USDA United States Department of Agriculture
Natural Resources Conservation Service

# Colorado
# Water Supply Outlook Report
## May 1, 2020

**When issues come up at SNOTEL sites, access can be tricky in the winter. In the photo above, Mike Ardison is slowly making his way up to do repairs on the Ivanhoe SNOTEL site in Pitkin county. At the end of April, Ivanhoe had 20.1 inches of snow water equivalent which is 137 percent of the median for this date.**

**Photo By: Zack Wilson Date: April 14th, 2020**

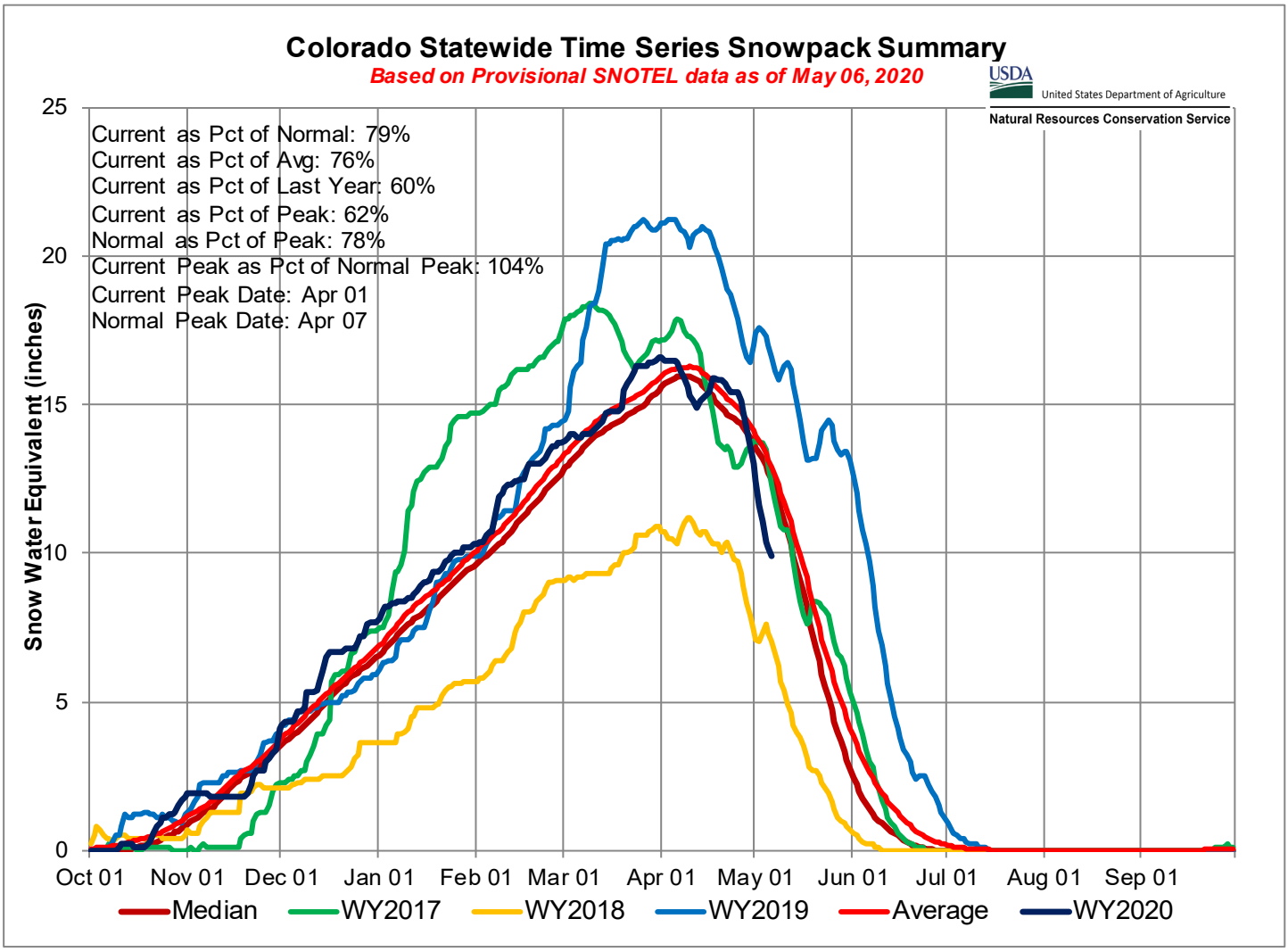
**NOTICE:** Due to the COVID-19 outbreak many end-of-month snow surveys were not conducted and are not included as part of the May 1st water supply report.

**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

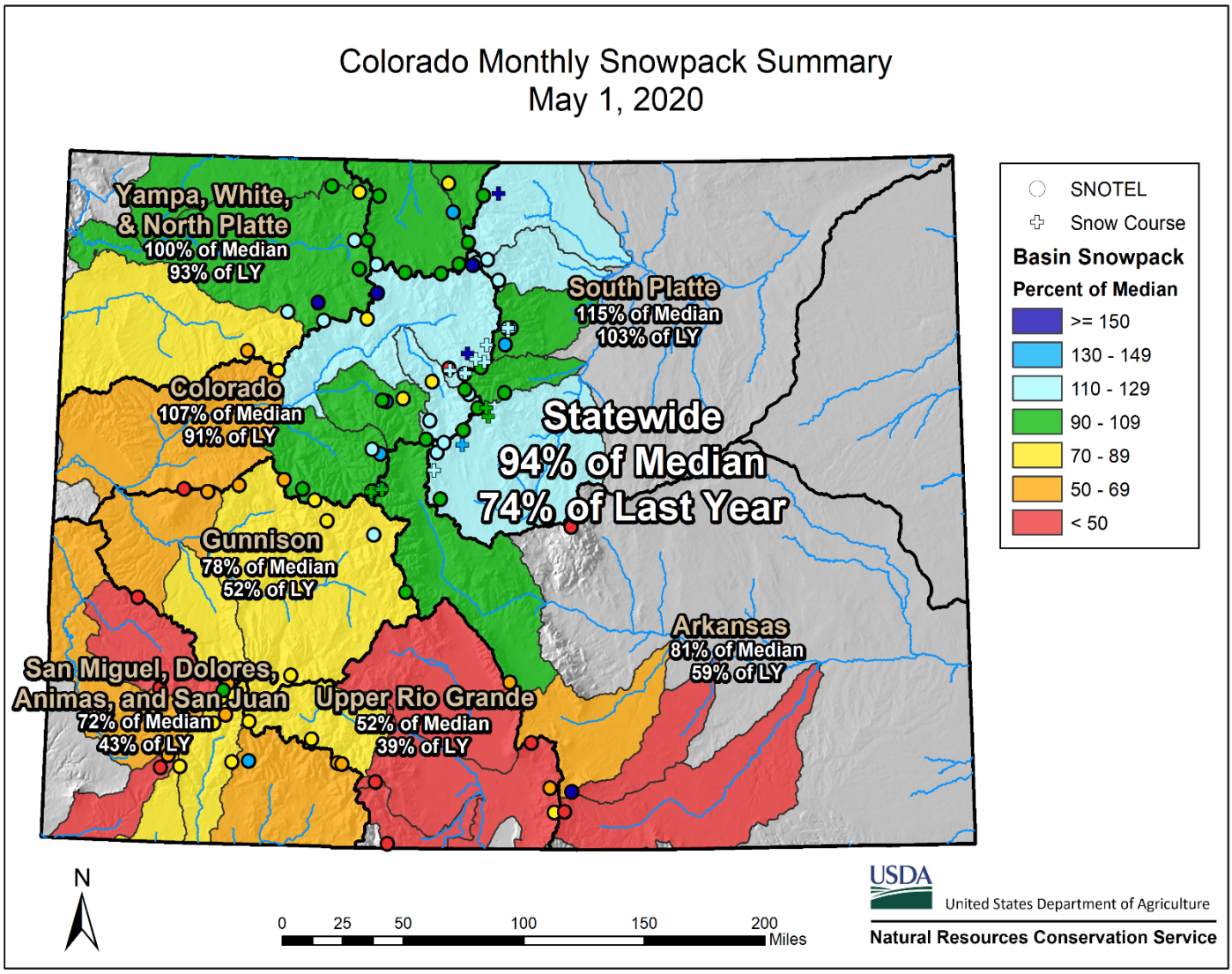
# Colorado Statewide Water Supply Conditions

## Summary



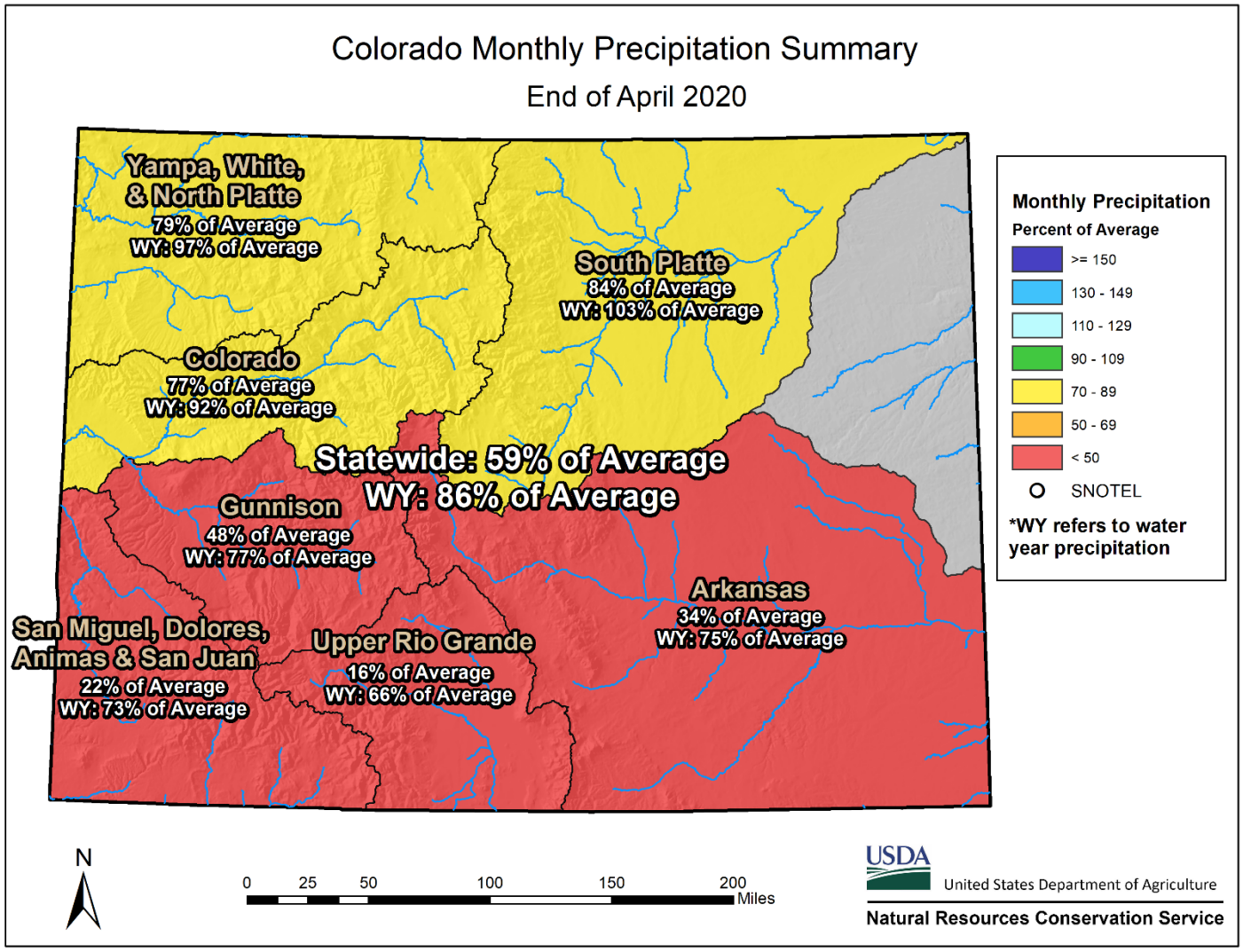

The month of April brought widely varying precipitation patterns to Colorado but all major basins received below average monthly precipitation. This was particularly exaggerated in southern Colorado where the majority of SNOTEL sites in the San Juan and Sangre de Cristo mountain ranges received the lowest or second lowest April precipitation on record. Statewide snowpack reached its peak on April 4th at 104 percent of normal. After the initial peak snowpack conditions varied widely across the state with snowmelt progressing quickly in dry southern Colorado but some parts of northern Colorado, such as the South Platte basin, received substantial snow accumulations in mid-April leading to a second higher peak. These differences in snowpack and precipitation patterns further amplified differences in streamflow forecasts between northern and southern Colorado. On average streamflow forecasts dropped between 10-15 percent since April 1st in the Gunnison, Rio Grande, and combined San Miguel, Dolores, Animas, and San Juan basins. The combination of an extremely dry late summer and fall and the recent precipitation deficits have led streamflow forecasts to be considerably lower than would commonly be assumed based on the peak snowpack accumulation which was near normal in these basins. This is an important consideration for water managers who have been monitoring the snowpack alone. The situation is considerably different in the northern half of Colorado where streamflow forecasts are much closer to average values and showed little change over the last month. No individual basins showed major change in reservoir storage over the last month and statewide storage is currently 104 percent of average.

## Snowpack



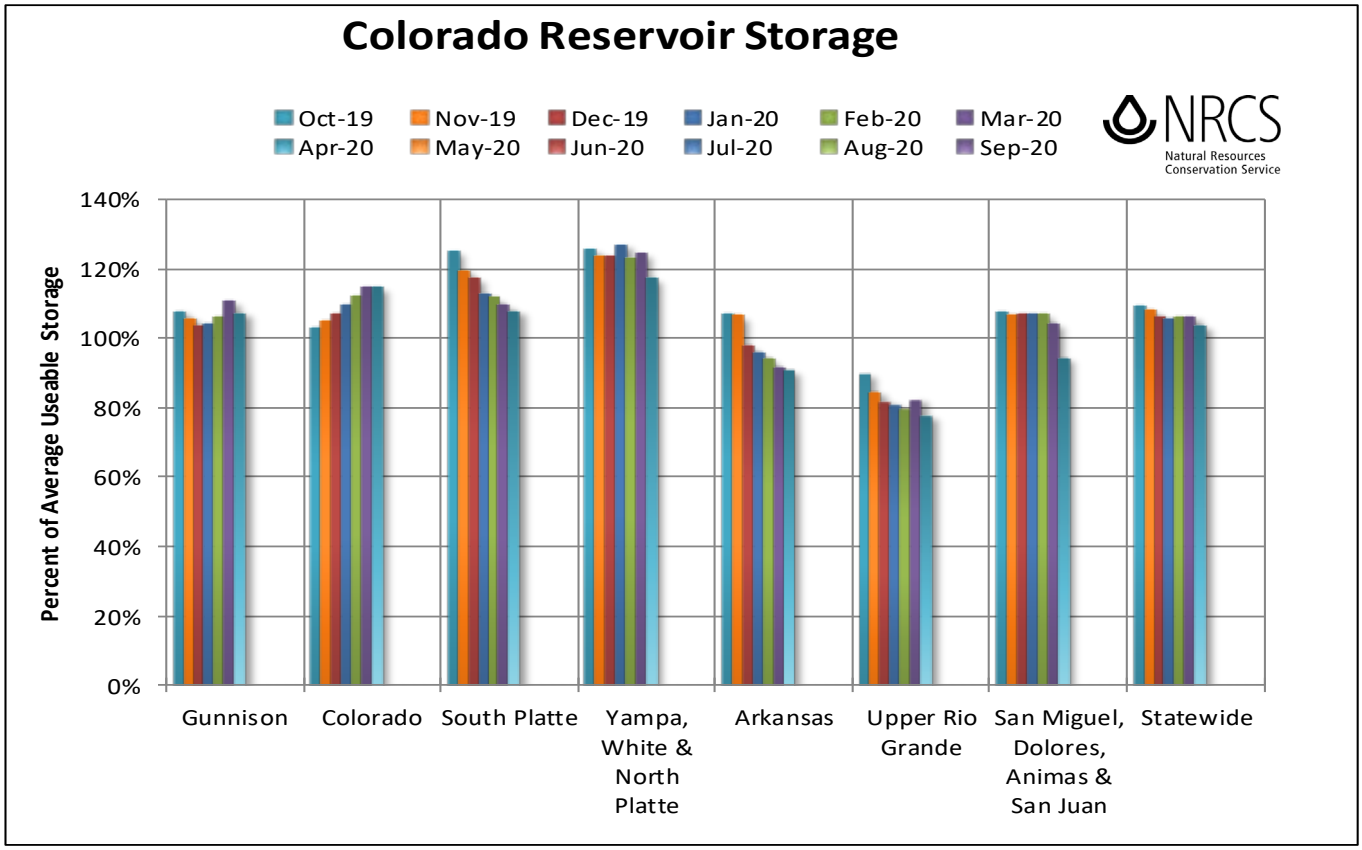

With higher mountain temperatures and below-average mountain precipitation, Colorado ended April with below-normal snowpack at 94 percent of normal. The bulk of the precipitation that did occur was received as snow in the northern mountains and the Front Range. To this effect, both the South Platte and the combined Yampa, White and North Platte river basin maintained average to above-average mountain snowpack of 115 and 100 percent respectively. A lack of substantial storm systems from the southwest contributed to a dwindling snowpack in basins further south. The Gunnison, Upper Rio Grande, and the combined San Miguel, Dolores, Animas, and San Juan basins all lost substantial snowpack during April. These basins ended the month with 78, 52, and 72 percent of normal respectively. As of May 1st, 11 SNOTEL sites in Gunnison, Upper Rio Grande, and the combined San Miguel, Dolores, Animas, and San Juan basins have completely melted out. Additionally, 91 percent of all measured sites in these basins registered below normal snowpack to end April. The Arkansas basin was a mixed bag, ending the month with 81 percent of normal snowpack. The Upper Arkansas sub-basin maintained an above-average snowpack of 109 percent. In contrast, the southern sub-basins Apishapa, Purgatoire, and Huerfano ended April with large deficits in snowpack of 10, 15 and 53 percent of normal. While still possible for late-season storms, drought conditions are likely to intensify for much of southern Colorado.

## Precipitation



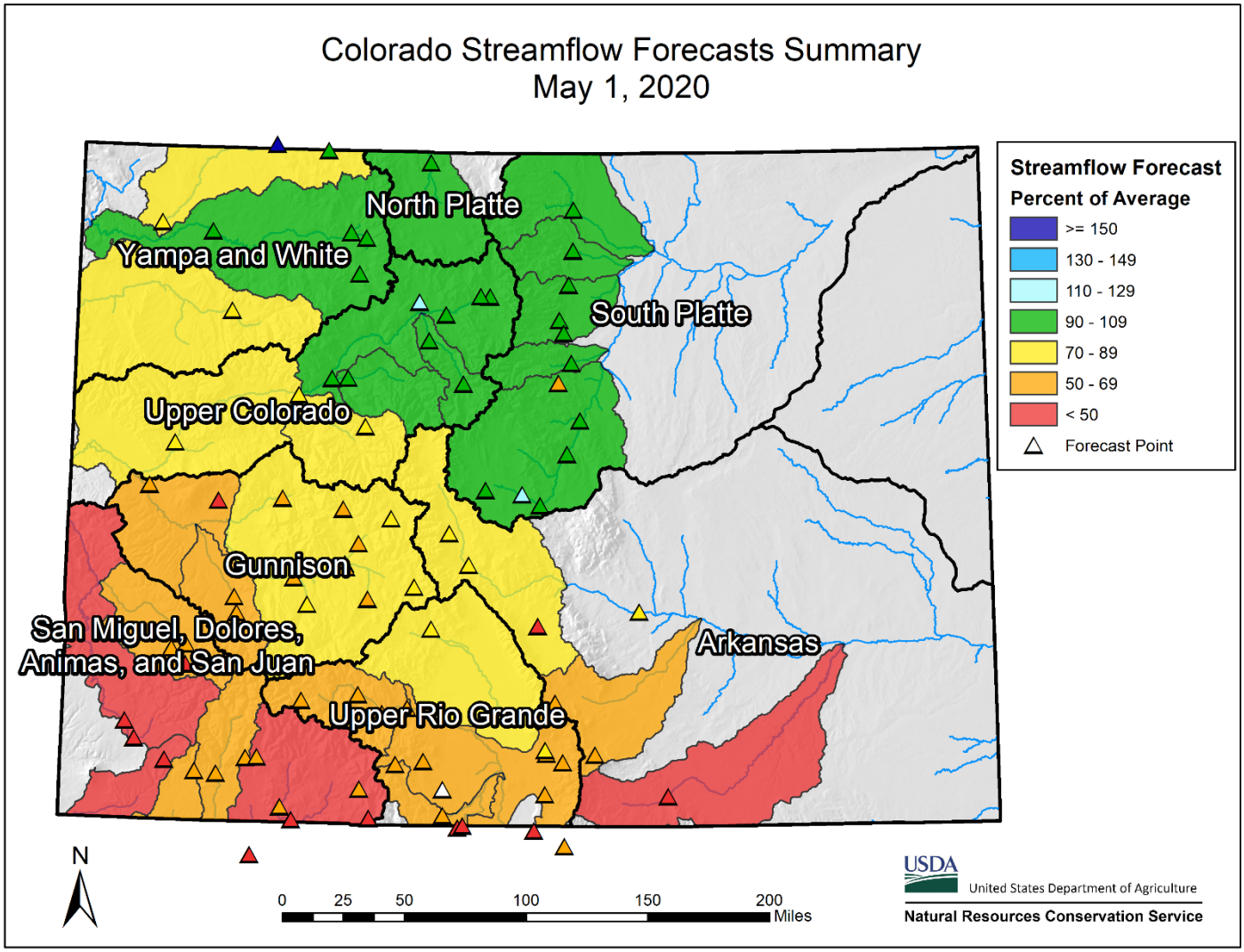

Precipitation totals for the month of April were below average across all of Colorado's mountains, with a third of all SNOTEL sites across the state measuring the lowest or second lowest precipitation levels on record for April. These record-dry conditions were most prevalent in the southern half of the state where drought conditions have deteriorated since last month. The Upper Rio Grande basin was extremely warm and dry last month, with 14 of the 15 SNOTELs in that basin receiving record low precipitation. The Upper Rio Grande basin received 16 percent of average precipitation which brings water year-to-date precipitation to 66 percent of average. Further to the west, the combined San Miguel, Dolores, Animas, and San Juan basins also experienced warm, dry conditions. The Columbus Basin SNOTEL on average receives 4.1 inches of precipitation in April but received a meager 0.3 inches of precipitation this April, another record low. These combined Southwest river basins received 22 percent of average precipitation bringing water year-to-date precipitation to 73 percent of average. To the east, the Arkansas basin received 34 percent of average precipitation bringing water year-to-date precipitation to 75 percent of average. The northern and parts of the central mountains received the highest amounts of precipitation in April but were still below average. The South Platte river basin received 84 percent of average precipitation bringing water year-to-date precipitation to 103 percent of average. The combined Yampa, White, and North Platte basins received 79 percent of average precipitation bringing water year-to-date precipitation to 97 percent of average. The Upper Colorado basin received 77 percent of average precipitation bringing water year-to-date precipitation to 92 percent of average. Finally, the Gunnison river basin received 48 percent of average precipitation which brings water year-to-date precipitation to 77 percent of average.

## Reservoir Storage




Reservoir storage across the state has stayed relatively close to average throughout the water year. This is largely related to the large snowmelt runoff season that occurred last year, which brought most reservoirs to above average levels going into the start of this water year. Drought conditions have been most severe in the southern portions of the state compared to the northern portions throughout the water year. This is reflected in current reservoir levels, where most of the reservoirs in the southern basins are below average and most of the reservoirs in the northern basins are above average. Most major river basins across the state saw slight declines in reservoir storage with respect to average compared to the beginning of April. This was most noticeable in the combined San Miguel, Dolores, Animas, and San Juan River basins and the Upper Rio Grande river basin, where warm temperatures and minimal precipitation occurred during April. The combined San Miguel, Dolores, Animas, and San Juan River basins are currently at 95 percent of average, down from 104 percent of average at the beginning of April. The Rio Grande River basin is currently at 78 percent of average, down from 83 percent of average at the beginning of April. The Arkansas River basin stayed relatively unchanged compared to the beginning of April and reservoir storage in that basin is currently 91 percent of average. To the north, where drought conditions have been less severe, the combined Yampa, White, and North Platte River basins are currently at 118 percent of average, down from 125 percent of average at the beginning of April. The Upper Colorado and the South Platte River basins are currently at 115 and 108 percent of average, respectively. The Gunnison River basin is currently at 107 percent of average, slightly down from 111 percent of average at the beginning of April. Overall, statewide reservoir storage is currently 104 percent of average, and with a normal to below-normal snowpack for most of the state, summer precipitation events will be crucial for increasing reservoirs across the state.

