte River basin is expecting below normal runoff at 92 percent of normal, largely due to the below normal snowpack in the South Platte headwaters. The Arkansas is slightly more optimistic due to the deep snowpack in the upper basin with forecasted 50 percent exceedance volumes at 103 percent of normal. In general, the lower forecasts are seen in rivers draining from the northern Sangre de Cristo and southern Front Range mountains which has seen below normal snowpack most of the water year. In western Colorado streamflow forecasts range from 113 percent of normal in the combined Colorado River basin to a whopping 179 percent of normal in the combined Yampa-White-Little Snake River basin. As the runoff season evolves, flooding could become a major concern in these basins depending on how quickly the snowpack melts and how much additional precipitation is received.

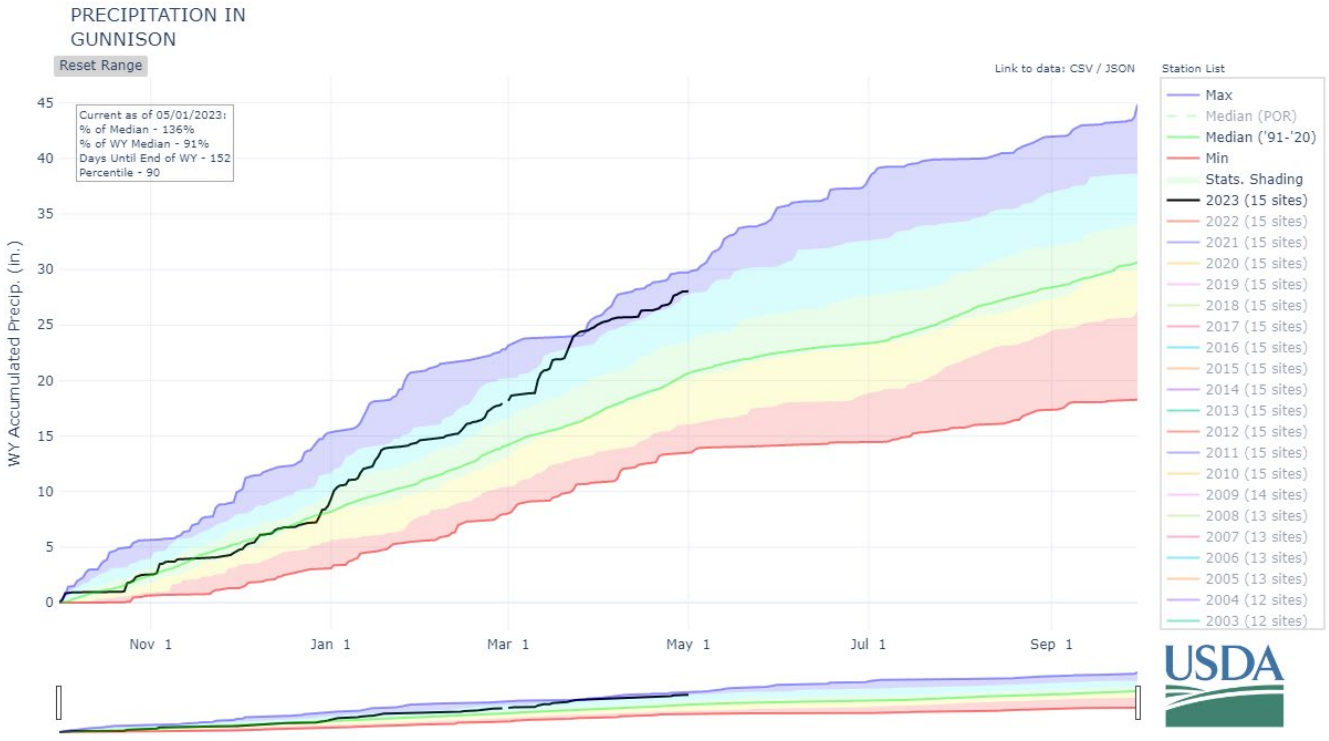
GUNNISON RIVER BASIN

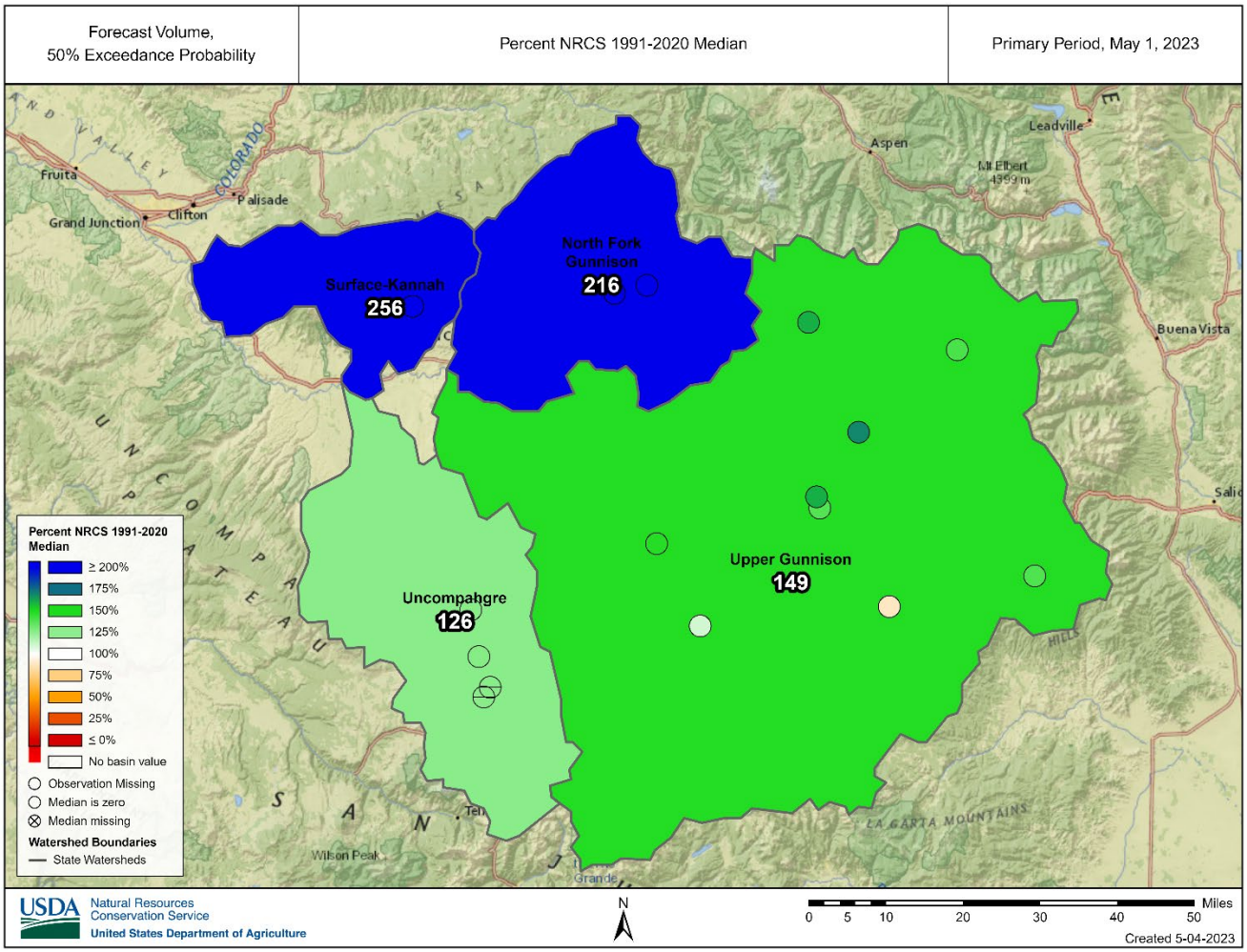
May 1st, 2023

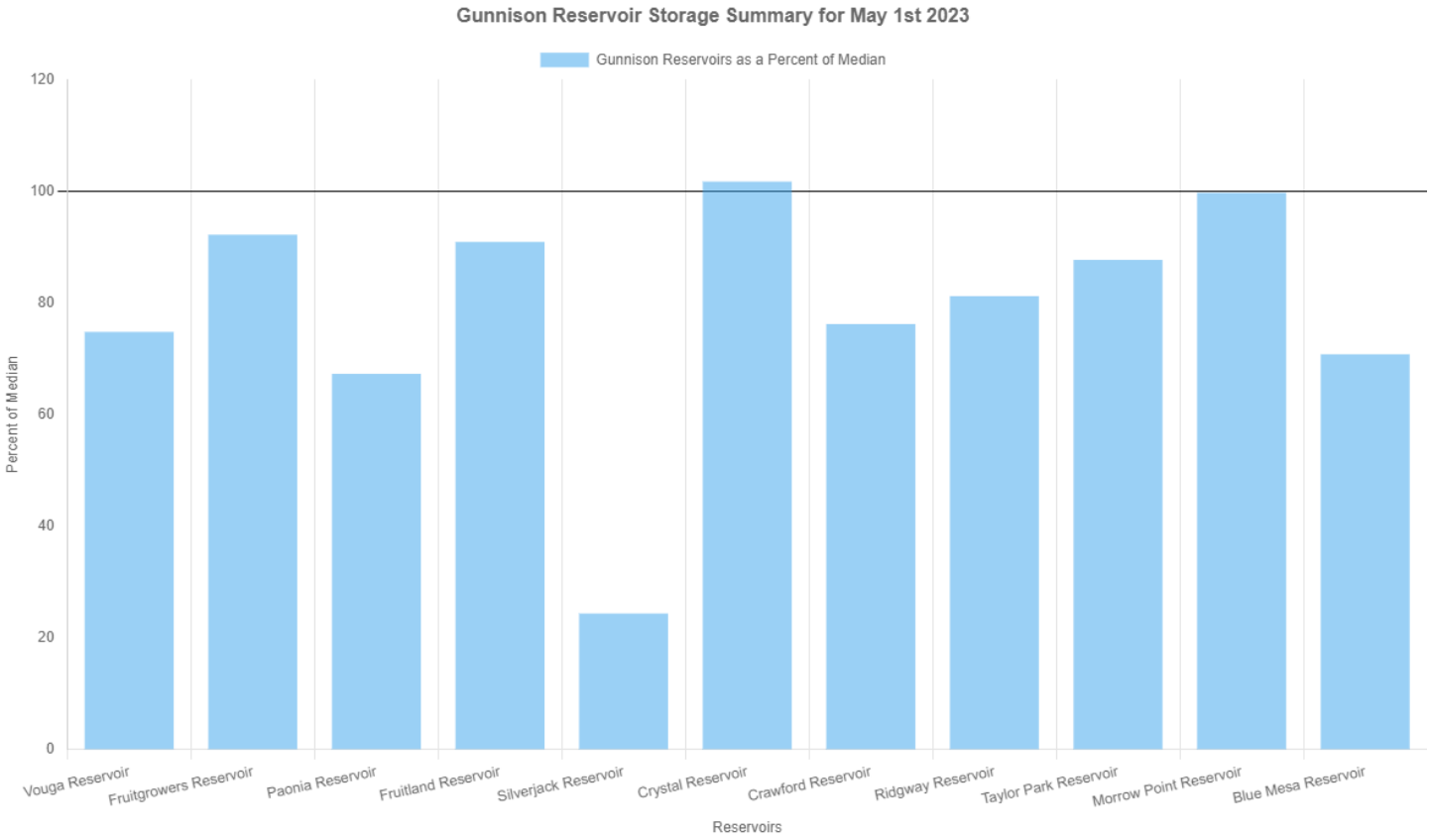
Snowpack in the Gunnison River basin is above normal at 180% of median. Precipitation for April was 83% of median which brings water year-to-date precipitation to 133% of median. Reservoir storage at the end of April was 77% of median compared to 65% last year. Current streamflow forecasts range from 104% of median at Cochetopa Creek below Rock Creek near Parlin to 306% of median at Surface Creek at Cedaredge.



*Snow water equivalent (SWE) values are calculated using daily SNOTEL data only for the above graph. In the paragraph SWE is calculated for the first of the month using both SNOTEL and Snow Course data.




Forecast Volume,
50% Exceedance Probability
Percent NRCS 1991-2020 Median
Primary Period, May 1, 2023
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Aspen
Leadville
Mt Elbert
4399 m
Buena Vista
Surface-Kannah
256
North Fork
Gunnison
216
Uncompahgre
126
Upper Gunnison
149
UNCOMPAHGRE PLATEAU
SAN
LA GARITA MOUNTAINS
Wilson Peak
Grande
Percent NRCS 1991-2020
Median
≥ 200%
175%
150%
125%
100%
75%
50%
25%
≤ 0%
No basin value
Observation Missing
Median is zero
Median missing
Watershed Boundaries
State Watersheds
USDA
Natural Resources
Conservation Service
United States Department of Agriculture
N
0 5 10 20 30 40 50
Miles
Created 5-04-2023


Gunnison Reservoir Storage Summary for May 1st 2023
Gunnison Reservoirs as a Percent of Median
Percent of Median
120
100
80
60
40
20
0
Vouga Reservoir
Fruitgrowers Reservoir
Paonia Reservoir
Fruitland Reservoir
Silverjack Reservoir
Crystal Reservoir
Crawford Reservoir
Ridgway Reservoir
Taylor Park Reservoir
Morrow Point Reservoir
Blue Mesa Reservoir
Reservoirs

Watershed Snowpack Analysis May 1st, 2023

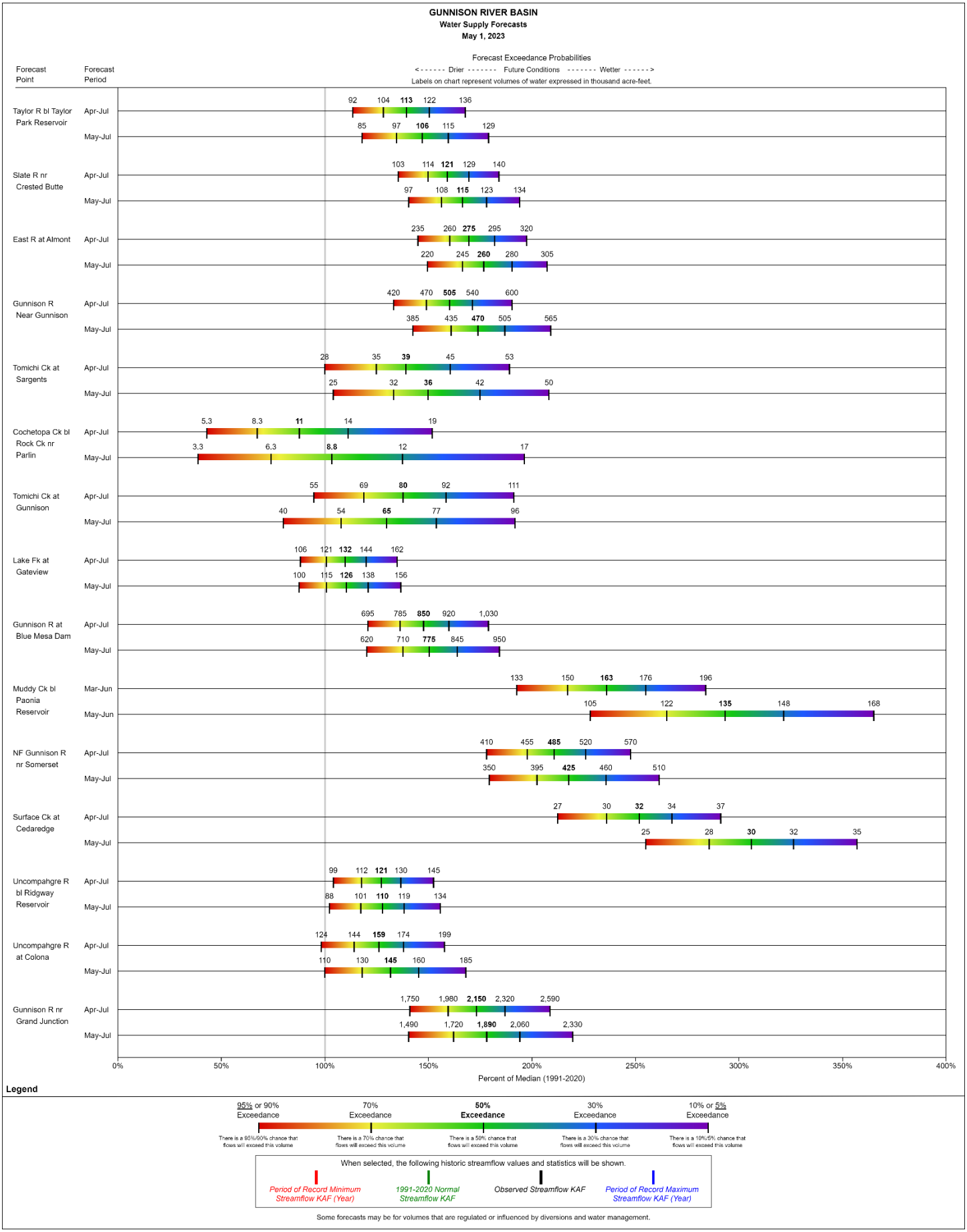
Gunnison Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
Upper Gunnison	15.0	154.3	78.5
North Fork Gunnison	3.0	199.1	87.6
Uncompahgre Plateau	1.0	1472.7	0.0
Uncompahgre	3.0	157.5	60.5
Surface-Kannah	3.0	178.7	102.5

Reservoir Storage End of April 2023

Gunnison Reservoir Data

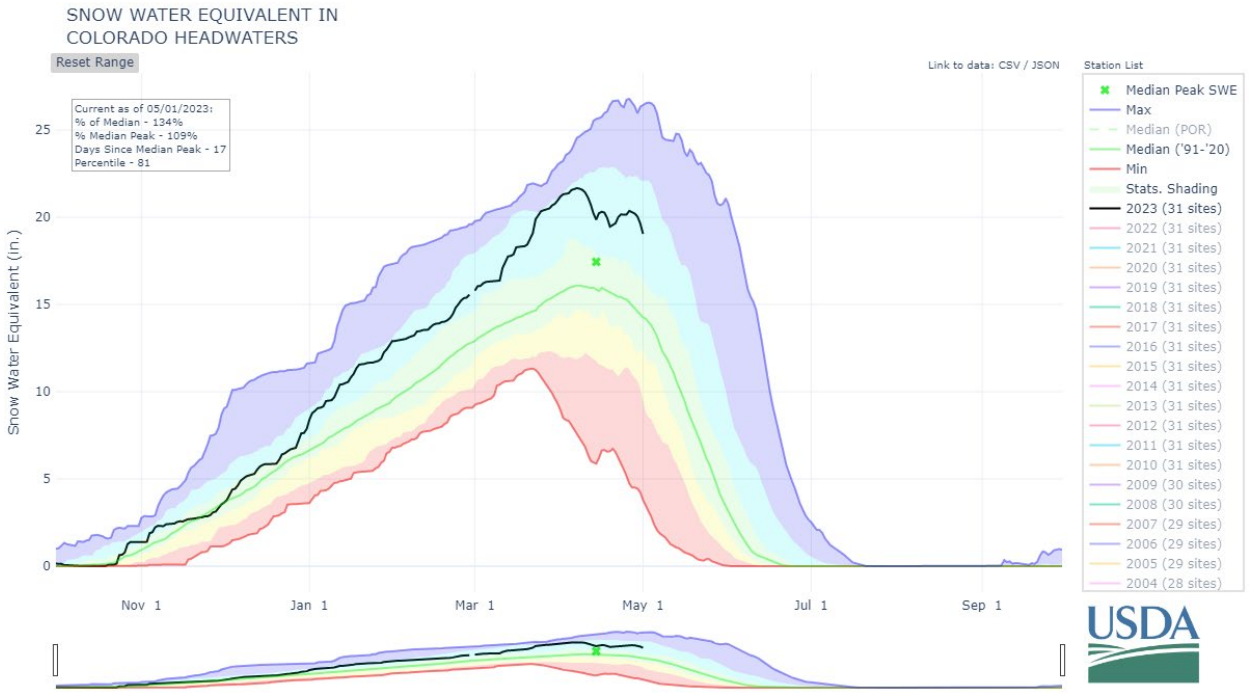
	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Vouga Reservoir	0.67	0.12	0.9	74.4
Silverjack Reservoir	1.76	3.92	7.2	24.4
Fruitgrowers Reservoir	3.23	3.48	3.5	92.3
Blue Mesa Reservoir	358.41	252.32	506.3	70.8
Fruitland Reservoir	4.91	4.07	5.4	90.9
Ridgway Reservoir	54.82	61.49	67.5	81.2
Morrow Point Reservoir	110.28	111.67	110.6	99.7
Crystal Reservoir	9.05	9.06	8.9	101.7
Paonia Reservoir	2.69	7.61	4.0	67.2
Taylor Park Reservoir	61.21	59.22	69.8	87.7
Crawford Reservoir	8.61	6.9	11.3	76.2


