



Natural  
Resources  
Conservation  
Service

# Arizona

## Basin Outlook Report

### January 15, 2019



**Issued by**

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

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### ***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 January 15, 2019

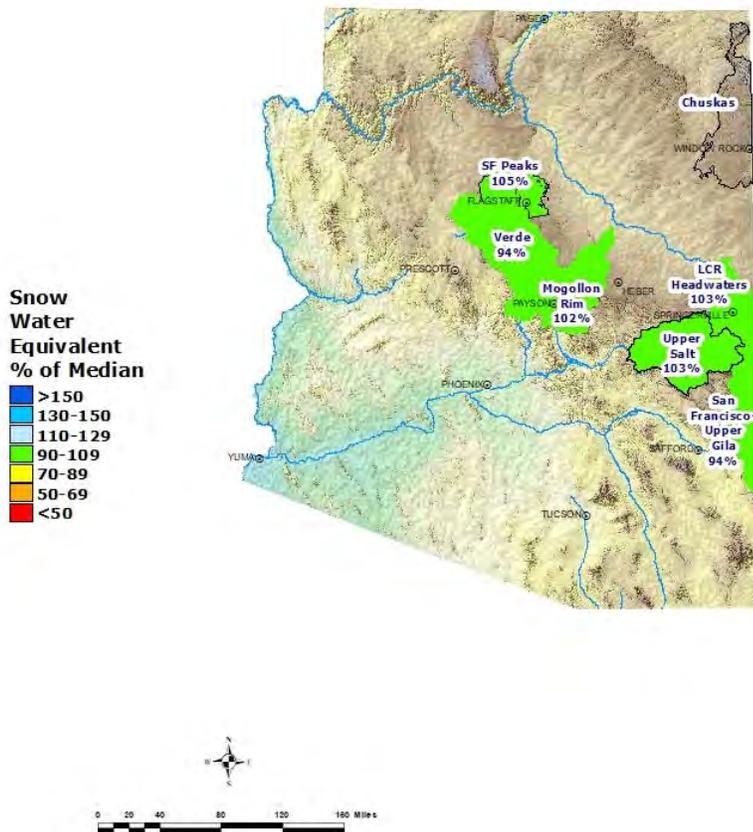
## SUMMARY

As of January 15, snowpack levels are normal throughout the major basins of the state. Precipitation for the first half of January was above normal to well above normal in the major river basins. The Salt and Verde River reservoir system stands at 47 percent of capacity, while San Carlos Reservoir is at 3 percent of capacity. The mid-month forecast calls for normal to above normal runoff in the Salt and Verde basins for the spring runoff period.

## SNOWPACK

Snow water equivalent levels in the state's major river basins are normal, ranging from 103 percent of median in both the Salt River Basin and the Little Colorado River Basin, to 94 percent of median in both the Verde River Basin and the Gila River Basin. The statewide snowpack is normal at 100 percent of median.