## Streamflow

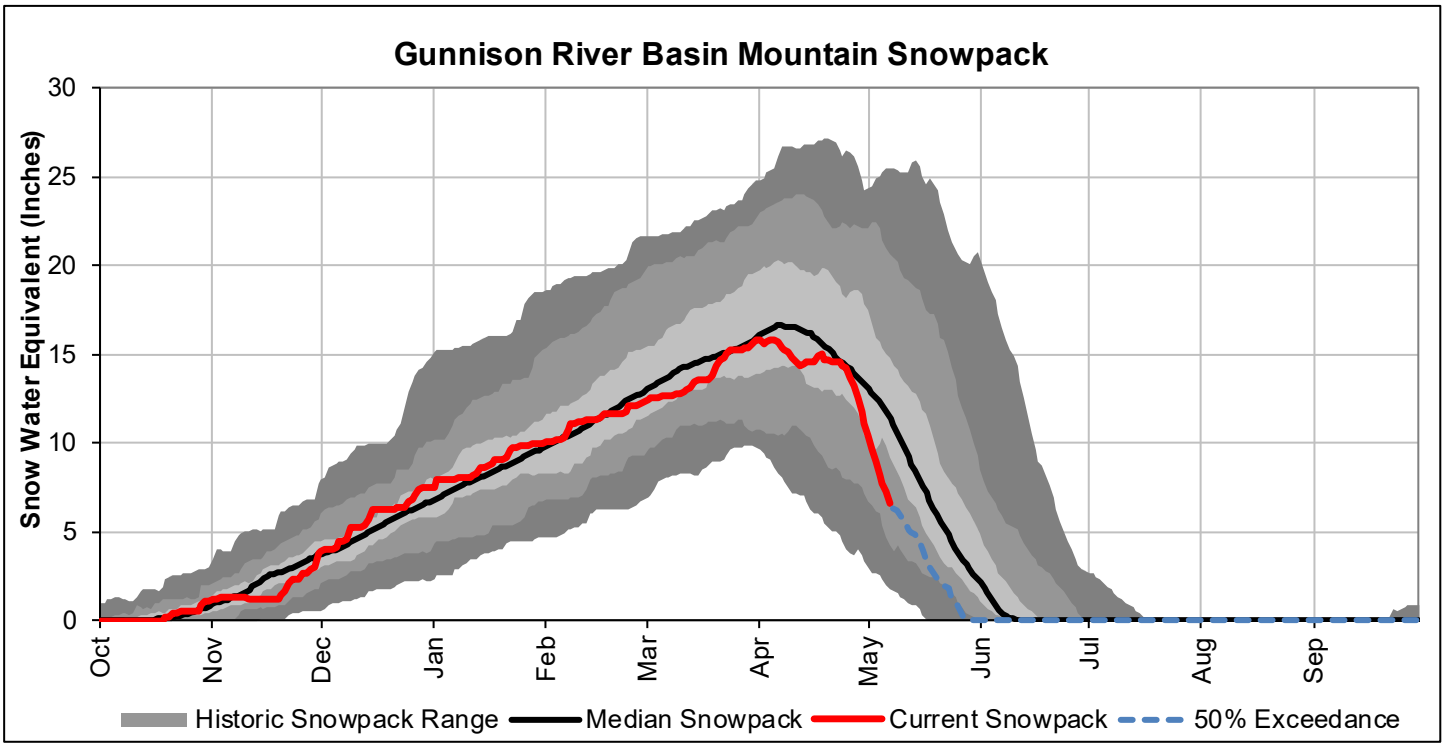



Owing to statewide below-average precipitation in April, forecasted streamflow volumes, calculated as 50 percent exceedance volumes, have decreased for most basins since the April 1st forecasts. However, due to the northern mountains and the Front Range maintaining an average to above-average snowpack, the North Platte and South Platte river basins are still forecasted to have above-average streamflow volumes of 106 and 102 percent of normal. Conditions have deteriorated further west where the combined Yampa and White, and Upper Colorado are expecting slightly below average streamflow volumes of 93 and 92 percent of normal. In these basins forecast points on streams sourced from mountains further west are generally expecting below-average streamflow volumes compared to forecast points draining mountains further east. In both basins, only 5 out of 21 forecasted points have forecasted streamflow volumes below 90 percent. From the crest of the Grand Mesa and Elk Range to the south, streamflow conditions have deteriorated due to dry soil conditions persisting from 2019, below-average snowpack, and substantially below-average April precipitation. The Gunnison, Upper Rio Grande, and combined San Miguel, Dolores, Animas, and San Juan river basins are now forecasted to have streamflow volumes of 60, 60, and 53 percent of normal. No forecast point in all three basins is forecasted to have greater than 80 percent of normal streamflow volumes. 57 percent of forecast points in those basins are expecting streamflow volumes below 60 percent of normal. Further east the Arkansas river basin is expecting 79 percent of normal streamflow volumes. Due to contrasting snowpack and precipitation conditions within the Arkansas River Basin, the Upper Arkansas sub-basin is expecting 84 percent of normal streamflow volumes compared to southern sub-basins Purgatoire and Huerfano expecting streamflow volumes of 49 and 51 percent of normal respectively.

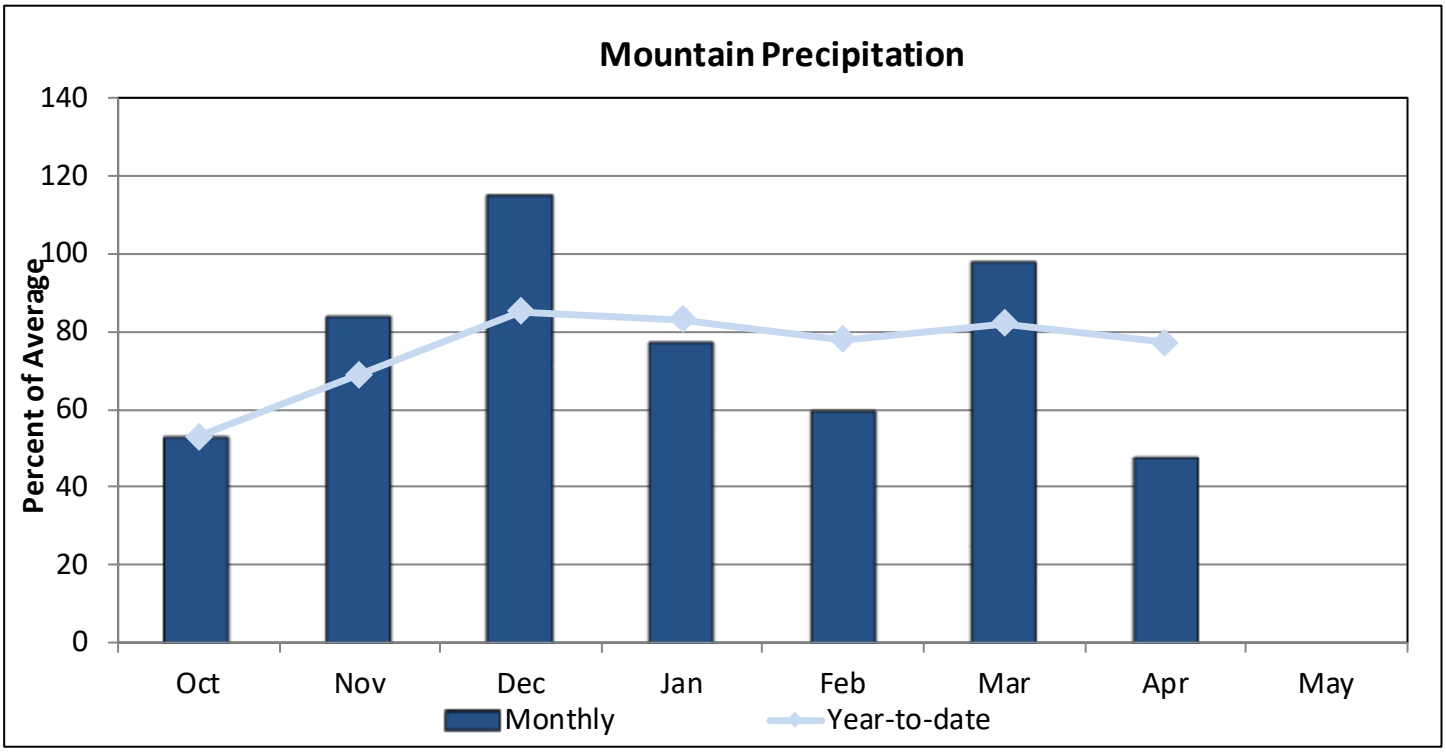
# GUNNISON RIVER BASIN

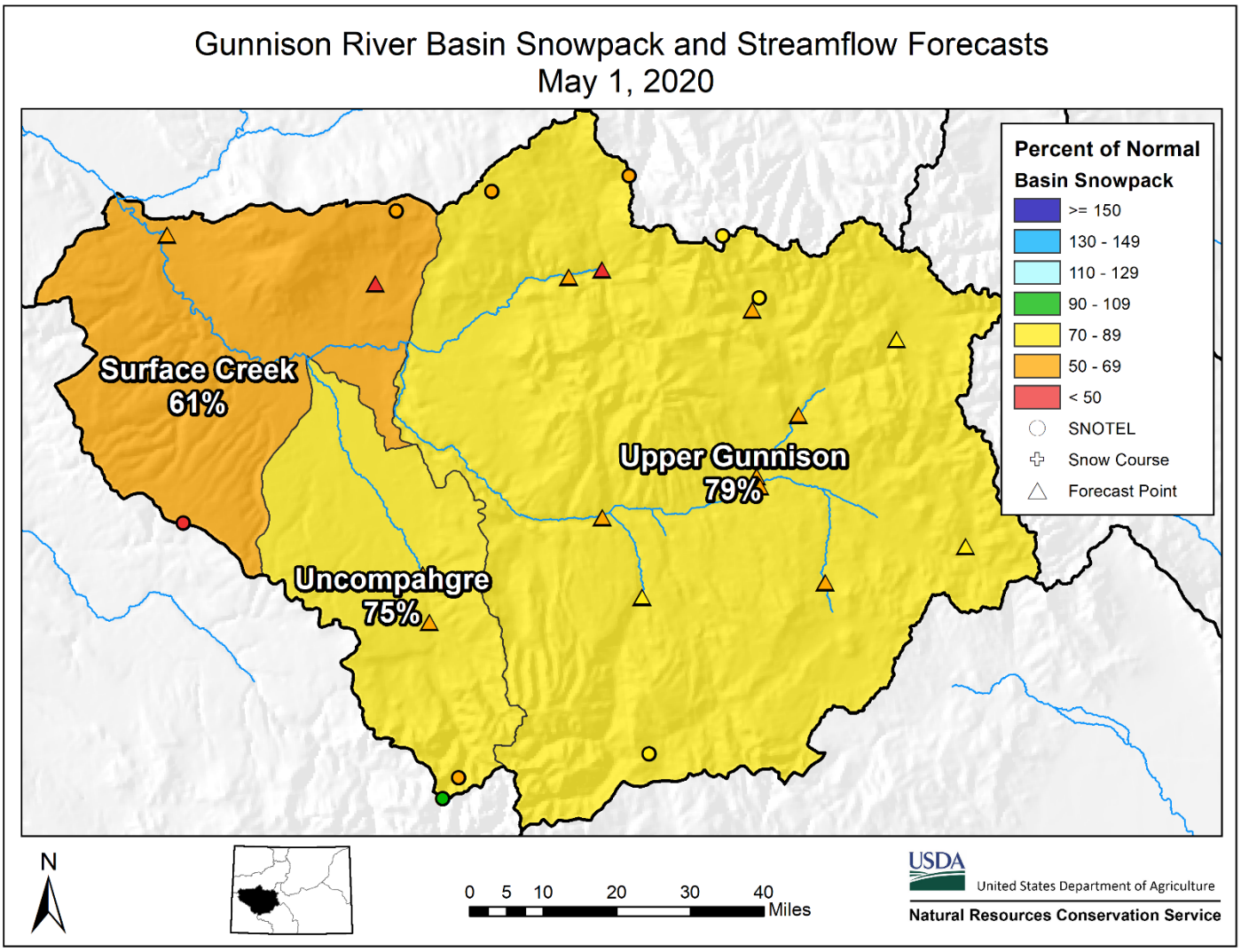
May 1, 2020

Snowpack in the Gunnison River basin is below normal at 78% of the median. Precipitation for April was 48% of average which brings water year-to-date precipitation to 77% of average. Reservoir storage at the end of April was 107% of average compared to 81% last year. Current streamflow forecasts range from 35% of average for Surface Creek at Cedaredge to 77% for Tomichi Creek at Sargents.




*SWE values calculated using daily SNOTEL data only

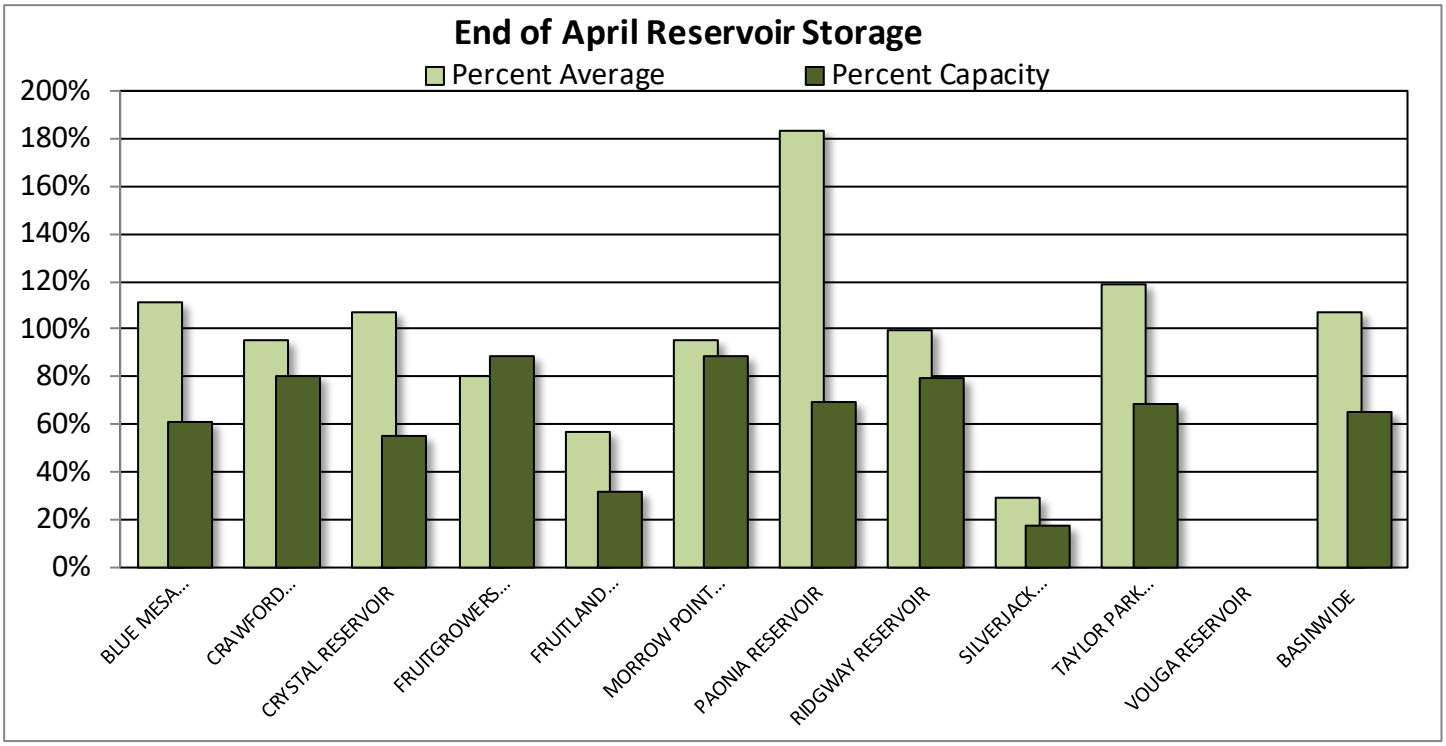





**Watershed Snowpack Analysis May 1st, 2020**

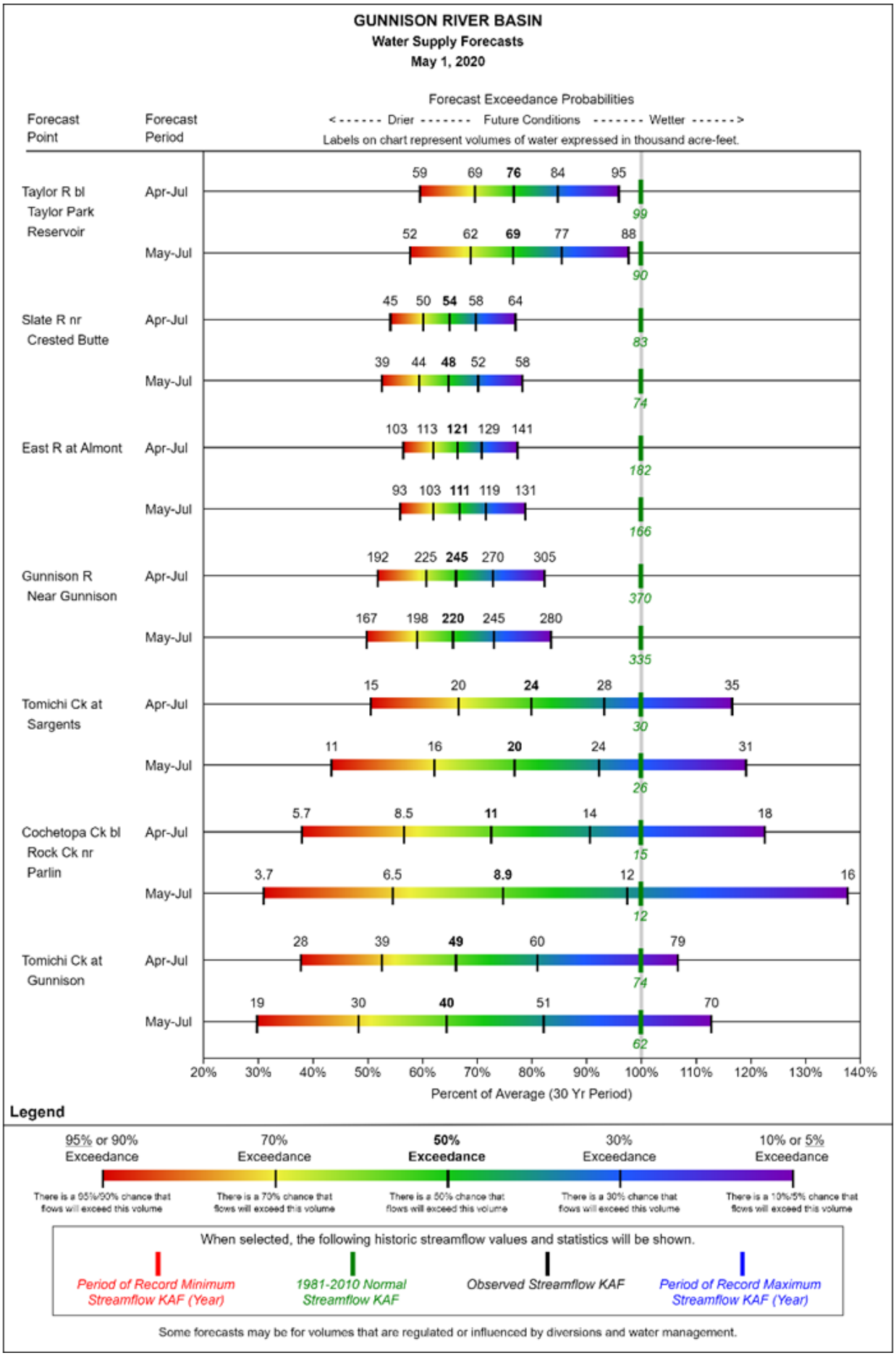
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Upper Gunnison | 10 | 79 | 146 |
| Surface Creek | 2 | 61 | |
| Uncompahgre | 3 | 75 | 174 |
| **Basin-Wide Total** | 13 | 78 | 152 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| BLUE MESA RESERVOIR | 509.6 | 334.8 | 457.1 | 830.0 |
| CRAWFORD RESERVOIR | 11.3 | 7.7 | 11.8 | 14.0 |
| CRYSTAL RESERVOIR | 9.7 | 9.3 | 9.0 | 17.5 |
| FRUITGROWERS RESERVOIR | 3.2 | 3.4 | 4.0 | 3.6 |
| FRUITLAND RESERVOIR | 2.9 | 5.2 | 5.1 | 9.2 |
| MORROW POINT RESERVOIR | 106.8 | 113.1 | 111.8 | 121.0 |
| PAONIA RESERVOIR | 10.7 | 6.1 | 5.8 | 15.4 |
| RIDGWAY RESERVOIR | 66.1 | 56.0 | 66.6 | 83.0 |
| SILVERJACK RESERVOIR | 2.3 | 2.5 | 7.8 | 12.8 |
| TAYLOR PARK RESERVOIR | 72.6 | 63.9 | 61.2 | 106.0 |
| VOUGA RESERVOIR | | 0.7 | | 0.9 |
| **BASINWIDE** | 795.0 | 602.8 | 740.2 | 1213.4 |
| Number of Reservoirs | 10 | 11 | 10 | 11 |


GUNNISON RIVER BASIN
Water Supply Forecasts
May 1, 2020
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
59 69 76 84 95
99
May-Jul
52 62 69 77 88
90
Slate R nr Crested Butte
Apr-Jul
45 50 54 58 64
83
May-Jul
39 44 48 52 58
74
East R at Almont
Apr-Jul
103 113 121 129 141
182
May-Jul
93 103 111 119 131
166
Gunnison R Near Gunnison
Apr-Jul
192 225 245 270 305
370
May-Jul
167 198 220 245 280
335
Tomichi Ck at Sargents
Apr-Jul
15 20 24 28 35
30
May-Jul
11 16 20 24 31
26
Cochetopa Ck bl Rock Ck nr Parlin
Apr-Jul
5.7 8.5 11 14 18
15
May-Jul
3.7 6.5 8.9 12 16
12
Tomichi Ck at Gunnison
Apr-Jul
28 39 49 60 79
74
May-Jul
19 30 40 51 70
62
20% 30% 40% 50% 60% 70% 80% 90% 100% 110% 120% 130% 140%
Percent of Average (30 Yr Period)
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)
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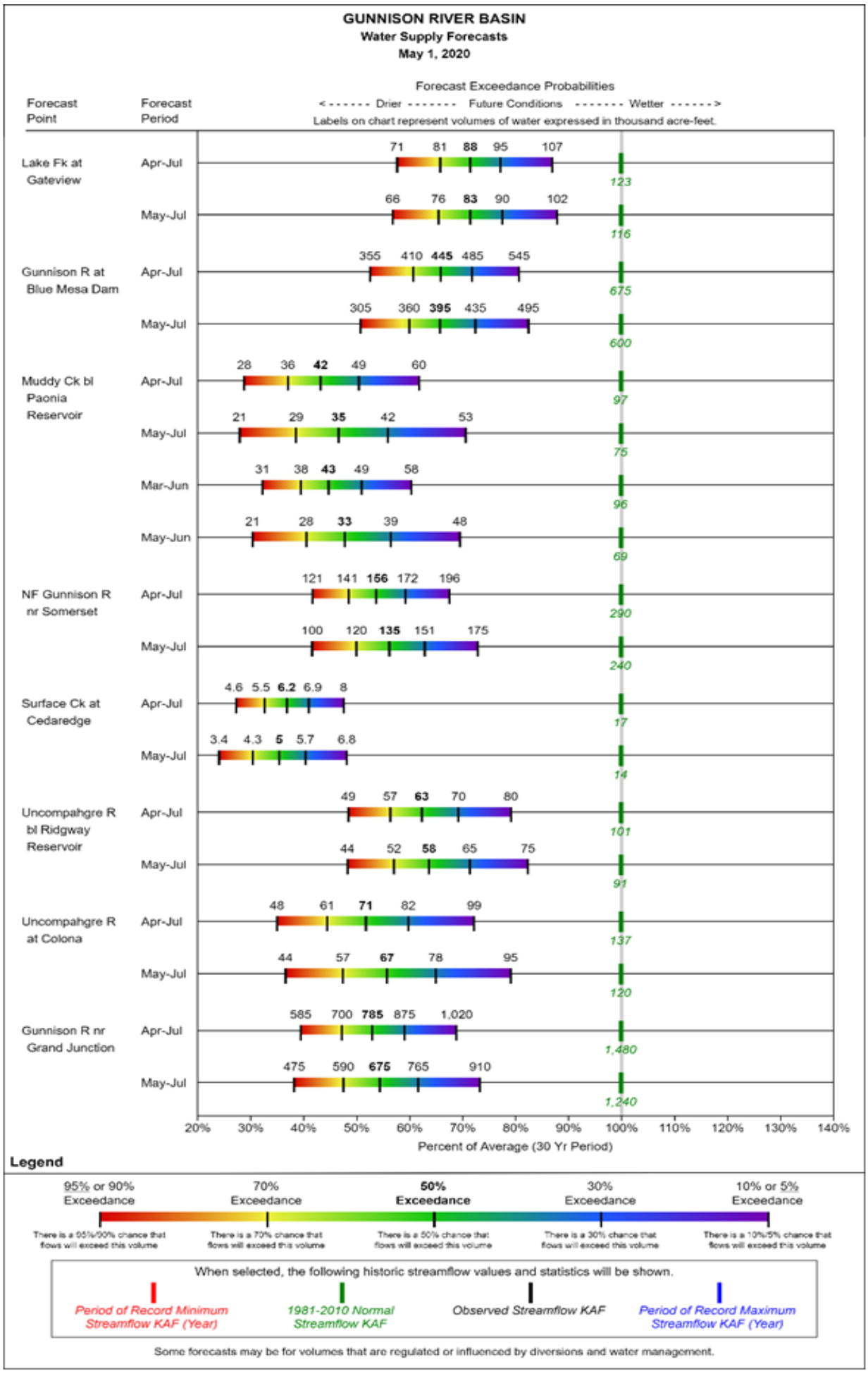
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.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Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
Lake Fk at Gateview
Apr-Jul 71 81 88 95 107 123
May-Jul 66 76 83 90 102 116
Gunnison R at Blue Mesa Dam
Apr-Jul 355 410 445 485 545 675
May-Jul 305 360 395 435 495 600
Muddy Ck bl Paonia Reservoir
Apr-Jul 28 36 42 49 60 97
May-Jul 21 29 35 42 53 75
Mar-Jun 31 38 43 49 58 96
May-Jun 21 28 33 39 48 69
NF Gunnison R nr Somerset
Apr-Jul 121 141 156 172 196 290
May-Jul 100 120 135 151 175 240
Surface Ck at Cedaredge
Apr-Jul 4.6 5.5 6.2 6.9 8 17
May-Jul 3.4 4.3 5 5.7 6.8 14
Uncompahgre R bl Ridgway Reservoir
Apr-Jul 49 57 63 70 80 101
May-Jul 44 52 58 65 75 91
Uncompahgre R at Colona
Apr-Jul 48 61 71 82 99 137
May-Jul 44 57 67 78 95 120
Gunnison R nr Grand Junction
Apr-Jul 585 700 785 875 1,020 1,480
May-Jul 475 590 675 765 910 1,240
20% 30% 40% 50% 60% 70% 80% 90% 100% 110% 120% 130% 140%
Percent of Average (30 Yr Period)
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
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Observed Streamflow KAF
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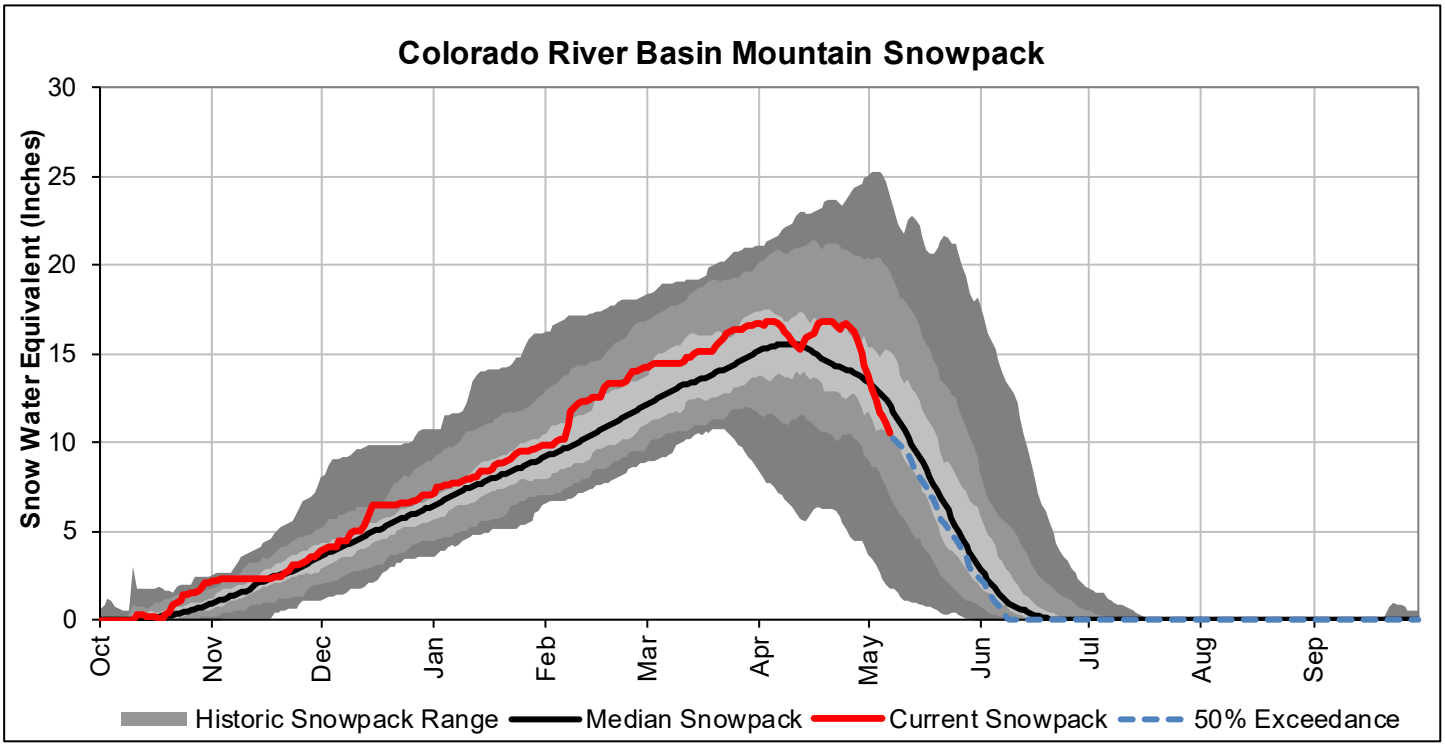
# UPPER COLORADO RIVER BASIN