GUNNISON RIVER BASIN
Water Supply Forecasts
May 1, 2023
Forecast Exceedance Probabilities
<------ Drier ------- Future Conditions ------- Wetter ------>
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
Taylor R bl Taylor Park Reservoir Apr-Jul 92 104 113 122 136
May-Jul 85 97 106 115 129
Slate R nr Crested Butte Apr-Jul 103 114 121 129 140
May-Jul 97 108 115 123 134
East R at Almont Apr-Jul 235 260 275 295 320
May-Jul 220 245 260 280 305
Gunnison R Near Gunnison Apr-Jul 420 470 505 540 600
May-Jul 385 435 470 505 565
Tomichi Ck at Sargents Apr-Jul 28 35 39 45 53
May-Jul 25 32 36 42 50
Cochetopa Ck bl Rock Ck nr Parlin Apr-Jul 5.3 8.3 11 14 19
May-Jul 3.3 6.3 8.8 12 17
Tomichi Ck at Gunnison Apr-Jul 55 69 80 92 111
May-Jul 40 54 65 77 96
Lake Fk at Gateview Apr-Jul 106 121 132 144 162
May-Jul 100 115 126 138 156
Gunnison R at Blue Mesa Dam Apr-Jul 695 785 850 920 1,030
May-Jul 620 710 775 845 950
Muddy Ck bl Paonia Reservoir Mar-Jun 133 150 163 176 196
May-Jun 105 122 135 148 168
NF Gunnison R nr Somerset Apr-Jul 410 455 485 520 570
May-Jul 350 395 425 460 510
Surface Ck at Cedaredge Apr-Jul 27 30 32 34 37
May-Jul 25 28 30 32 35
Uncompahgre R bl Ridgway Reservoir Apr-Jul 99 112 121 130 145
May-Jul 88 101 110 119 134
Uncompahgre R at Colona Apr-Jul 124 144 159 174 199
May-Jul 110 130 145 160 185
Gunnison R nr Grand Junction Apr-Jul 1,750 1,980 2,150 2,320 2,590
May-Jul 1,490 1,720 1,890 2,060 2,330
0% 50% 100% 150% 200% 250% 300% 350% 400%
Percent of Median (1991-2020)
Legend
95% or 90% Exceedance
There is a 95%/90% chance that flows will exceed this volume
70% Exceedance
There is a 70% chance that flows will exceed this volume
50% Exceedance
There is a 50% chance that flows will exceed this volume
30% Exceedance
There is a 30% chance that flows will exceed this volume
10% or 5% Exceedance
There is a 10%/5% chance that flows will exceed this volume
When selected, the following historic streamflow values and statistics will be shown.
Period of Record Minimum Streamflow KAF (Year)
1991-2020 Normal Streamflow KAF
Observed Streamflow KAF
Period of Record Maximum Streamflow KAF (Year)
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

COLORADO HEADWATERS RIVER BASIN

May 1st, 2023

Snowpack in the Colorado River basin is above normal at 134% of the median. Precipitation for April was 69% of median which brings water year-to-date precipitation to 111% of median. Reservoir storage at the end of April was 101% of median compared to 88% last year. Current streamflow forecasts range from 82% of median at Blue River below Dillon Reservoir to 137% of median at Roaring Fork at Glenwood Springs.



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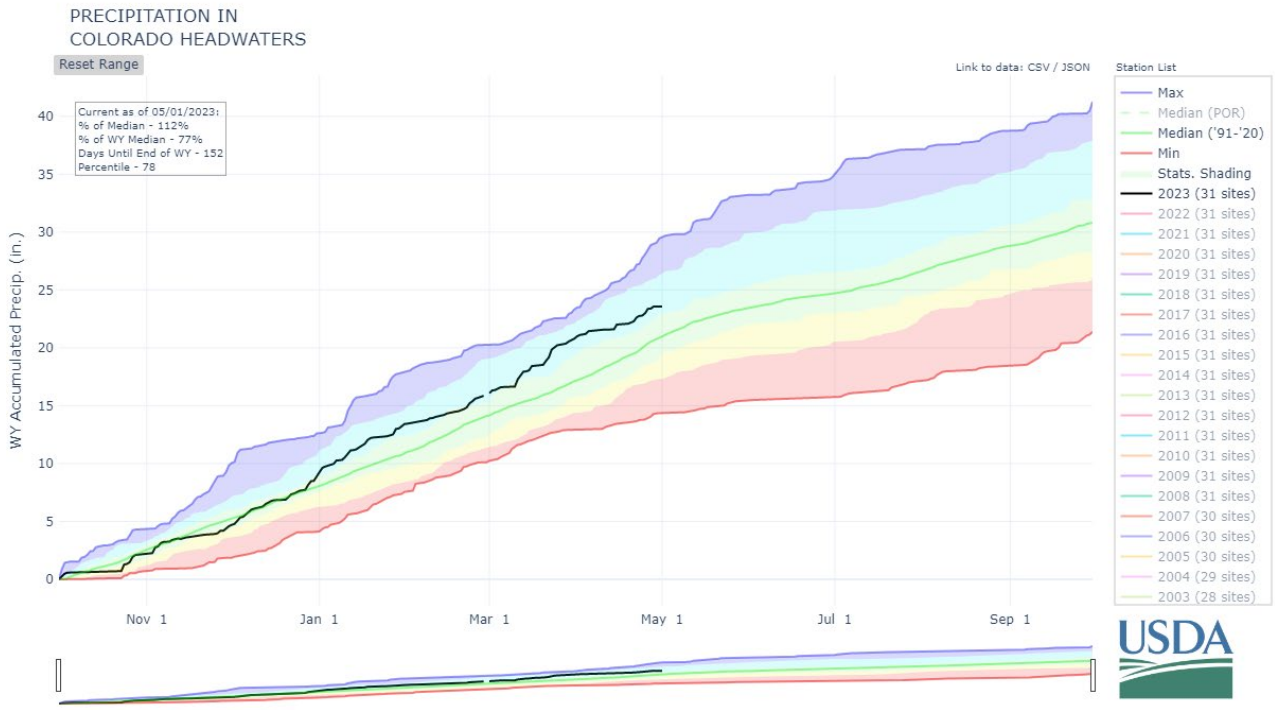
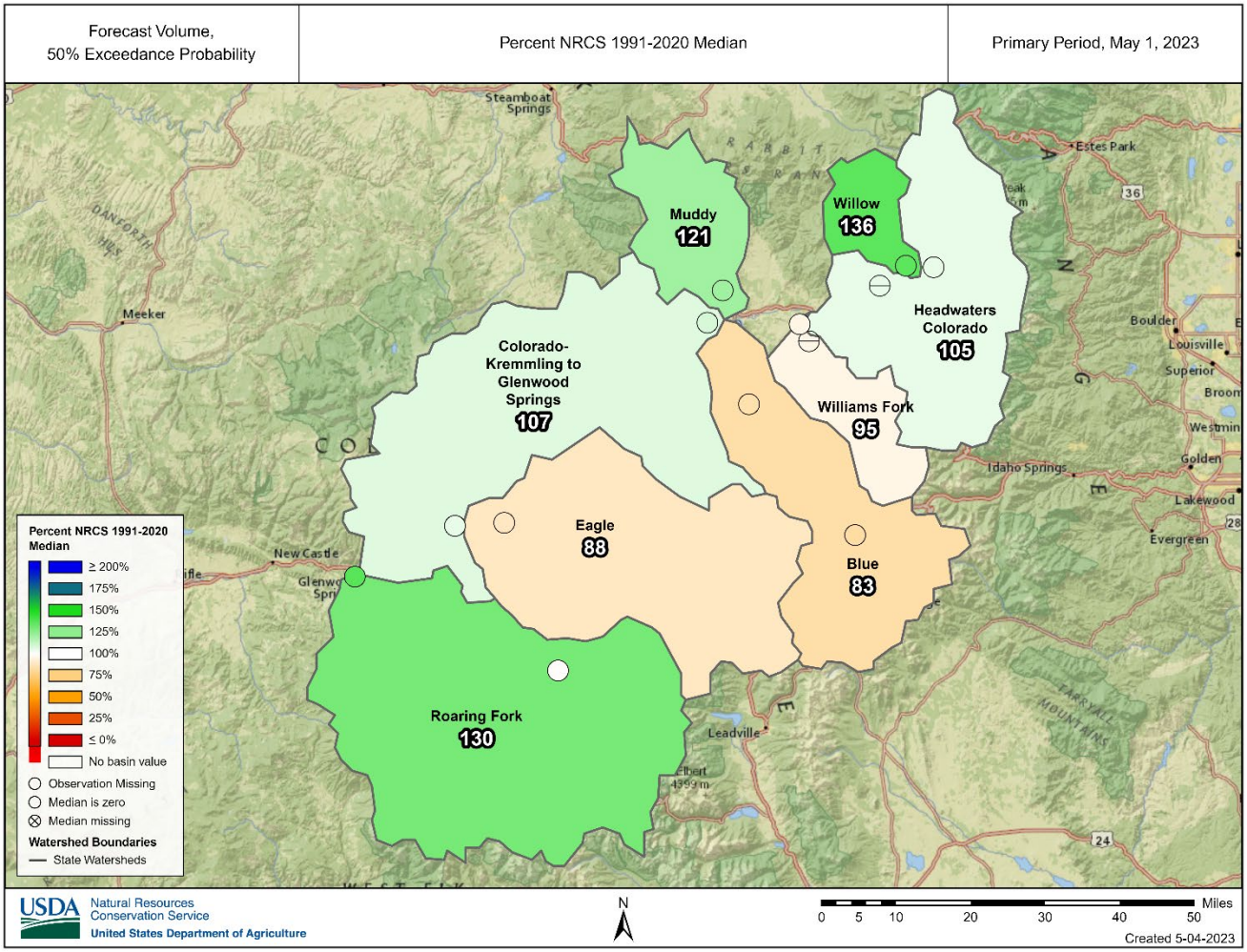
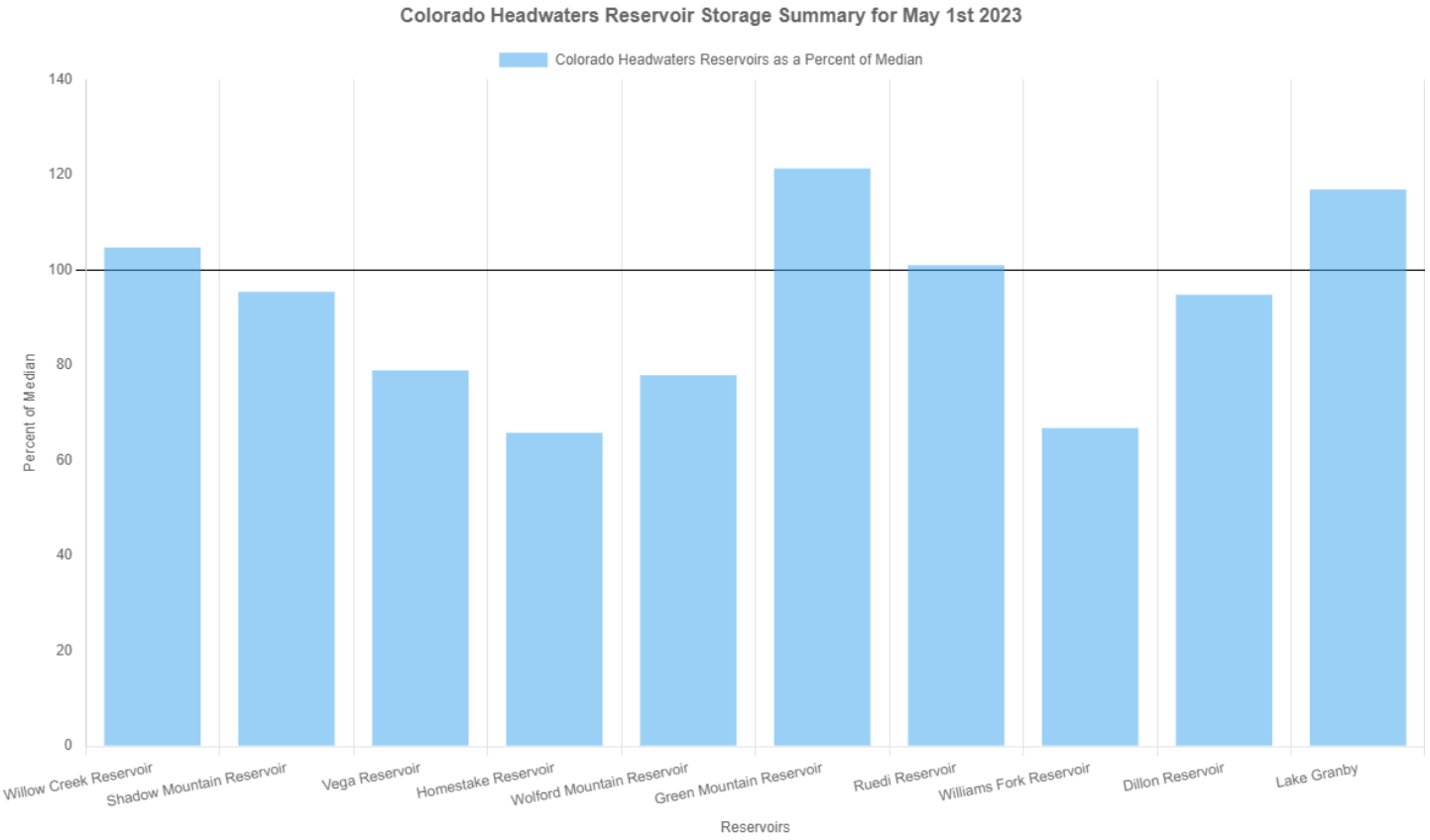



Forecast Volume,
50% Exceedance Probability
Percent NRCS 1991-2020 Median
Primary Period, May 1, 2023
Muddy
121
Willow
136
Headwaters
Colorado
105
Colorado-
Kremmling to
Glenwood
Springs
107
Williams Fork
95
Eagle
88
Blue
83
Roaring Fork
130
Steamboat Springs
Estes Park
Meeker
Boulder
Louisville
Superior
Idaho Springs
Golden
Lakewood
Evergreen
New Castle
Leadville
Percent NRCS 1991-2020
Median
≥ 200%
175%
150%
125%
100%
75%
50%
25%
≤ 0%
No basin value
Observation Missing
Median is zero
Median missing
Watershed Boundaries
State Watersheds
USDA
Natural Resources
Conservation Service
United States Department of Agriculture
N
0 5 10 20 30 40 50
Miles
Created 5-04-2023


Colorado Headwaters Reservoir Storage Summary for May 1st 2023
Colorado Headwaters Reservoirs as a Percent of Median
Percent of Median
140
120
100
80
60
40
20
0
Willow Creek Reservoir
Shadow Mountain Reservoir
Vega Reservoir
Homestake Reservoir
Wolford Mountain Reservoir
Green Mountain Reservoir
Ruedi Reservoir
Williams Fork Reservoir
Dillon Reservoir
Lake Granby
Reservoirs

Watershed Snowpack Analysis May 1st, 2023

Colorado Headwaters Sub-Basin Snow Data

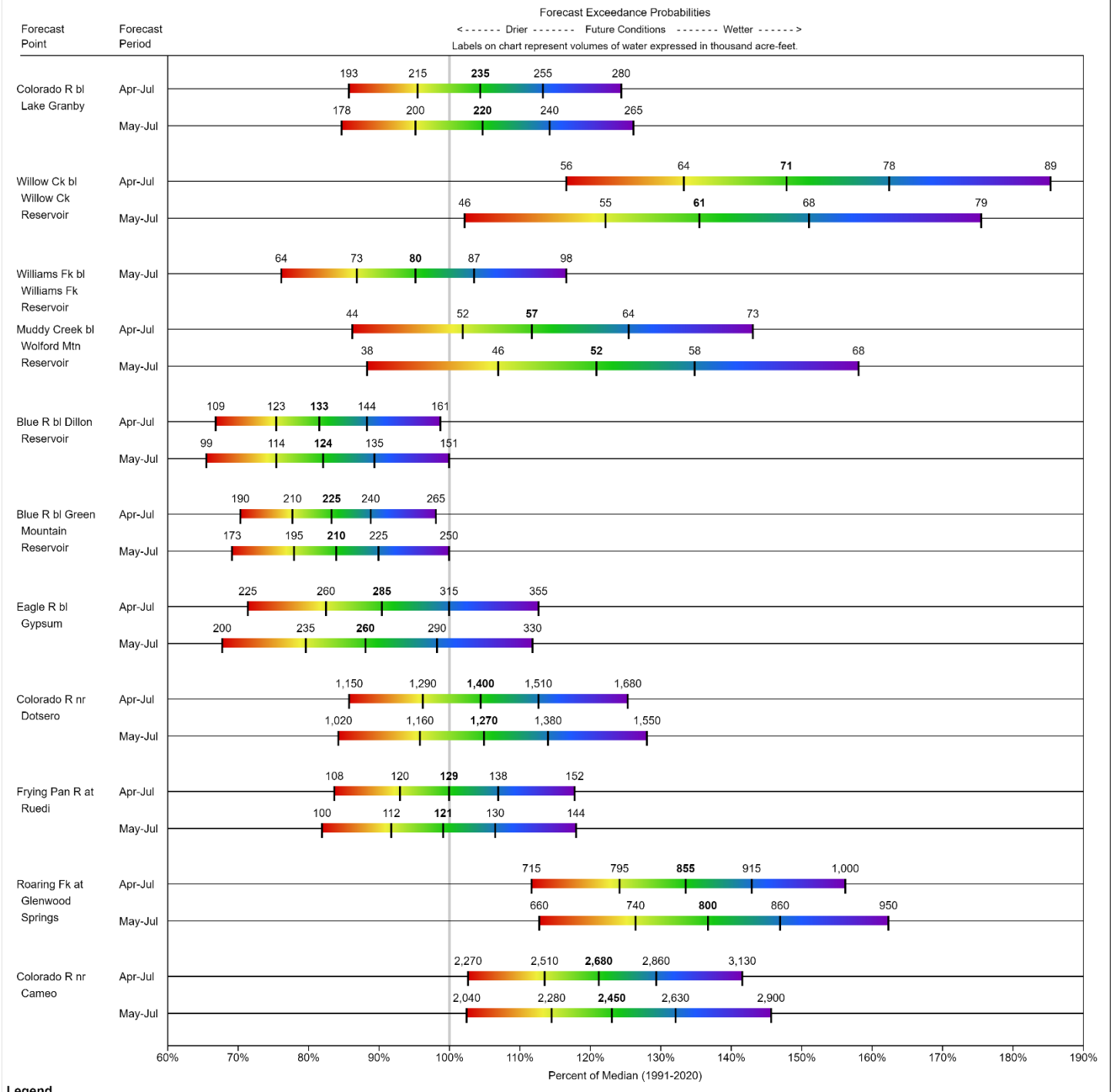
	# of Sites	% Median	Last Year % Median
Headwaters Colorado	8.0	103.1	76.6
Roaring Fork	12.0	127.2	84.7
Colorado-Kremmling to Glenwood Springs	5.0	151.2	81.0
Eagle	8.0	106.6	93.4
Blue	9.0	102.6	87.5
Plateau	4.0	191.7	101.1
Williams Fork	4.0	85.6	73.0
Muddy	4.0	148.1	112.5
Willow	3.0	141.2	89.0
Troublesome	1.0	123.3	89.2

Reservoir Storage End of April 2023

Colorado Headwaters Reservoir Data

	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Wolford Mountain Reservoir	39.56	32.13	50.8	77.9
Willow Creek Reservoir	6.7	7.02	6.4	104.7
Vega Reservoir	13.81	8.98	17.5	78.9
Shadow Mountain Reservoir	16.4	16.51	17.2	95.3
Ruedi Reservoir	66.28	59.24	65.6	101.0
Green Mountain Reservoir	73.52	45.79	60.6	121.3
Lake Granby	315.18	257.1	269.5	116.9
Williams Fork Reservoir	45.95	63.19	68.8	66.8
Homestake Reservoir	11.65	5.3	17.7	65.8
Dillon Reservoir	194.94	192.76	205.6	94.8

UPPER COLORADO RIVER BASIN
Water Supply Forecasts
May 1, 2023



Legend

When selected, the following historic streamflow values and statistics will be shown.

