



Natural
Resources
Conservation
Service

Arizona

Basin Outlook Report

April 1, 2020



Issued by

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Basin Outlook Reports And Federal – State – Private Cooperative Snow Surveys

How forecasts are made

Most of the annual streamflow in Arizona 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 Snow Telemetry (SNOTEL) sites, along with precipitation and streamflow values, are used in statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service (NRCS) the National Weather Service, and the Salt River Project.

Forecasts of any kind are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertainty 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 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 are concerned about having an adequate water supply, they may want to base their decisions on the 90% or 70% exceedance probability forecasts. On the other hand, if users anticipate receiving too much water, or are concerned about the threat of flooding, they may want to base their decisions on the 30% or 10% exceedance probability forecasts. Regardless of the forecast value users choose, they should be prepared to deal with either more or less water.



For more water supply and resource management information, contact:

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ARIZONA Basin Outlook Report as of April 1, 2020

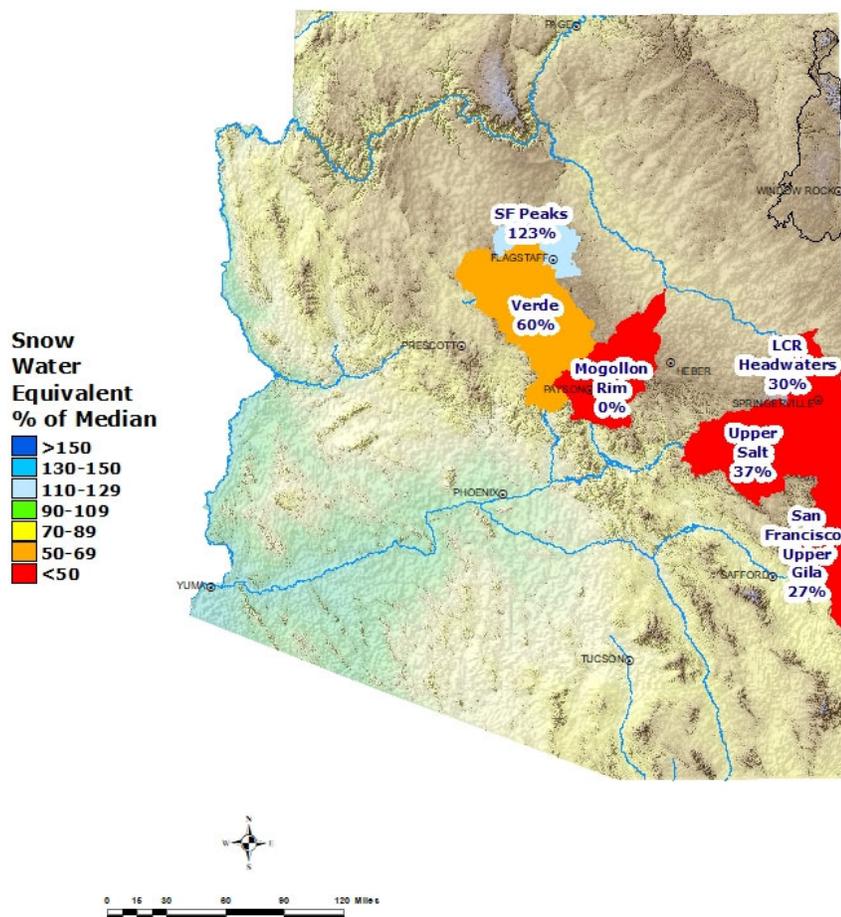
SUMMARY

As of April 1, snowpack levels are well below normal throughout the major basins of the state. Precipitation for the month of March was well above normal in the major river basins. The Salt and Verde River reservoir system stands at 97 percent of capacity, while San Carlos Reservoir is at 23 percent of capacity. The forecast calls for below normal to above normal runoff in the major basins for the spring runoff period.

SNOWPACK

Snow water equivalent levels in the state's major river basins are well below normal, ranging from 60 percent of median in the Verde River Basin to 27 percent of median in the Gila River Basin. The statewide snowpack is well below normal at 70 percent of median.