**Arizona  
Snow Water Equivalent  
as of January 15, 2019**

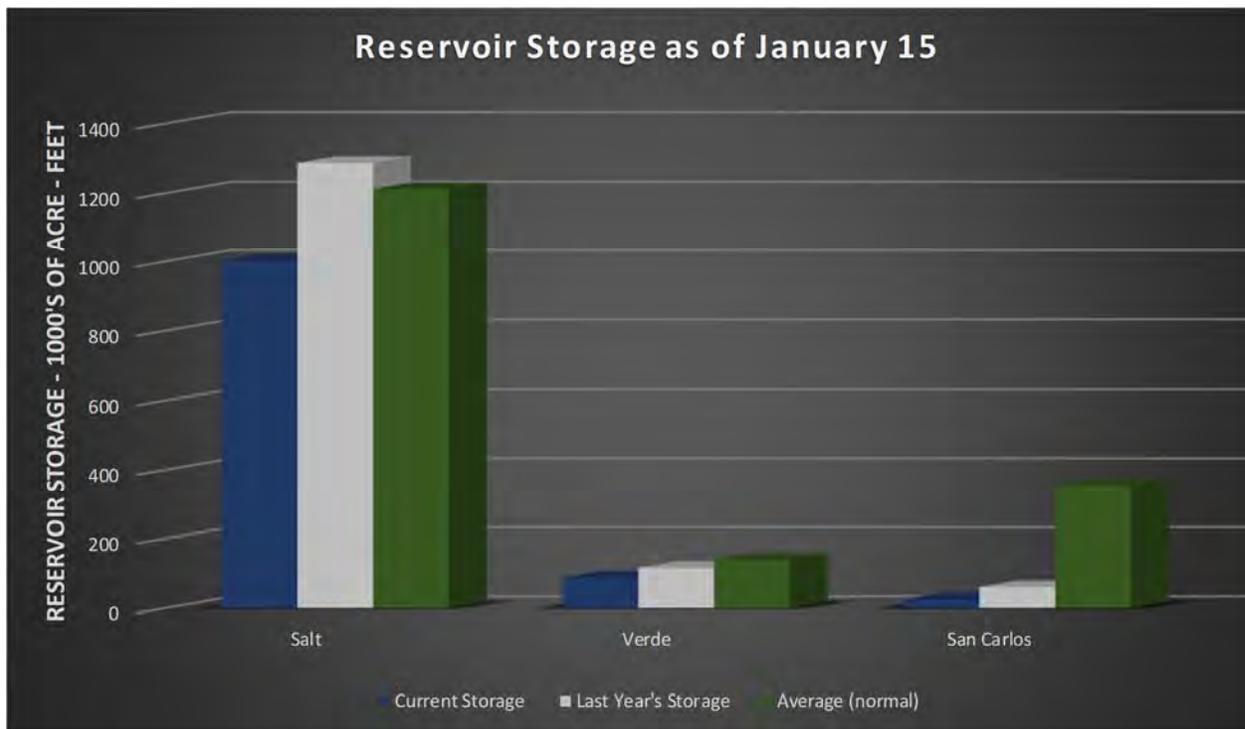


## PRECIPITATION

Mountain data from NRCS SNOTEL sites and NWS Cooperator gages show that precipitation for the first half of January was above average to well above average in the major river basins. Cumulative precipitation since October 1 is normal to 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 January 15, the Salt and Verde River reservoir system stands at 47 percent of capacity. San Carlos Reservoir is currently at 3 percent of capacity.



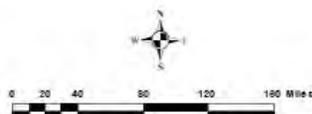
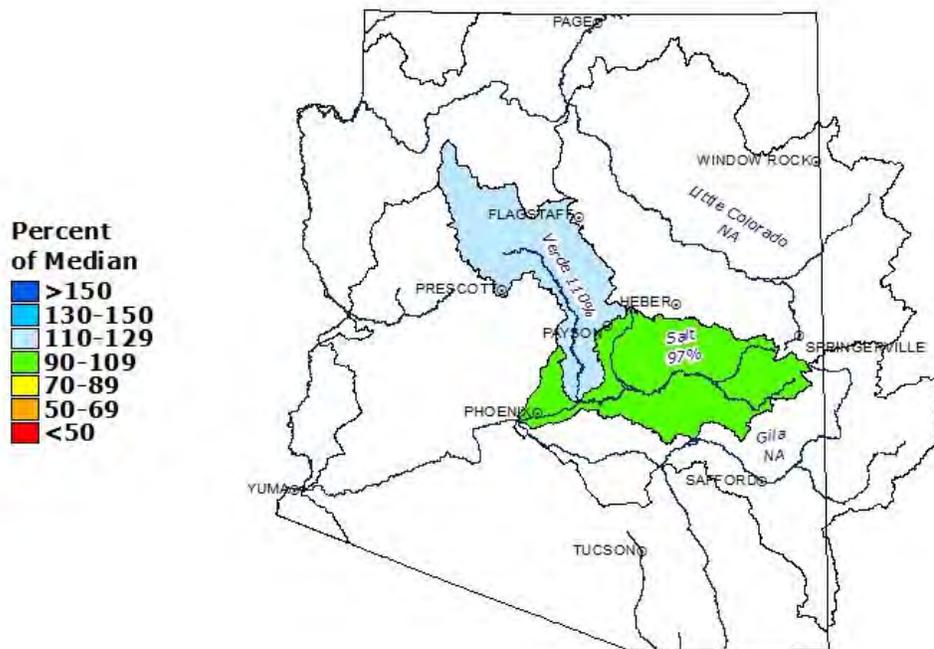
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1002.6	1288.0	1212.0	2025.8
Verde River System	87.5	116.0	140.2	287.4
San Carlos Reservoir	24.5	60.6	355.0	875.0
Lyman Lake	3.7	11.2	12.0	30.0
Lake Havasu	568.7	551.1	561.2	619.0
Lake Mohave	1618.1	1700.4	1659.0	1810.0
Lake Mead	10304.0	10400.0	20361.0	26159.0
Lake Powell	9846.0	13906.0	17553.0	24322.0