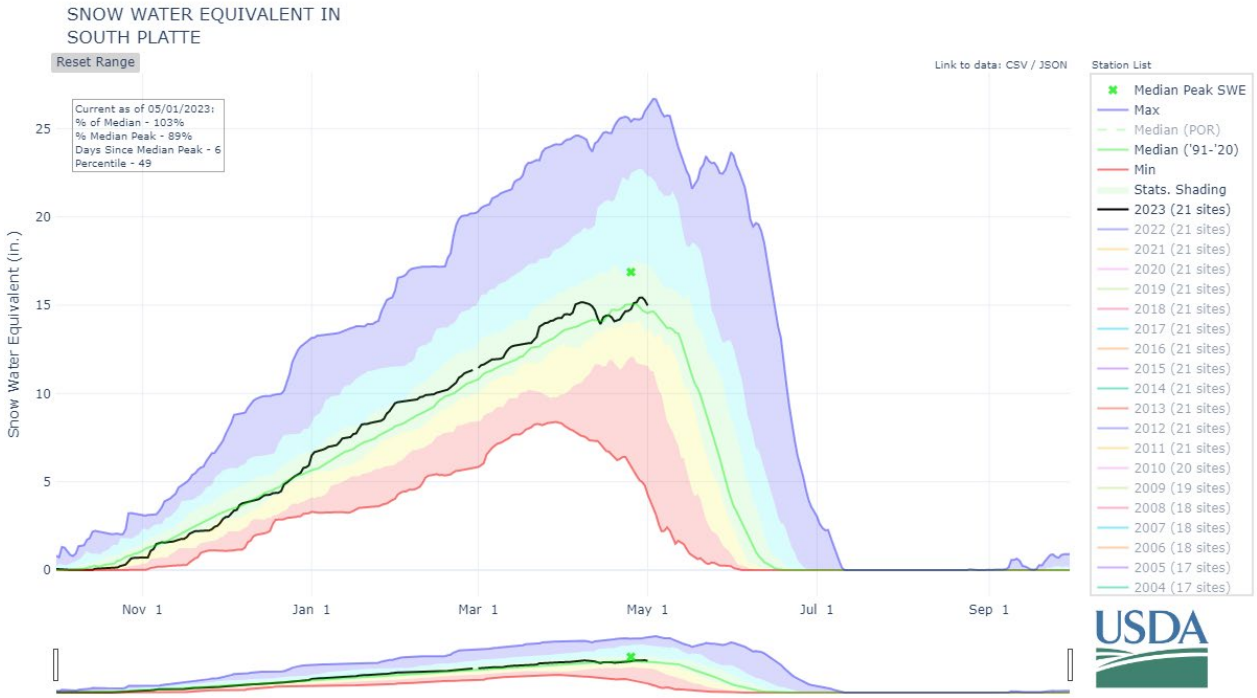
Period of Record Minimum Streamflow KAF (Year) | *1991-2020 Normal Streamflow KAF* | *Observed Streamflow KAF* | *Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

SOUTH PLATTE RIVER BASIN

May 1st, 2023

Snowpack in the South Platte River basin is above normal at 103% of median. Precipitation for April was 80% of median which brings water year-to-date precipitation to 93% of median. Reservoir storage at the end of April was 94% of median compared to 100% last year. Current streamflow forecasts are at 92 percent of median and range from 68% of median at South Platte River below Antero Reservoir to 112% of median at Cache La Poudre River at Canyon Mouth.



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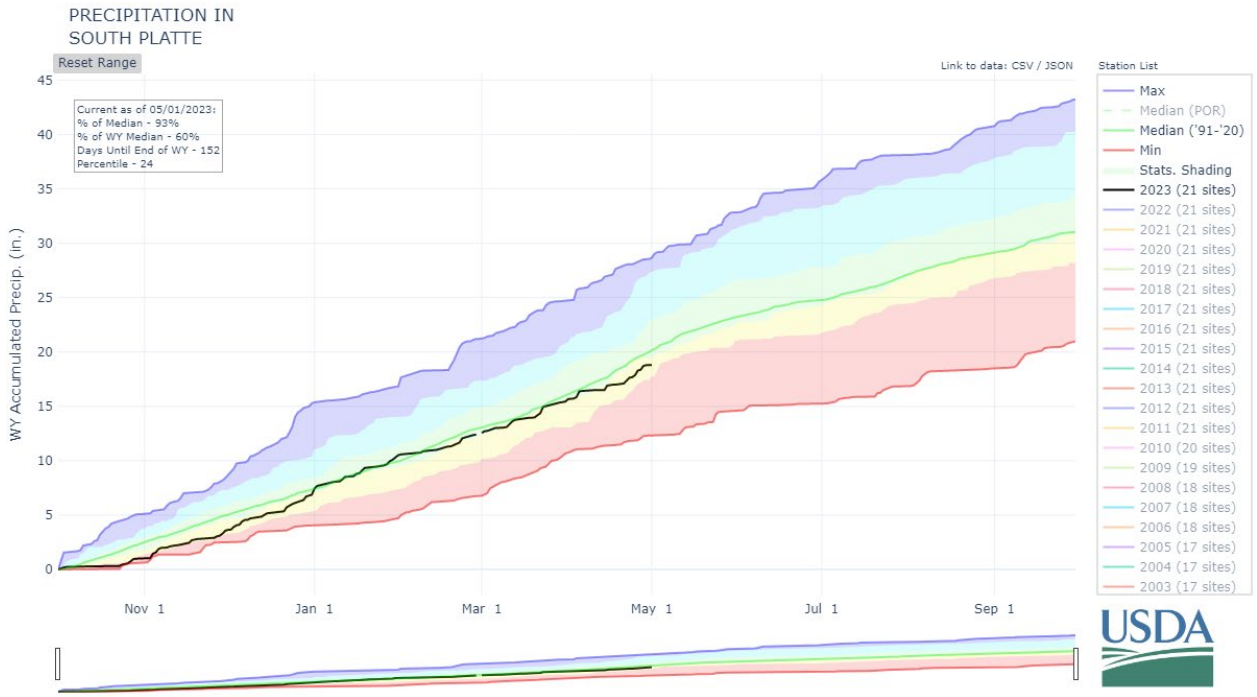
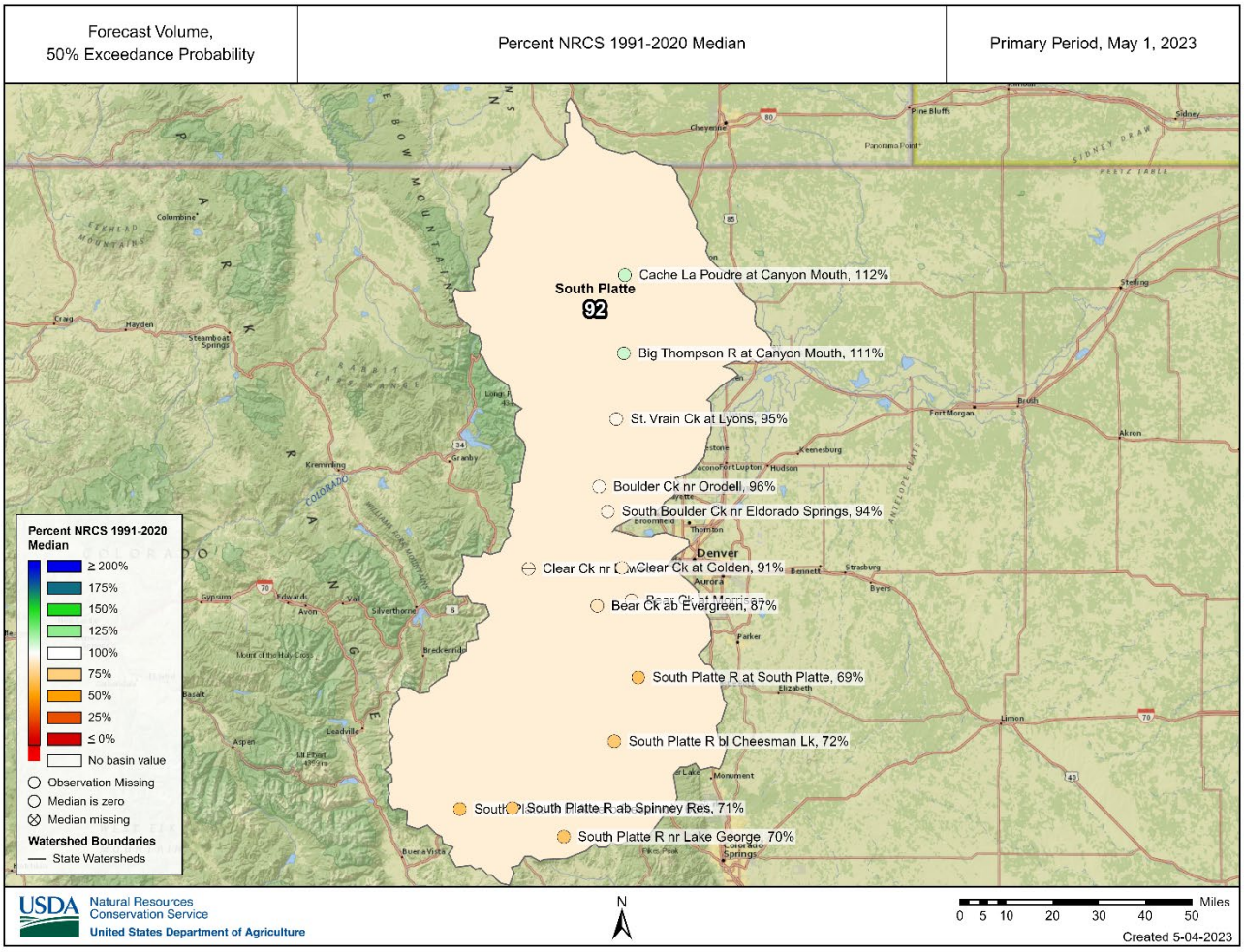
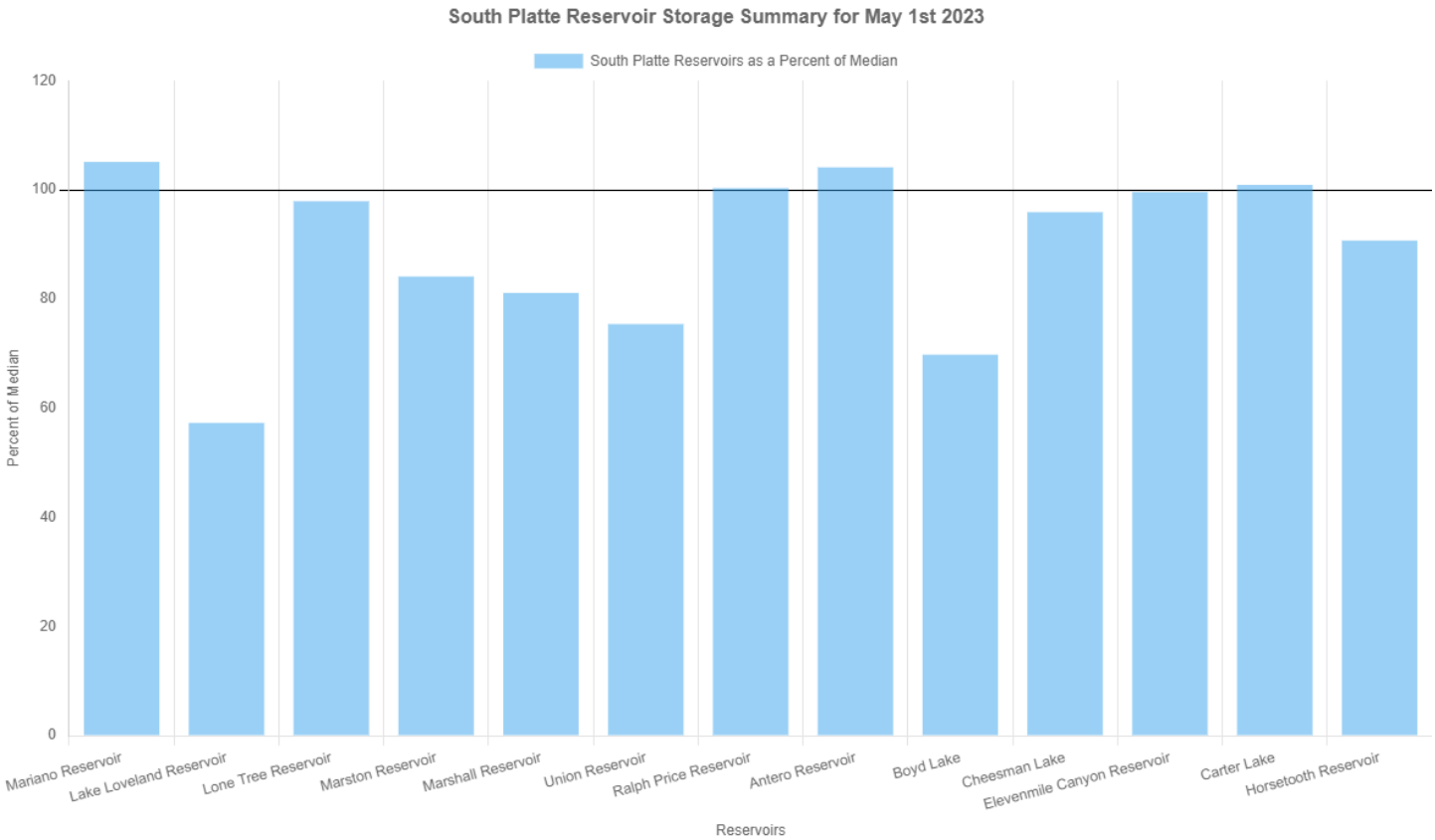






** As of this publication we are still missing data from several reservoirs. Please see website for updates.*

Watershed Snowpack Analysis May 1st, 2023

South Platte Sub-Basin Snow Data

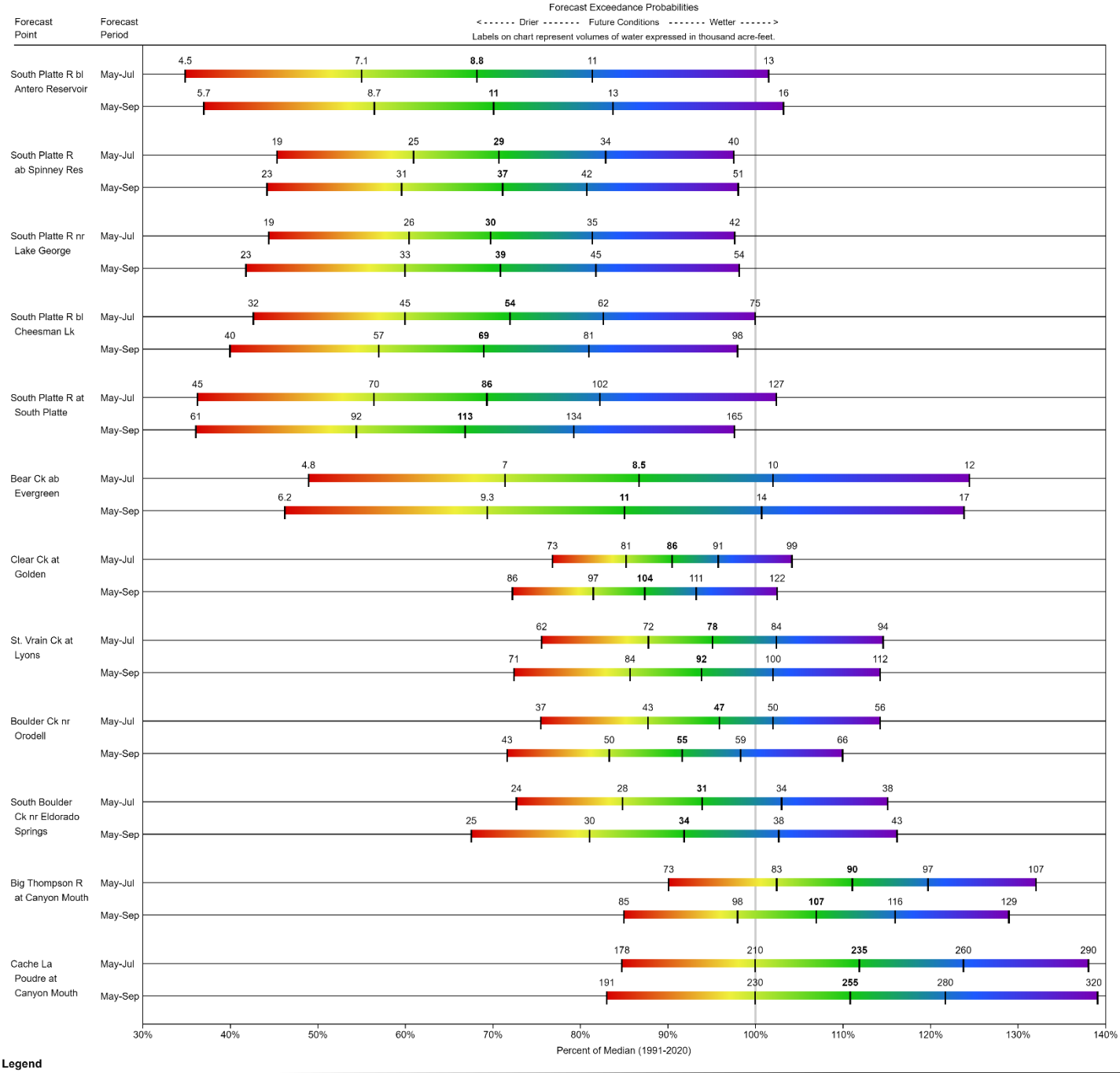
	# of Sites	% Median	Last Year % Median
Upper South Platte	15.0	85.1	75.0
North Fork Cache La Poudre	4.0	115.3	101.4
Cache La Poudre	9.0	113.5	92.8
Big Thompson	7.0	119.5	97.4
Clear	5.0	90.1	76.8
Boulder	6.0	106.2	87.6
Saint Vrain	5.0	119.4	106.9