**Arizona
Snow Water Equivalent
as of April 1, 2020**

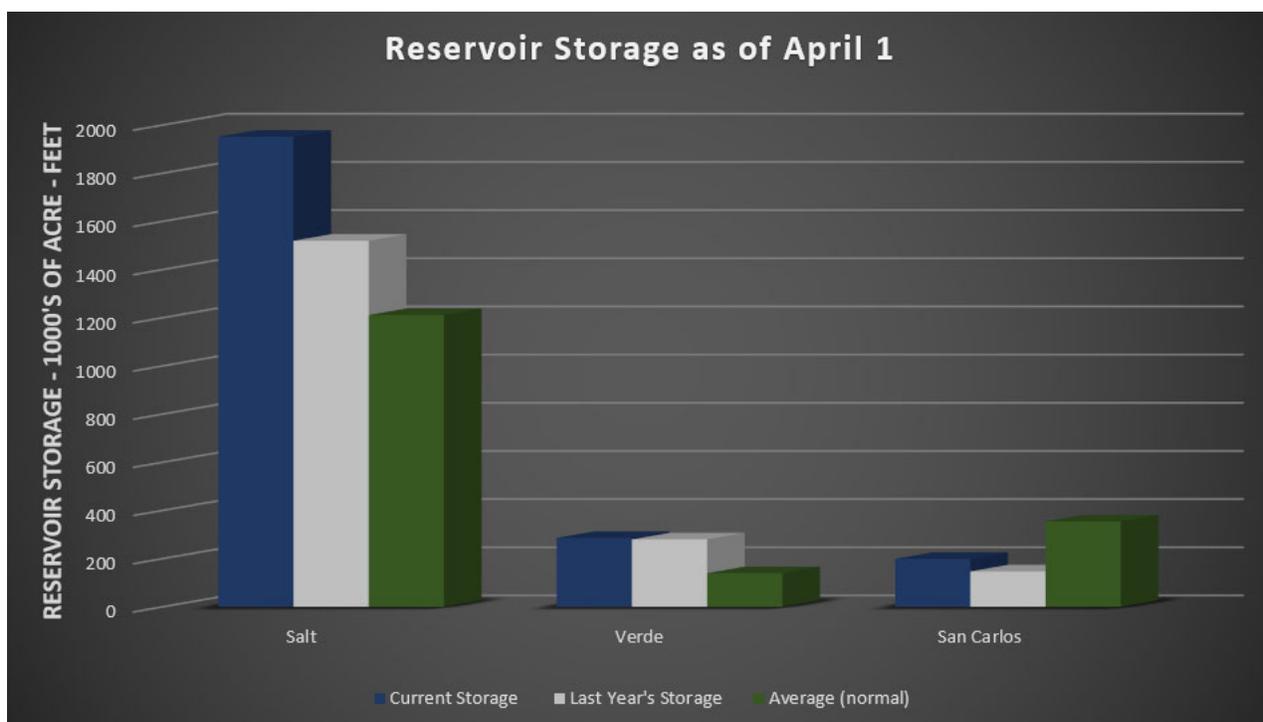


PRECIPITATION

Mountain data from NRCS SNOTEL sites and NWS Cooperator gages show that precipitation for March was well above average in the major river basins. Cumulative precipitation since October 1 is slightly above normal throughout the basins. Please refer to the precipitation bar graphs found in this report for more information on precipitation levels in the basins.

RESERVOIR STORAGE

As of April 1, the Salt and Verde River reservoir system stands at 97 percent of capacity. San Carlos Reservoir is currently at 23 percent of capacity.