May 1, 2020

Snowpack in the Colorado River basin is above normal at 107% of the median. Precipitation for April was 77% of average which brings water year-to-date precipitation to 92% of average. Reservoir storage at the end of April was 115% of average compared to 93% last year. Current streamflow forecasts range from 73% of average for the Roaring Fork at Glenwood Springs to 110% for the Colorado River below Lake Granby.

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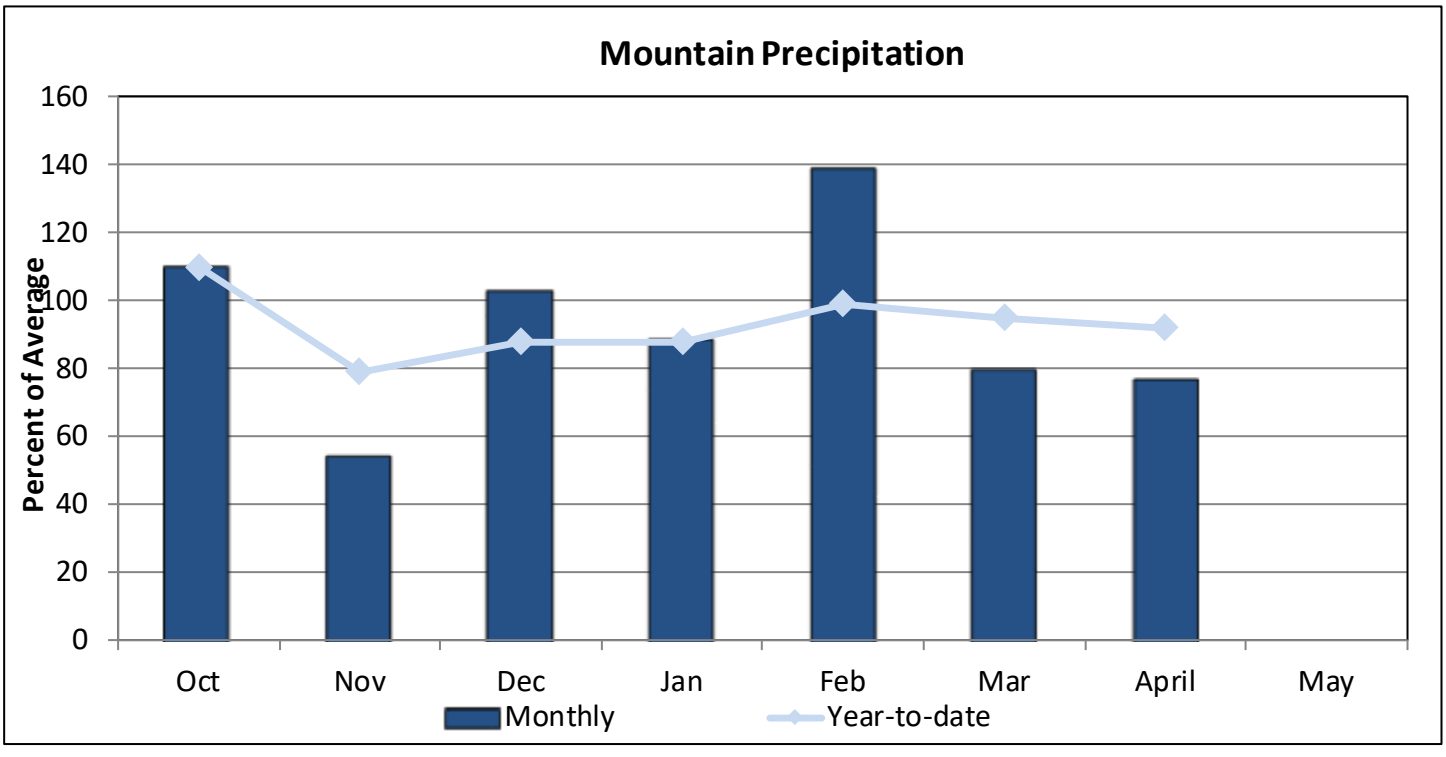
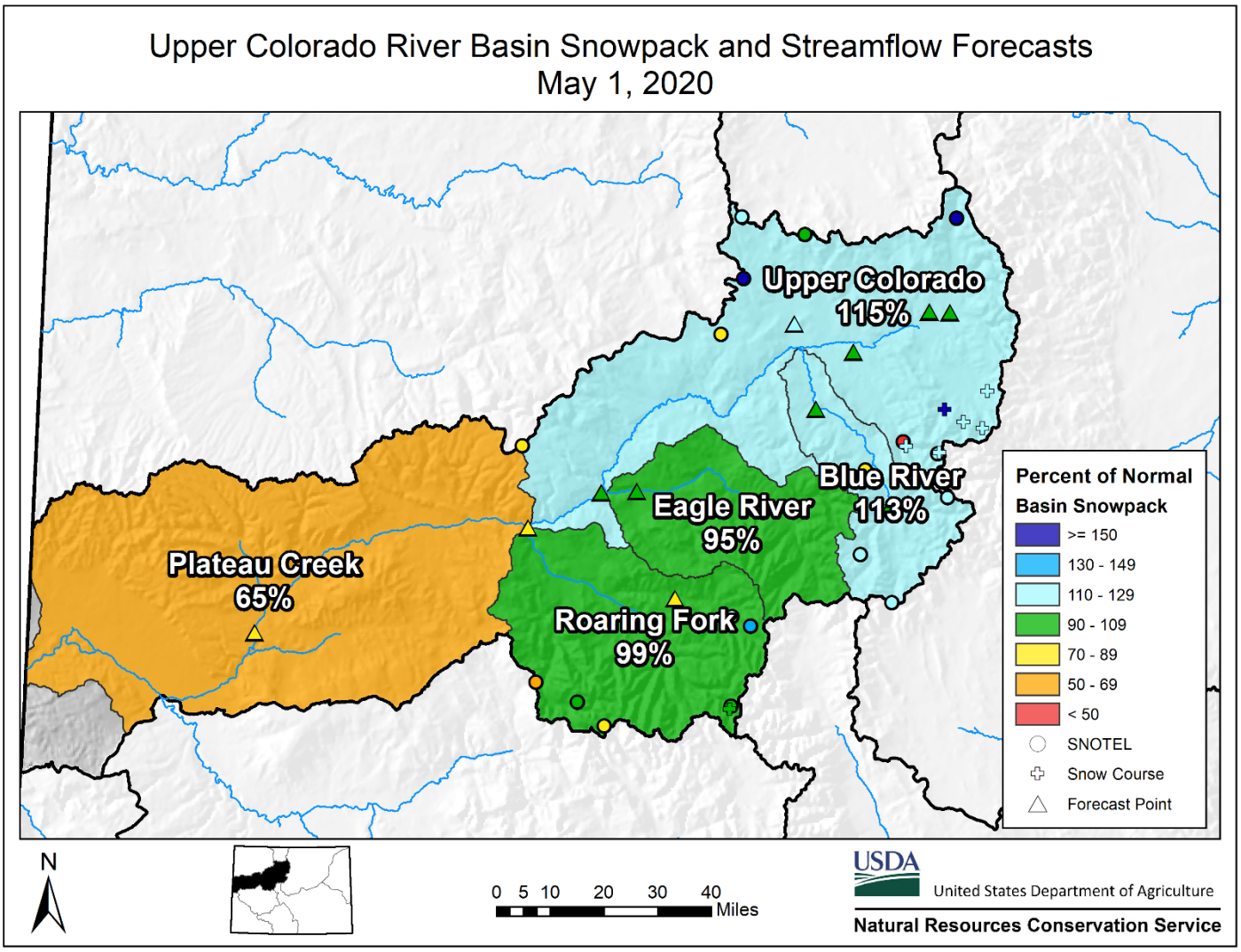
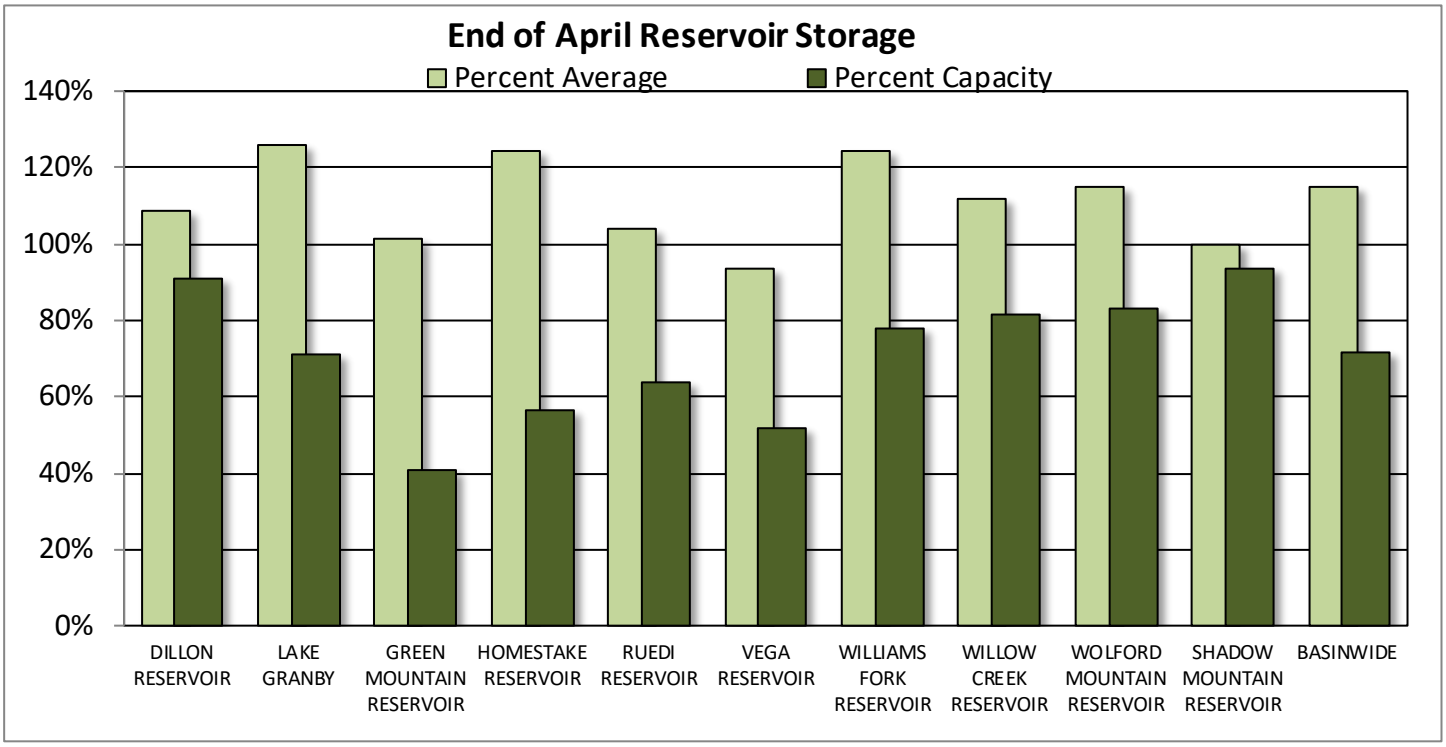





**Watershed Snowpack Analysis May 1st, 2020**

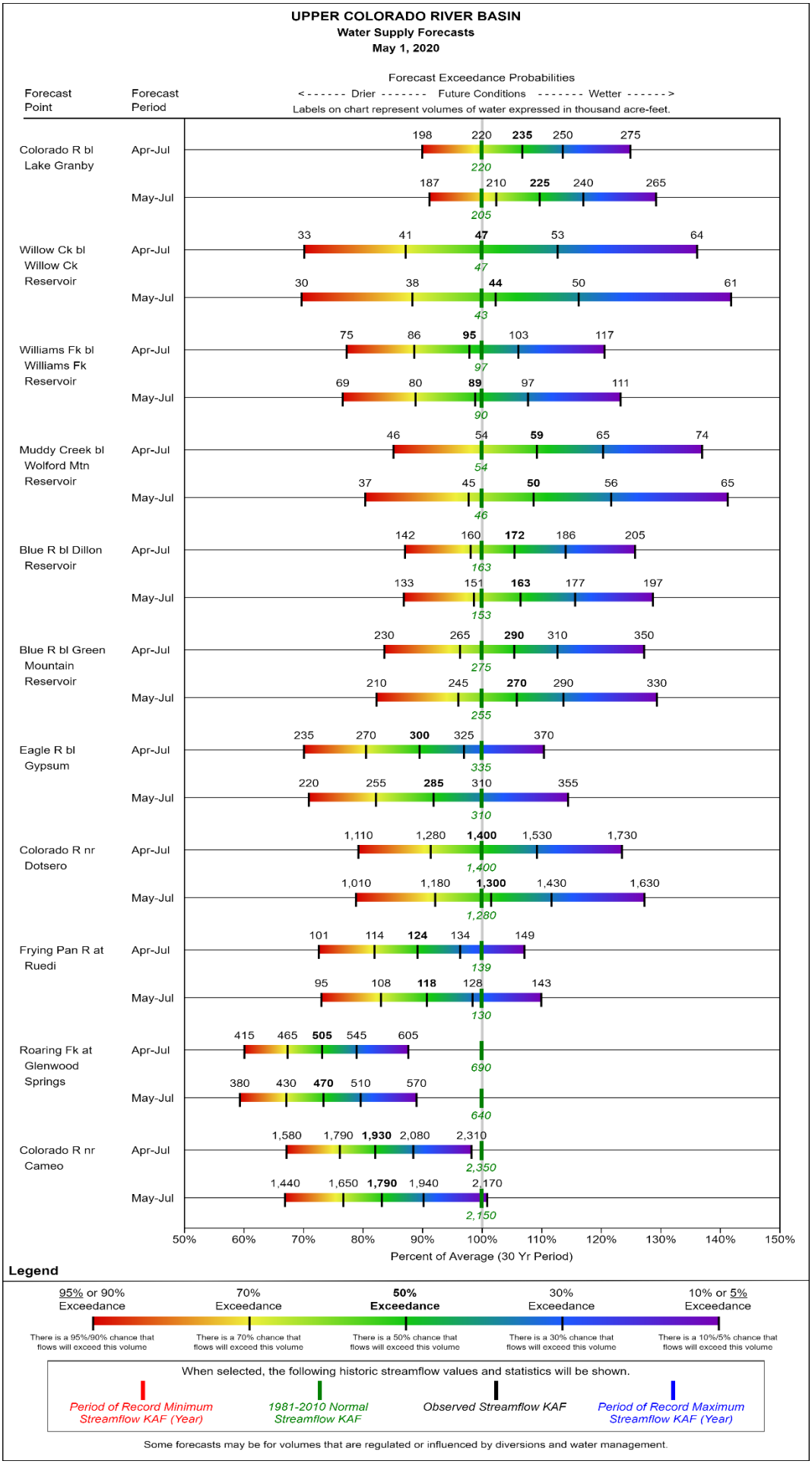
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Blue River | 5 | 113 | 136 |
| Upper Colorado | 25 | 115 | 110 |
| Muddy Creek | 3 | 129 | 110 |
| Eagle River | 4 | 95 | 114 |
| Plateau Creek | 5 | 65 | 131 |
| Roaring Fork | 8 | 99 | 142 |
| Williams Fork | 5 | 109 | 99 |
| Willow Creek | 2 | 110 | 128 |
| **Basin-Wide Total** | 35 | 107 | 119 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| DILLON RESERVOIR | 226.5 | 180.2 | 208.7 | 249.1 |
| LAKE GRANBY | 329.9 | 267.7 | 262.4 | 465.6 |
| GREEN MOUNTAIN RESERVOIR | 60.2 | 49.0 | 59.5 | 146.8 |
| HOMESTAKE RESERVOIR | 24.2 | 9.7 | 19.5 | 43.0 |
| RUEDI RESERVOIR | 65.0 | 59.8 | 62.6 | 102.0 |
| VEGA RESERVOIR | 17.1 | 11.6 | 18.3 | 32.9 |
| WILLIAMS FORK RESERVOIR | 75.6 | 67.6 | 60.8 | 97.0 |
| WILLOW CREEK RESERVOIR | 7.4 | 7.0 | 6.6 | 9.1 |
| WOLFORD MOUNTAIN RESERVOIR | 54.8 | 38.6 | 47.7 | 65.9 |
| SHADOW MOUNTAIN RESERVOIR | 17.2 | 17.3 | 17.2 | 18.4 |
| **BASINWIDE** | 877.9 | 708.5 | 763.3 | 1229.8 |
| Number of Reservoirs | 10 | 10 | 10 | 10 |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Forecast Exceedance Probabilities
< - - - - - - Drier - - - - - - - Future Conditions - - - - - - - Wetter - - - - - - >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
Colorado R bl Lake Granby
Apr-Jul
198 220 235 250 275
220
May-Jul
187 210 225 240 265
205
Willow Ck bl Willow Ck Reservoir
Apr-Jul
33 41 47 53 64
47
May-Jul
30 38 44 50 61
43
Williams Fk bl Williams Fk Reservoir
Apr-Jul
75 86 95 103 117
97
May-Jul
69 80 89 97 111
90
Muddy Creek bl Wolford Mtn Reservoir
Apr-Jul
46 54 59 65 74
54
May-Jul
37 45 50 56 65
46
Blue R bl Dillon Reservoir
Apr-Jul
142 160 172 186 205
163
May-Jul
133 151 163 177 197
153
Blue R bl Green Mountain Reservoir
Apr-Jul
230 265 290 310 350
275
May-Jul
210 245 270 290 330
255
Eagle R bl Gypsum
Apr-Jul
235 270 300 325 370
335
May-Jul
220 255 285 310 355
310
Colorado R nr Dotsero
Apr-Jul
1,110 1,280 1,400 1,530 1,730
1,400
May-Jul
1,010 1,180 1,300 1,430 1,630
1,280
Frying Pan R at Ruedi
Apr-Jul
101 114 124 134 149
139
May-Jul
95 108 118 128 143
130
Roaring Fk at Glenwood Springs
Apr-Jul
415 465 505 545 605
690
May-Jul
380 430 470 510 570
640
Colorado R nr Cameo
Apr-Jul
1,580 1,790 1,930 2,080 2,310
2,350
May-Jul
1,440 1,650 1,790 1,940 2,170
2,150
50% 60% 70% 80% 90% 100% 110% 120% 130% 140% 150%
Percent of Average (30 Yr Period)
Legend
95% or 90% Exceedance
There is a 95%/90% chance that flows will exceed this volume
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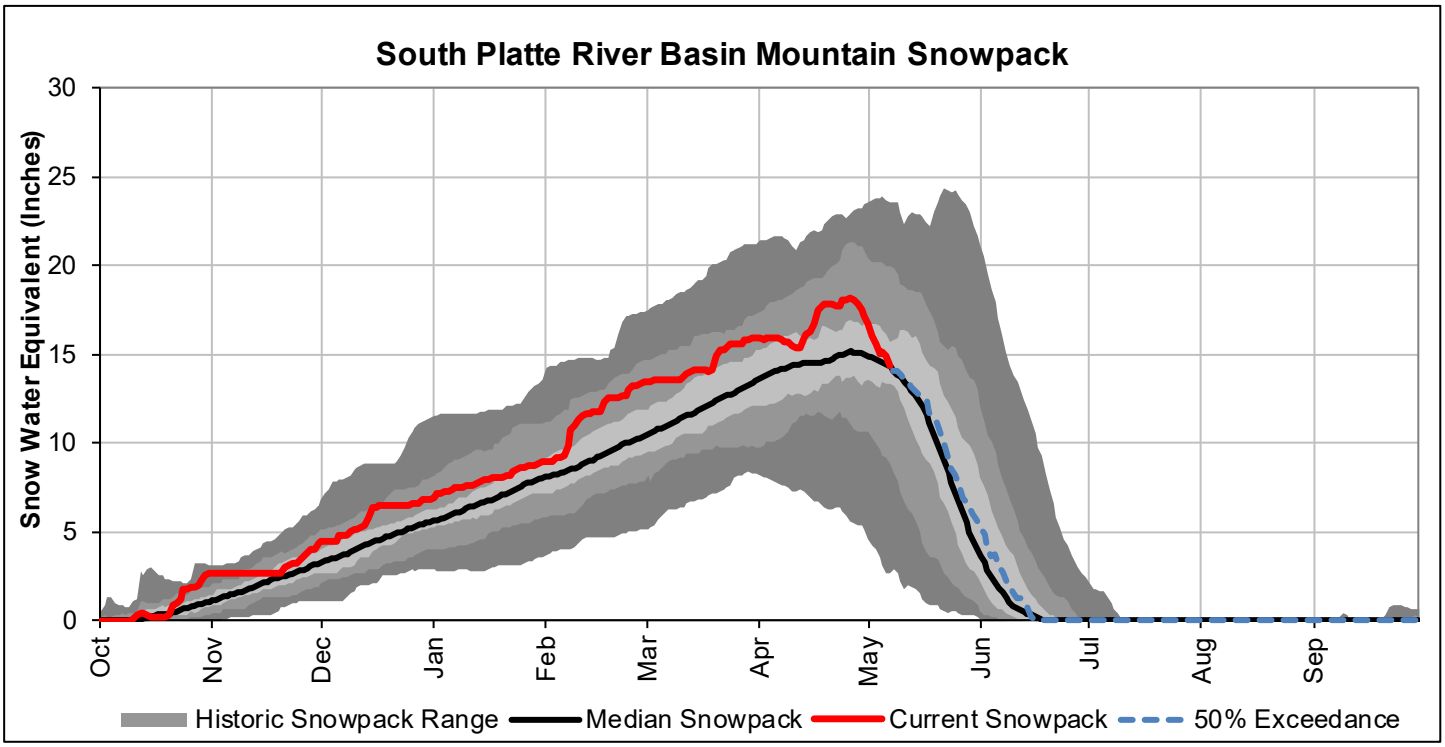
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

# SOUTH PLATTE RIVER BASIN

May 1, 2020

Snowpack in the South Platte River basin is above normal at 115% of the median. Precipitation for April was 84% of average which brings water year-to-date precipitation to 103%. Reservoir storage at the end of April was 108% of average compared to 104% last year. Current streamflow forecasts range from 60% of average for Bear Creek above Evergreen to 116% for the South Platte River near Lake George.