Reservoir Storage End of April 2023

South Platte Reservoir Data

	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Cheesman Lake	65.7	56.31	68.5	95.9
Elevenmile Canyon Reservoir	99.21	100.14	99.6	99.6
Marston Reservoir	7.14	5.54	8.5	84.0
Windsor Reservoir	nan	12.4	13.9	nan
Mariano Reservoir	5.04	5.04	4.8	105.0
Terry Reservoir	nan	6.68	5.9	nan
Cache La Poudre	nan	10.43	9.6	nan
Union Reservoir	8.9	10.54	11.8	75.4
Boyd Lake	21.57	26.25	30.9	69.8
Marshall Reservoir	7.3	6.1	9.0	81.1
Fossil Creek Reservoir	nan	9.39	9.7	nan
Lone Tree Reservoir	8.12	8.22	8.3	97.8
Horsetooth Reservoir	113.96	140.64	125.6	90.7
Chambers Lake	nan	5.4	3.6	nan
Lake Loveland Reservoir	4.7	6.59	8.2	57.3
Cobb Lake	nan	17.55	14.2	nan
Spinney Mountain Reservoir	nan	34.14	30.2	nan
Ralph Price Reservoir	12.94	9.71	12.9	100.3
Antero Reservoir	20.41	19.79	19.6	104.1
Gross Reservoir	nan	15.05	10.7	nan
Black Hollow Reservoir	nan	3.17	2.9	nan
Carter Lake	103.19	101.51	102.3	100.9
Halligan Reservoir	nan	6.43	5.4	nan

SOUTH PLATTE RIVER BASIN
Water Supply Forecasts
May 1, 2023



Legend

95% or 90% Exceedance — There is a 95%/90% chance that flows will exceed this volume
70% Exceedance — There is a 70% chance that flows will exceed this volume
50% Exceedance — There is a 50% chance that flows will exceed this volume
30% Exceedance — There is a 30% chance that flows will exceed this volume
10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

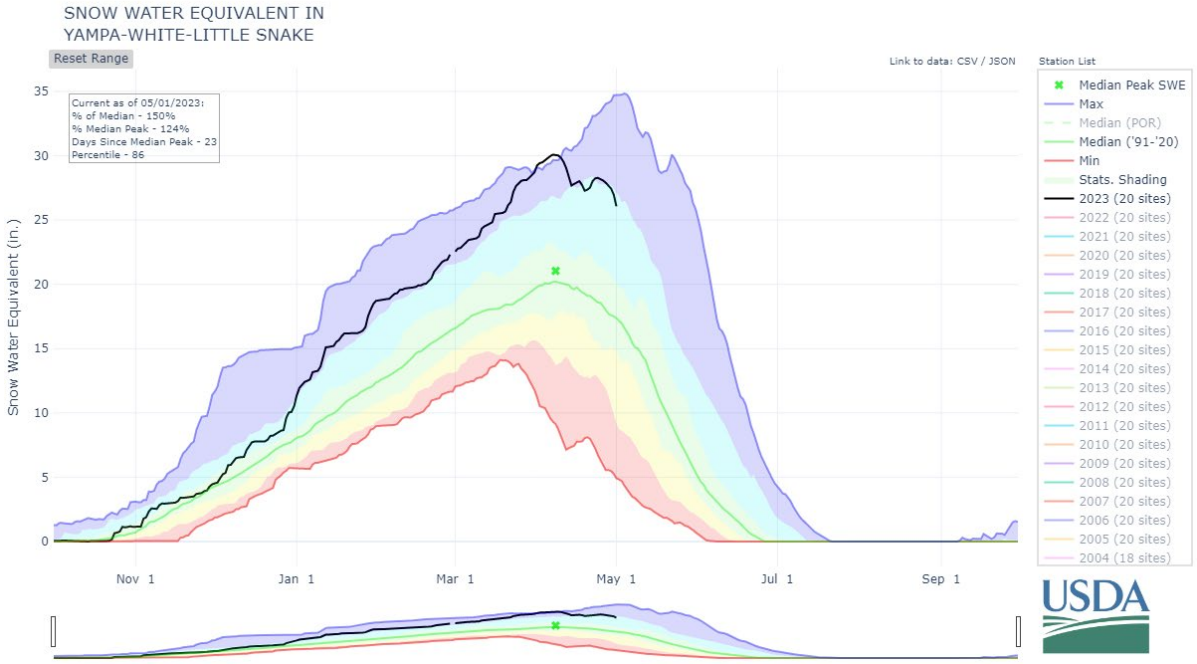
Period of Record Minimum Streamflow KAF (Year)
1991-2020 Normal Streamflow KAF
Observed Streamflow KAF
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

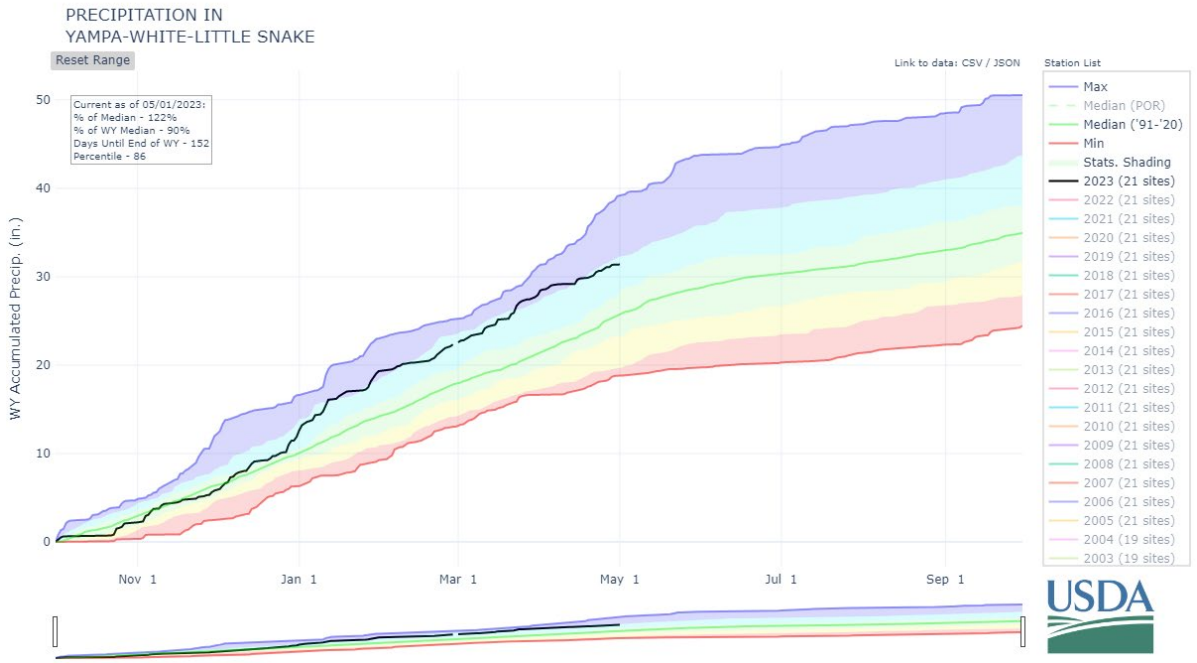
YAMPA-WHITE-LITTLE SNAKE AND LARAMIE-NORTH PLATTE RIVER BASINS

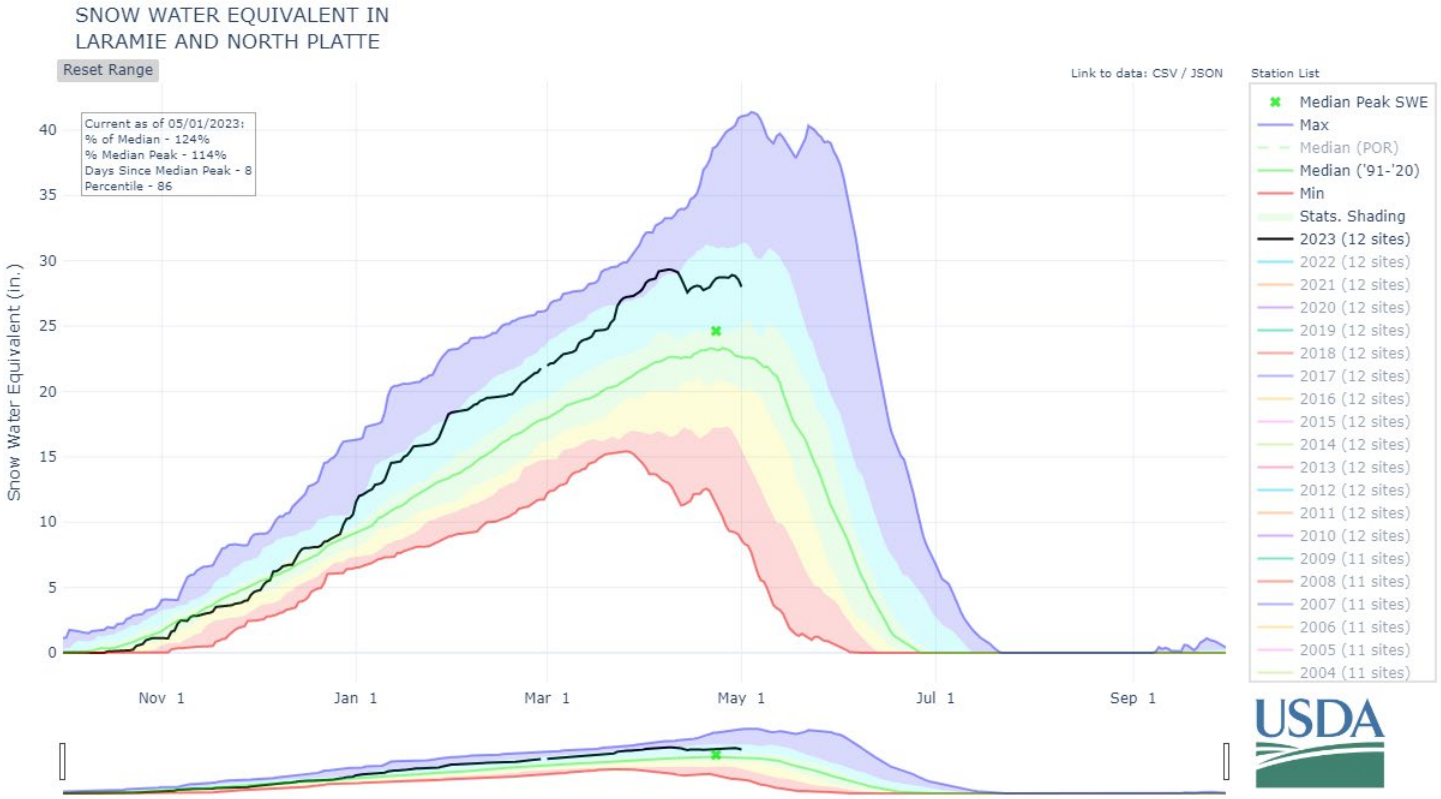
May 1st, 2023

Snowpack in the Yampa-White-Little Snake and the Laramie-North Platte River basins are above normal at 150% and 124% of the median. Precipitation for April was 74% and 80% of median and water year-to-date precipitation is 122% and 111% of median, respectively. Reservoir storage at the end of April for the Yampa-White-Little Snake was 97% of median compared to 77% last year. Current streamflow forecasts range from 142% of median at Yampa River at Steamboat Springs to 248% of median at Little Snake River near Lily.

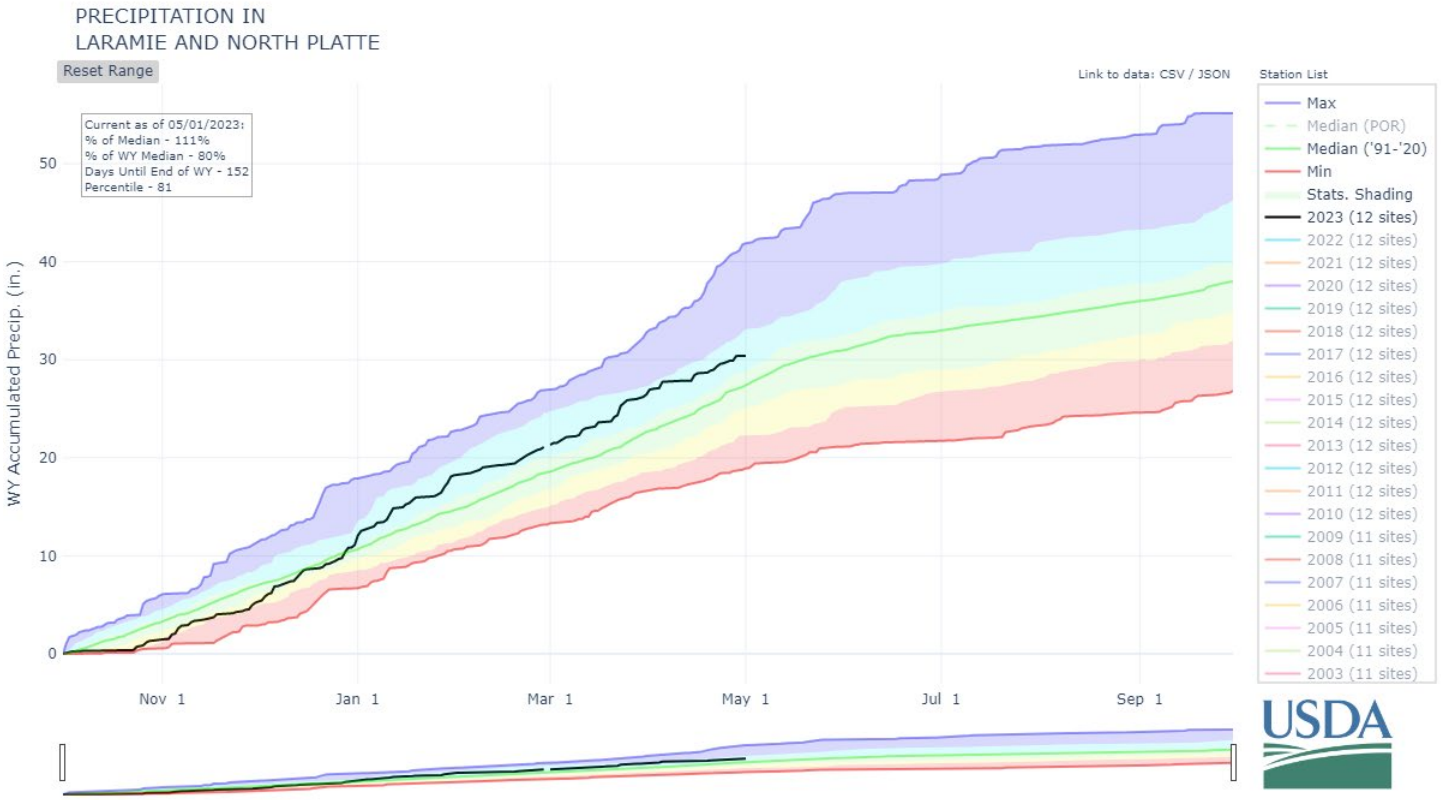


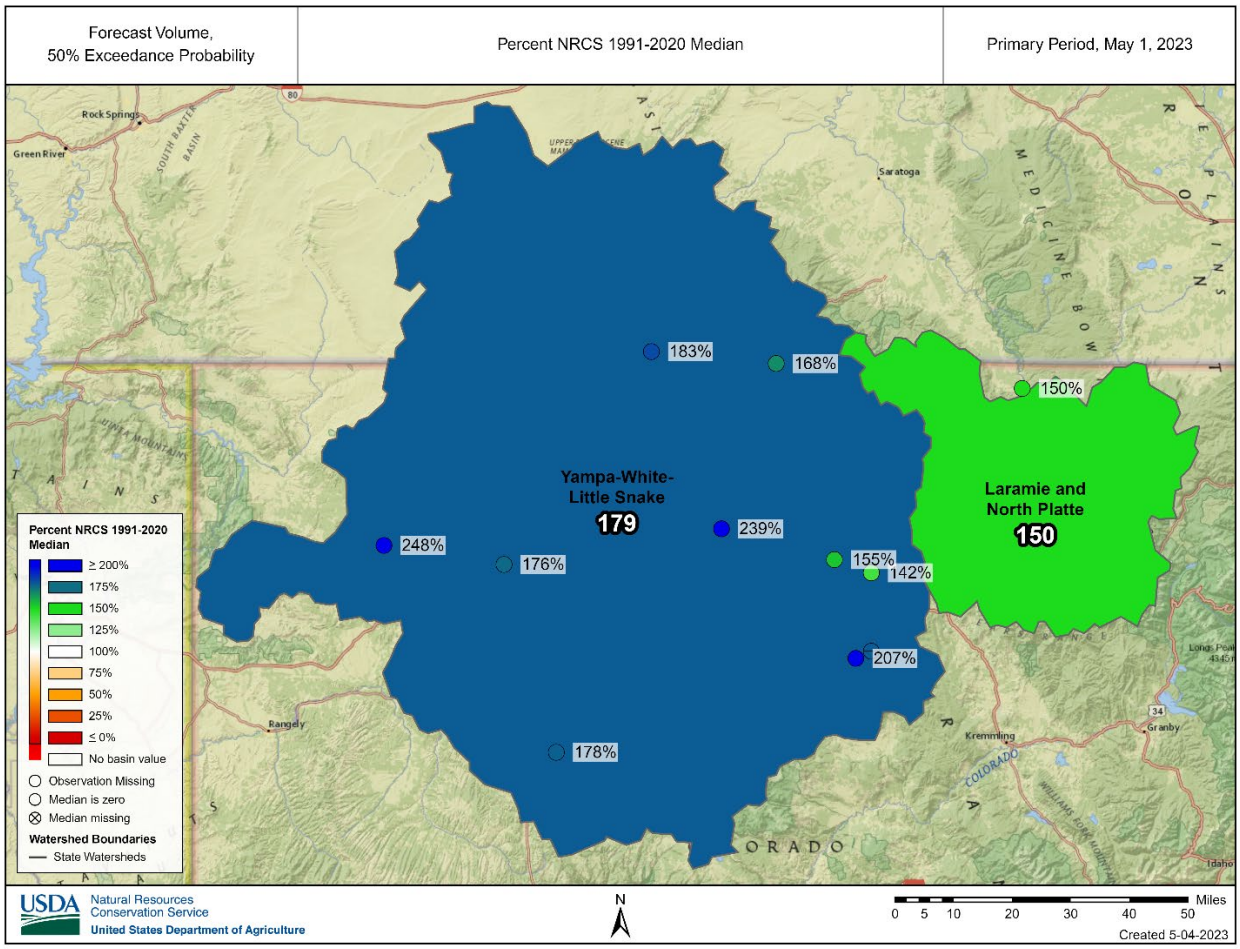
*SWE values calculated using daily SNOTEL data only

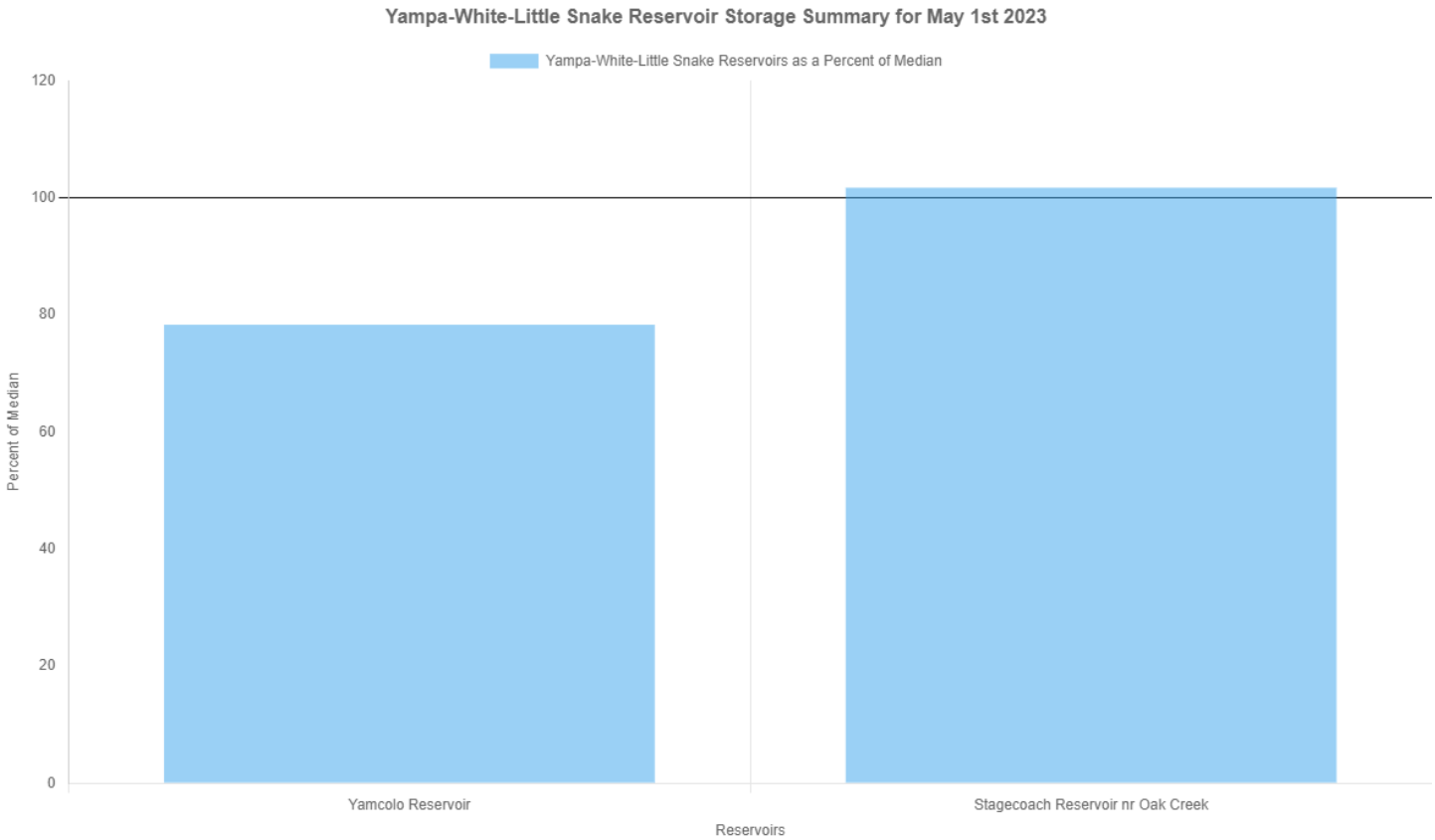




*Snow water equivalent (SWE) values are calculated using daily SNOTEL data only. In the paragraph SWE is calculated for the first of the month using both SNOTEL and Snow Course data.