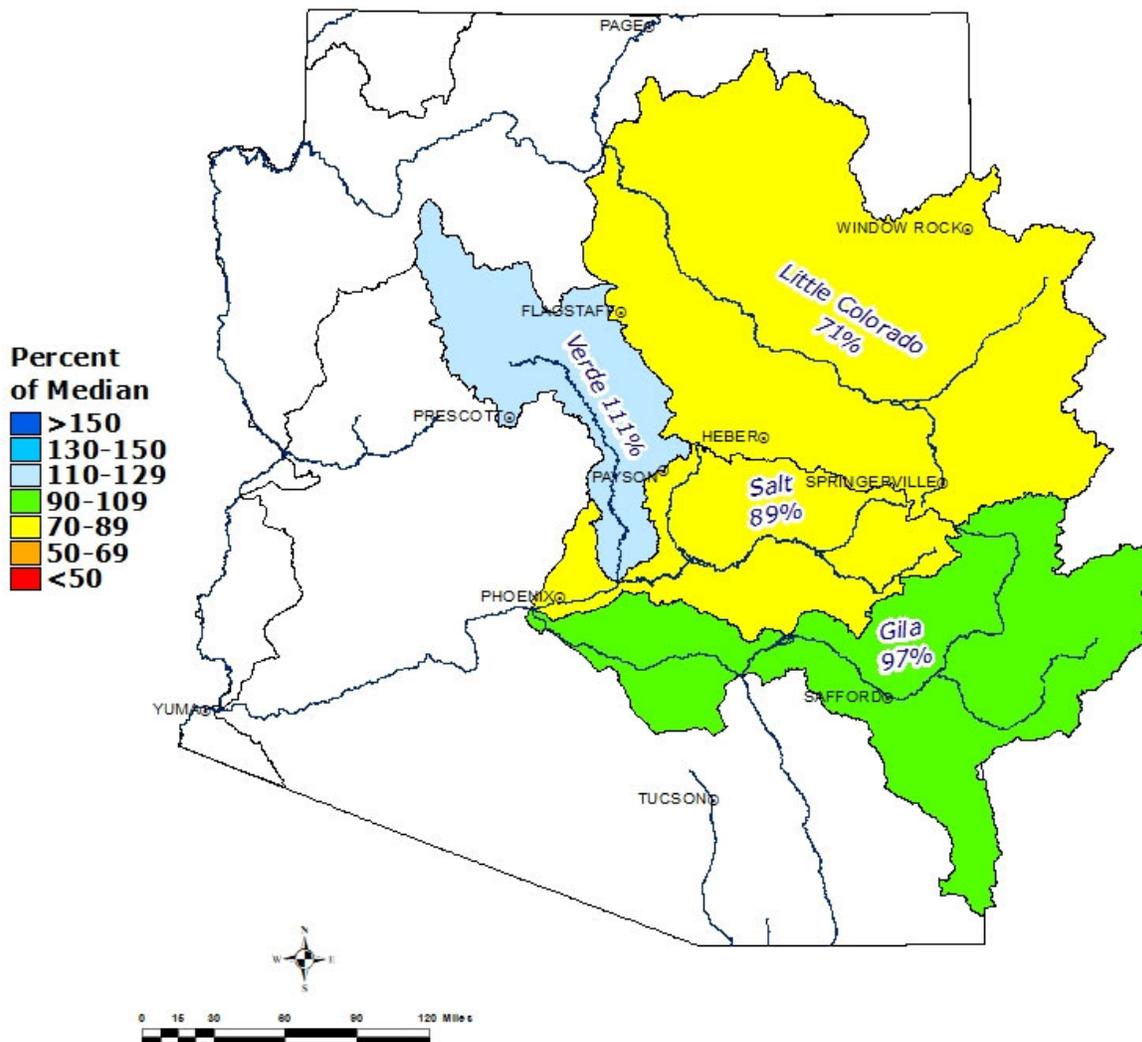
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1952.2	1520.3	1181.0	2025.8
Verde River System	286.6	280.5	135.7	287.4
San Carlos Reservoir	199.7	147.6	324.9	875.0
Lyman Lake	15.1	11.1	11.8	30.0
Lake Havasu	546.9	579.4	562.7	619.0
Lake Mohave	1708.1	1687.0	1602.0	1810.0
Lake Mead	11602.0	10877.0	20297.0	26159.0
Lake Powell	11812.0	9049.0	17745.0	24322.0

STREAMFLOW

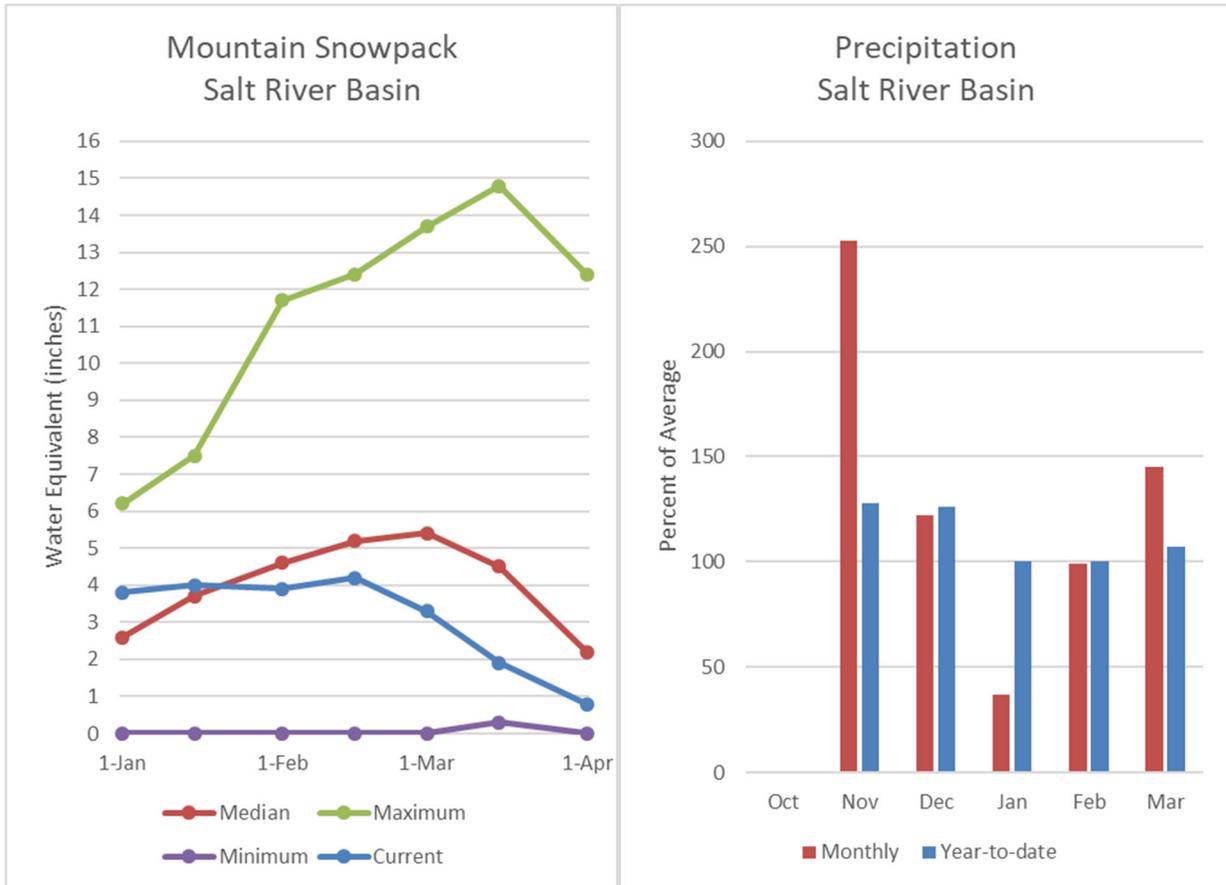
As of April 1, the forecast calls for below normal to above normal streamflow for the spring runoff period, ranging from 71 percent of median in the Little Colorado River above Lyman Lake to 111 percent of median in the Verde River above Horseshoe Dam. Total precipitation since the beginning of the water year has been slightly above average for the state, producing more favorable conditions for runoff this spring. Please refer to the basin forecast tables found in this report for more information regarding water supply forecasts.