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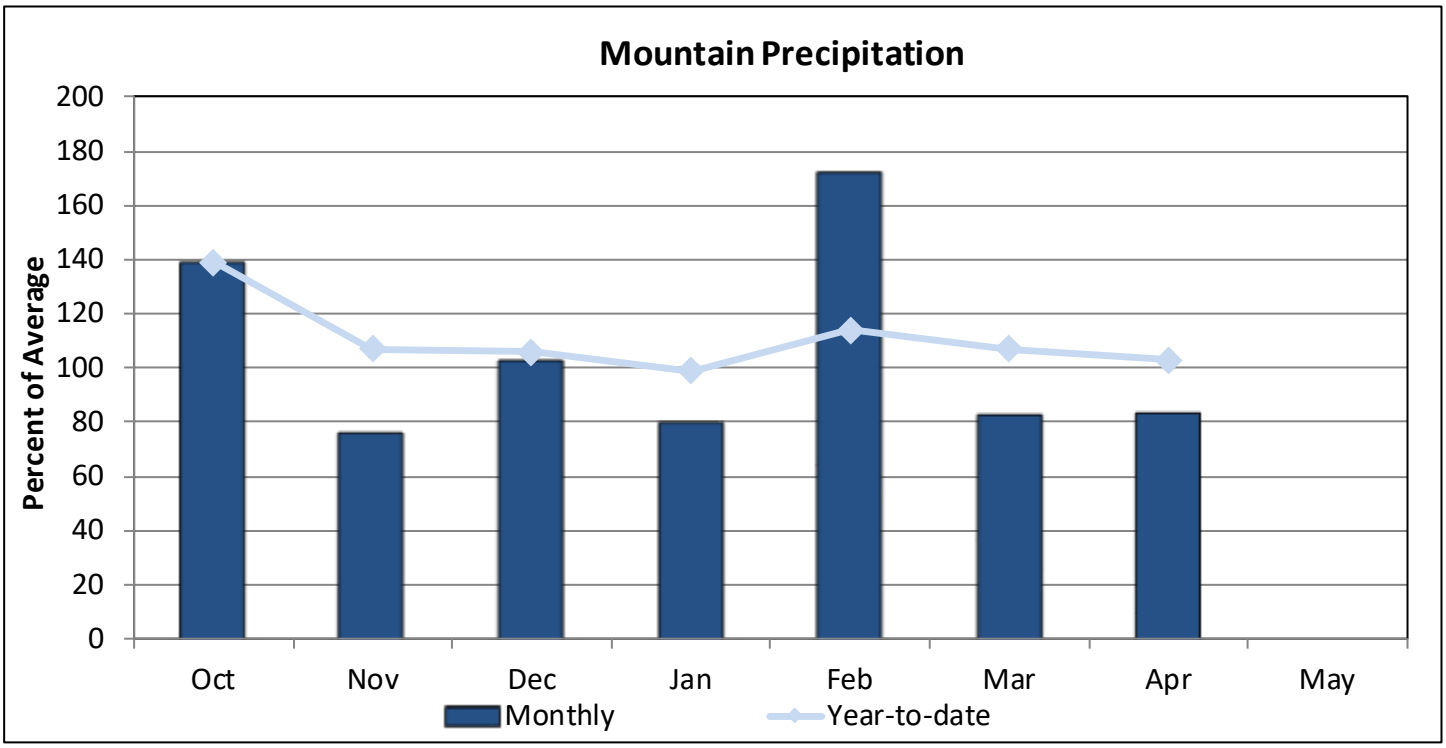
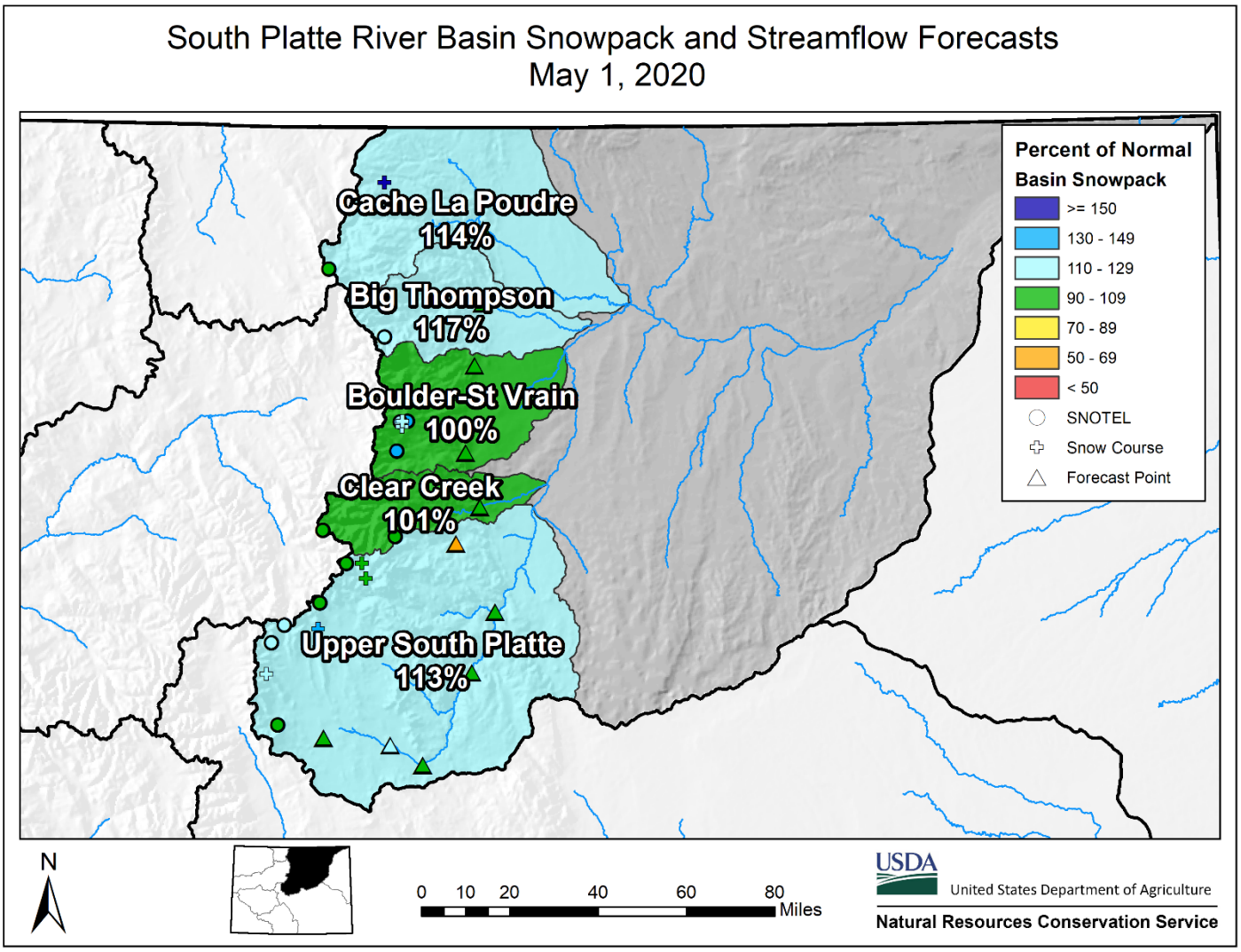
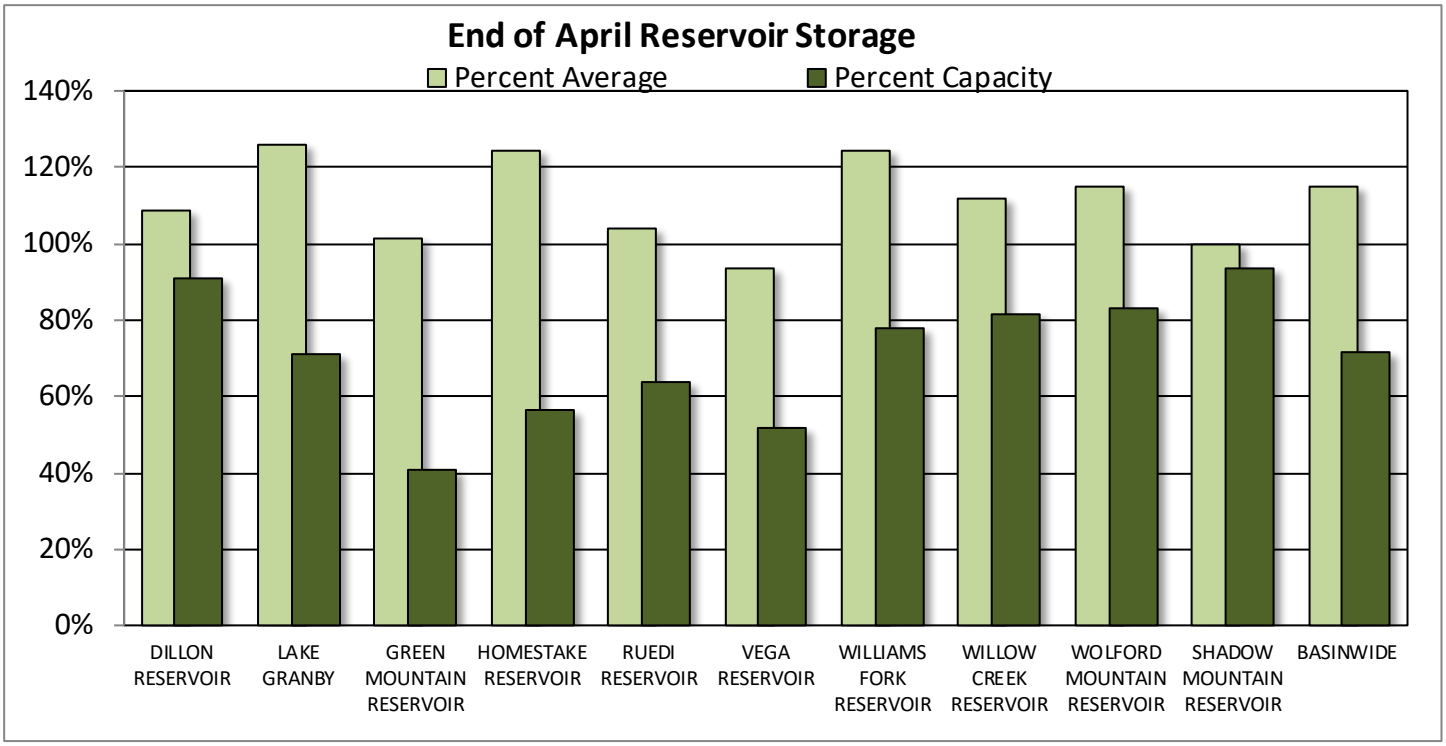





**Watershed Snowpack Analysis May 1st, 2020**

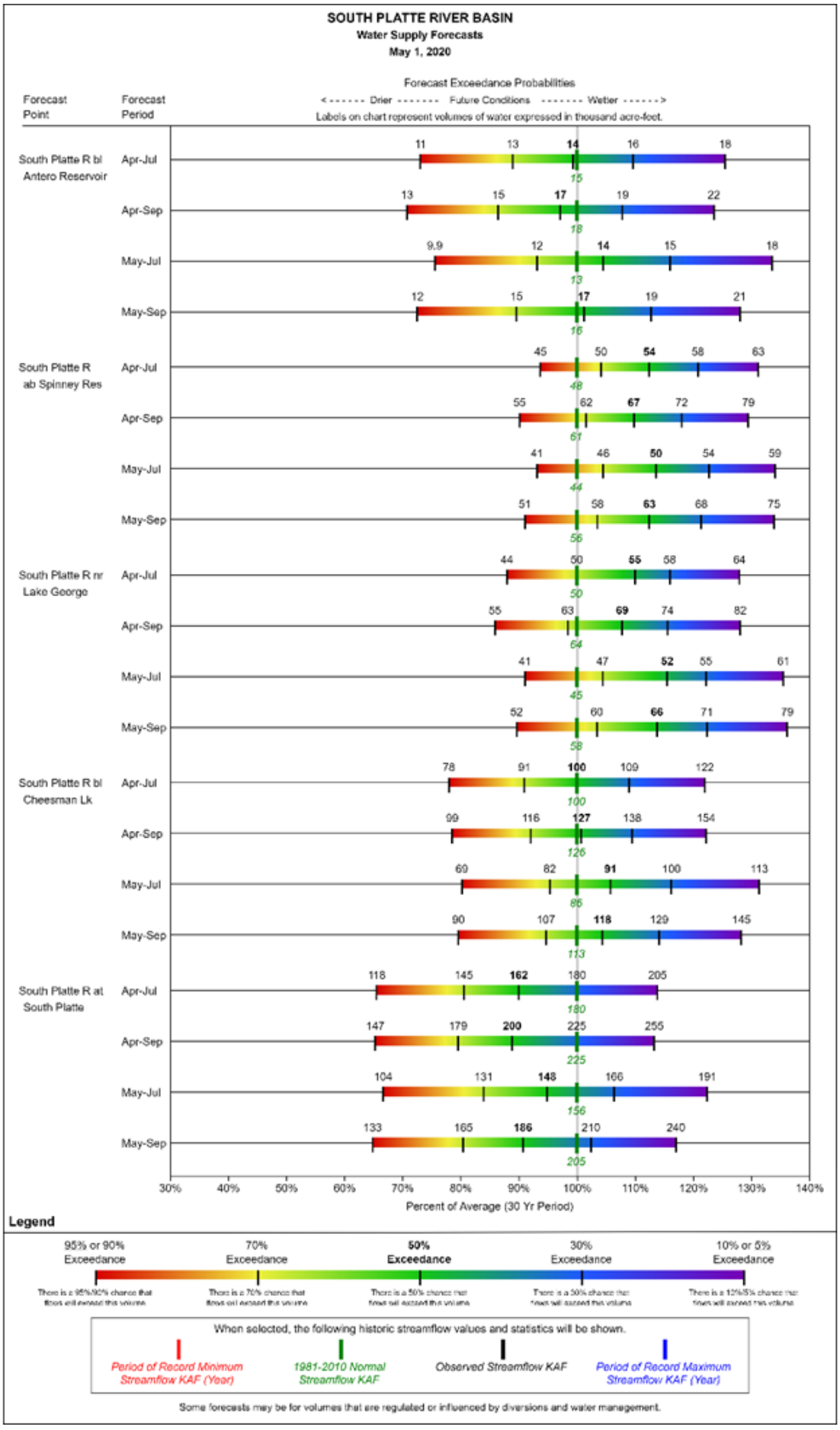
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Big Thompson | 3 | 117 | 104 |
| Boulder Creek | 5 | 125 | 97 |
| Cache La Poudre | 3 | 114 | 109 |
| Clear Creek | 2 | 101 | 106 |
| Saint Vrain | 1 | | |
| Upper South Platte | 12 | 113 | 135 |
| **Basin-Wide Total** | 26 | 115 | 113 |

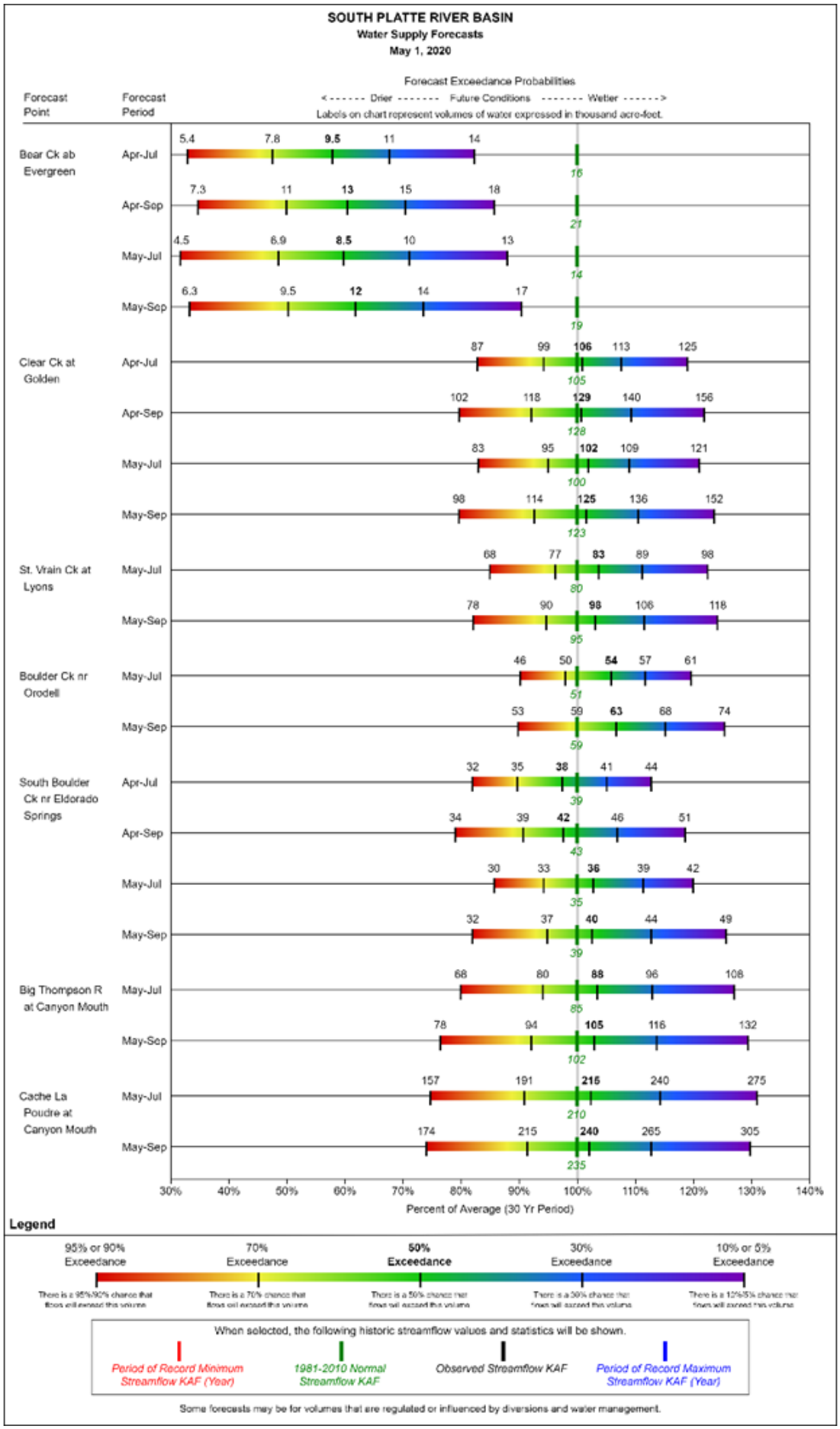
*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| ANTERO RESERVOIR | 19.7 | 19.8 | 14.7 | 19.9 |
| BARR LAKE | 26.7 | 25.6 | 28.8 | 30.1 |
| BLACK HOLLOW RESERVOIR | 3.7 | 3.9 | 2.9 | 6.5 |
| BOYD LAKE | 35.3 | 31.3 | 30.9 | 48.4 |
| CACHE LA POUDRE | 10.6 | 10.6 | 8.4 | 10.1 |
| CARTER LAKE | 104.3 | 105.4 | 97.5 | 108.9 |
| CHAMBERS LAKE | 4.5 | 2.6 | 3.7 | 8.8 |
| CHEESMAN LAKE | 53.7 | 65.0 | 69.0 | 79.0 |
| COBB LAKE | 18.0 | 15.2 | 11.9 | 22.3 |
| ELEVENMILE CANYON RESERVOIR | 99.3 | 99.8 | 96.6 | 98.0 |
| EMPIRE RESERVOIR | 32.3 | 36.4 | 31.7 | 36.5 |
| FOSSIL CREEK RESERVOIR | 9.3 | 10.1 | 8.2 | 11.1 |
| GROSS RESERVOIR | 14.8 | 5.1 | 8.5 | 29.8 |
| HALLIGAN RESERVOIR | 6.4 | 6.4 | 4.5 | 6.4 |
| HORSECREEK RESERVOIR | 11.7 | 11.6 | 13.3 | 14.7 |
| HORSETOOTH RESERVOIR | 144.3 | 116.5 | 116.6 | 149.7 |
| JACKSON LAKE RESERVOIR | 26.0 | 26.1 | 27.1 | 26.1 |
| JULESBURG RESERVOIR | 20.7 | 20.5 | 19.6 | 20.5 |
| LAKE LOVELAND RESERVOIR | 7.0 | 1.8 | 8.0 | 10.3 |
| LONE TREE RESERVOIR | 7.1 | 7.5 | 8.0 | 8.7 |
| MARIANO RESERVOIR | 3.6 | 5.2 | 4.4 | 5.4 |
| MARSHALL RESERVOIR | 9.0 | 8.7 | 8.1 | 10.0 |
| MARSTON RESERVOIR | 7.0 | 6.9 | 8.6 | 13.0 |
| MILTON RESERVOIR | 20.8 | 21.5 | 20.2 | 23.5 |
| POINT OF ROCKS RESERVOIR | 68.6 | 70.3 | 66.5 | 70.6 |
| PREWITT RESERVOIR | 24.3 | 24.1 | 22.0 | 28.2 |
| RIVERSIDE RESERVOIR | 54.1 | 55.2 | 52.0 | 55.8 |
| SPINNEY MOUNTAIN RESERVOIR | 41.7 | 38.5 | 28.7 | 49.0 |
| STANDLEY RESERVOIR | 39.8 | 29.0 | 36.6 | 42.0 |
| TERRY RESERVOIR | 7.3 | 6.7 | 4.9 | 8.0 |
| UNION RESERVOIR | 10.5 | 10.4 | 11.1 | 13.0 |
| WINDSOR RESERVOIR | 11.6 | 10.3 | 11.2 | 15.2 |
| **BASINWIDE** | 953.7 | 907.9 | 884.2 | 1079.5 |
| Number of Reservoirs | 32 | 32 | 32 | 32 |

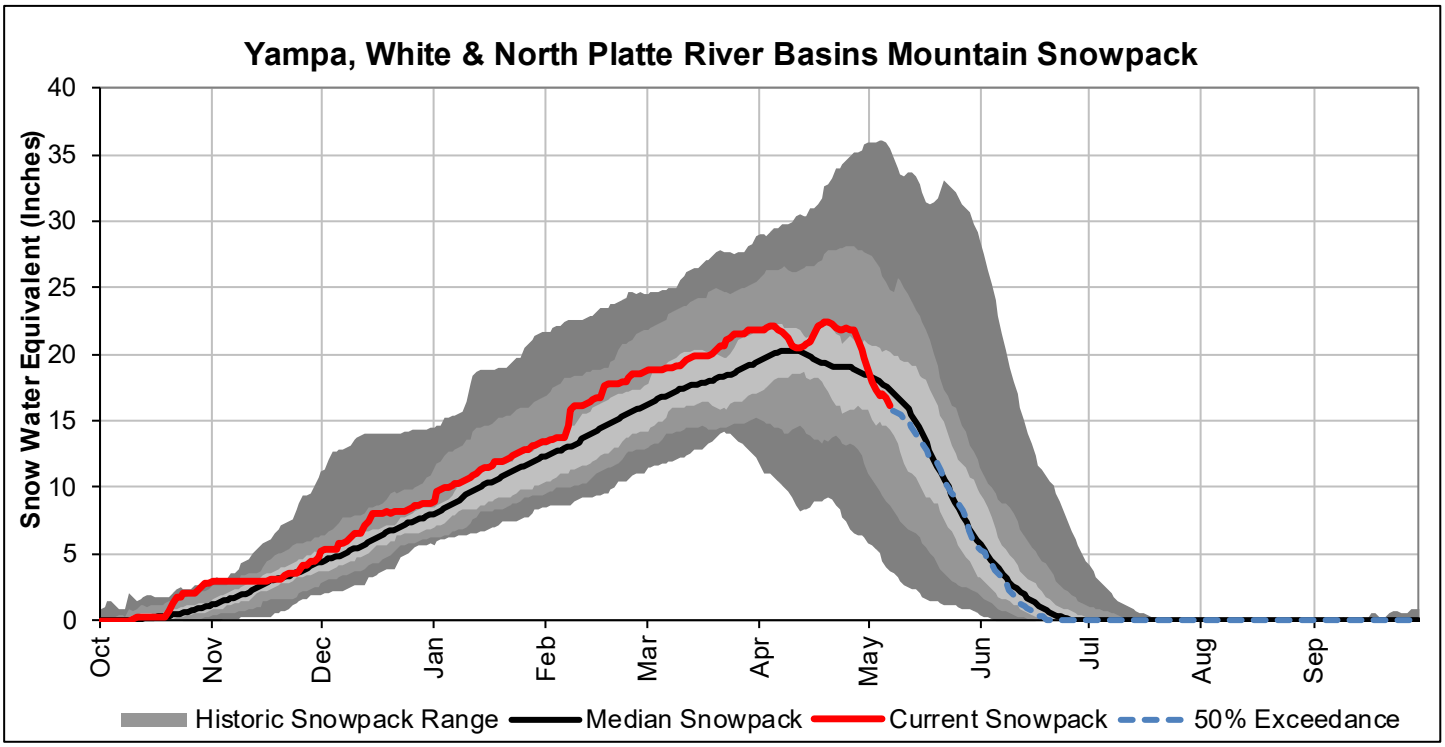

SOUTH PLATTE RIVER BASIN
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
Forecast Point
Forecast Period
< ------ Drier ------ Future Conditions ------ Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
South Platte R bl Antero Reservoir
Apr-Jul 11 13 14 16 18 15
Apr-Sep 13 15 17 19 22 18
May-Jul 9.9 12 14 15 18 13
May-Sep 12 15 17 19 21 16
South Platte R ab Spinney Res
Apr-Jul 45 50 54 58 63 48
Apr-Sep 55 62 67 72 79 61
May-Jul 41 46 50 54 59 44
May-Sep 51 58 63 68 75 56
South Platte R nr Lake George
Apr-Jul 44 50 55 58 64 50
Apr-Sep 55 63 69 74 82 64
May-Jul 41 47 52 55 61 45
May-Sep 52 60 66 71 79 58
South Platte R bl Cheesman Lk
Apr-Jul 78 91 100 109 122 100
Apr-Sep 99 116 127 138 154 126
May-Jul 69 82 91 100 113 86
May-Sep 90 107 118 129 145 113
South Platte R at South Platte
Apr-Jul 118 145 162 180 205 180
Apr-Sep 147 179 200 225 255 225
May-Jul 104 131 148 166 191 156
May-Sep 133 165 186 210 240 205
30% 40% 50% 60% 70% 80% 90% 100% 110% 120% 130% 140%
Percent of Average (30 Yr Period)
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)
1981-2010 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
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
Forecast Point
Forecast Period
<------- Drier ------- Future Conditions ------- Wetter ------>
Labels on chart represent volumes of water expressed in thousand acre-feet.
Bear Ck ab Evergreen
Apr-Jul 5.4 7.8 9.5 11 14 16
Apr-Sep 7.3 11 13 15 18 21
May-Jul 4.5 6.9 8.5 10 13 14
May-Sep 6.3 9.5 12 14 17 19
Clear Ck at Golden
Apr-Jul 87 99 106 113 125 105
Apr-Sep 102 118 129 140 156 128
May-Jul 83 95 102 109 121 100
May-Sep 98 114 125 136 152 123
St. Vrain Ck at Lyons
May-Jul 68 77 83 89 98 80
May-Sep 78 90 98 106 118 95
Boulder Ck nr Orodell
May-Jul 46 50 54 57 61 51
May-Sep 53 59 63 68 74 59
South Boulder Ck nr Eldorado Springs
Apr-Jul 32 35 38 41 44 39
Apr-Sep 34 39 42 46 51 43
May-Jul 30 33 36 39 42 35
May-Sep 32 37 40 44 49 39
Big Thompson R at Canyon Mouth
May-Jul 68 80 88 96 108 86
May-Sep 78 94 105 116 132 102
Cache La Poudre at Canyon Mouth
May-Jul 157 191 216 240 275 210
May-Sep 174 215 240 265 305 235
30% 40% 50% 60% 70% 80% 90% 100% 110% 120% 130% 140%
Percent of Average (30 Yr Period)
Legend
95% or 90% Exceedance
70% Exceedance
50% Exceedance
30% Exceedance
10% or 5% Exceedance
When selected, the following historic streamflow values and statistics will be shown.
Period of Record Minimum Streamflow KAF (Year)
1981-2010 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.