## STREAMFLOW

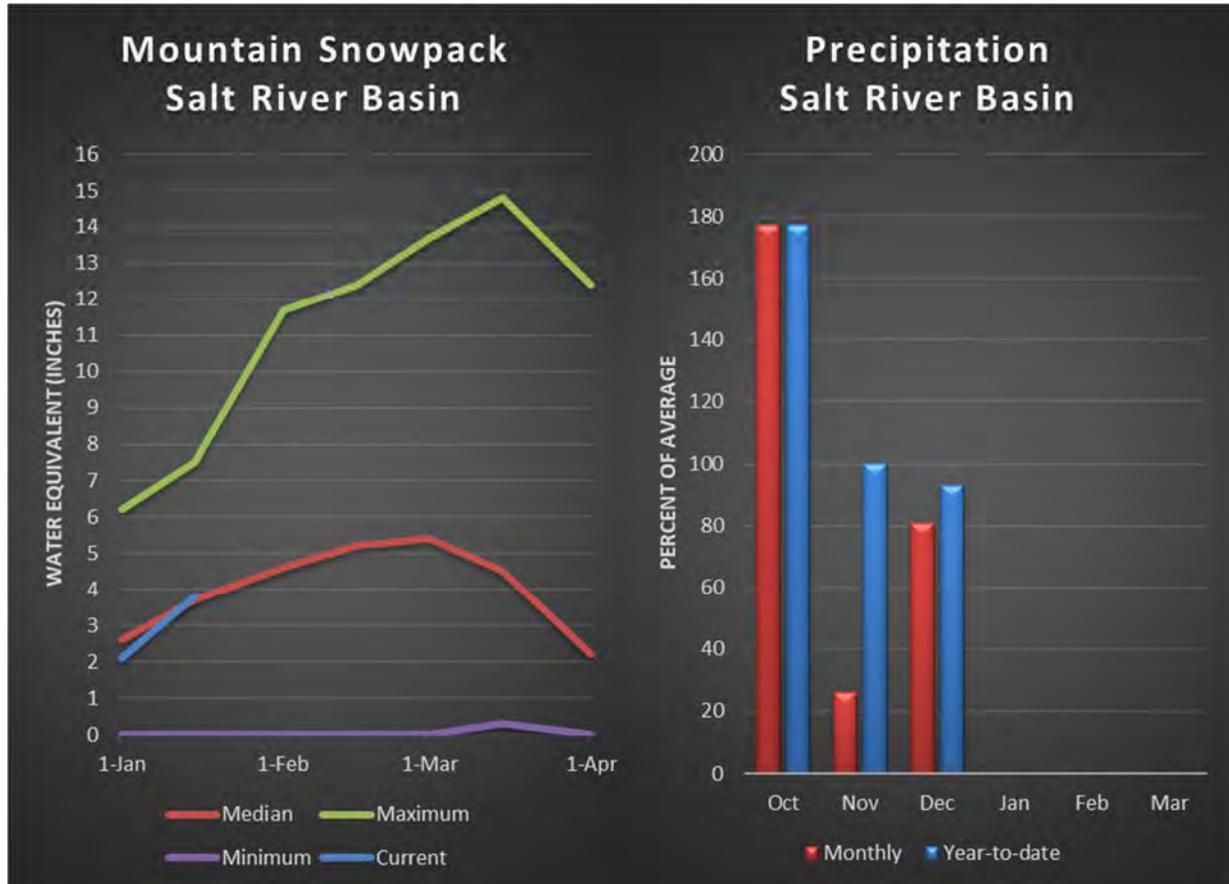
As of January 15, the forecast calls for normal to slightly above normal streamflow for the spring runoff period, ranging from 97 percent of median in the Salt River near Roosevelt to 110 percent of median in the Verde River above Horseshoe Dam. Total precipitation since the beginning of the water year has been average, resulting in improved conditions for runoff. Please refer to the basin forecast tables found in this report for more information regarding water supply forecasts. Due to current staffing, most official forecasts only will be available February through May. If you rely on the January forecasts, please contact Travis Kolling, [travis.kolling@az.usda.gov](mailto:travis.kolling@az.usda.gov), or Cara McCarthy, [cara.s.mccarthy@por.usda.gov](mailto:cara.s.mccarthy@por.usda.gov).

### Arizona Spring Streamflow Forecasts as of January 15, 2019



## SALT RIVER BASIN as of January 15, 2019

Normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 97% of median streamflow through May, while at Tonto Creek, the forecast also calls for 97% of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 103% of median.