*No reservoirs are currently monitored in the Laramie-North Platte combined basin. We are waiting on reservoir conditions data to be received from our cooperators. For current conditions data can be accessed through the NRCS Snow Survey webpage

Watershed Snowpack Analysis May 1st, 2023

Laramie and North Platte Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
North Platte Headwaters	14.0	127.1	97.8
Laramie	6.0	121.7	110.6

Yampa-White-Little Snake Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
Yampa	10.0	132.6	94.1
Little Snake	10.0	166.8	90.2
White	4.0	157.9	68.4
Williams Fork of the Yampa	1.0	132.9	85.6
Elk	2.0	152.2	93.0

Reservoir Storage End of April 2023

Yampa-White-Little Snake Reservoir Data

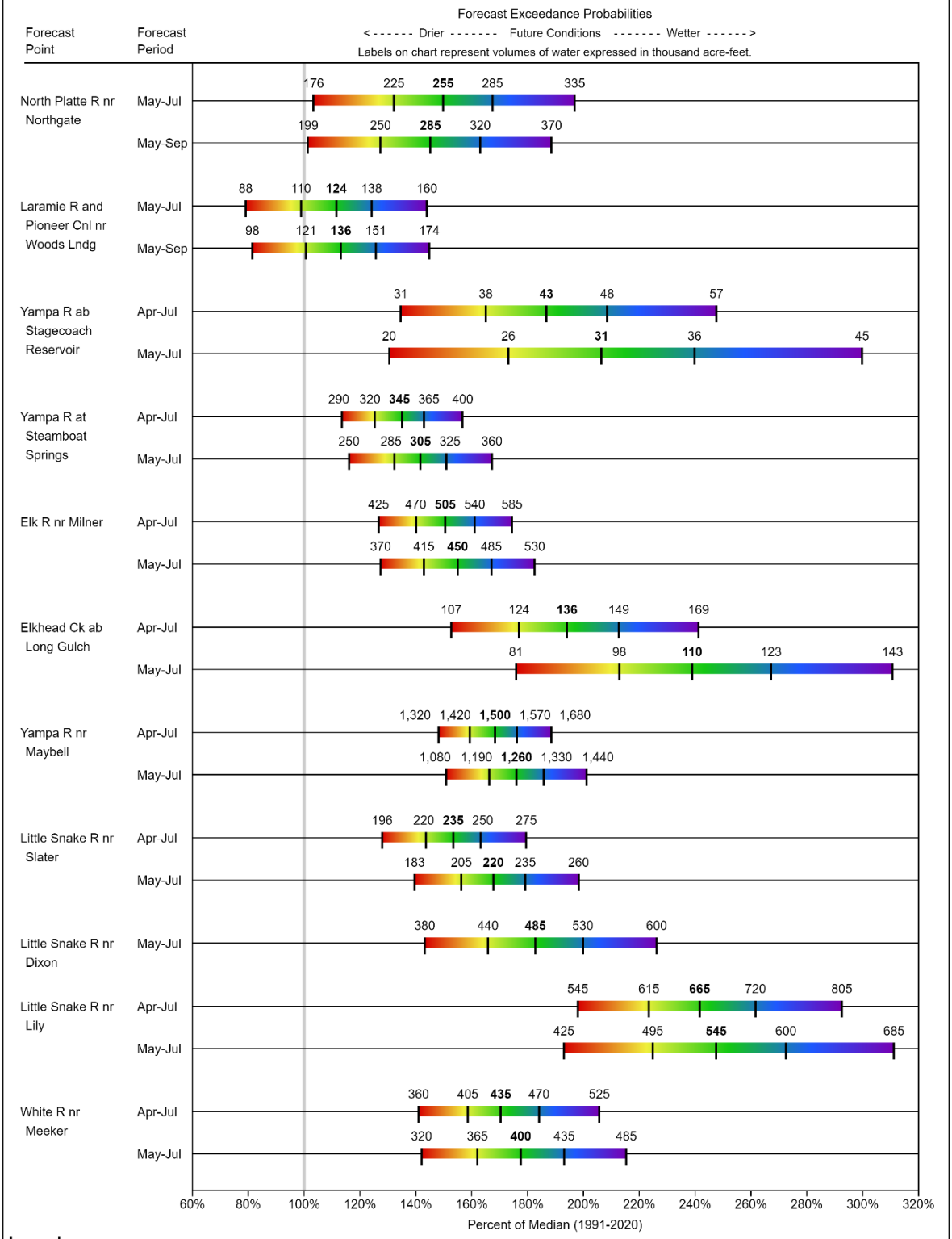
	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Yamcolo Reservoir	6.42	4.8	8.2	78.3
Stagecoach Reservoir nr Oak Creek	32.46	29.9	31.9	101.8
High Savery Reservoir	10.21	8.5	15.0	68.1
Elkhead Reservoir	nan	18.08	24.5	nan

*No reservoirs are currently monitored in our database for the Laramie-North Platte combined basin.

YAMPA-WHITE-NORTH PLATTE RIVER BASINS

Water Supply Forecasts

May 1, 2023



Legend

95% or 90% Exceedance	70% Exceedance	**50% Exceedance**	30% Exceedance	10% or 5% Exceedance
There is a 95%/90% chance that flows will exceed this volume	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

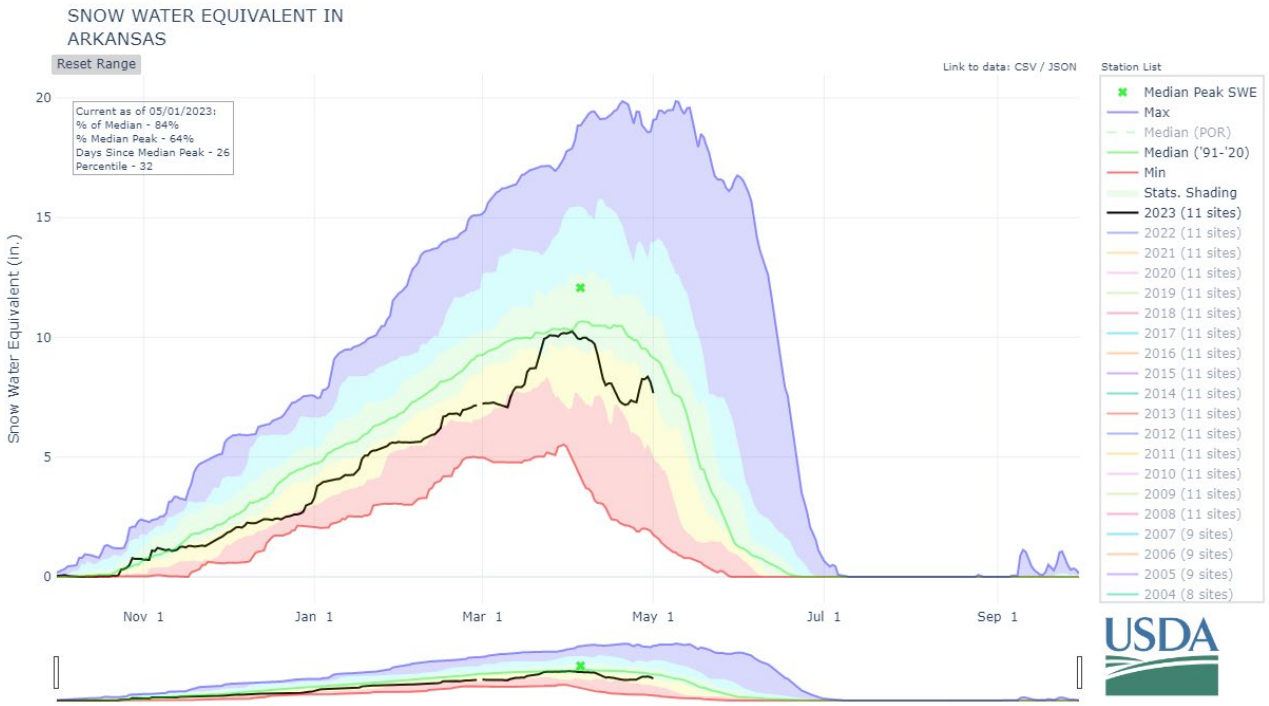
Period of Record Minimum Streamflow KAF (Year)	*1991-2020 Normal Streamflow KAF*	*Observed Streamflow KAF*	*Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

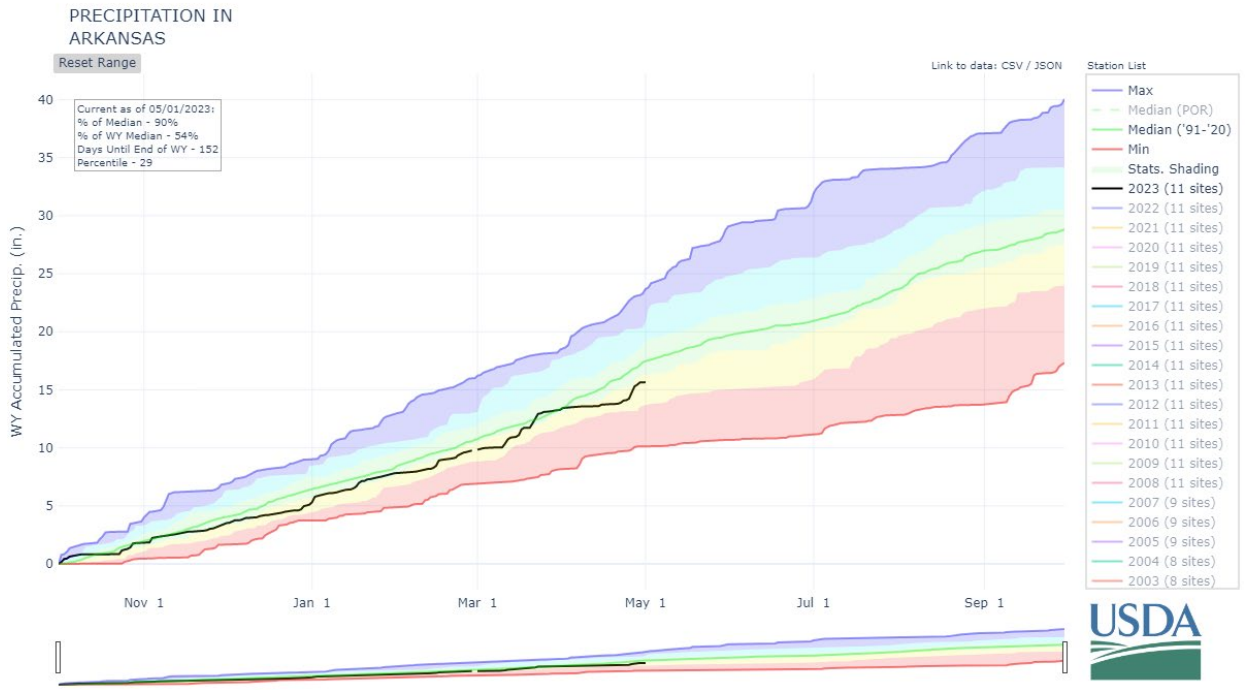
ARKANSAS RIVER BASIN

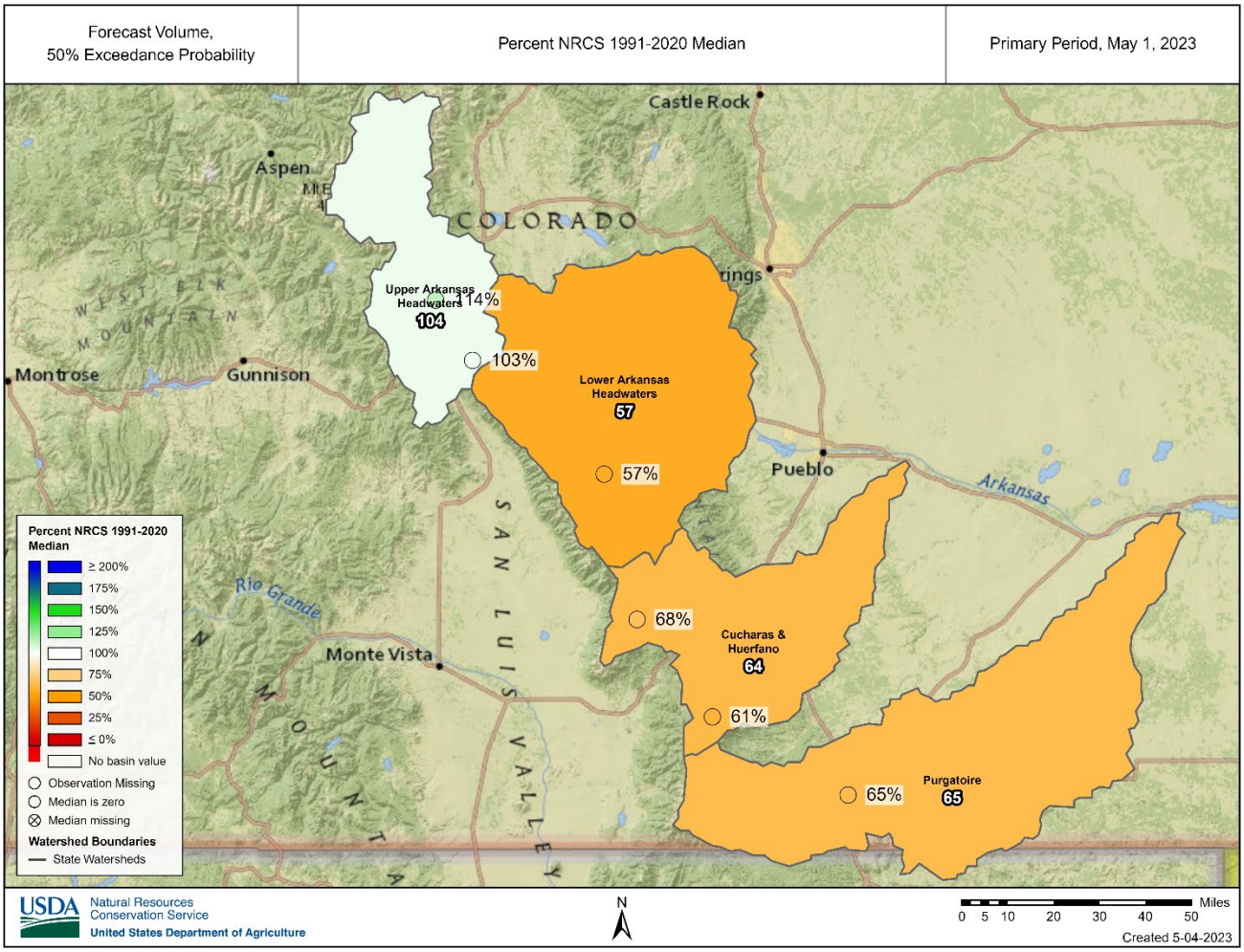
May 1st, 2023

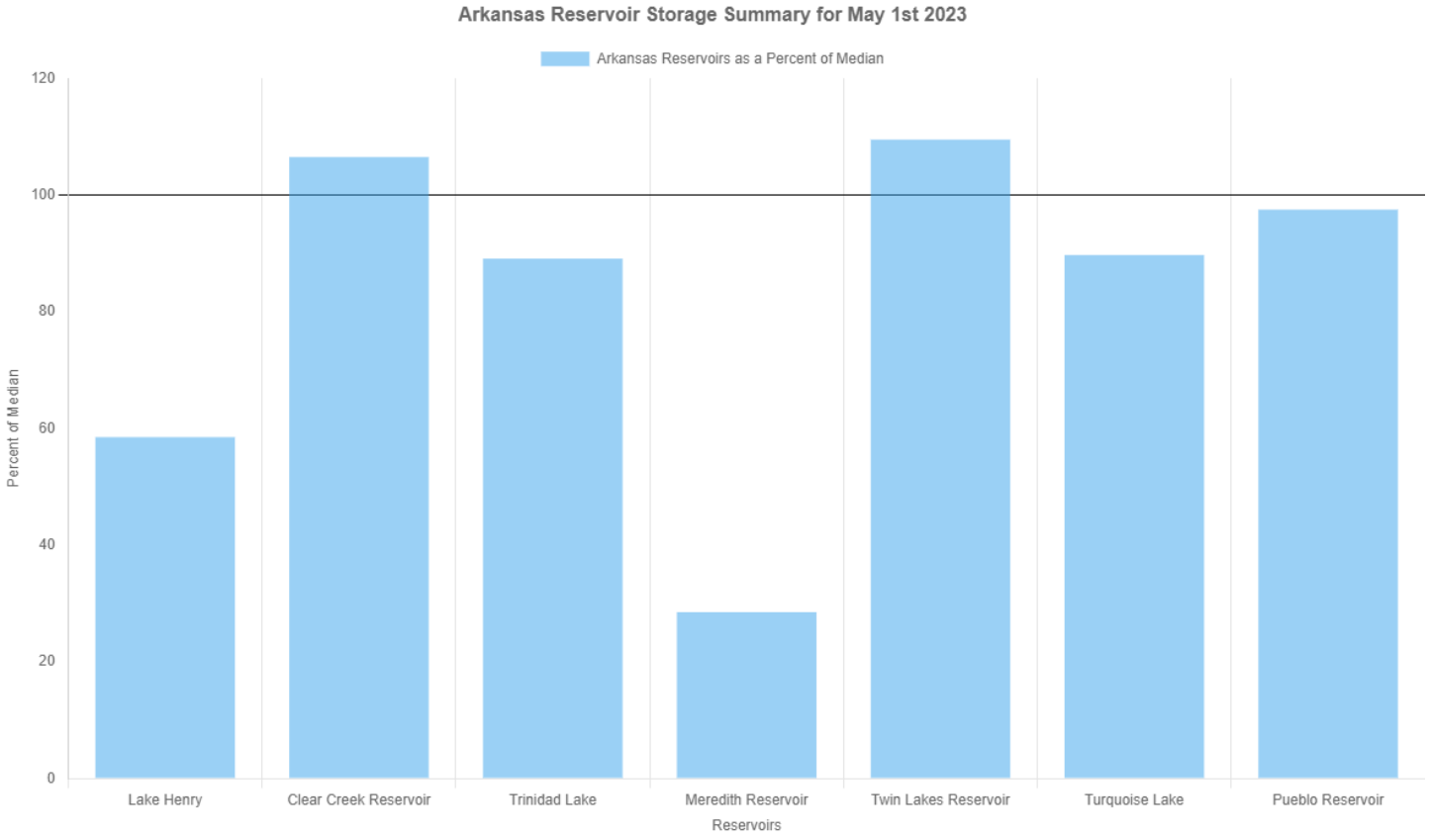
Snowpack in the Arkansas River basin is below normal at 84% of median. Precipitation for April was 71% of median which brings water year-to-date precipitation to 90% of median. Reservoir storage at the end of April was 91% of median compared to 92% last year. Current streamflow forecasts range from 61% of median at Cucharas River near La Veta to 114% of median at Chalk Creek near Nathrop.