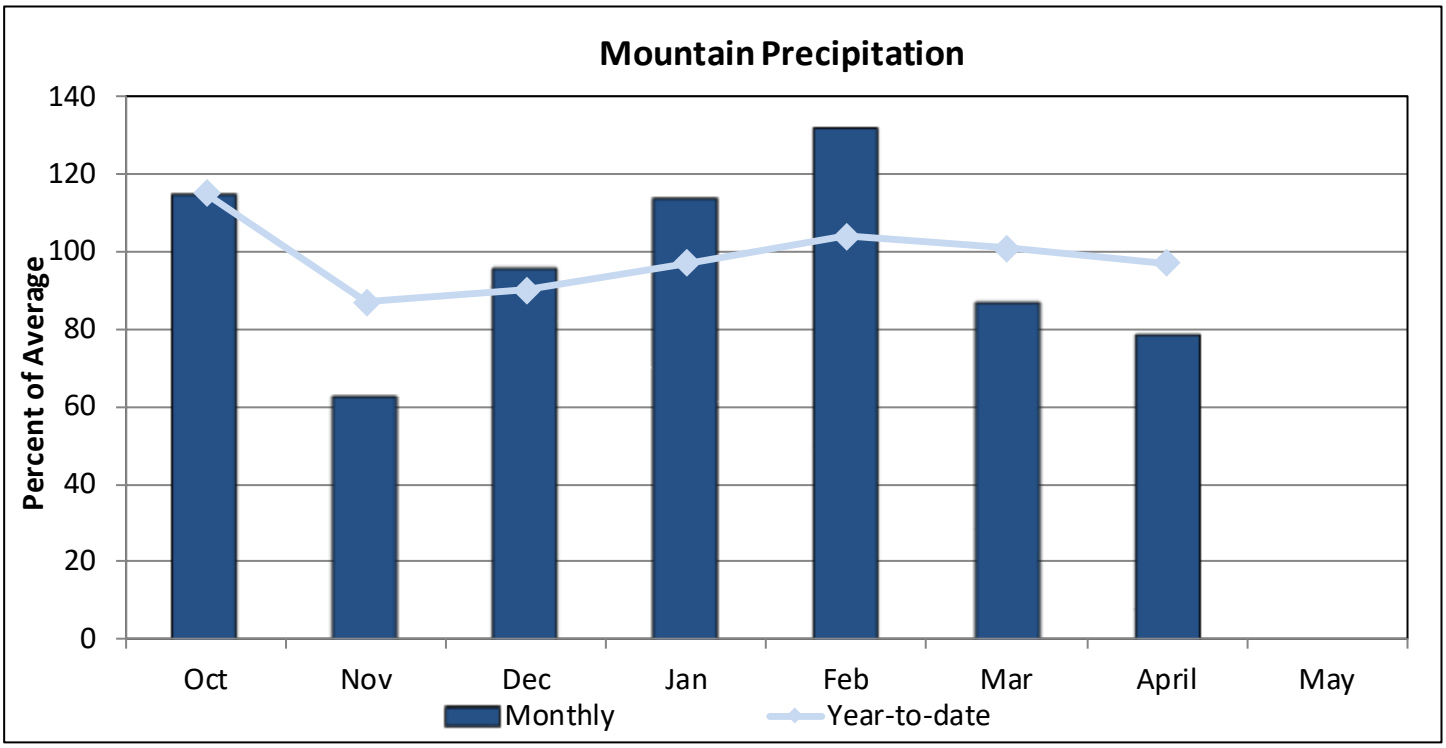
# YAMPA, WHITE, NORTH PLATTE, AND LARAMIE RIVER BASINS

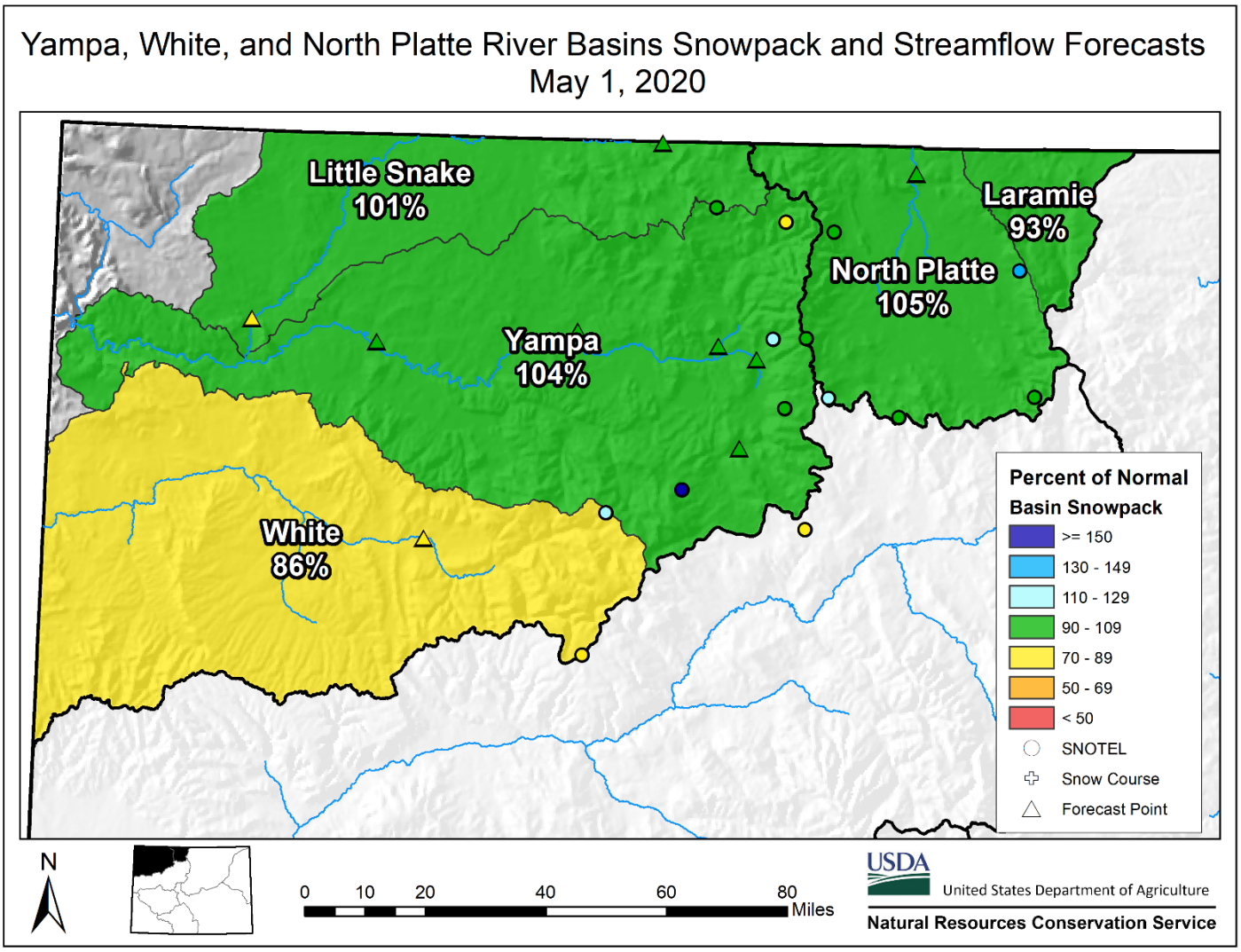
May 1, 2020

Snowpack in the Yampa, White & North Platte basins is normal at 100% of the median. Precipitation for April was 79% of average and water year-to-date precipitation is 97% of average. Reservoir storage at the end of April was 118% of average compared to 104% last year. Current streamflow forecasts range from 76% of average for White River near Meeker to 106% for the North Platte River near Northgate.




*SWE values calculated using daily SNOTEL data only

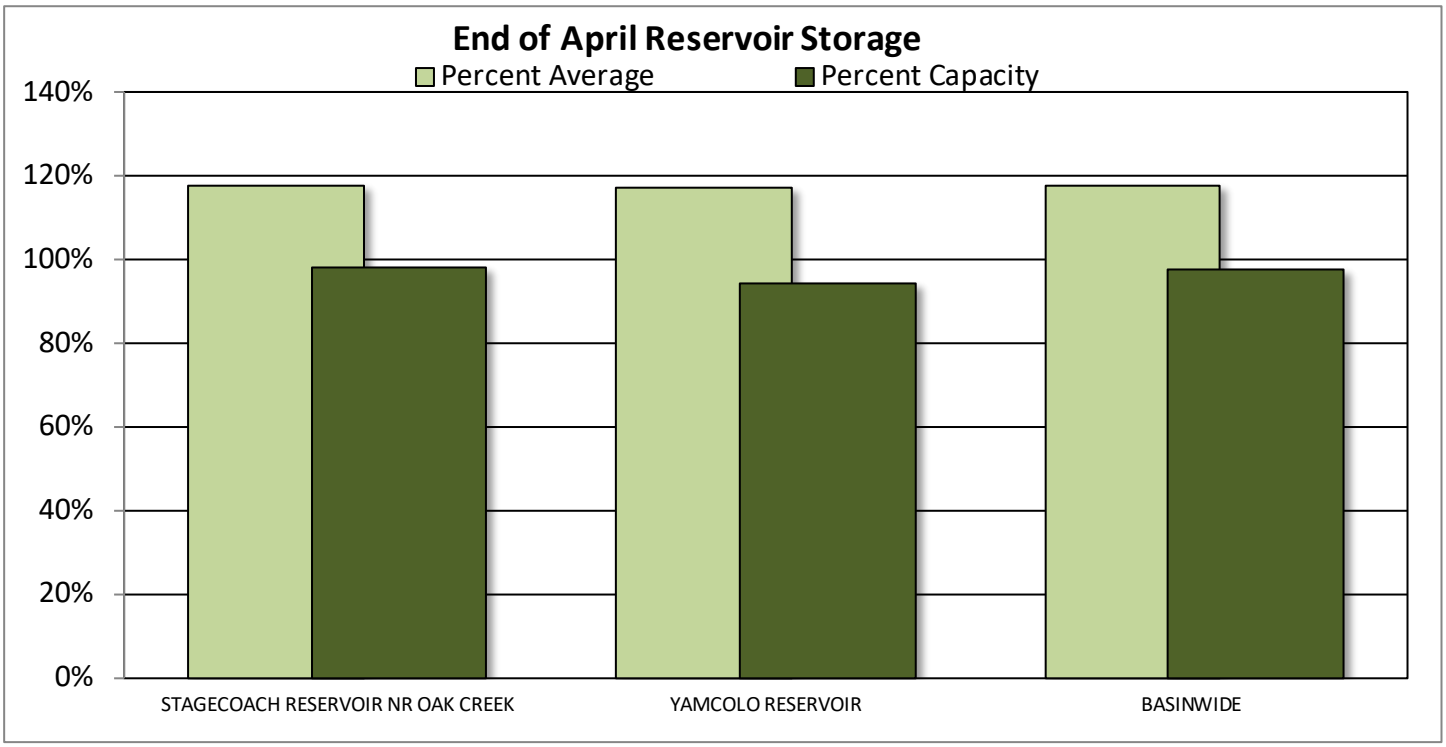





**Watershed Snowpack Analysis May 1st, 2020**

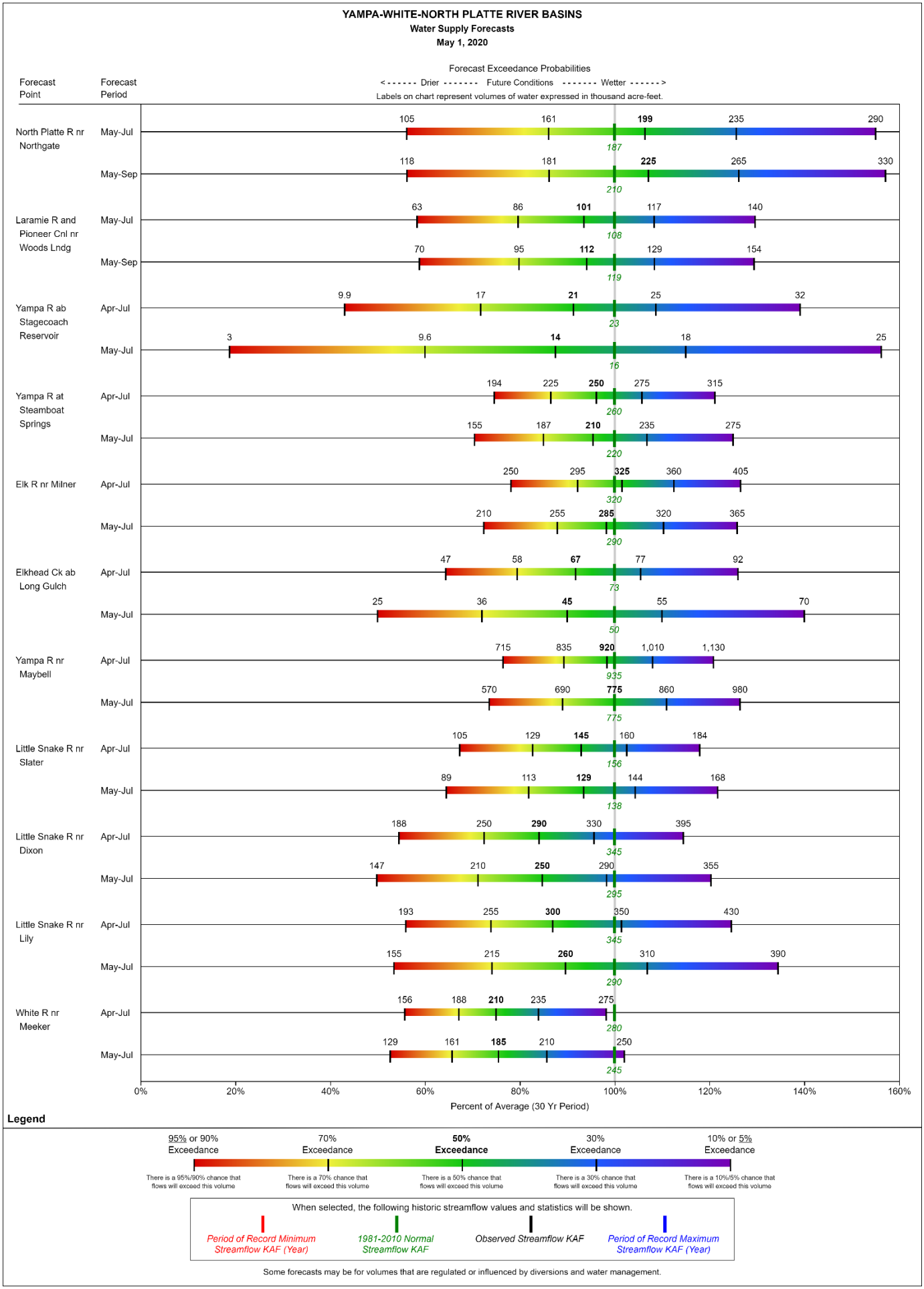
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Laramie | 2 | 93 | 107 |
| North Platte | 8 | 105 | 113 |
| Total Laramie & North Platte | 10 | 103 | 112 |
| Elk | 2 | 90 | 93 |
| Yampa | 9 | 104 | 106 |
| White | 3 | 86 | 122 |
| Total Yampa & White | 11 | 97 | 107 |
| Little Snake | 8 | 101 | 107 |
| **Basin-Wide Total** | 26 | 100 | 109 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

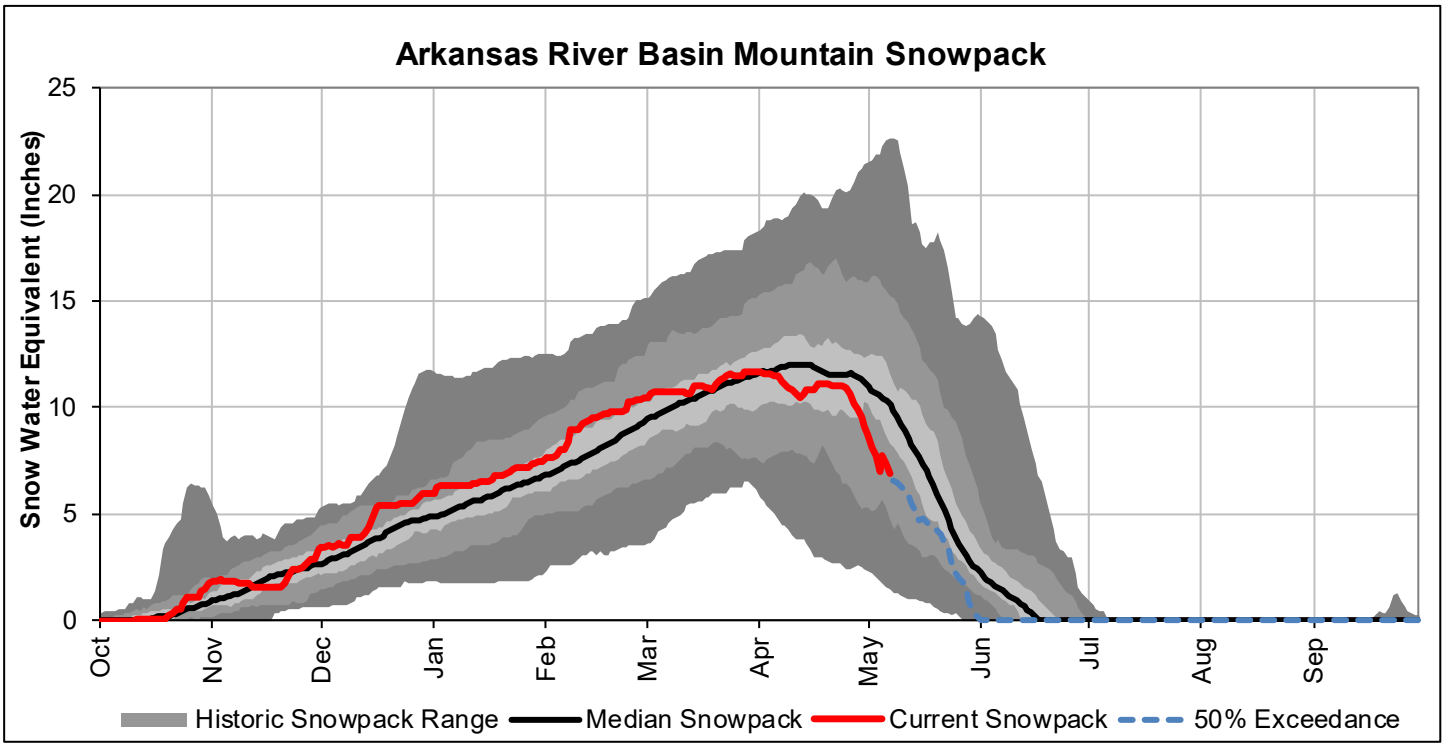
| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| STAGECOACH RESERVOIR NR OAK C | 35.8 | 33.3 | 30.4 | 36.5 |
| YAMCOLO RESERVOIR | 8.2 | 5.4 | 7.0 | 8.7 |
| **BASINWIDE** | 44.0 | 38.7 | 37.4 | 45.2 |
| Number of Reservoirs | 2 | 2 | 2 | 2 |


YAMPA-WHITE-NORTH PLATTE RIVER BASINS
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
< ------- Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
North Platte R nr Northgate
May-Jul 105 161 199 235 290 187
May-Sep 118 181 225 265 330 210
Laramie R and Pioneer Cnl nr Woods Lndg
May-Jul 63 86 101 117 140 108
May-Sep 70 95 112 129 154 119
Yampa R ab Stagecoach Reservoir
Apr-Jul 9.9 17 21 25 32 23
May-Jul 3 9.6 14 18 25 16
Yampa R at Steamboat Springs
Apr-Jul 194 225 250 275 315 260
May-Jul 155 187 210 235 275 220
Elk R nr Milner
Apr-Jul 250 295 325 360 405 320
May-Jul 210 255 285 320 365 290
Elkhead Ck ab Long Gulch
Apr-Jul 47 58 67 77 92 73
May-Jul 25 36 45 55 70 50
Yampa R nr Maybell
Apr-Jul 715 835 920 1,010 1,130 935
May-Jul 570 690 775 860 980 775
Little Snake R nr Slater
Apr-Jul 105 129 145 160 184 156
May-Jul 89 113 129 144 168 138
Little Snake R nr Dixon
Apr-Jul 188 250 290 330 395 345
May-Jul 147 210 250 290 355 295
Little Snake R nr Lily
Apr-Jul 193 255 300 350 430 345
May-Jul 155 215 260 310 390 290
White R nr Meeker
Apr-Jul 156 188 210 235 275 280
May-Jul 129 161 185 210 250 245
0% 20% 40% 60% 80% 100% 120% 140% 160%
Percent of Average (30 Yr Period)
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)
1981-2010 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.