Arizona Spring Streamflow Forecasts as of April 1, 2020



SALT RIVER BASIN as of April 1, 2020

Below normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 89% of median streamflow through May, while at Tonto Creek, the forecast calls for 95% of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 37% of median.



**Salt River Basin
Streamflow Forecasts - April 1, 2020**

SALT RIVER BASIN	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Salt R nr Roosevelt ³	APR			80	100%			80
	APR-MAY	68	93	113	89%	136	175	127
Tonto Ck ab Gun Ck nr Roosevelt ³	APR			5.2	118%			4.4
	APR-MAY	1.8	3.7	5.6	95%	8	12.7	5.9

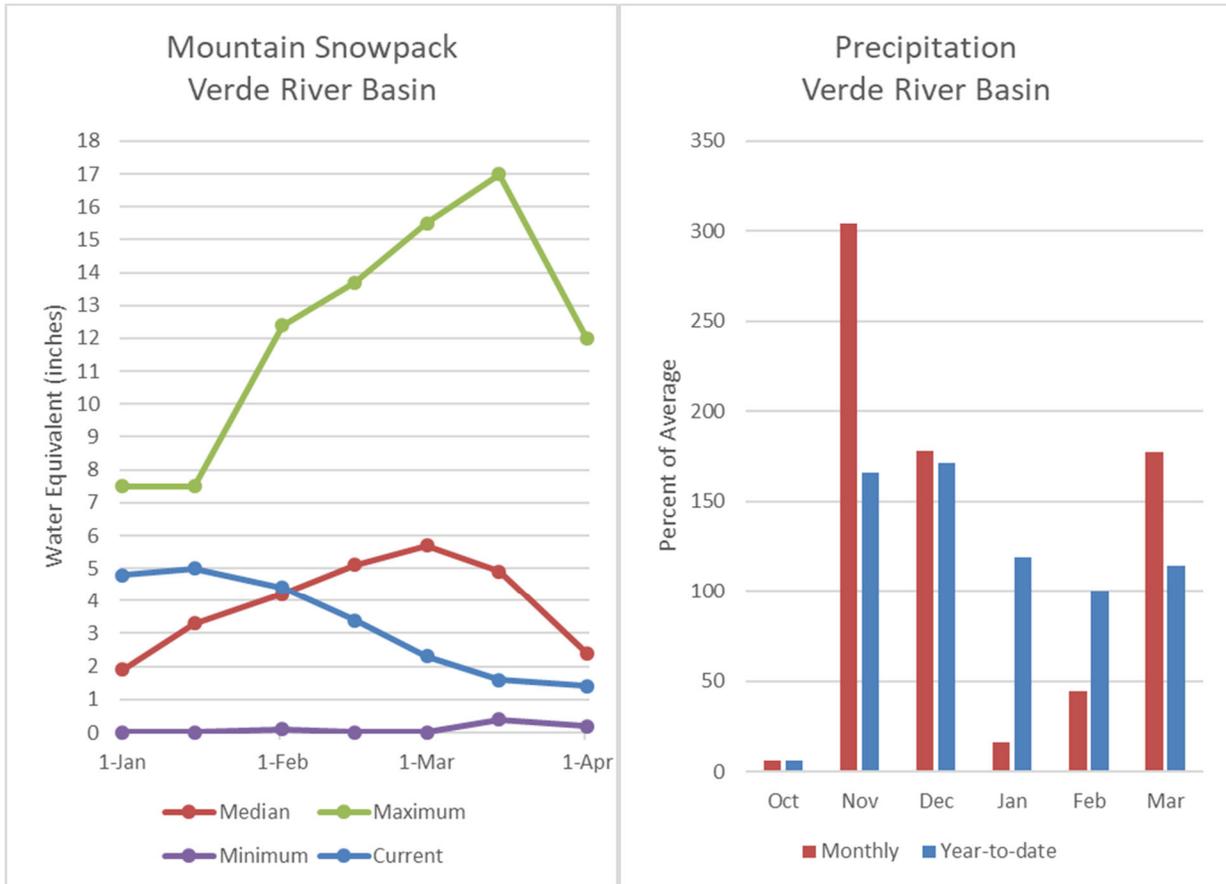
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Salt River Reservoir System	1952.2	1520.3	1378.0	2025.8
Basin-wide Total	1952.2	1520.3	1378.0	2025.8
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
SALT RIVER BASIN	8	37%	115%