*Snow water equivalent (SWE) values are calculated using daily SNOTEL data only for the above graph. In the paragraph SWE is calculated for the first of the month using both SNOTEL and Snow Course data.




Forecast Volume,
50% Exceedance Probability
Percent NRCS 1991-2020 Median
Primary Period, May 1, 2023
Castle Rock
Aspen
COLORADO
Upper Arkansas Headwaters
104
114%
103%
Lower Arkansas Headwaters
57
57%
Montrose
Gunnison
Pueblo
Arkansas
Rio Grande
Monte Vista
68%
Cucharas & Huerfano
64
61%
Purgatoire
65
65%
Percent NRCS 1991-2020 Median
≥ 200%
175%
150%
125%
100%
75%
50%
25%
≤ 0%
No basin value
Observation Missing
Median is zero
Median missing
Watershed Boundaries
State Watersheds
USDA Natural Resources Conservation Service
United States Department of Agriculture
N
Miles
0 5 10 20 30 40 50
Created 5-04-2023


Arkansas Reservoir Storage Summary for May 1st 2023
Arkansas Reservoirs as a Percent of Median
120
100
80
60
40
20
0
Percent of Median
Lake Henry
Clear Creek Reservoir
Trinidad Lake
Meredith Reservoir
Twin Lakes Reservoir
Turquoise Lake
Pueblo Reservoir
Reservoirs

Watershed Snowpack Analysis May 1st, 2023

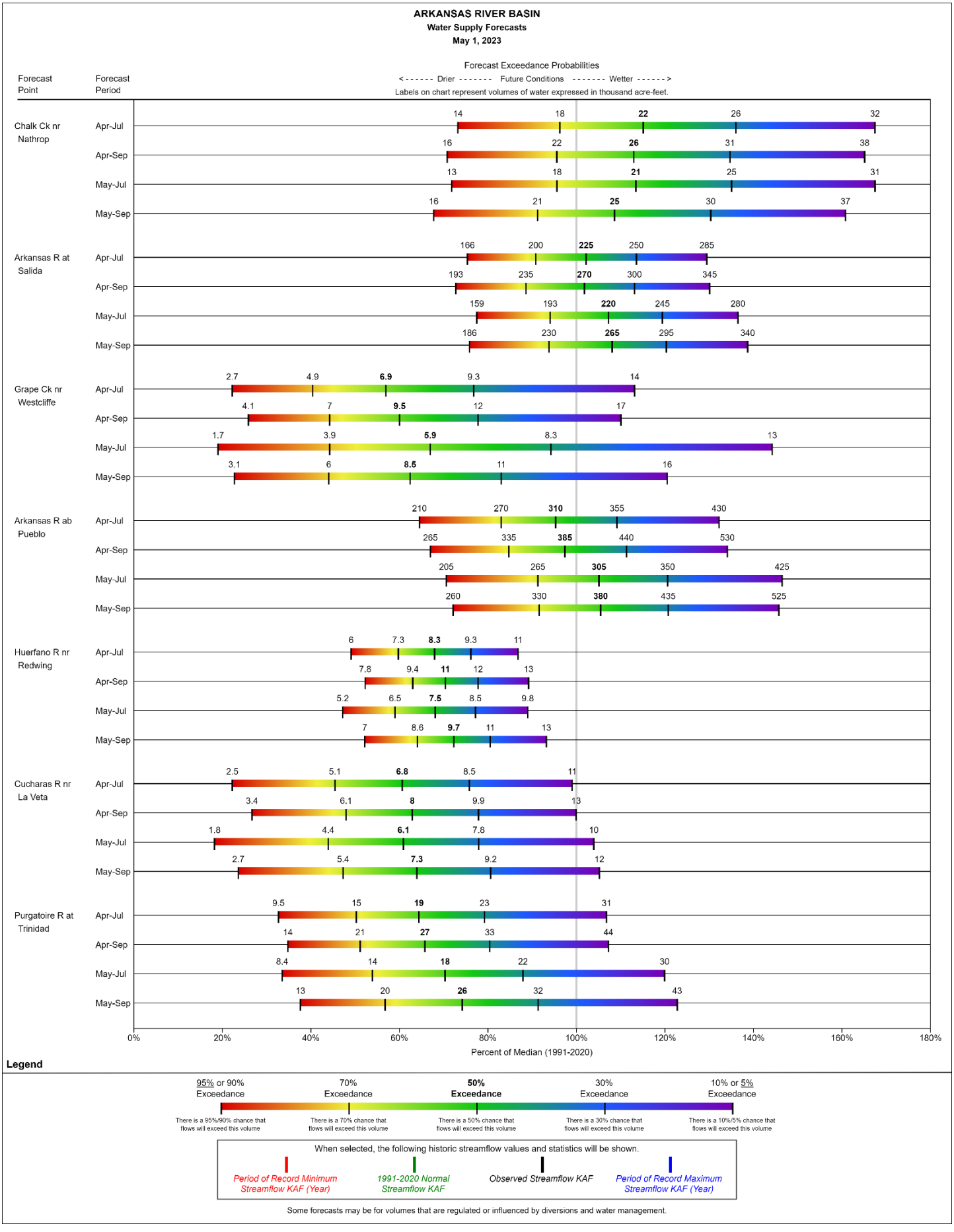
Arkansas Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
Cucharas & Huerfano	5.0	47.2	25.3
Upper Arkansas Headwaters	10.0	104.2	81.6
Lower Arkansas Headwaters	3.0	60.3	43.0
Purgatoire	3.0	39.8	37.0
Apishapa	2.0	32.8	65.5

Reservoir Storage End of April 2023

Arkansas Reservoir Data

	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Meredith Reservoir	8.98	24.8	31.5	28.5
Twin Lakes Reservoir	37.88	30.27	34.6	109.5
Clear Creek Reservoir	8.52	7.54	8.0	106.5
Lake Henry	4.27	6.82	7.3	58.5
Trinidad Lake	22.82	23.93	25.6	89.1
Pueblo Reservoir	213.82	217.22	219.2	97.5
Turquoise Lake	53.93	46.6	60.1	89.7



Legend

95% or 90% Exceedance — There is a 95%/90% chance that flows will exceed this volume

70% Exceedance — There is a 70% chance that flows will exceed this volume

50% Exceedance — There is a 50% chance that flows will exceed this volume

30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

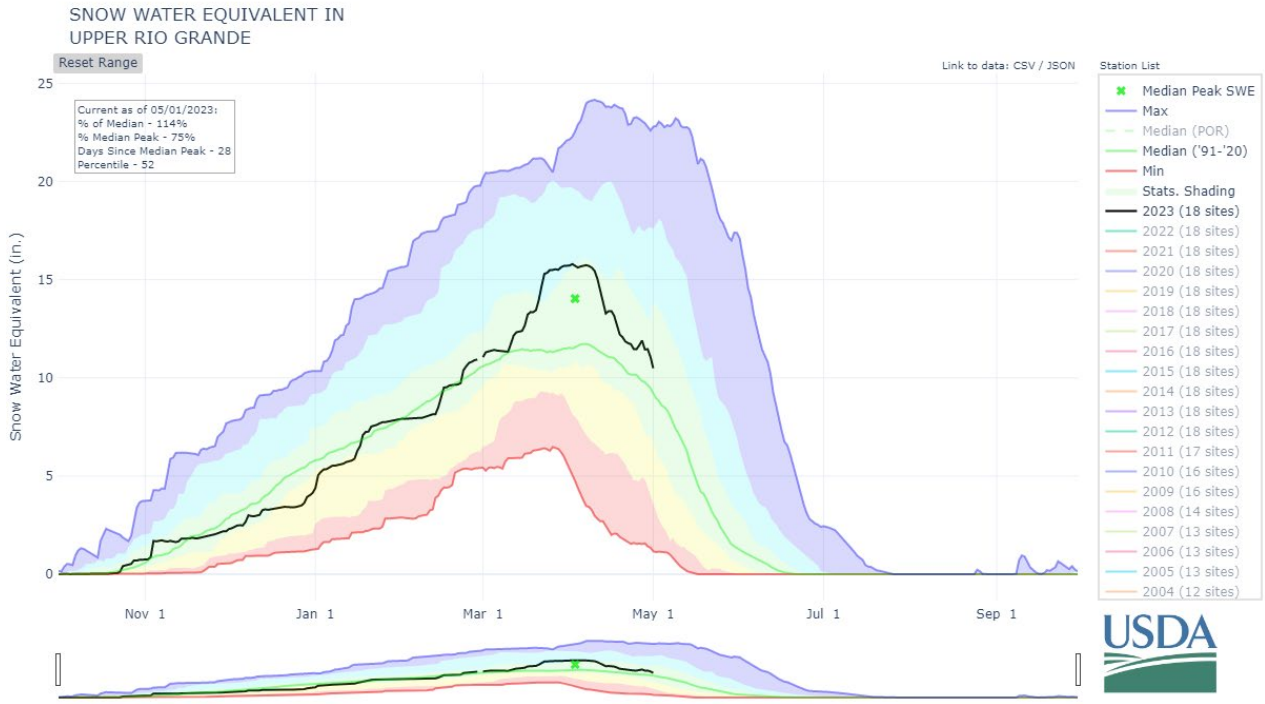
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

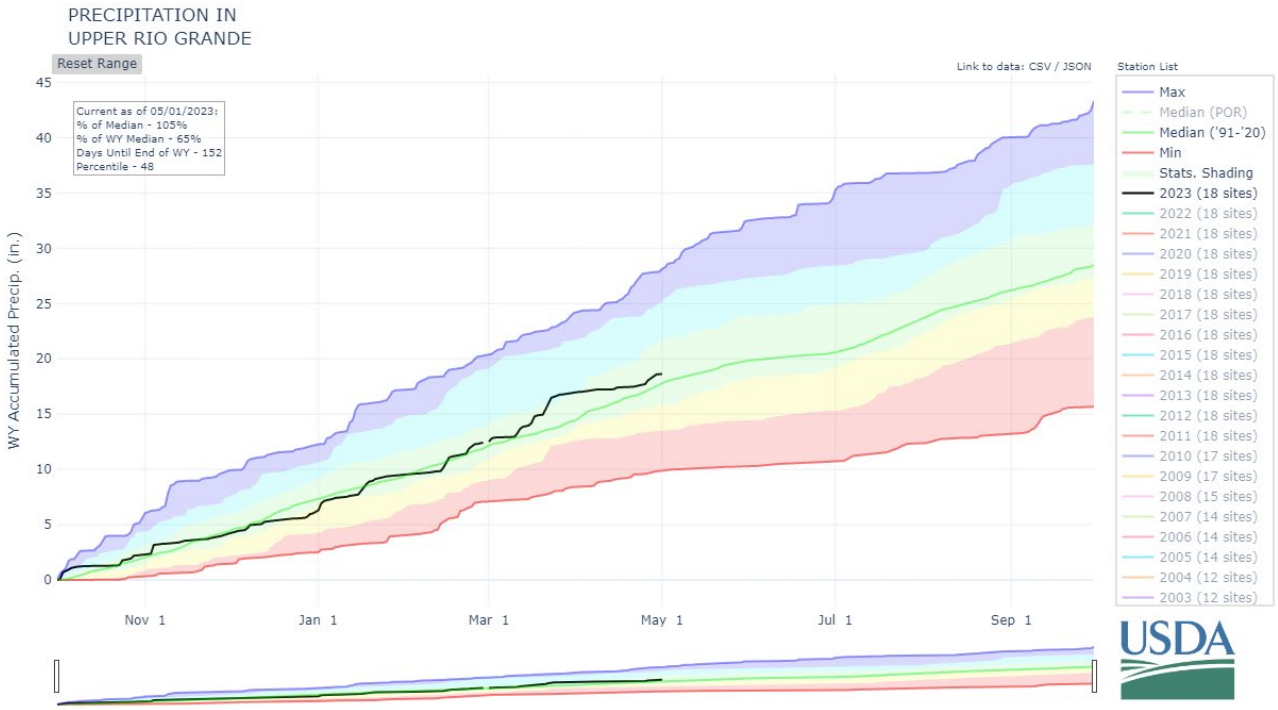
UPPER RIO GRANDE RIVER BASIN

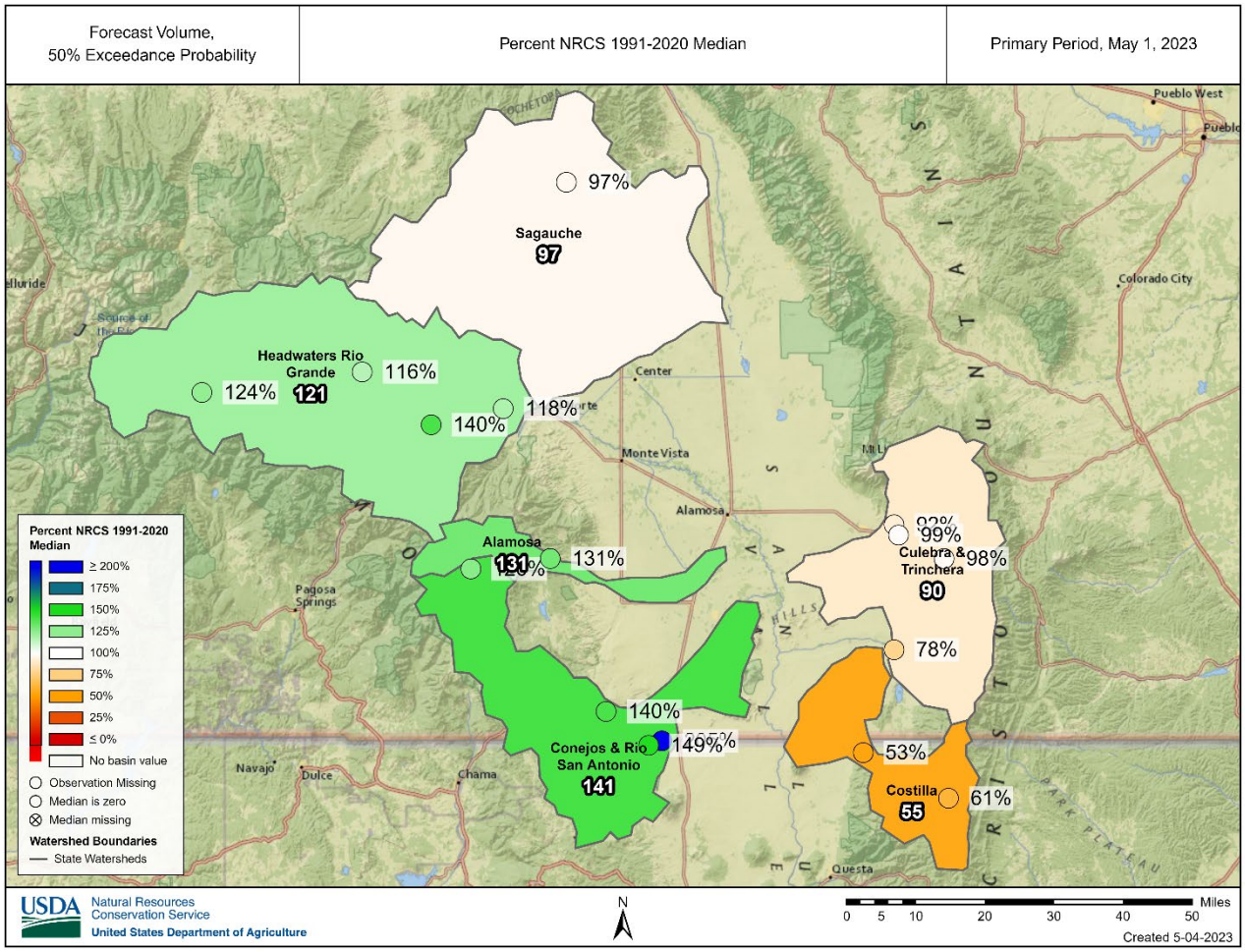
May 1st, 2023

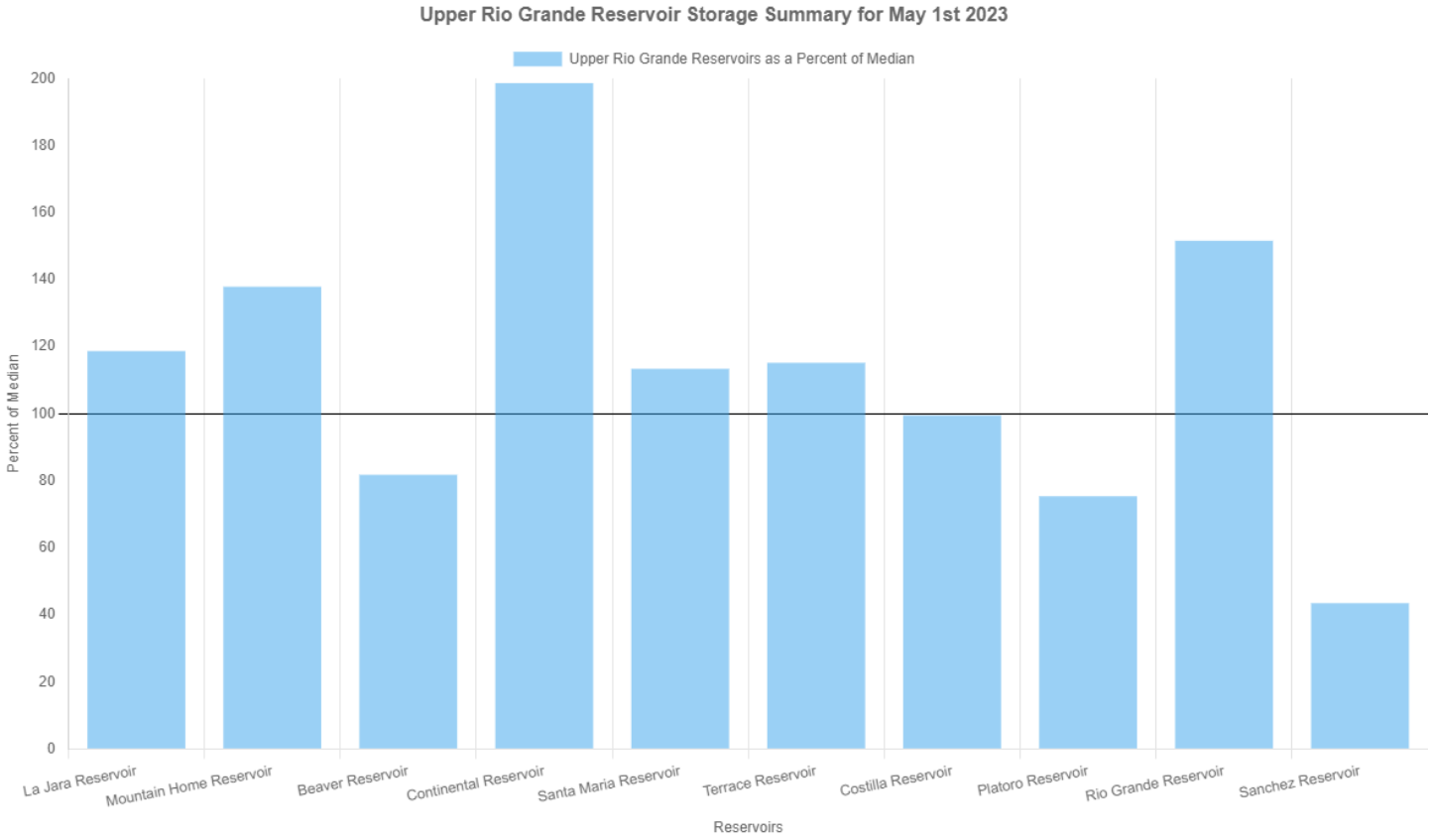
Snowpack in the Upper Rio Grande River basin is above normal at 121% of median. Precipitation for April was 58% of median which brings water year-to-date precipitation to 104% of median. Reservoir storage at the end of April was 106% of median compared to 93% last year. Current streamflow forecasts range from 53% of median at Costilla Creek near Costilla to 247% of median at San Antonio River at Ortiz.