### Salt River Basin Streamflow Forecasts - January 16, 2019

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 <sup>3</sup>	MAR-MAY	99	166	225	94%	295	425	240
	J15-MAY	126	210	290	97%	385	560	300
Tonto Ck ab Gun Ck nr Roosevelt <sup>3</sup>	JAN			4.5	118%			3.8
	J15-MAY	10.8	24	37	97%	54	88	38

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

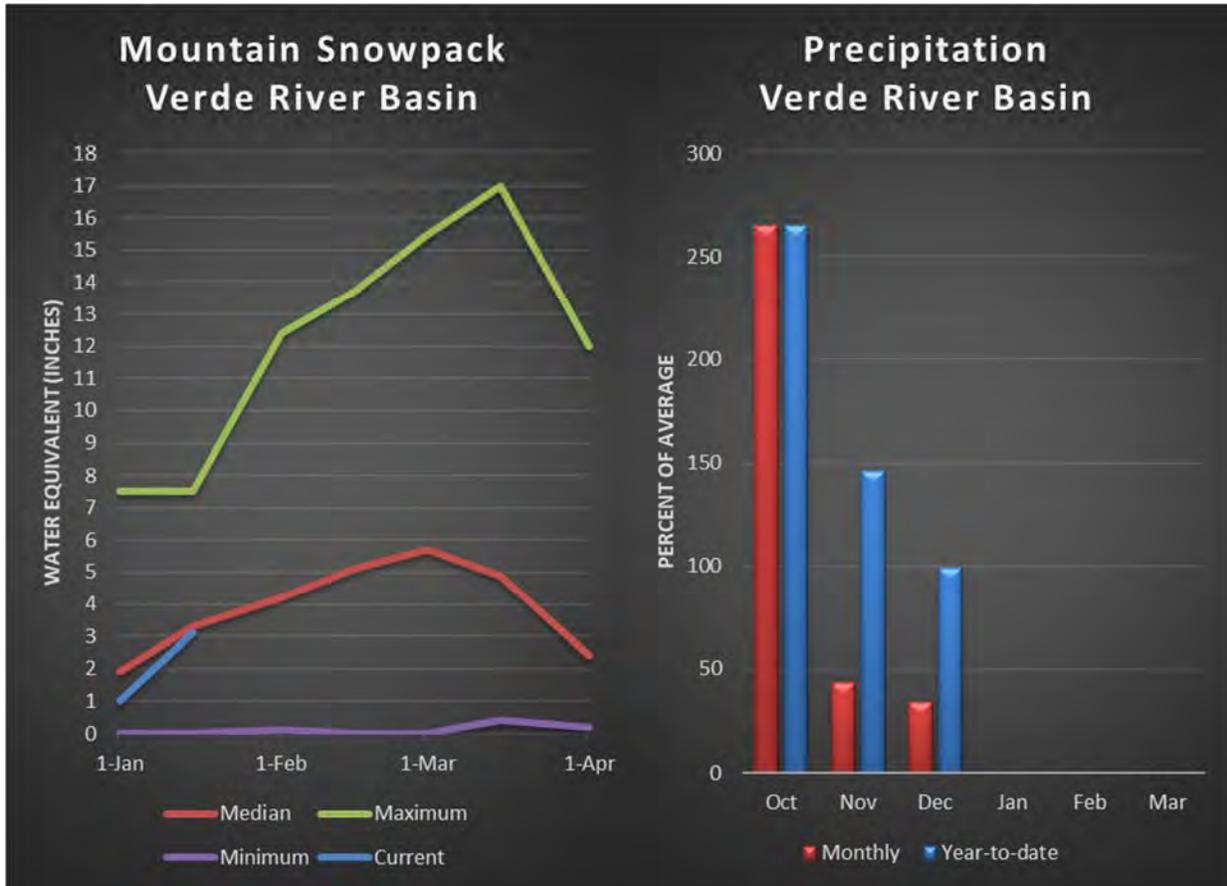
Reservoir Storage Middle of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Salt River Reservoir System	1002.6	1288.0	1212.0	2025.8
Basin-wide Total		1288.0	1212.0	2025.8
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 16, 2019	# of Sites	% Median	Last Year % Median
SALT RIVER BASIN	8	103%	14%

## VERDE RIVER BASIN as of January 15, 2019

Slightly above normal streamflow levels are forecast for the basin. In the Verde River above Horseshoe Dam, the forecast calls for 110% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 94% of median.