VERDE RIVER BASIN as of April 1, 2020

Above normal streamflow levels are forecast for the basin. In the Verde River above Horseshoe Dam, the forecast calls for 111% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 60% of median.



Verde River Basin Streamflow Forecasts - April 1, 2020

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

VERDE RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Verde R bl Tangle Ck ab Horseshoe Dam ³	APR			30	125%			24
	APR-MAY	15.8	28	40	111%	54	81	36

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

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

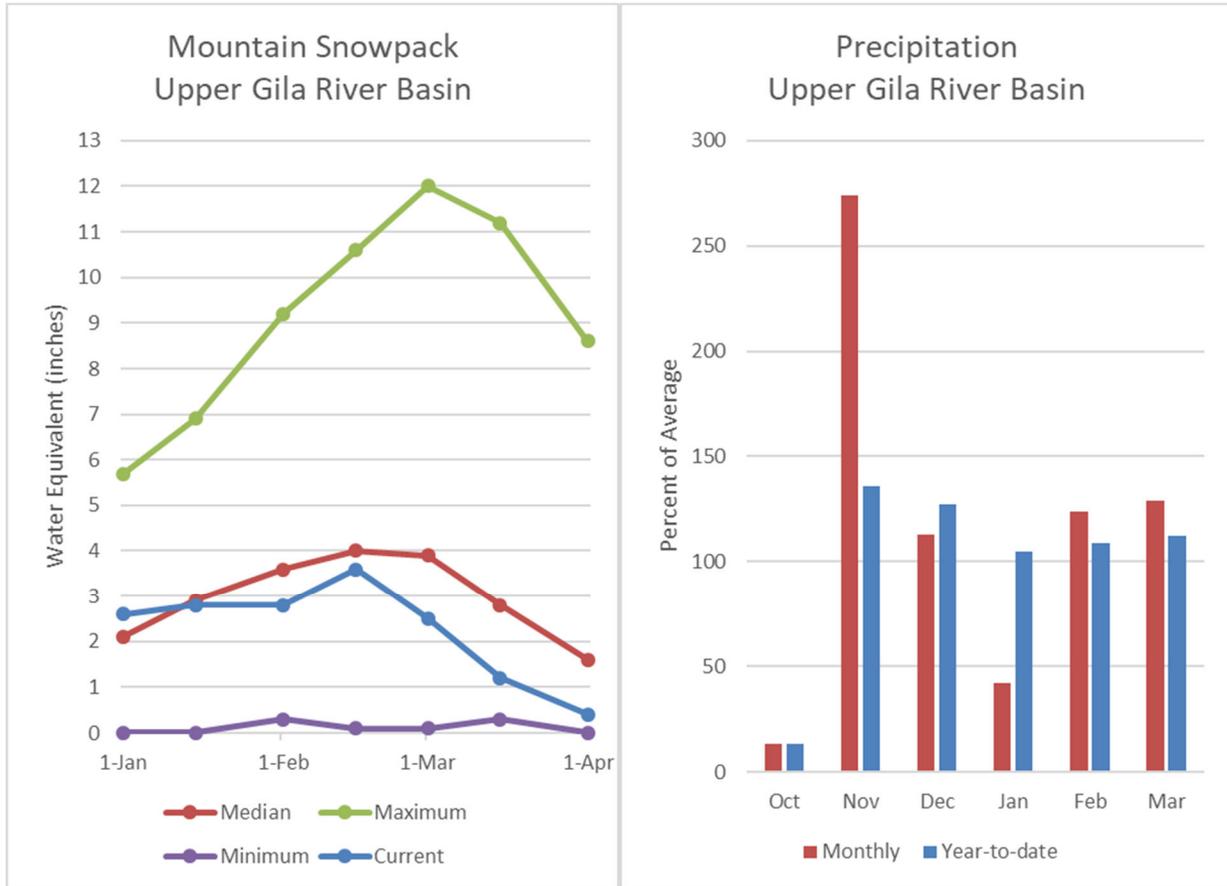
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Verde River Reservoir System	286.6	280.5	203.6	287.4
Basin-wide Total	286.6	280.5	203.6	287.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
VERDE RIVER BASIN	6	60%	540%