*Snow water equivalent (SWE) values are calculated using daily SNOTEL data only for the above graph. In the paragraph SWE is calculated for the first of the month using both SNOTEL and Snow Course data.




Forecast Volume, 50% Exceedance Probability
Percent NRCS 1991-2020 Median
Primary Period, May 1, 2023
Sagauche
97
97%
Headwaters Rio Grande
121
124%
116%
140%
118%
Alamosa
131
131%
Conejos & Rio San Antonio
141
140%
149%
Culebra & Trinchera
90
99%
98%
78%
Costilla
55
53%
61%
Monte Vista
Center
Alamosa
Pagosa Springs
Navajo
Dulce
Chama
Questa
Colorado City
Pueblo West
Percent NRCS 1991-2020 Median
≥ 200%
175%
150%
125%
100%
75%
50%
25%
≤ 0%
No basin value
Observation Missing
Median is zero
Median missing
Watershed Boundaries
State Watersheds
USDA Natural Resources Conservation Service
United States Department of Agriculture
N
0 5 10 20 30 40 50 Miles
Created 5-04-2023


Upper Rio Grande Reservoir Storage Summary for May 1st 2023
Upper Rio Grande Reservoirs as a Percent of Median
Percent of Median
200
180
160
140
120
100
80
60
40
20
0
La Jara Reservoir
Mountain Home Reservoir
Beaver Reservoir
Continental Reservoir
Santa Maria Reservoir
Terrace Reservoir
Costilla Reservoir
Platoro Reservoir
Rio Grande Reservoir
Sanchez Reservoir
Reservoirs

Watershed Snowpack Analysis May 1st, 2023

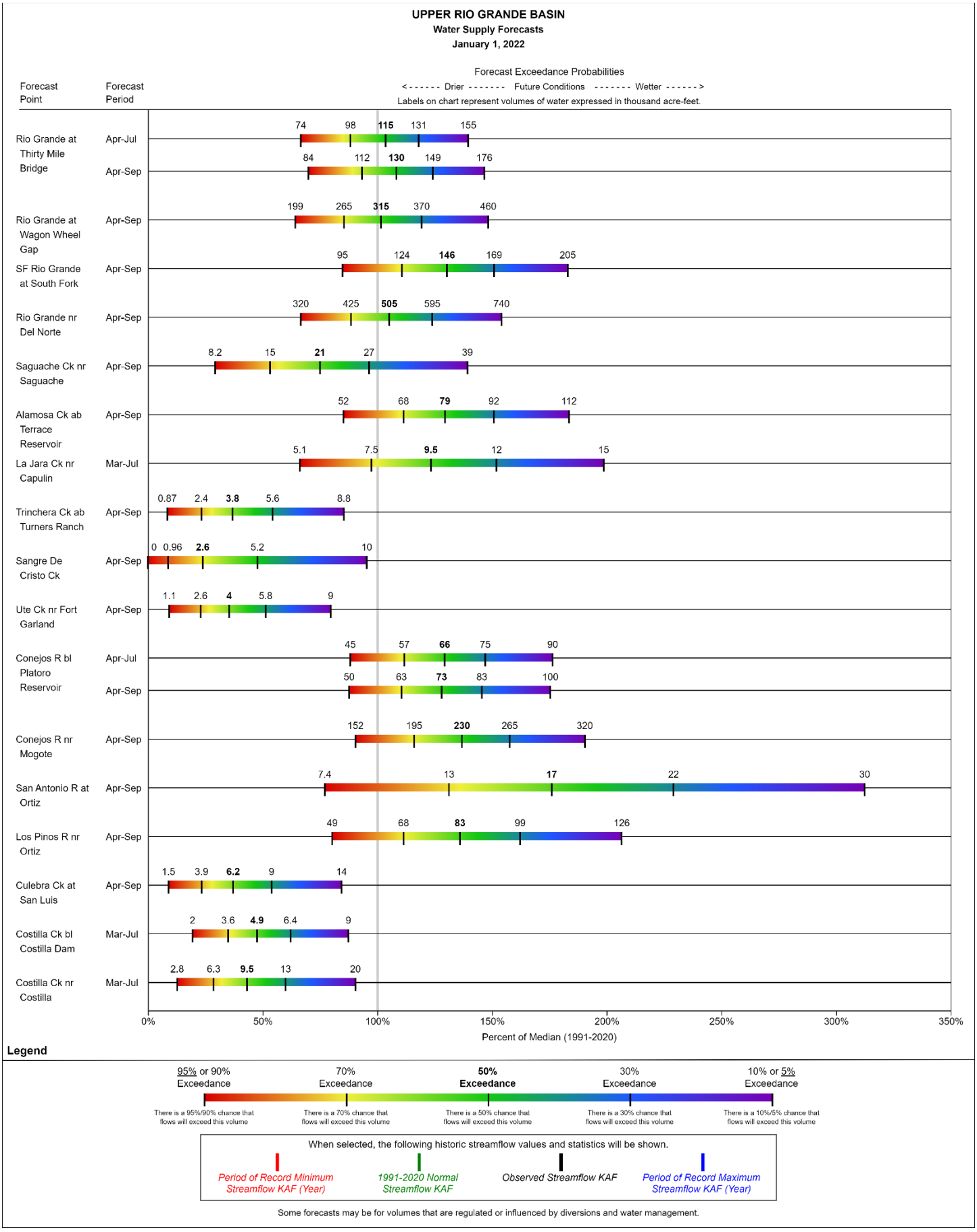
Upper Rio Grande Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
Sagauche	4.0	105.1	2.9
Costilla	2.0	50.0	0.0
Headwaters Rio Grande	8.0	121.5	50.9
Northern San Luis Valley	2.0	31.6	10.5
Conejos & Rio San Antonio	5.0	162.2	57.0
Culebra & Trinchera	4.0	84.6	1.0
Alamosa	4.0	133.6	30.7

Reservoir Storage End of April 2023

Upper Rio Grande Reservoir Data

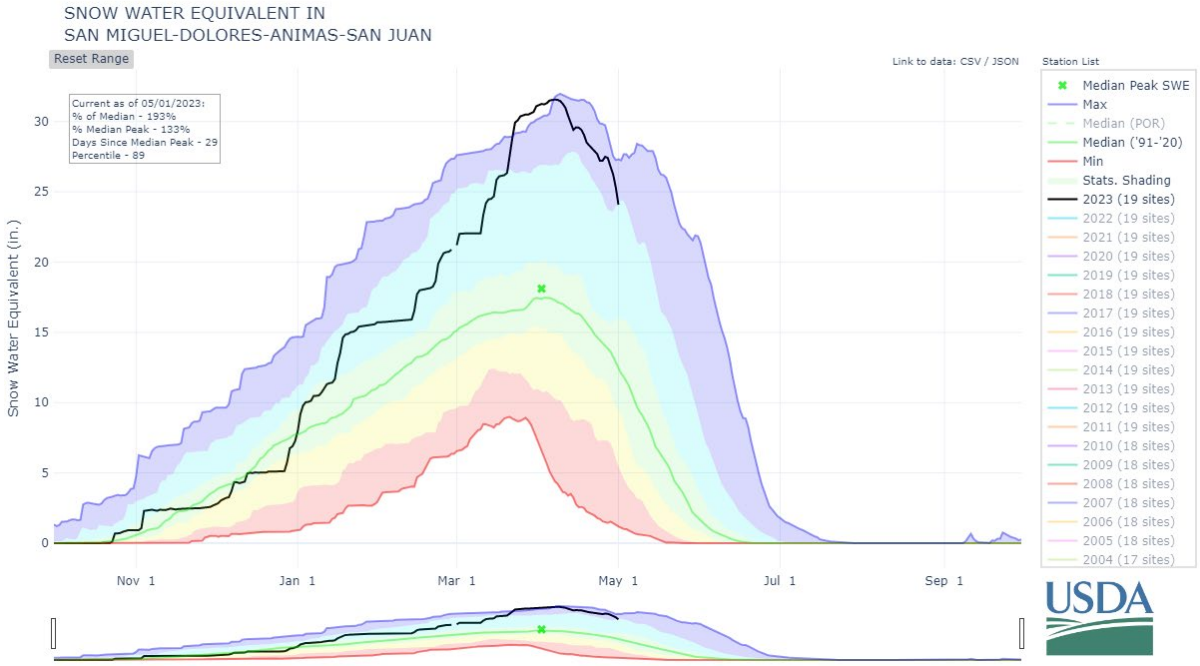
	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
La Jara Reservoir	2.73	1.69	2.3	118.7
Costilla Reservoir	8.26	5.24	8.3	99.5
Platoro Reservoir	13.8	14.42	18.3	75.4
Beaver Reservoir	3.6	3.86	4.4	81.8
Rio Grande Reservoir	29.57	23.81	19.5	151.6
Terrace Reservoir	9.33	7.41	8.1	115.2
Mountain Home Reservoir	4.96	4.71	3.6	137.8
Continental Reservoir	13.9	12.12	7.0	198.6
Sanchez Reservoir	8.95	6.65	20.6	43.4
Santa Maria Reservoir	8.5	11.56	7.5	113.3


UPPER RIO GRANDE BASIN
Water Supply Forecasts
January 1, 2022
Forecast Exceedance Probabilities
< ------ Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
Rio Grande at Thirty Mile Bridge Apr-Jul 74 98 115 131 155
Apr-Sep 84 112 130 149 176
Rio Grande at Wagon Wheel Gap Apr-Sep 199 265 315 370 460
SF Rio Grande at South Fork Apr-Sep 95 124 146 169 205
Rio Grande nr Del Norte Apr-Sep 320 425 505 595 740
Saguache Ck nr Saguache Apr-Sep 8.2 15 21 27 39
Alamosa Ck ab Terrace Reservoir Apr-Sep 52 68 79 92 112
La Jara Ck nr Capulin Mar-Jul 5.1 7.5 9.5 12 15
Trinchera Ck ab Turners Ranch Apr-Sep 0.87 2.4 3.8 5.6 8.8
Sangre De Cristo Ck Apr-Sep 0 0.96 2.6 5.2 10
Ute Ck nr Fort Garland Apr-Sep 1.1 2.6 4 5.8 9
Conejos R bl Platoro Reservoir Apr-Jul 45 57 66 75 90
Apr-Sep 50 63 73 83 100
Conejos R nr Mogote Apr-Sep 152 195 230 265 320
San Antonio R at Ortiz Apr-Sep 7.4 13 17 22 30
Los Pinos R nr Ortiz Apr-Sep 49 68 83 99 126
Culebra Ck at San Luis Apr-Sep 1.5 3.9 6.2 9 14
Costilla Ck bl Costilla Dam Mar-Jul 2 3.6 4.9 6.4 9
Costilla Ck nr Costilla Mar-Jul 2.8 6.3 9.5 13 20
0% 50% 100% 150% 200% 250% 300% 350%
Percent of Median (1991-2020)
Legend
95% or 90% Exceedance
There is a 95%/90% chance that flows will exceed this volume
70% Exceedance
There is a 70% chance that flows will exceed this volume
50% Exceedance
There is a 50% chance that flows will exceed this volume
30% Exceedance
There is a 30% chance that flows will exceed this volume
10% or 5% Exceedance
There is a 10%/5% chance that flows will exceed this volume
When selected, the following historic streamflow values and statistics will be shown.
Period of Record Minimum Streamflow KAF (Year)
1991-2020 Normal Streamflow KAF
Observed Streamflow KAF
Period of Record Maximum Streamflow KAF (Year)
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

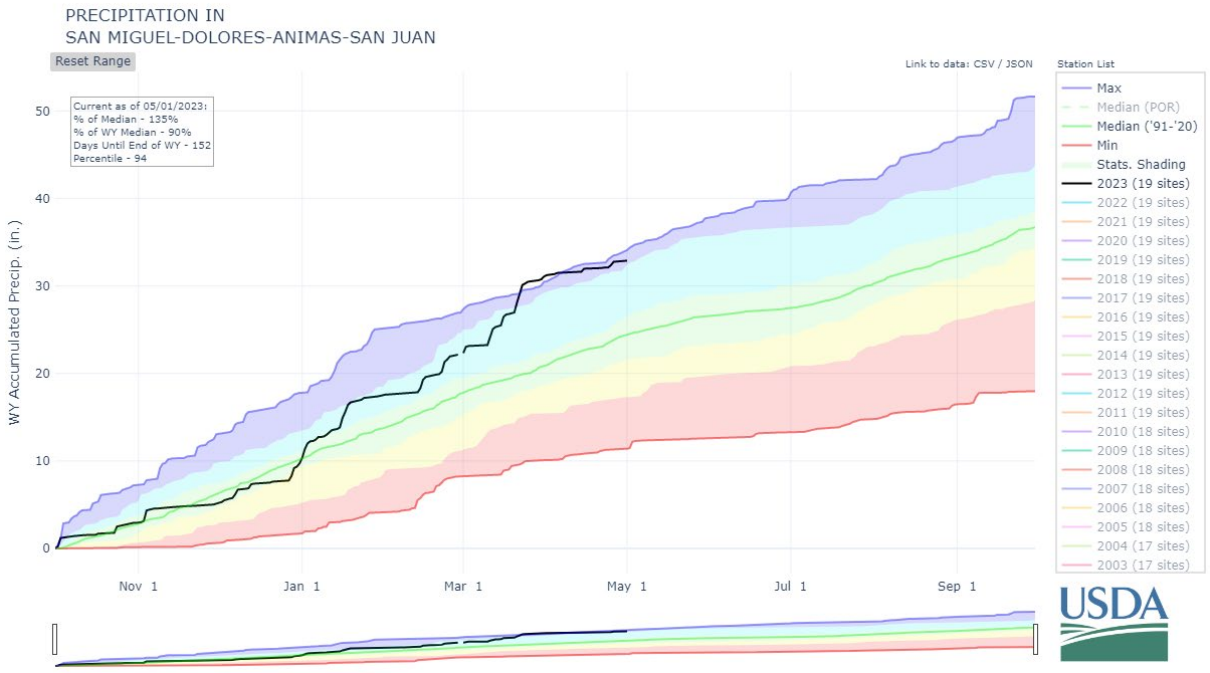
SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN COMBINED RIVER BASIN

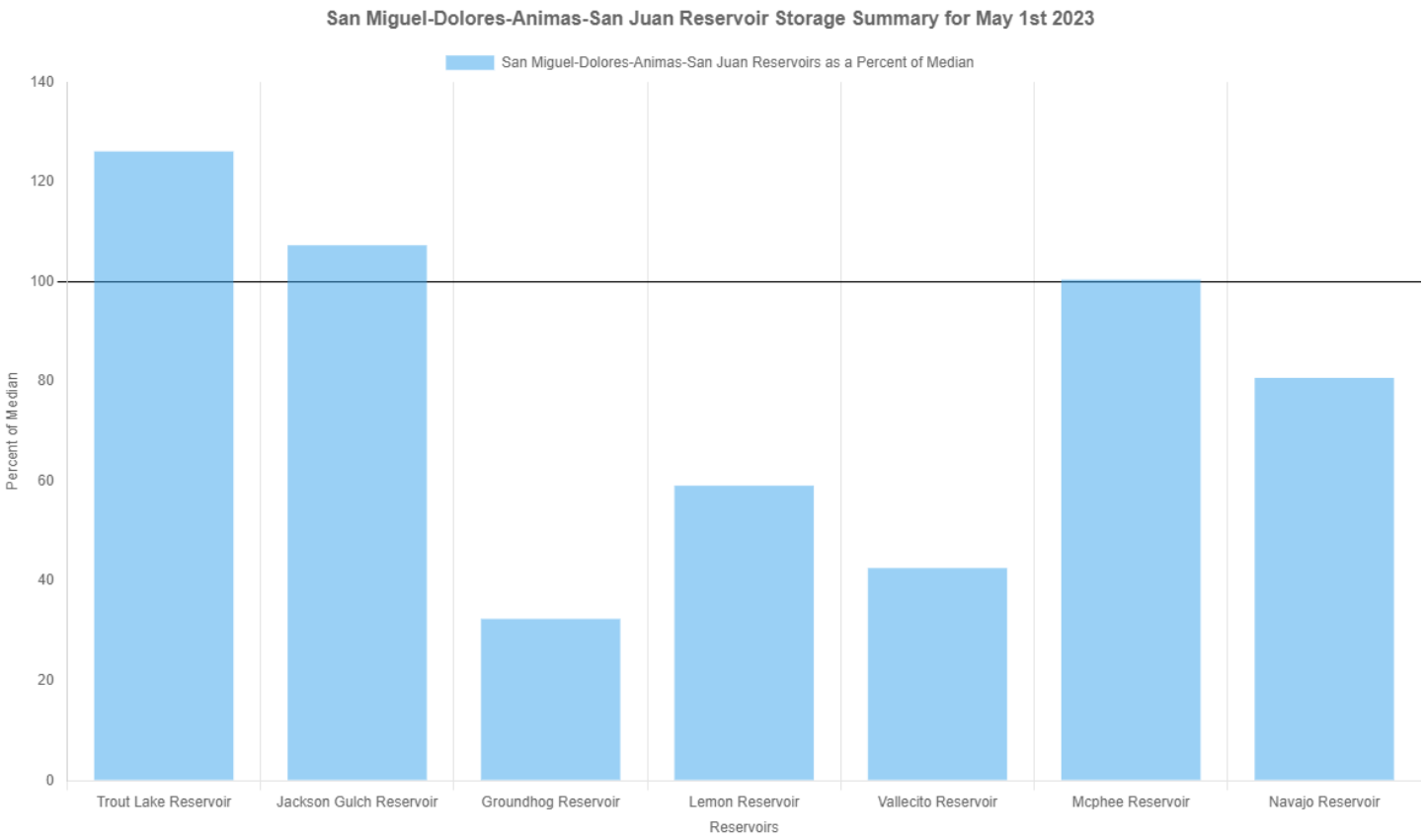
May 1st, 2023

Snowpack in the combined southwest river basins is above normal at 193% of median. Precipitation for April was 62% of median which brings water year-to-date precipitation to 135% of median. Reservoir storage at the end of April was 82% of median compared to 66% last year. Current streamflow forecasts range from 136% of median at San Juan River near Carracas to 257% of median at Mancos River near Mancos.