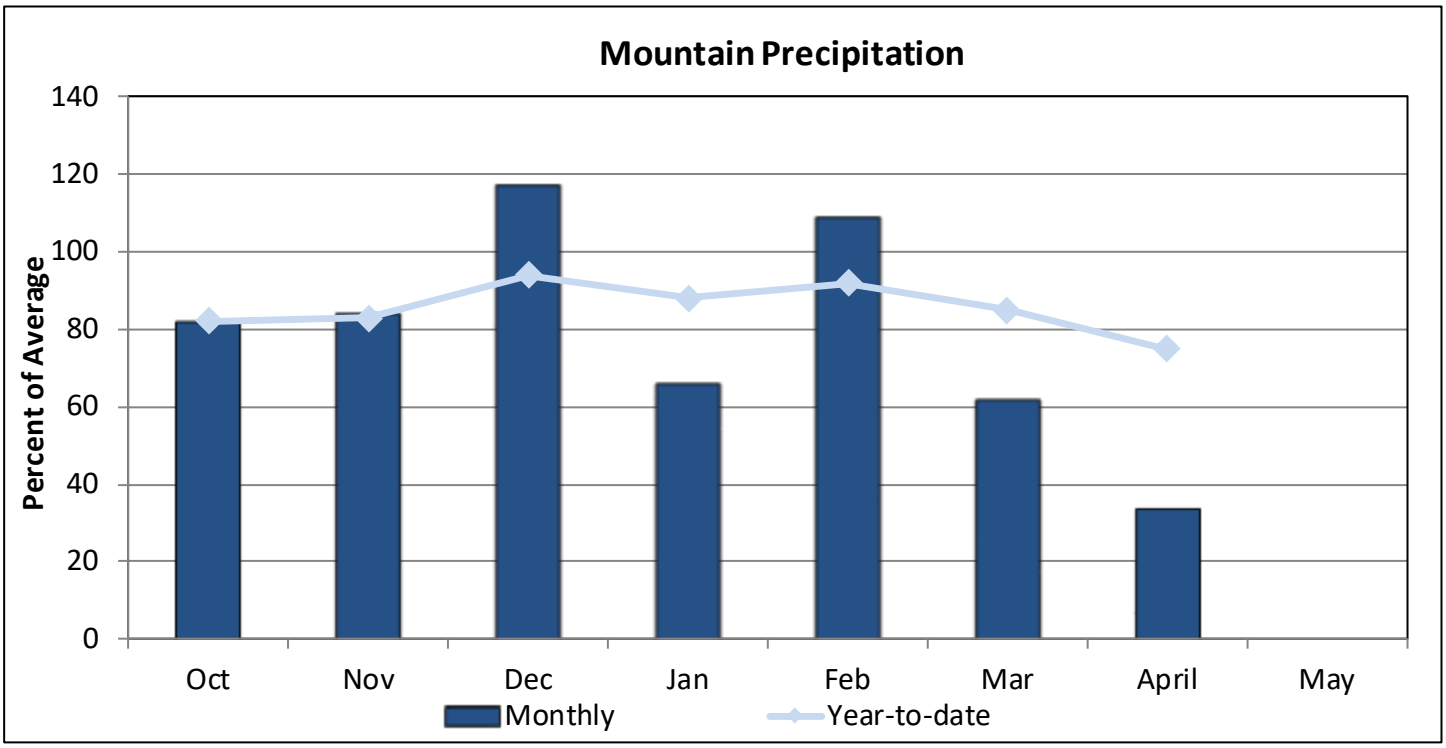
# ARKANSAS RIVER BASIN

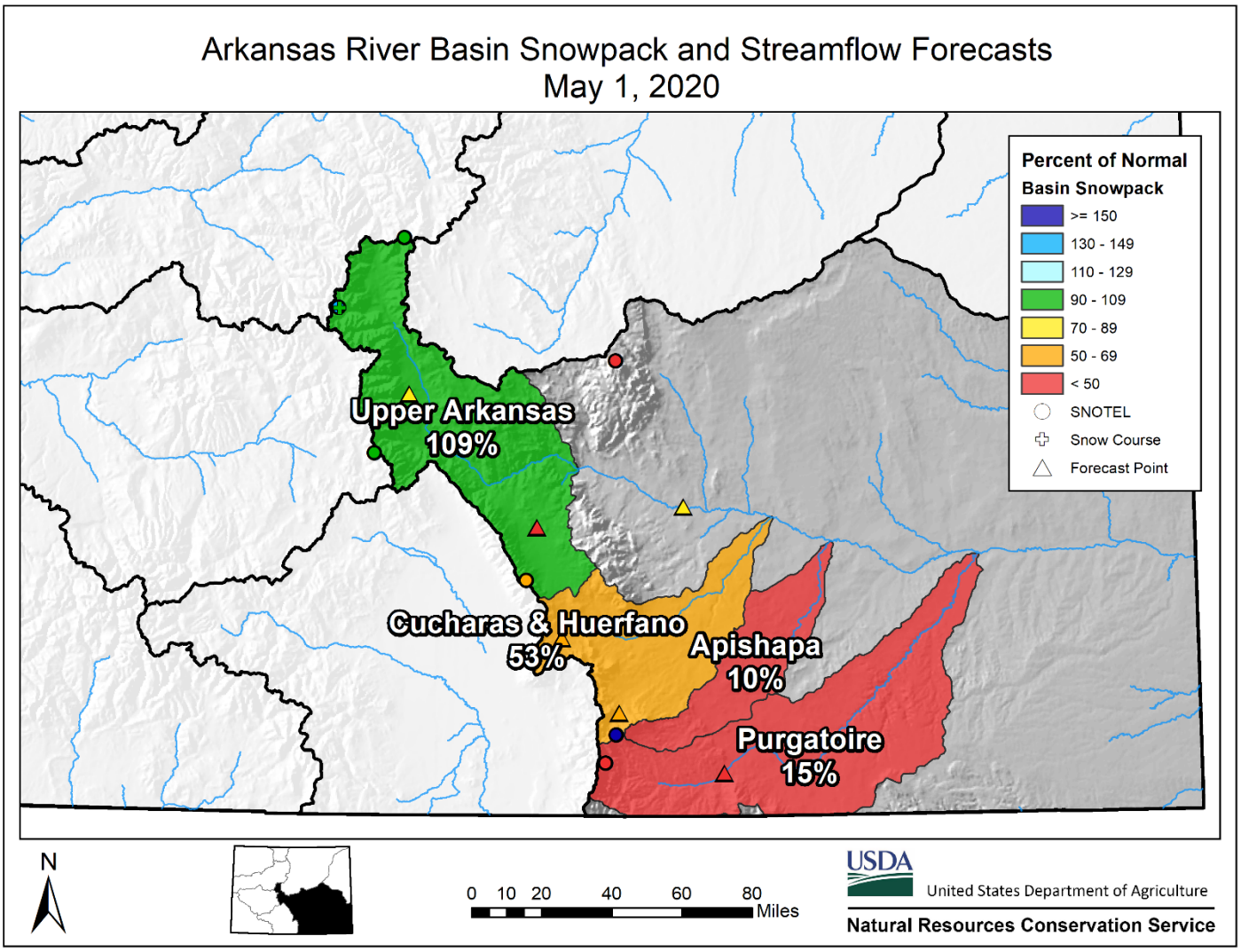
May 1, 2020

Snowpack in the Arkansas River basin is below normal at 81% of the median. Precipitation for April was 34% of average which brings water year-to-date precipitation to 75% of average. Reservoir storage at the end of April was 91% of average compared to 92% last year. Current streamflow forecasts range from 41% of average for Grape Creek near Westcliffe to 87% for the Arkansas River at Salida.




*SWE values calculated using daily SNOTEL data only

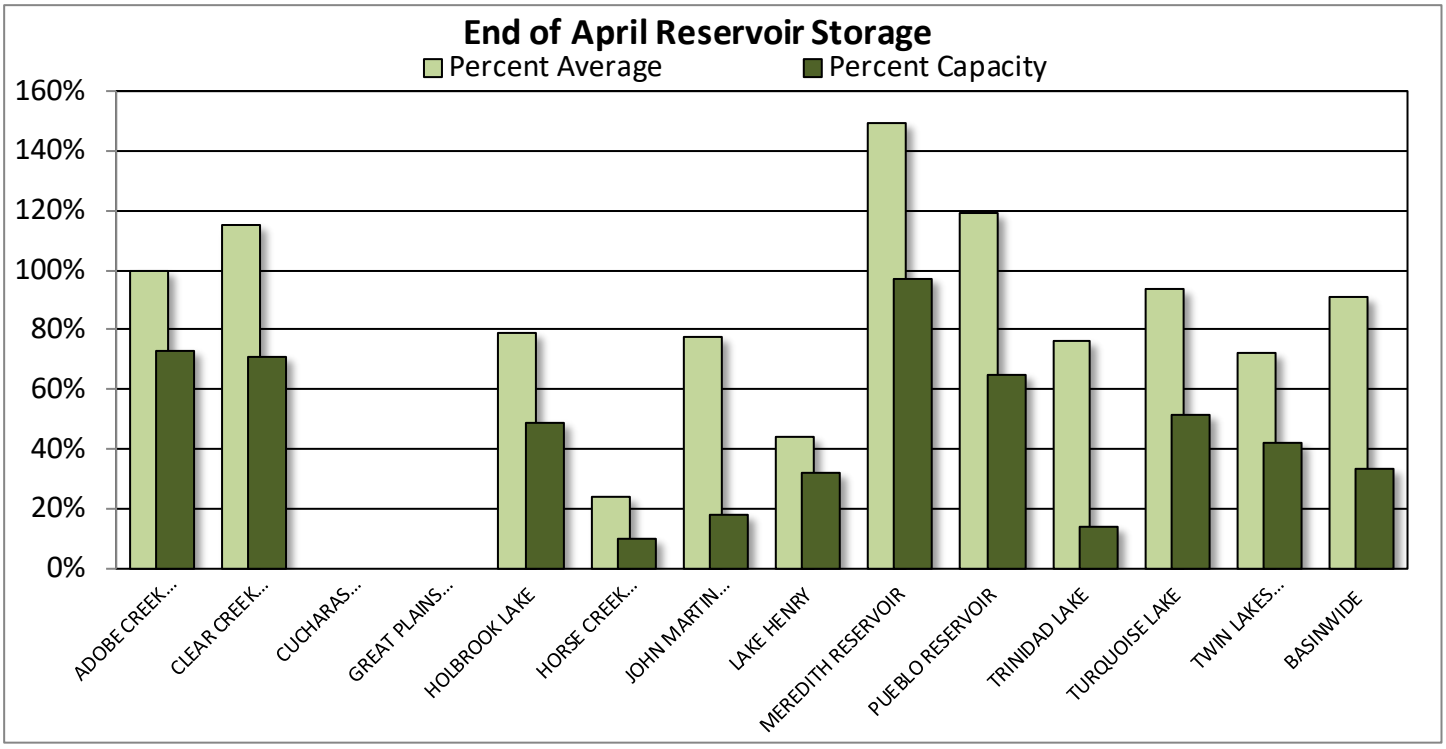





**Watershed Snowpack Analysis May 1st, 2020**

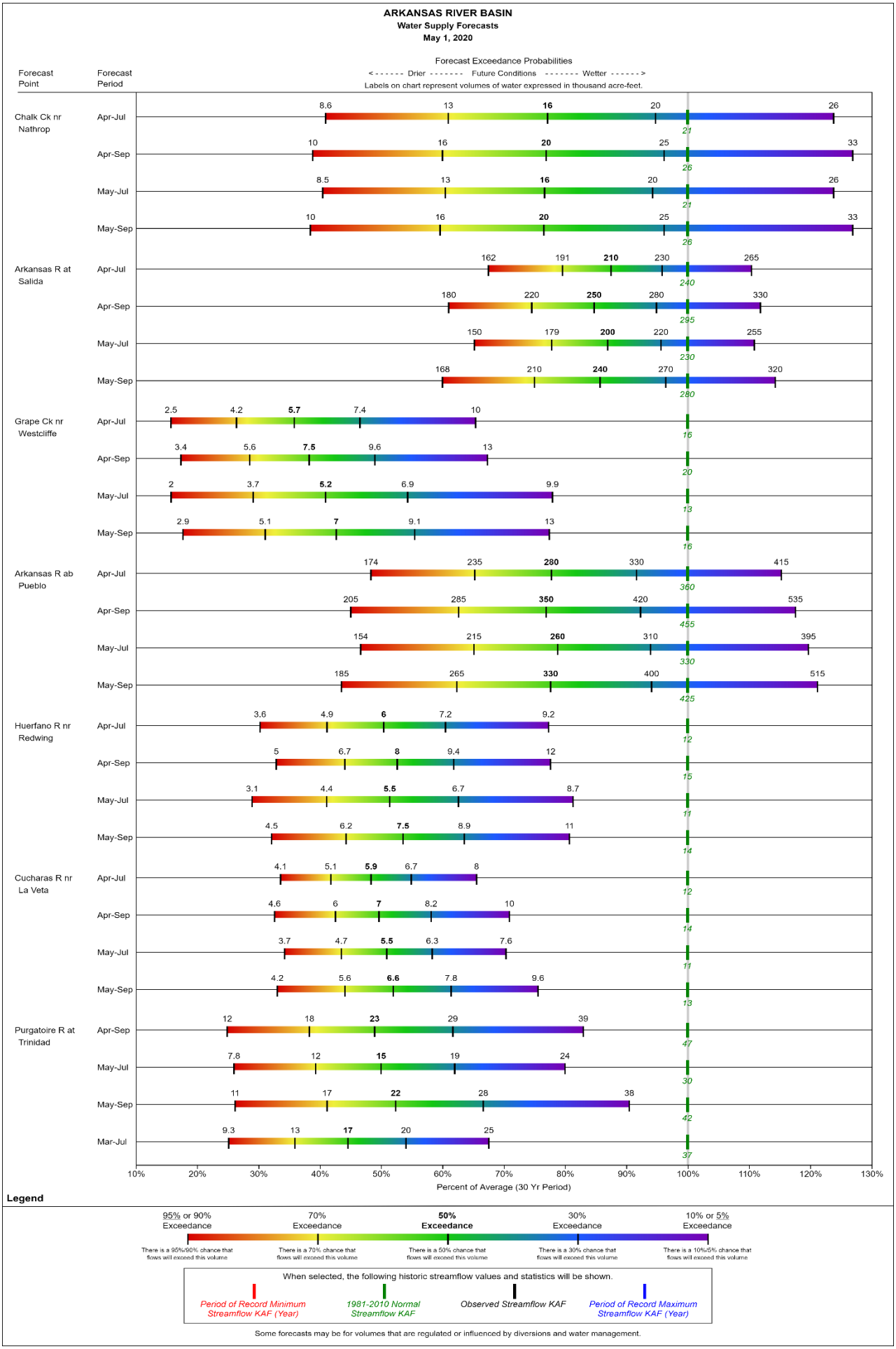
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Upper Arkansas | 4 | 109 | 140 |
| Cucharas & Huerfano | 3 | 53 | 108 |
| Purgatoire | 2 | 15 | 205 |
| **Basin-Wide Total** | 9 | 81 | 125 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

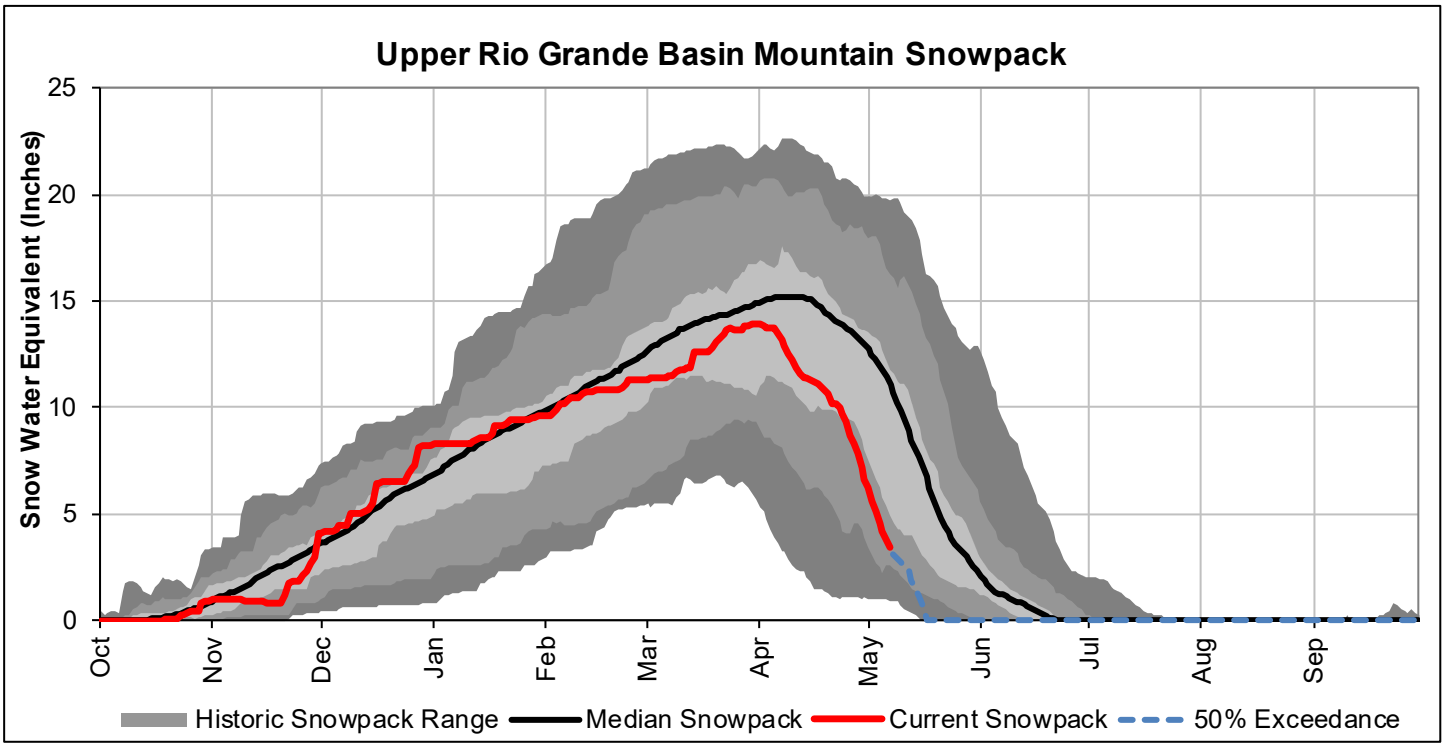
| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| ADOBE CREEK RESERVOIR | 45.2 | 8.3 | 45.2 | 62.0 |
| CLEAR CREEK RESERVOIR | 8.1 | 7.6 | 7.0 | 11.4 |
| CUCHARAS RESERVOIR | | | | 40.0 |
| GREAT PLAINS RESERVOIR | | | | 150.0 |
| HOLBROOK LAKE | 3.4 | 0.3 | 4.3 | 7.0 |
| HORSE CREEK RESERVOIR | 2.7 | 26.6 | 11.1 | 27.0 |
| JOHN MARTIN RESERVOIR | 111.8 | 167.4 | 143.9 | 616.0 |
| LAKE HENRY | 3.0 | 6.9 | 6.8 | 9.4 |
| MEREDITH RESERVOIR | 40.8 | 29.6 | 27.3 | 42.0 |
| PUEBLO RESERVOIR | 228.6 | 237.5 | 192.4 | 354.0 |
| TRINIDAD LAKE | 23.1 | 24.2 | 30.4 | 167.0 |
| TURQUOISE LAKE | 65.8 | 42.6 | 70.4 | 127.0 |
| TWIN LAKES RESERVOIR | 36.0 | 22.0 | 50.1 | 86.0 |
| **BASINWIDE** | 568.5 | 572.9 | 588.9 | 1698.8 |
| Number of Reservoirs | 11 | 11 | 11 | 13 |


ARKANSAS RIVER BASIN
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
< ------ Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
Chalk Ck nr Nathrop
Apr-Jul 8.6 13 16 20 26 21
Apr-Sep 10 16 20 25 33 26
May-Jul 8.5 13 16 20 26 21
May-Sep 10 16 20 25 33 26
Arkansas R at Salida
Apr-Jul 162 191 210 230 265 240
Apr-Sep 180 220 250 280 330 295
May-Jul 150 179 200 220 255 230
May-Sep 168 210 240 270 320 280
Grape Ck nr Westcliffe
Apr-Jul 2.5 4.2 5.7 7.4 10 16
Apr-Sep 3.4 5.6 7.5 9.6 13 20
May-Jul 2 3.7 5.2 6.9 9.9 13
May-Sep 2.9 5.1 7 9.1 13 16
Arkansas R ab Pueblo
Apr-Jul 174 235 280 330 415 360
Apr-Sep 205 285 350 420 535 455
May-Jul 154 215 260 310 395 330
May-Sep 185 265 330 400 515 425
Huerfano R nr Redwing
Apr-Jul 3.6 4.9 6 7.2 9.2 12
Apr-Sep 5 6.7 8 9.4 12 15
May-Jul 3.1 4.4 5.5 6.7 8.7 11
May-Sep 4.5 6.2 7.5 8.9 11 14
Cucharas R nr La Veta
Apr-Jul 4.1 5.1 5.9 6.7 8 12
Apr-Sep 4.6 6 7 8.2 10 14
May-Jul 3.7 4.7 5.5 6.3 7.6 11
May-Sep 4.2 5.6 6.6 7.8 9.6 13
Purgatoire R at Trinidad
Apr-Sep 12 18 23 29 39 47
May-Jul 7.8 12 15 19 24 30
May-Sep 11 17 22 28 38 42
Mar-Jul 9.3 13 17 20 25 37
10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 110% 120% 130%
Percent of Average (30 Yr Period)
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)
1981-2010 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.

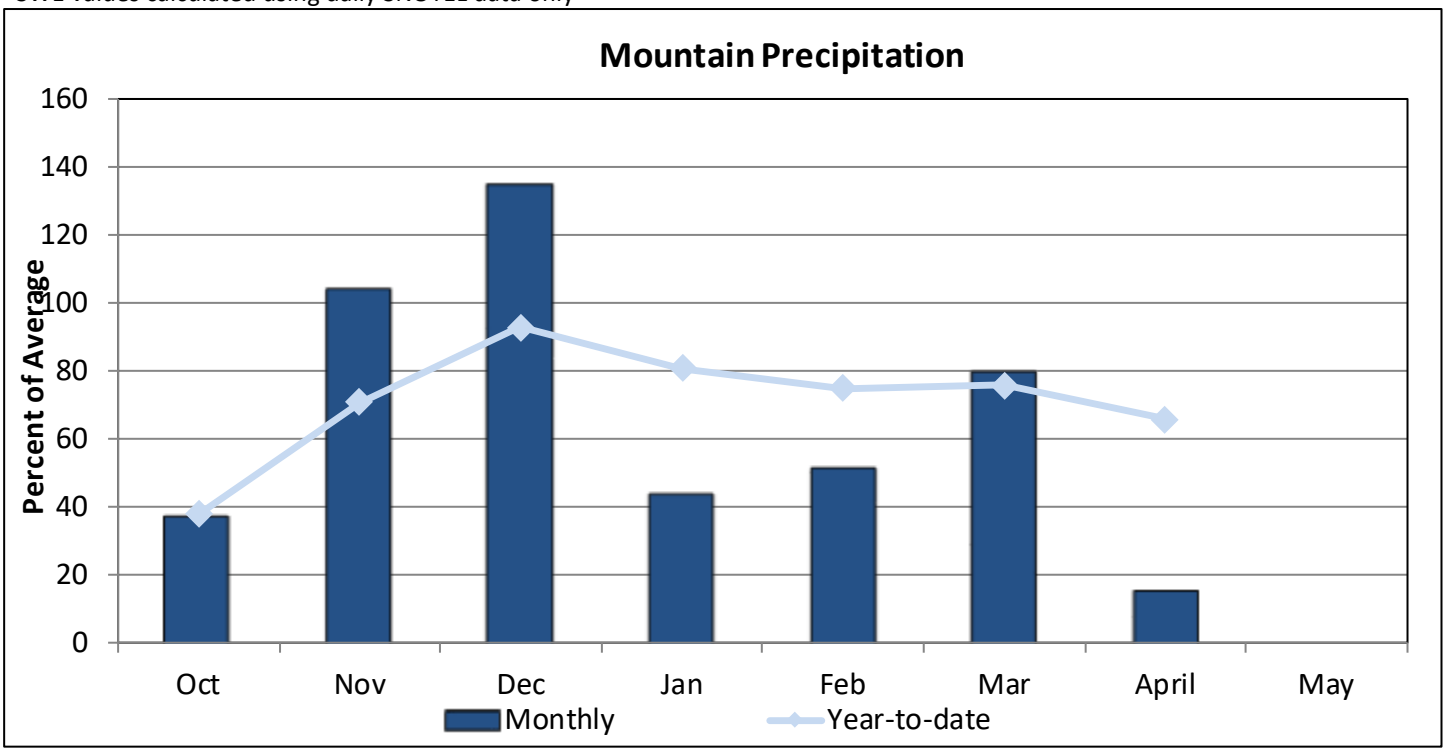
# UPPER RIO GRANDE RIVER BASIN

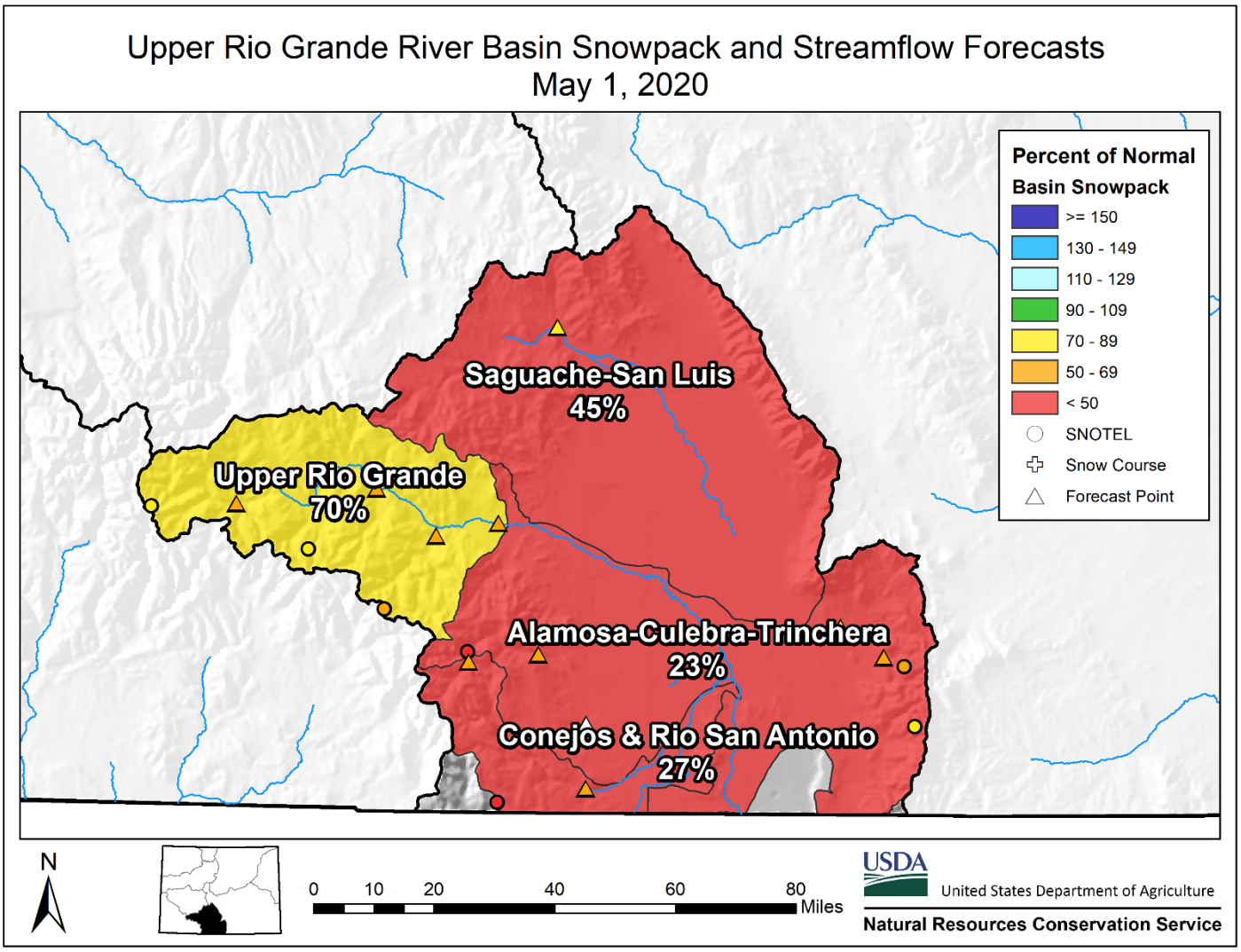
May 1, 2020

Snowpack in the Upper Rio Grande River basin is below normal at 52% of median. Precipitation for April was 16% of average which brings water year-to-date precipitation to 66% of average. Reservoir storage at the end of April was 78% of average compared to 79% last year. Current streamflow forecasts range from 28% of average for San Antonio River at Ortiz to 75% for Saguache Creek near Saguache.