SAN FRANCISCO-UPPER GILA RIVER BASIN as of April 1, 2020

Normal streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 107% of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 97% of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 55% of median through May. Snow survey measurements show the snowpack for this basin to be at 27% of median.



San Francisco-Upper Gila River Basin Streamflow Forecasts - April 1, 2020

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

SAN FRANCISCO-UPPER GILA RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Gila R at Gila ³	APR-MAY	9.4	13.1	16.1	98%	19.6	25	16.5
Gila R bl Blue Ck nr Virden ³	APR-MAY	8	14.6	20	95%	27	38	21
San Francisco R at Glenwood ³	APR-MAY	4	6.4	8.6	118%	11.1	15.8	7.3
San Francisco R at Clifton ³	APR-MAY	8	13.7	18.5	107%	24	33	17.3
Gila R nr Solomon ³	APR			36	144%			25
San Carlos Reservoir Inflow ³	APR-MAY	16.3	28	38	97%	49	68	39
	APR-MAY	0.03	2.8	10.1	55%	24	64	18.4

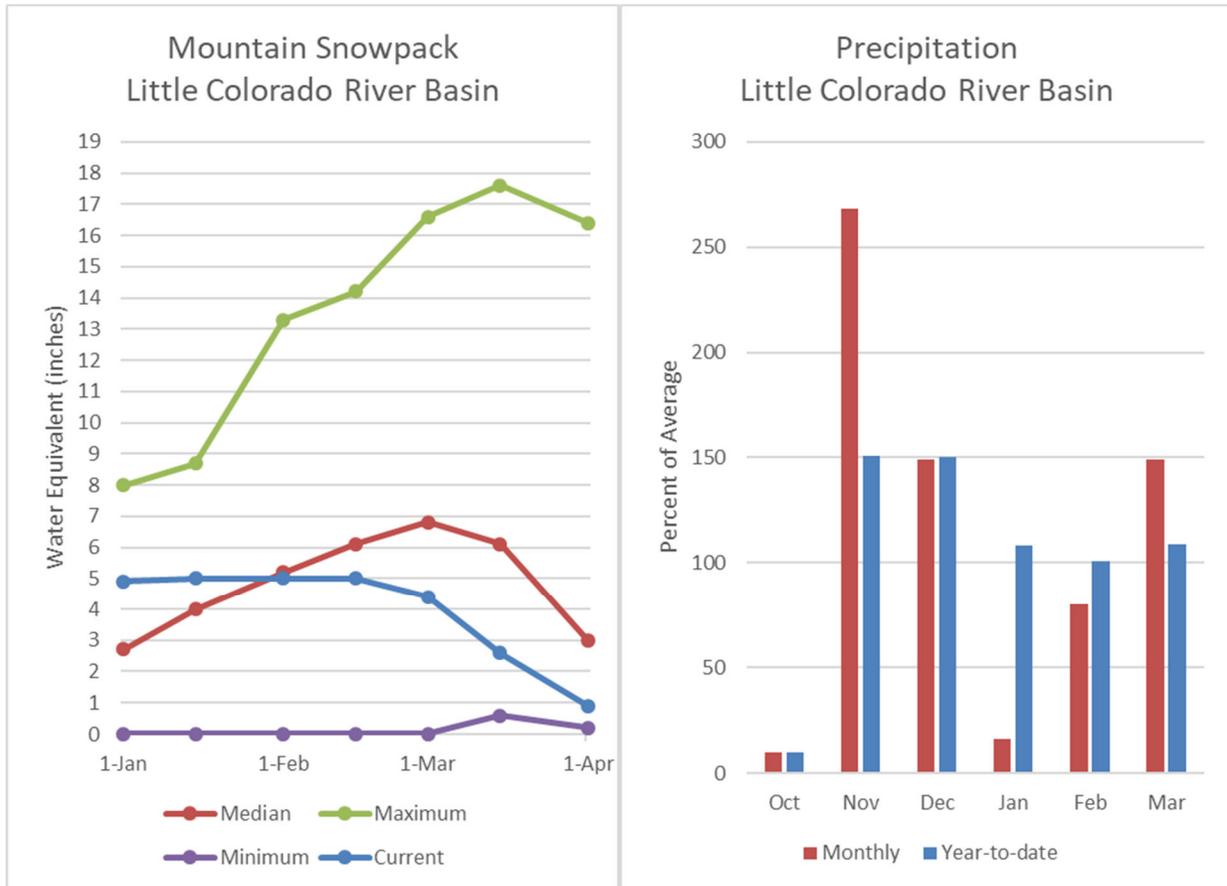
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
San Carlos Reservoir	199.7	149.1	413.8	875.0
Basin-wide Total	199.7	149.1	413.8	875.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
SAN FRANCISCO-UPPER GILA RIVER BASIN	7	27%	41%