*Snow water equivalent (SWE) values are calculated using daily SNOTEL data only for the above graph. In the paragraph SWE is calculated for the first of the month using both SNOTEL and Snow Course data.





Watershed Snowpack Analysis May 1st, 2023

San Miguel-Dolores-Animas-San Juan Sub-Basin Snow Data

	# of Sites	% Median	Last Year % Median
Animas	9.0	157.0	54.4
Upper San Juan	7.0	167.2	49.1
San Miguel	6.0	231.4	55.5
Dolores	4.0	259.4	37.7
Mancos-La Plata	3.0	214.9	72.1

Reservoir Storage End of April 2023

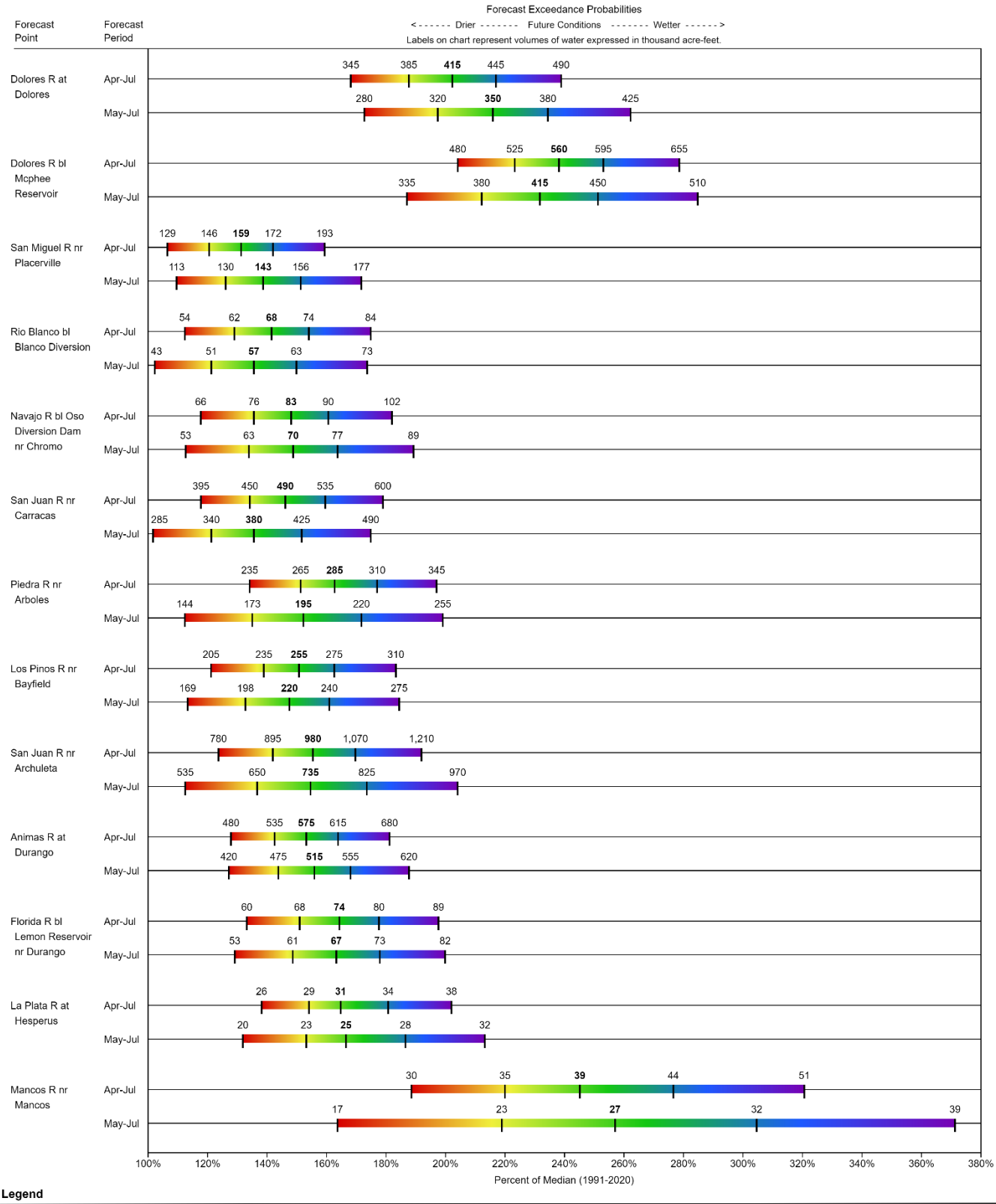
San Miguel-Dolores-Animas-San Juan Reservoir Data

	Current Storage (KAF)	LY Storage (KAF)	Median (KAF)	Percent of Median
Navajo Reservoir	1123.74	898.25	1393.0	80.7
Jackson Gulch Reservoir	8.15	7.26	7.6	107.2
Vallecito Reservoir	36.48	73.04	85.7	42.6
Trout Lake Reservoir	1.93	2.27	1.53	126.1
Mcphee Reservoir	325.73	213.35	324.3	100.4
Groundhog Reservoir	5.31	8.28	16.4	32.4
Lemon Reservoir	13.23	19.03	22.4	59.1

SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS

Water Supply Forecasts

May 1, 2023



Legend

95% or 90% Exceedance — There is a 95%/90% chance that flows will exceed this volume

70% Exceedance — There is a 70% chance that flows will exceed this volume

50% Exceedance — There is a 50% chance that flows will exceed this volume

30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

Period of Record Maximum Streamflow KAF (Year)

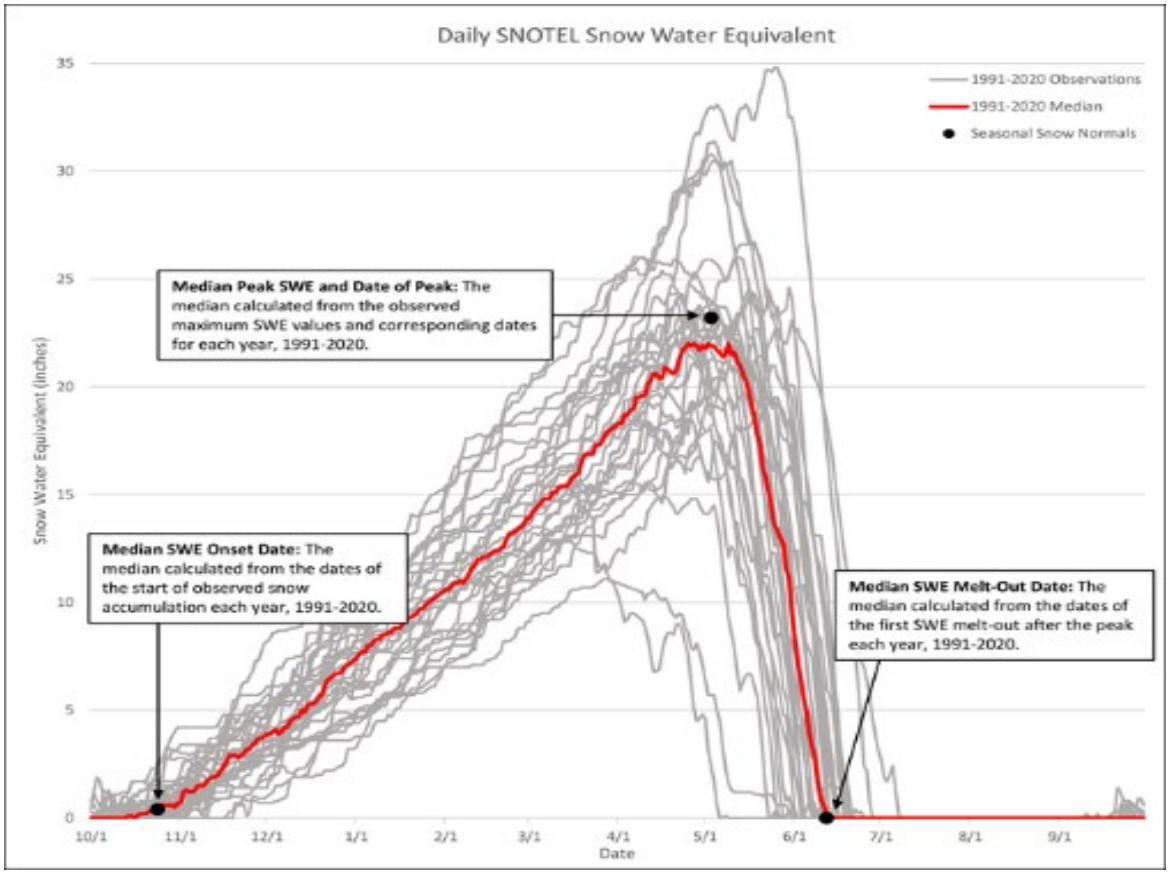
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

New 1991-2020 Statistical Normals

The NRCS Snow Survey and Water Supply Forecasting (SSWSF) Program recently published new statistical normals (medians or averages) to describe the central tendency of a data record over a 30-year period. Data normals are key in helping water users compare current conditions to past conditions using the metric "% of normal." Every 10 years, the SSWSF Program updates the 30-year normals reference period to stay consistent with World Meteorological Organization standards that account for changing climatic conditions over time. As such, this year the SSWSF Program transitioned from using 1981-2010 data normals to using 1991-2020 data normals.

For the 1991-2020 reference period, the median is the official NRCS normal when conveying information about current snowpack, precipitation, and water supply conditions. The median was previously used as the official 1981-2010 normal for SWE and some streamflow forecast points, but the average was used for other data types. Setting the official normal to the median provides consistency across data types and stations. Viewing the 30-year average December be preferable over the median in some instances, therefore, both the average and the median are available in most NRCS reports and products. See Median vs. Average for more information about the median.

A new suite of statistics for automated snow monitoring stations are available to provide information about normal seasonal snowpack characteristics. These new seasonal statistics include medians and averages for the SWE onset date and melt-out date, as well as the median and average maximum seasonal SWE value (Peak SWE) and date of Peak SWE. More detailed information on the updated normals can be found on the Water and Climate Center's 30-year normals page.



How to Read Snowpack Graphs

The graphs show snow water equivalent (SWE) (in inches), using daily SNOTEL data. 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.

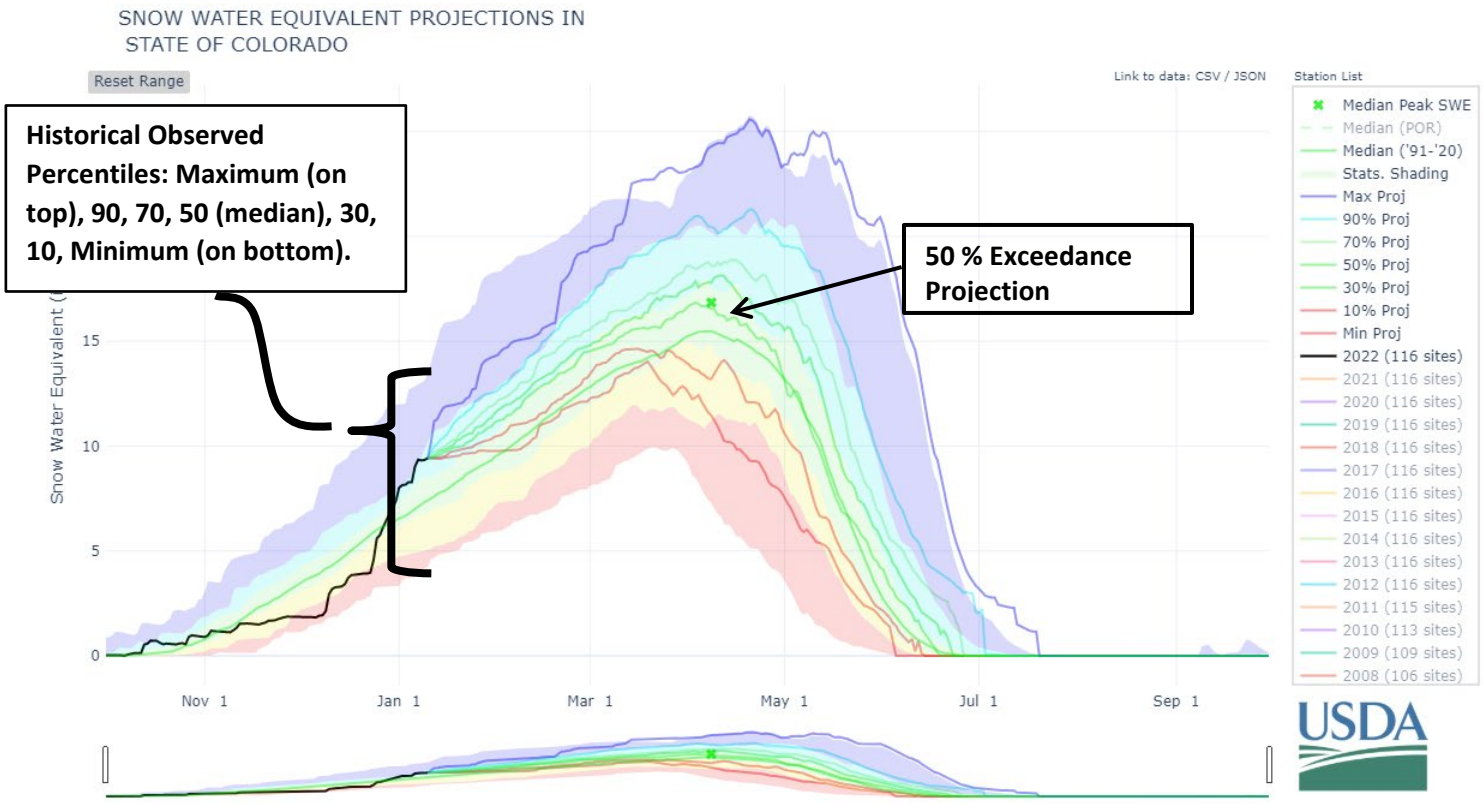
Current water year is represented by the heavy red line terminating on the last day the graphic was updated.

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.

50 % Exceedance Projection: The most probabilistic snowpack projection, based on the median snowpack is projected forward from the end of the current period to the end of the current water year.

For more detailed information on these graphs visit:

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_062291.pdf



How Forecasts Are Made

For more water supply and resource management information, contact:

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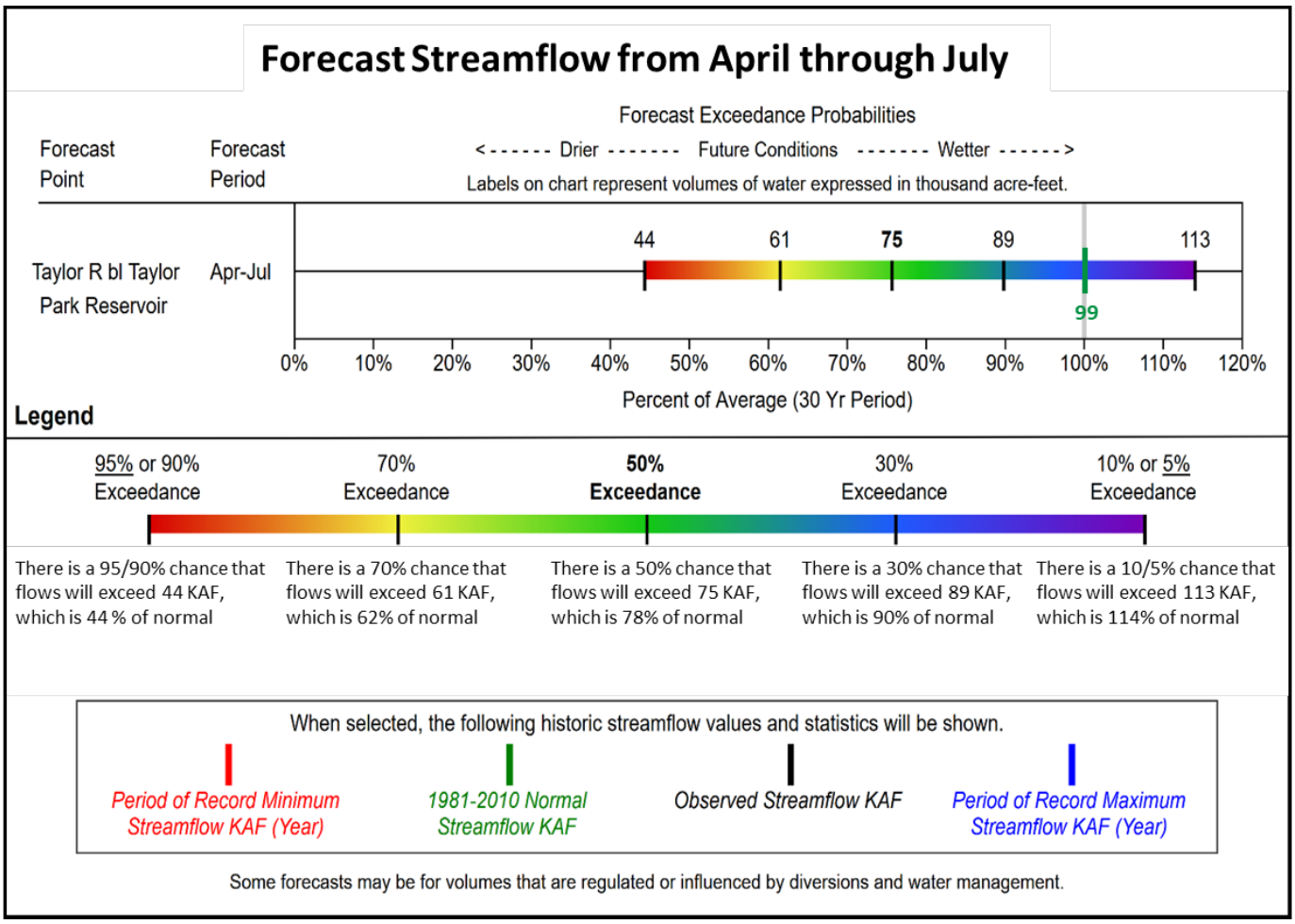
Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual 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 December 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 December 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.

Interpreting the Forecast Graphics

These graphics provide a new way to visualize the range of streamflows represented by the forecast exceedance probabilities for each forecast period. The colors in the bar for each forecast point indicate the exceedance probability of the forecasts and the vertical lines on the bar signify the five published forecast exceedance probabilities. The numbers displayed above the color scale represent the actual forecasted streamflow volume (in KAF) for the given exceedance probability. The horizontal axis provides the percent of median represented by each forecast and the gray line centered above 100% represents the 1981-2010 historical median streamflow. The position of the gray line relative to the color scale provides a benchmark for considering future streamflows. If the majority of the forecast range is to the right of the gray line, there is a higher likelihood of above median streamflow volumes during the provided forecast period. Conversely, if the majority of the color bar is to the left of the median mark, below median volumes are more likely. The horizontal span of the forecasts offers an indication of the uncertainty in a given forecast: when the bar spans a large horizontal range, the forecast skill is low and uncertainty is high; when the bar is narrow in width, the forecast skill is higher and uncertainty lower.



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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, February through June. The information December be obtained from the Natural Resources Conservation Service web page at
http://www.wcc.nrcs.usda.gov/wsf/westwide.html

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