*SWE values calculated using daily SNOTEL data only

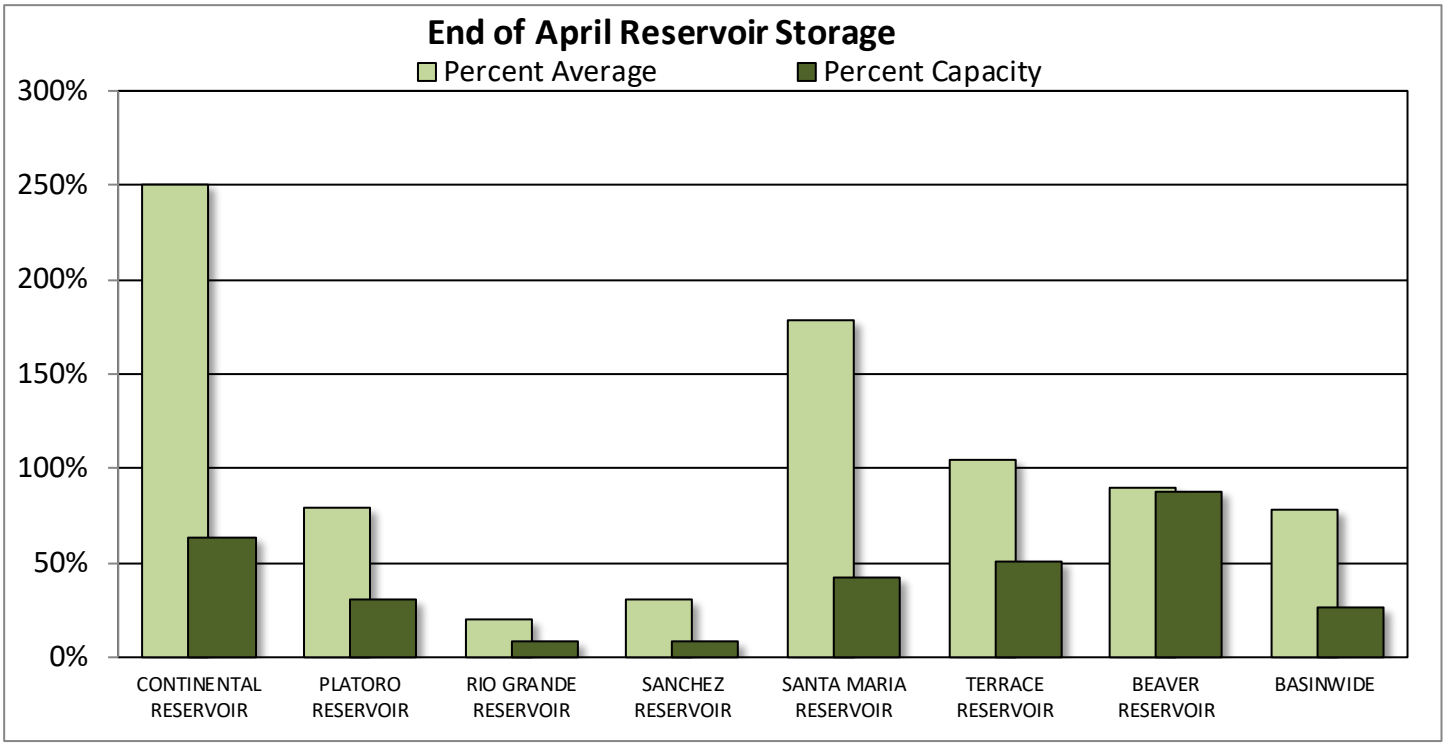





**Watershed Snowpack Analysis May 1st, 2020**

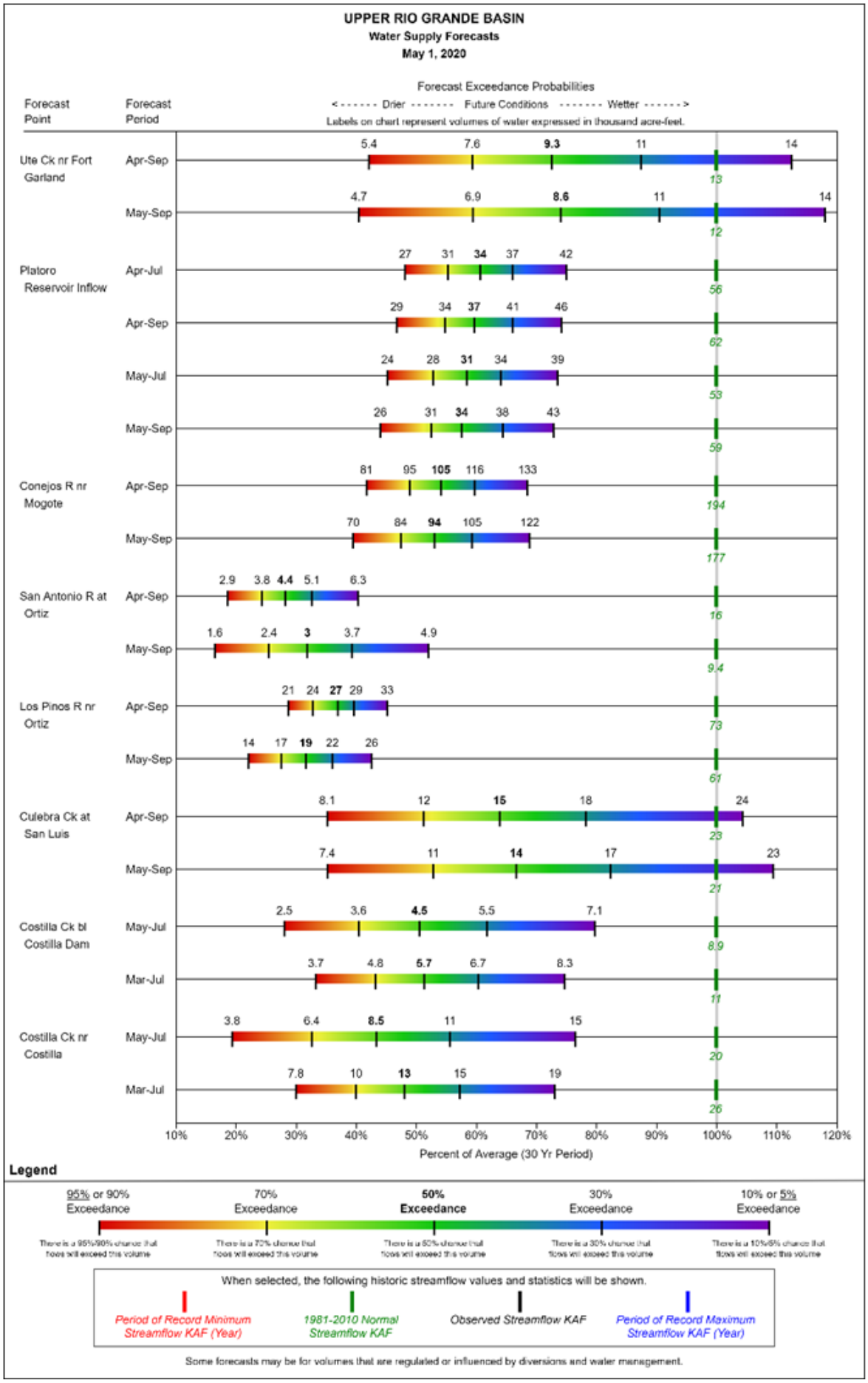
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Alamosa Creek | 1 | 0 | 115 |
| Conejos & Rio San Antonio | 2 | 27 | 131 |
| Culebra & Trinchera Creek | 3 | 37 | 121 |
| Upper Rio Grande | 5 | 70 | 139 |
| **Basin-Wide Total** | 11 | 52 | 134 |

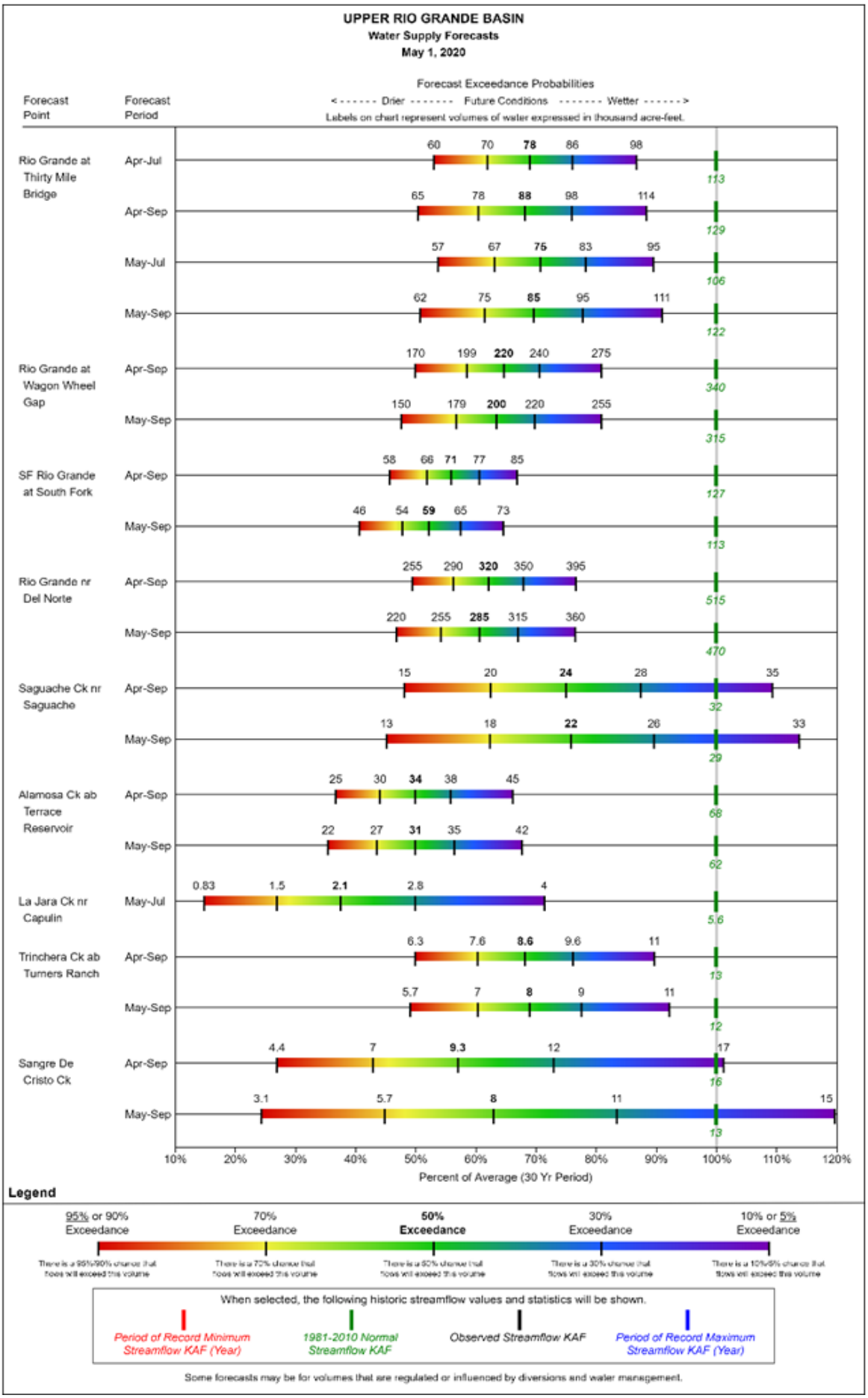
*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| CONTINENTAL RESERVOIR | 17.3 | 18.4 | 6.9 | 27.0 |
| PLATORO RESERVOIR | 18.6 | 19.3 | 23.5 | 60.0 |
| RIO GRANDE RESERVOIR | 4.2 | 6.8 | 20.8 | 51.0 |
| SANCHEZ RESERVOIR | 9.0 | 8.7 | 29.0 | 103.0 |
| SANTA MARIA RESERVOIR | 19.1 | 19.6 | 10.7 | 45.0 |
| TERRACE RESERVOIR | 9.1 | 6.2 | 8.7 | 18.0 |
| BEAVER RESERVOIR | 3.9 | 2.9 | 4.4 | 4.5 |
| **BASINWIDE** | 81.2 | 81.9 | 104.0 | 308.5 |
| Number of Reservoirs | 7 | 7 | 7 | 7 |


UPPER RIO GRANDE BASIN
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
Forecast Point
Forecast Period
< ------ Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Ute Ck nr Fort Garland
Apr-Sep 5.4 7.6 9.3 11 14 13
May-Sep 4.7 6.9 8.6 11 14 12
Platoro Reservoir Inflow
Apr-Jul 27 31 34 37 42 56
Apr-Sep 29 34 37 41 46 62
May-Jul 24 28 31 34 39 53
May-Sep 26 31 34 38 43 59
Conejos R nr Mogote
Apr-Sep 81 95 105 116 133 194
May-Sep 70 84 94 105 122 177
San Antonio R at Ortiz
Apr-Sep 2.9 3.8 4.4 5.1 6.3 16
May-Sep 1.6 2.4 3 3.7 4.9 9.4
Los Pinos R nr Ortiz
Apr-Sep 21 24 27 29 33 73
May-Sep 14 17 19 22 26 61
Culebra Ck at San Luis
Apr-Sep 8.1 12 15 18 24 23
May-Sep 7.4 11 14 17 23 21
Costilla Ck bl Costilla Dam
May-Jul 2.5 3.6 4.5 5.5 7.1 8.9
Mar-Jul 3.7 4.8 5.7 6.7 8.3 11
Costilla Ck nr Costilla
May-Jul 3.8 6.4 8.5 11 15 20
Mar-Jul 7.8 10 13 15 19 26
10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 110% 120%
Percent of Average (30 Yr Period)
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)
1981-2010 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 BASIN
Water Supply Forecasts
May 1, 2020
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 60 70 78 86 98 113
Apr-Sep 65 78 88 98 114 129
May-Jul 57 67 75 83 95 106
May-Sep 62 75 85 95 111 122
Rio Grande at Wagon Wheel Gap
Apr-Sep 170 199 220 240 275 340
May-Sep 150 179 200 220 255 315
SF Rio Grande at South Fork
Apr-Sep 58 66 71 77 85 127
May-Sep 46 54 59 65 73 113
Rio Grande nr Del Norte
Apr-Sep 255 290 320 350 395 515
May-Sep 220 255 285 315 360 470
Saguache Ck nr Saguache
Apr-Sep 15 20 24 28 35 32
May-Sep 13 18 22 26 33 29
Alamosa Ck ab Terrace Reservoir
Apr-Sep 25 30 34 38 45 68
May-Sep 22 27 31 35 42 62
La Jara Ck nr Capulin
May-Jul 0.83 1.5 2.1 2.8 4 5.6
Trinchera Ck ab Turners Ranch
Apr-Sep 6.3 7.6 8.6 9.6 11 13
May-Sep 5.7 7 8 9 11 12
Sangre De Cristo Ck
Apr-Sep 4.4 7 9.3 12 17 16
May-Sep 3.1 5.7 8 11 15 13
10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 110% 120%
Percent of Average (30 Yr Period)
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
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There is a 10%/5% chance that flows will exceed this volume
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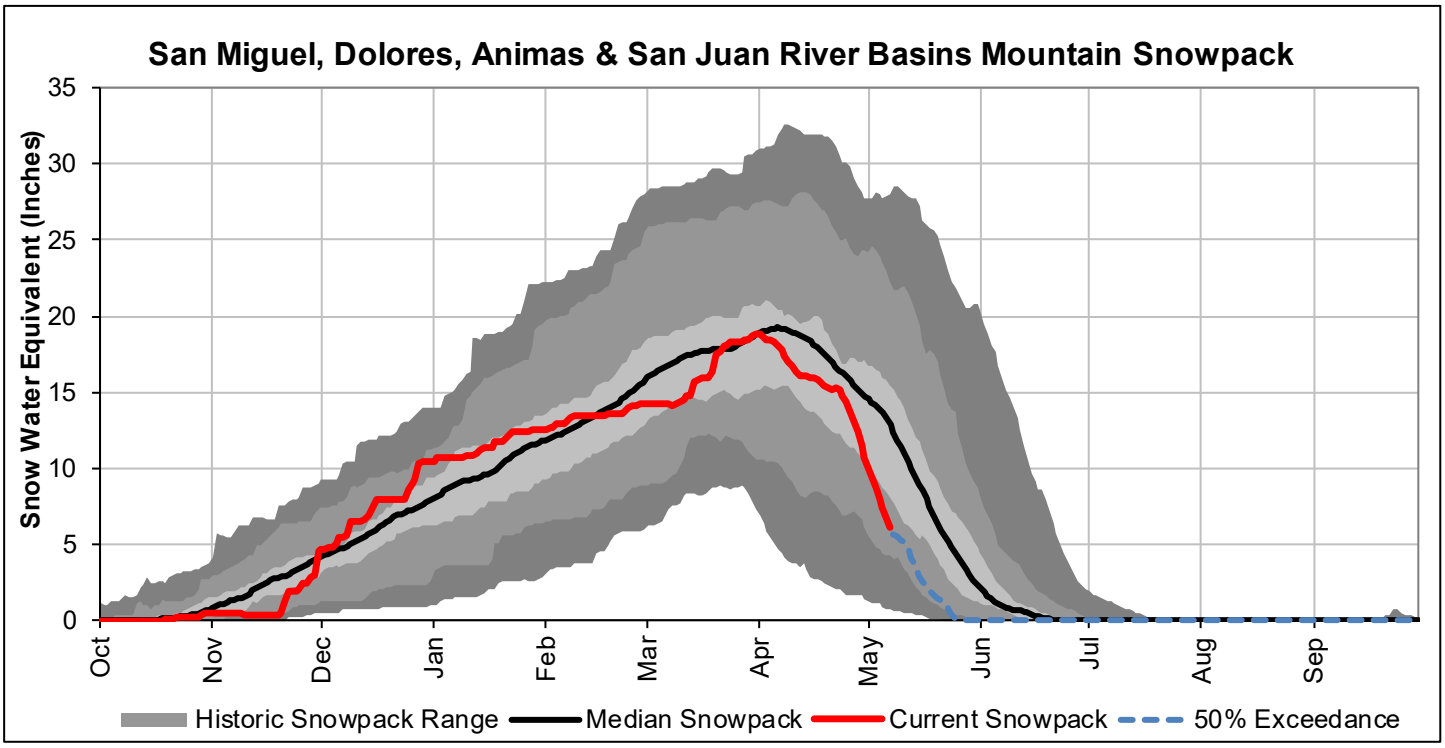
Observed Streamflow KAF
Period of Record Maximum Streamflow KAF (Year)
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

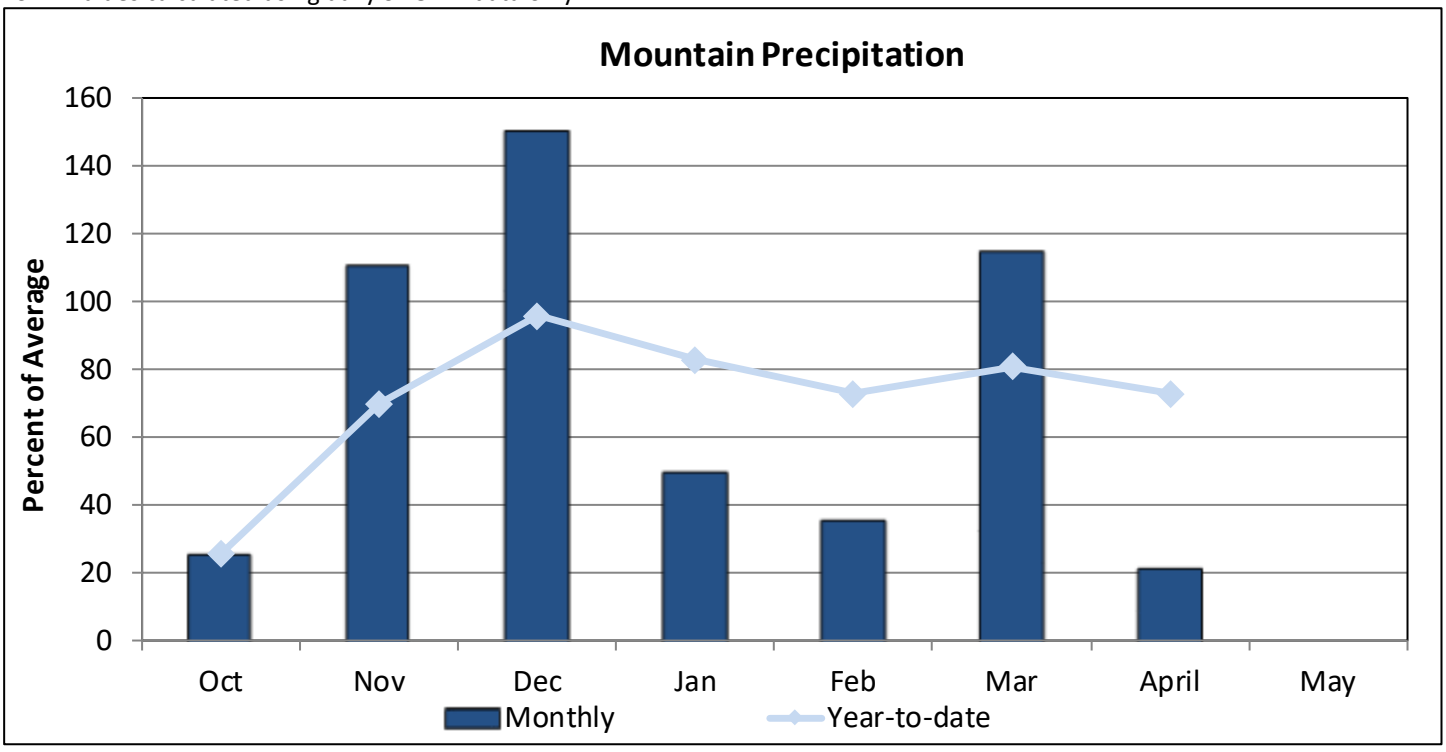
# SAN MIGUEL, DOLORES, ANIMAS, AND SAN JUAN RIVER BASINS

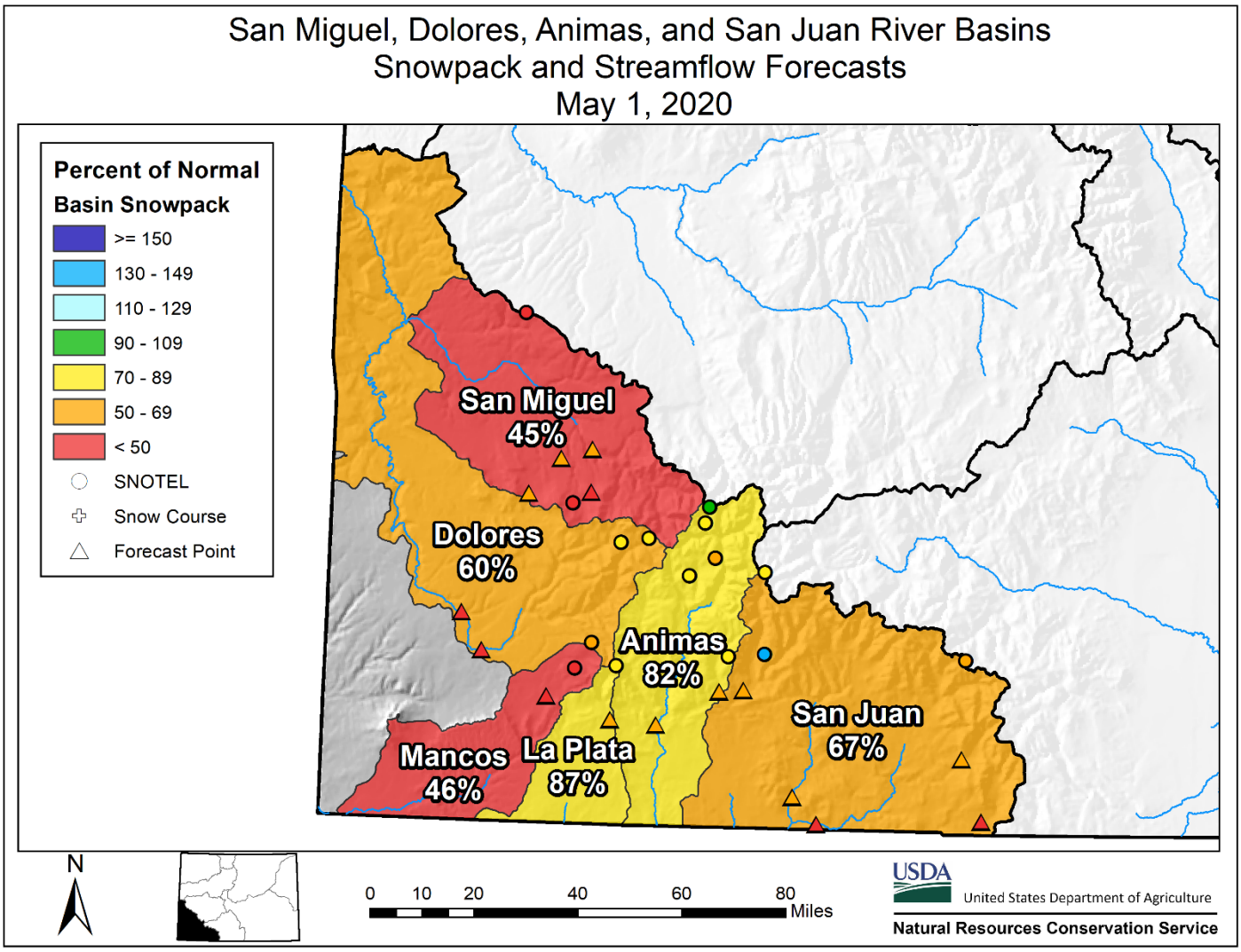
May 1, 2020

Snowpack in the combined southwest river basins is below normal at 72% of median. Precipitation for April was 22% of average which brings water year-to-date precipitation to 73% of average. Reservoir storage at the end of April was 95% of average compared to 76% last year. Current streamflow forecasts range from 42% of average for the Mancos River near Mancos to 65% for the Vallecito Reservoir Inflow.