LITTLE COLORADO RIVER BASIN as of April 1, 2020

Below normal streamflow levels are forecast for the basin. In the Little Colorado River, above Lyman Lake, the forecast calls for 71% of median streamflow through June. At Blue Ridge (C.C. Cragin) Reservoir, inflow to the lake is forecast at 88% of median through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 30% and 0% of median, respectively.



Little Colorado River Basin Streamflow Forecasts - April 1, 2020

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

LITTLE COLORADO RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Little Colorado R ab Lyman Lake ³	APR-JUN	0.93	1.76	2.5	71%	3.5	5.4	3.5
Rio Nutria nr Ramah ³	APR-MAY	0	0.07	0.19	100%	0.41	0.98	0.19
Zuni R ab Black Rock Reservoir ³	APR-MAY	0	0	0.07	70%	0.41	1.2	0.1
Blue Ridge Reservoir Inflow ³	APR-MAY	0.92	2.2	3.6	88%	5.4	9.1	4.1
Lake Mary Reservoir Inflow ³	APR-MAY	0.47	0.83	1.15	115%	1.54	2.3	1

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

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lyman Reservoir	15.1	11.1	14.7	30.0
Basin-wide Total	15.1	11.1	14.7	30.0
# of reservoirs	1	1	1	1

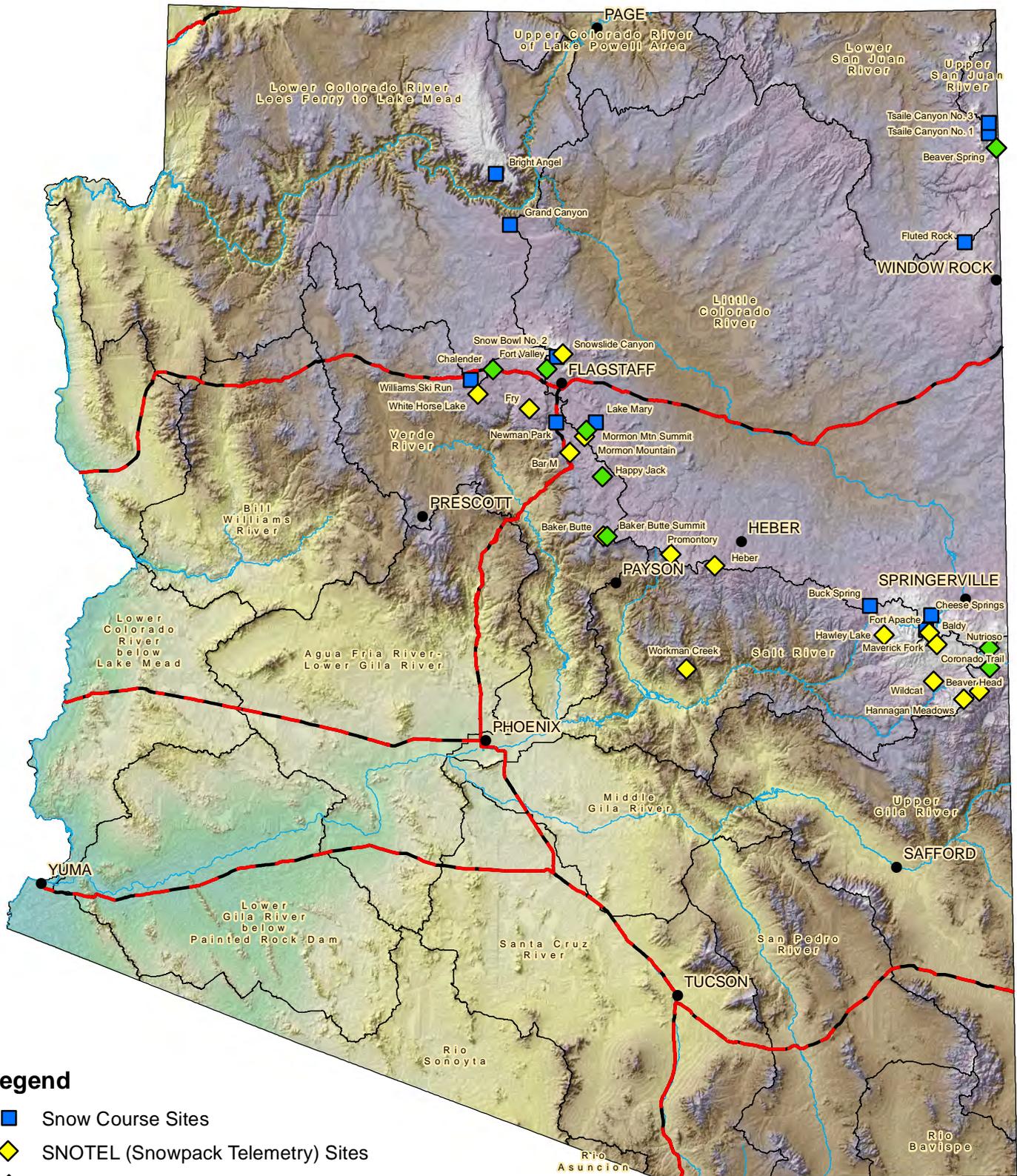
Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
LITTLE COLORADO RIVER BASIN	6	30%	155%
CENTRAL MOGOLLON RIM	3	0%	144%