*SWE values calculated using daily SNOTEL data only

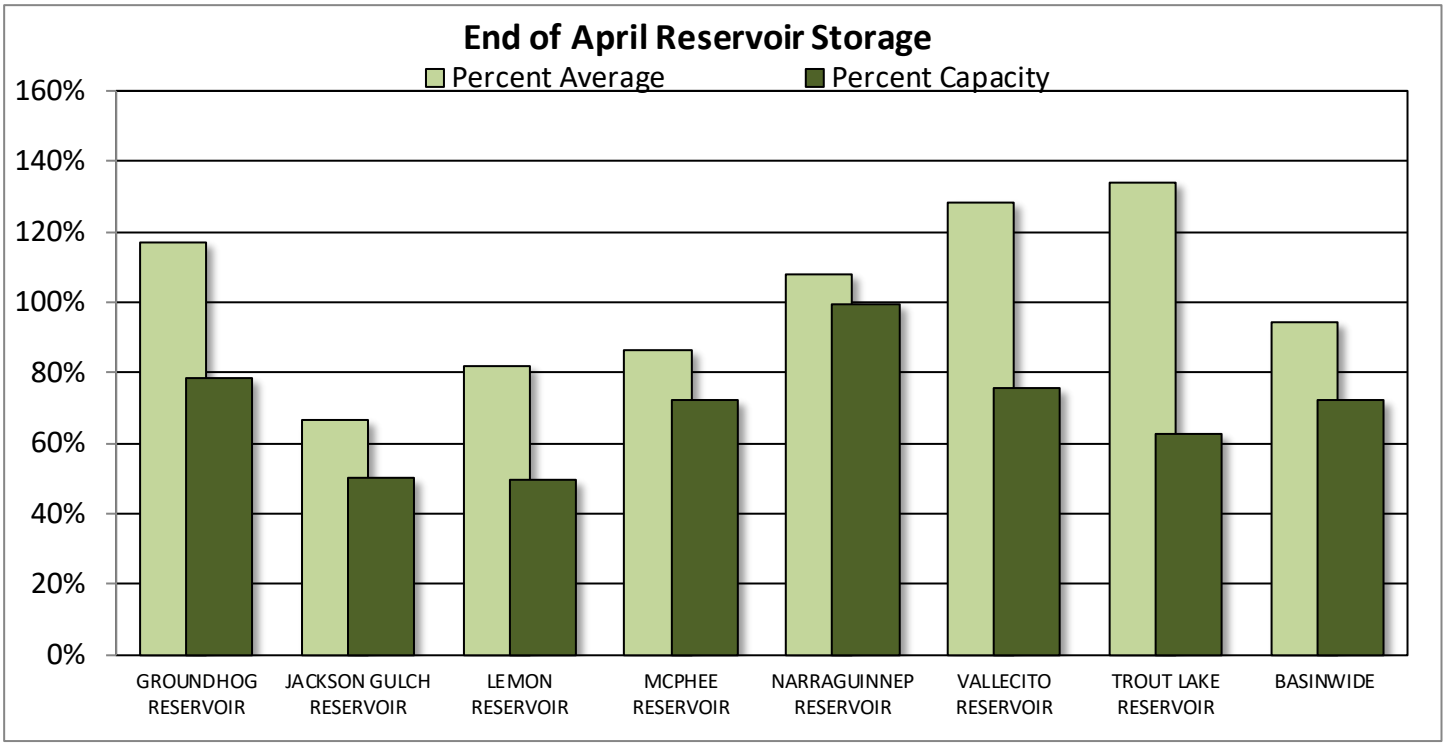





**Watershed Snowpack Analysis May 1st, 2020**

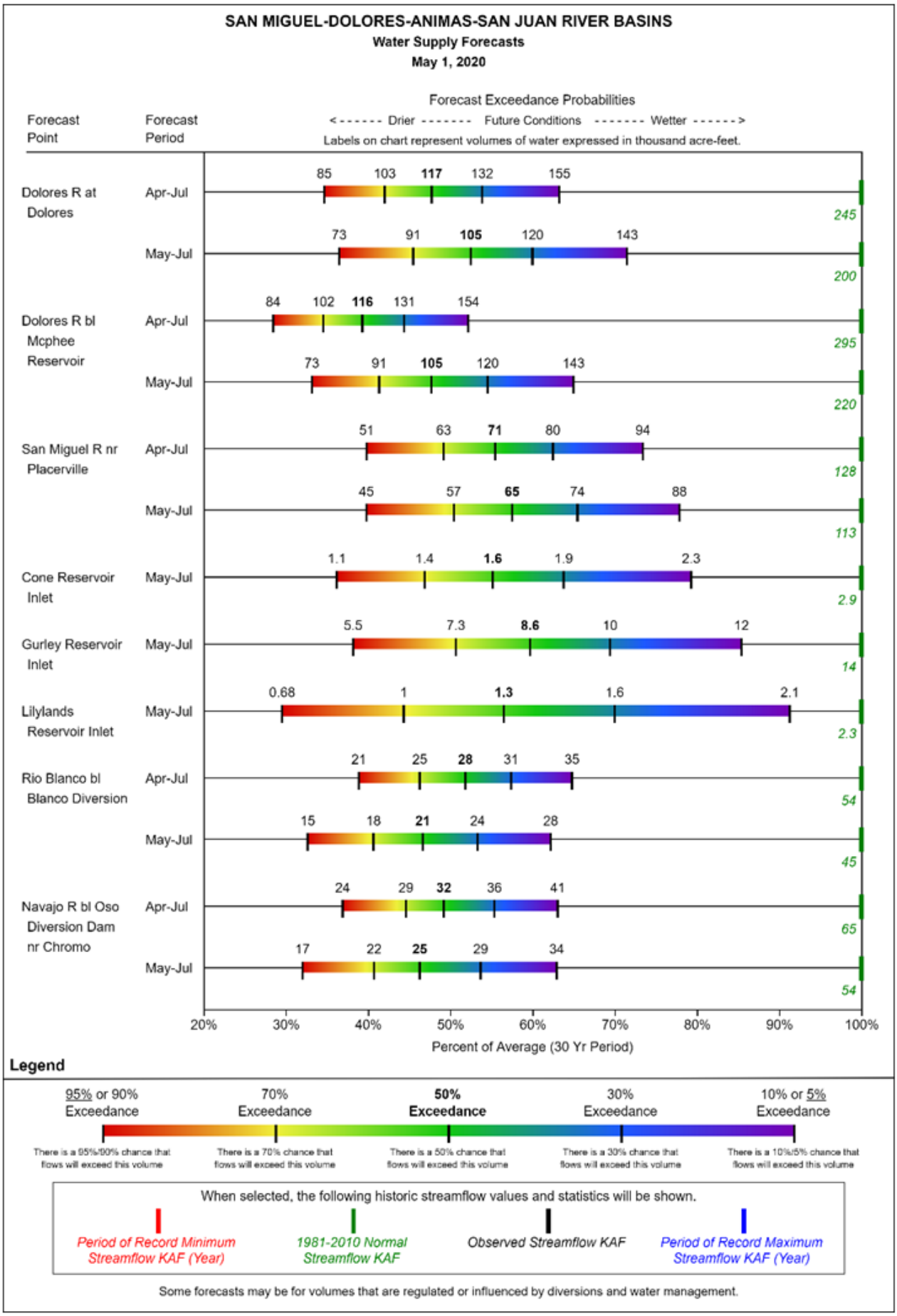
| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Animas | 9 | 82 | 166 |
| Dolores | 5 | 60 | 211 |
| San Miguel | 3 | 45 | 225 |
| San Juan | 3 | 67 | 131 |
| **Basin-Wide Total** | 19 | 72 | 168 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of April 2020**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| GROUNDHOG RESERVOIR | 17.3 | 5.3 | 14.8 | 22.0 |
| JACKSON GULCH RESERVOIR | 5.0 | 5.0 | 7.5 | 10.0 |
| LEMON RESERVOIR | 19.8 | 12.5 | 24.1 | 40.0 |
| MCPHEE RESERVOIR | 276.0 | 258.4 | 319.4 | 381.0 |
| NARRAGUINNEP RESERVOIR | 18.9 | 19.0 | 17.5 | 19.0 |
| VALLECITO RESERVOIR | 95.1 | 47.1 | 74.2 | 126.0 |
| TROUT LAKE RESERVOIR | 2.0 | 2.4 | 1.5 | 3.2 |
| **BASINWIDE** | 434.1 | 349.8 | 459.0 | 601.2 |
| Number of Reservoirs | 7 | 7 | 7 | 7 |


SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
Forecast Point
Forecast Period
< ------ Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Dolores R at Dolores
Apr-Jul
85 103 117 132 155
245
May-Jul
73 91 105 120 143
200
Dolores R bl Mcphee Reservoir
Apr-Jul
84 102 116 131 154
295
May-Jul
73 91 105 120 143
220
San Miguel R nr Placerville
Apr-Jul
51 63 71 80 94
128
May-Jul
45 57 65 74 88
113
Cone Reservoir Inlet
May-Jul
1.1 1.4 1.6 1.9 2.3
2.9
Gurley Reservoir Inlet
May-Jul
5.5 7.3 8.6 10 12
14
Lilylands Reservoir Inlet
May-Jul
0.68 1 1.3 1.6 2.1
2.3
Rio Blanco bl Blanco Diversion
Apr-Jul
21 25 28 31 35
54
May-Jul
15 18 21 24 28
45
Navajo R bl Oso Diversion Dam nr Chromo
Apr-Jul
24 29 32 36 41
65
May-Jul
17 22 25 29 34
54
20% 30% 40% 50% 60% 70% 80% 90% 100%
Percent of Average (30 Yr Period)
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
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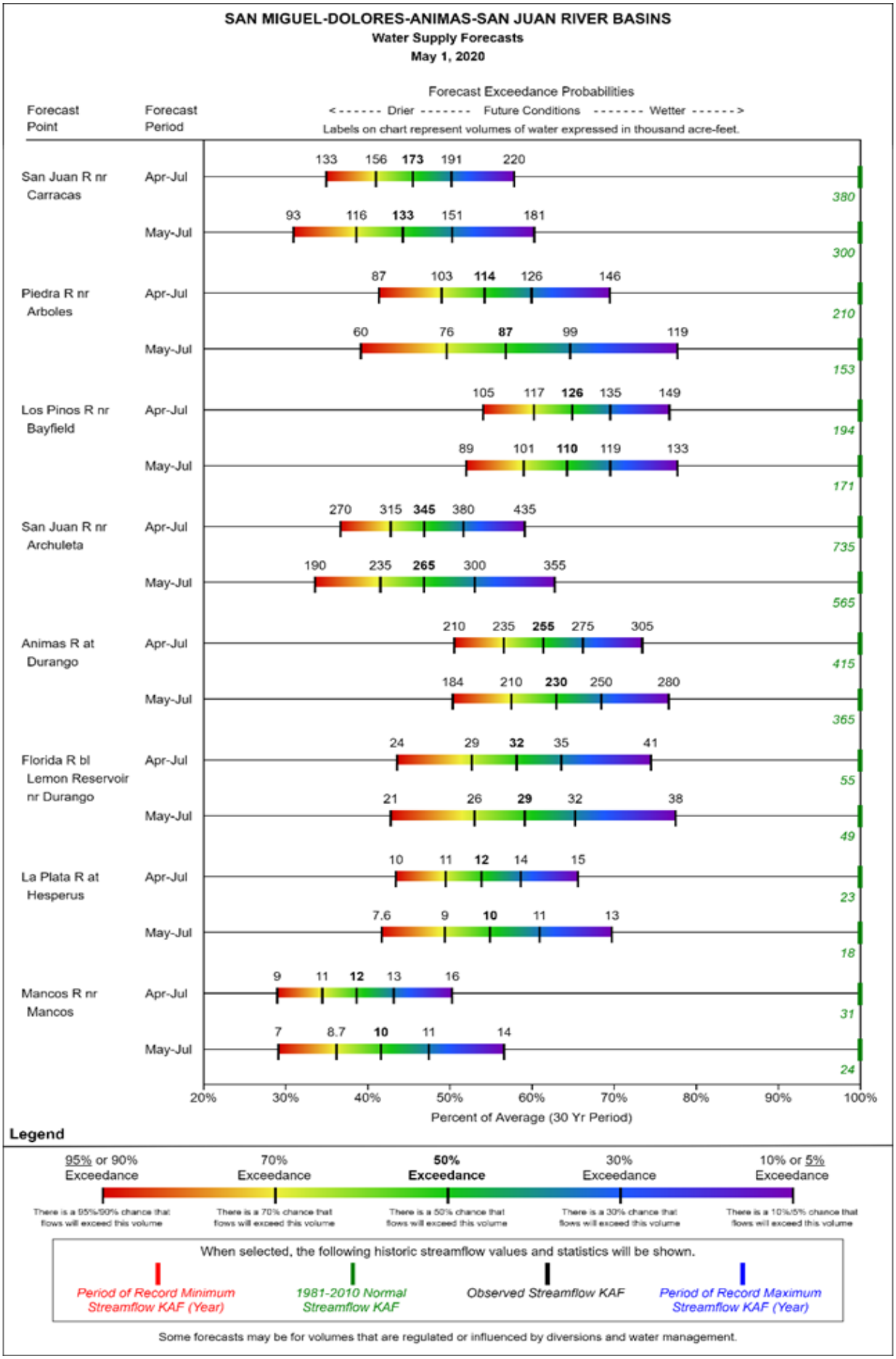
SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS
Water Supply Forecasts
May 1, 2020
Forecast Exceedance Probabilities
< ------ Drier ------- Future Conditions ------- Wetter ------ >
Labels on chart represent volumes of water expressed in thousand acre-feet.
Forecast Point
Forecast Period
San Juan R nr Carracas
Apr-Jul
133 156 173 191 220
380
May-Jul
93 116 133 151 181
300
Piedra R nr Arboles
Apr-Jul
87 103 114 126 146
210
May-Jul
60 76 87 99 119
153
Los Pinos R nr Bayfield
Apr-Jul
105 117 126 135 149
194
May-Jul
89 101 110 119 133
171
San Juan R nr Archuleta
Apr-Jul
270 315 345 380 435
735
May-Jul
190 235 265 300 355
565
Animas R at Durango
Apr-Jul
210 235 255 275 305
415
May-Jul
184 210 230 250 280
365
Florida R bl Lemon Reservoir nr Durango
Apr-Jul
24 29 32 35 41
55
May-Jul
21 26 29 32 38
49
La Plata R at Hesperus
Apr-Jul
10 11 12 14 15
23
May-Jul
7.6 9 10 11 13
18
Mancos R nr Mancos
Apr-Jul
9 11 12 13 16
31
May-Jul
7 8.7 10 11 14
24
20% 30% 40% 50% 60% 70% 80% 90% 100%
Percent of Average (30 Yr Period)
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# 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. The SWE observations at these sites are averaged and normalized to produce these basin snowpack graphs.

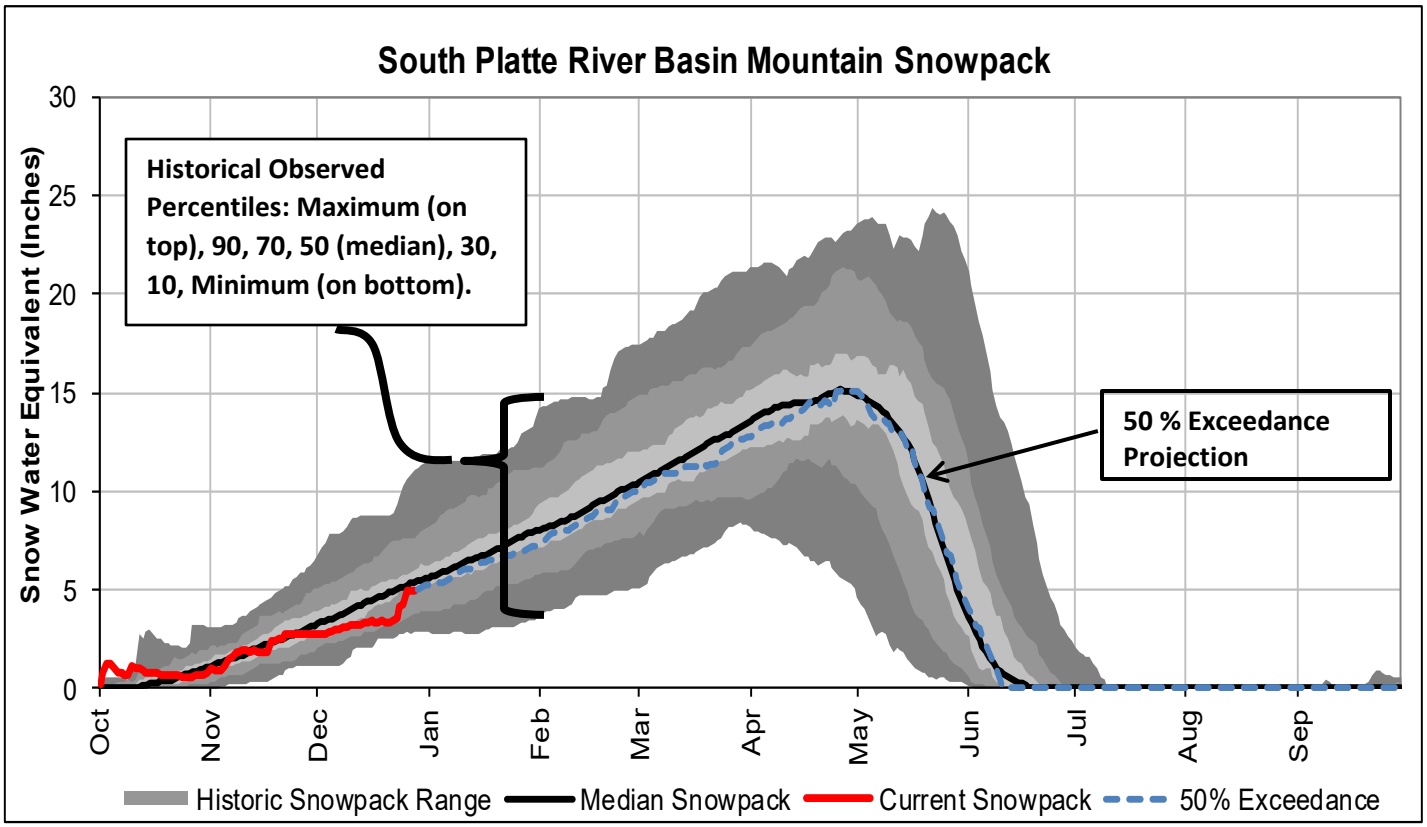
**Current** water year is represented by the heavy red line terminating on the last day the graphic was updated.

**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 % Excedance 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:*

**Brian Domonkos**
**Snow Survey Supervisor**
**USDA, Natural Resources Conservation Service**
**Denver Federal Center, Bldg 56, Rm 2604**
**PO Box 25426**
**Denver, CO 80225-0426**
**Phone (720) 544-2852**
**Website: http://www.nrcs.usda.gov/wps/portal/nrcs/main/co/snow/**

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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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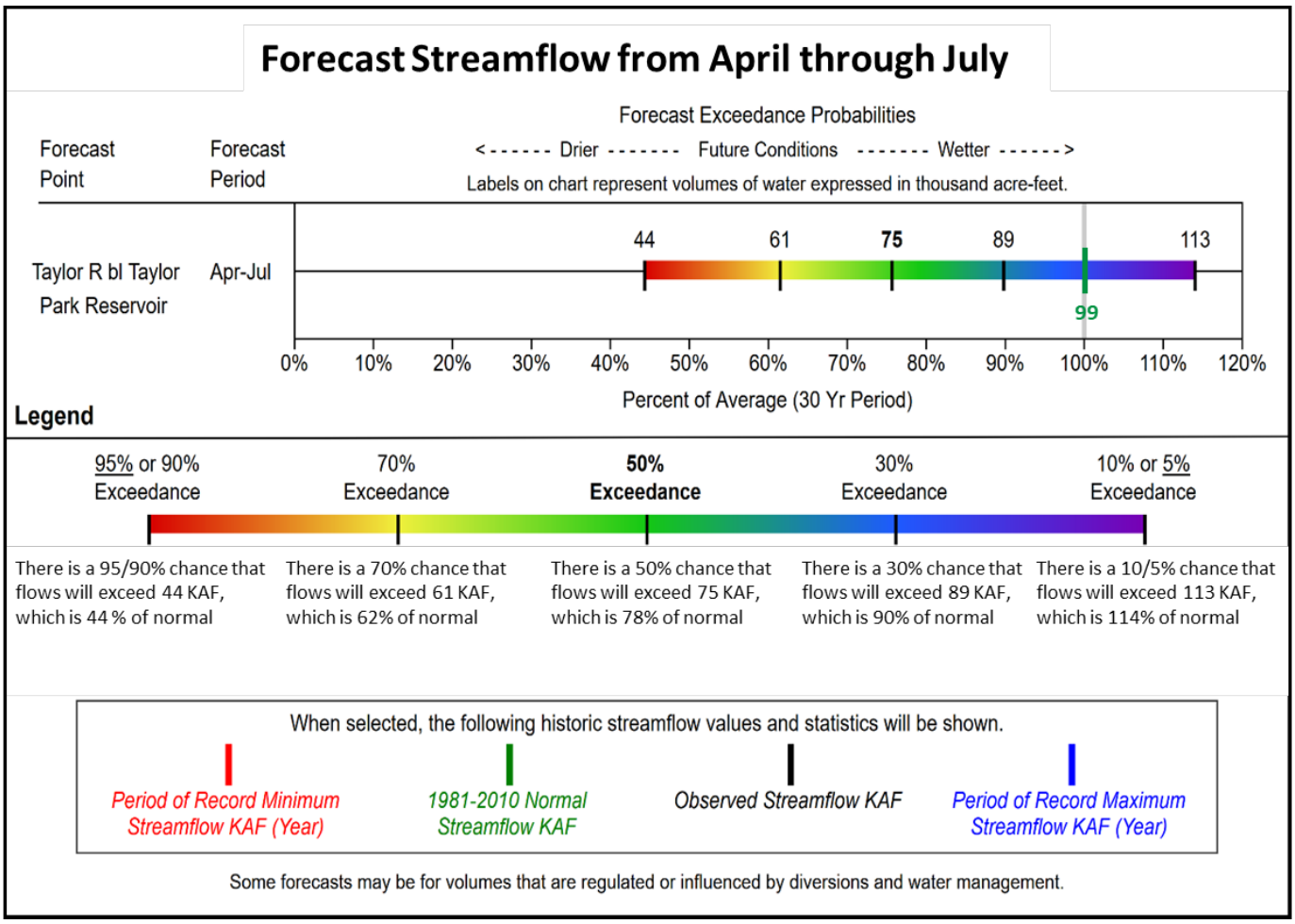
# Interpreting the Forecast Graphics

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 average represented by each forecast and the gray line centered above 100% represents the 1981-2010 historical average 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 average streamflow volumes during the provided forecast period. Conversely, if the majority of the color bar is to the left of the average mark, below average 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.



Denver Federal Center, Bldg 56, Rm 2604
PO Box 25426
Denver, CO 80225-0426

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.wcc.nrcs.usda.gov/wsf/westwide.html

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*Issued by*

**Matthew J. Lohr**
**Chief, Natural Resources Conservation Service**
**Farm Production and Conservation Mission Area**
**U.S. Department of Agriculture**

*Released by*

**Clint Evans**
**State Conservationist**
**Natural Resources Conservation Service**
**Lakewood, Colorado**

# Colorado
# Water Supply Outlook Report
**Natural Resources Conservation Service**
**Lakewood, CO**