Basinwide Summary: April 1, 2020
(Averages/Medians based on 1981-2010 reference period)

Snowpack Summary for April 1, 2020

SALT RIVER BASIN		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baldy	SNOTEL	9125	0	0.0	2.5	0%	4.3	172%	
Beaver Head	SNOTEL	7990	0	0.0	0.0		0.0		
Buck Spring	SC	7400	0	0.0	0.0		0.0		
Coronado Trail	SNOTEL	8400	0	0.0	0.0		0.0		
Hawley Lake	SNOTEL	8300	20	7.7			12.0		
Coronado Trail	SC	8350			0.0		0.0		
Fort Apache	SC	9160			6.2		8.9	144%	
Hannagan Meadows	SNOTEL	9020	4	1.8	7.7	23%	5.2	68%	
Maverick Fork	SNOTEL	9200	11	4.0	5.3	75%	8.4	158%	
Nutriosio	SC	8500			0.0		0.0		
Nutriosio	SNOTEL	8500	0	0.0			0.0		
Wildcat	SNOTEL	7850	0	0.0	0.0		0.0		
Workman Creek	SNOTEL	6900	0	0.0	0.0		0.0		
Basin Index						37%		115%	
# of sites						8		8	
VERDE RIVER BASIN		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	0	0.0	0.0		0.1		
Baker Butte No. 2	SC	7700			8.9				
Baker Butte Smt	SNOTEL	7700	33	12.6			17.4		
Bar M	SNOTEL	6393	0	0.0			0.0		
Chalender	SC	7100			0.0		0.0		
Chalender	SNOTEL	7100	0	0.0			0.0		
Fort Valley	SC	7350			0.0		0.0		
Fort Valley	SNOTEL	7350	0	0.0			0.0		
Fry	SNOTEL	7200	2	0.6	0.0		0.0		
Happy Jack	SNOTEL	7630	0	0.0	0.3	0%	5.0	1667%	
Happy Jack	SC	7630	0	0.0	0.0		0.0		
Mormon Mountain	SNOTEL	7500	0	0.0	0.7	0%	0.3	43%	
Mormon Mountain Summit #2	SC	8470			10.2				
Mormon Mtn Summit	SNOTEL	8500	21	7.4			12.6		
Newman Park	SC	6750			0.0		0.0		
White Horse Lake	SNOTEL	7180	0	0.0	0.0		0.0		
Williams Ski Run	SC	7720			6.5		14.5	223%	
Basin Index						60%		540%	
# of sites						6		6	
SAN FRANCISCO PEAKS		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Snow Bowl #2	SC	11200			19.2		23.4	122%	
Snowslide Canyon	SNOTEL	9730	56	20.9	17.0	123%	27.8	164%	
Basin Index						123%		164%	
# of sites						1		1	
SAN FRANCISCO-UPPER GILA RIVER BASIN		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Beaver Head	SNOTEL	7990	0	0.0	0.0		0.0		
Coronado Trail	SNOTEL	8400	0	0.0	0.0		0.0		
Coronado Trail	SC	8350			0.0		0.0		
Frisco Divide	SNOTEL	8000	0	0.0	0.0		0.0		
Hannagan Meadows	SNOTEL	9020	4	1.8	7.7	23%	5.2	68%	
Hummingbird - Aerial And Snow Course	SC	10550			9.0				
Lookout Mountain	SNOTEL	8500	0	0.0	0.0		0.0		

Arizona Snow Survey Data Sites



Legend

- Snow Course Sites
- ◆ SNOTEL (Snowpack Telemetry) Sites
- ◆ SNOTEL and Snow Course Sites
- Basin Boundaries