## Verde River Basin Streamflow Forecasts - January 16, 2019

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 <sup>3</sup>	JAN			28	122%			23
	J15-MAY	60	112	160	110%	220	335	145

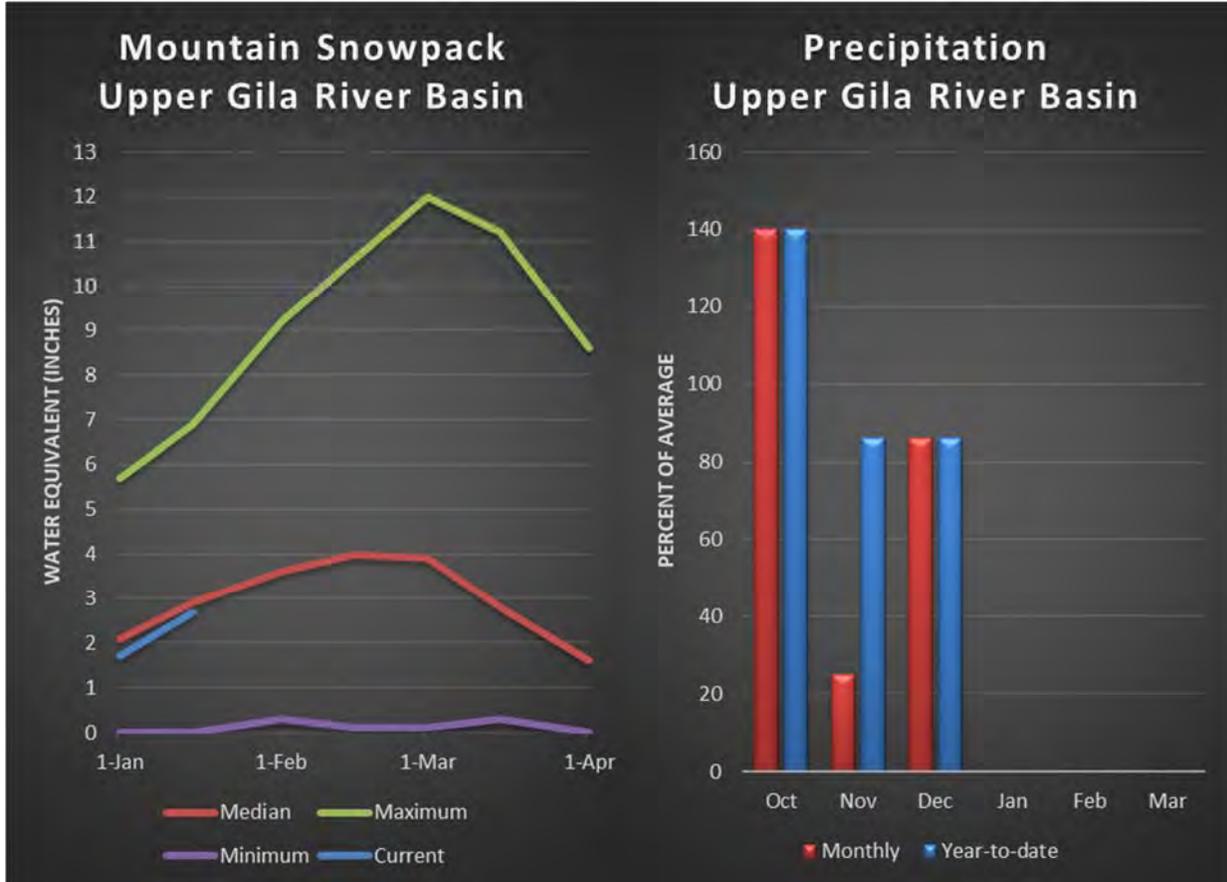
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

<b>Reservoir Storage Middle of January, 2019</b>	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Verde River Reservoir System	87.5	116.0	140.2	287.4
Basin-wide Total		116.0	140.2	287.4
# of reservoirs	1	1	1	1

<b>Watershed Snowpack Analysis January 16, 2019</b>	# of Sites	% Median	Last Year % Median
VERDE RIVER BASIN	11	94%	12%

## SAN FRANCISCO-UPPER GILA RIVER BASIN as of January 15, 2019

Snow survey measurements show the snowpack for this basin to be at 94% of median. Due to current staffing, most official forecasts only will be available February through May. If you rely on the January forecasts, please contact Travis Kolling, [travis.kolling@az.usda.gov](mailto:travis.kolling@az.usda.gov), or Cara McCarthy, [cara.s.mccarthy@por.usda.gov](mailto:cara.s.mccarthy@por.usda.gov).



## San Francisco-Upper Gila River Basin Streamflow Forecasts - January 16, 2019

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 <sup>3</sup>								
Gila R bl Blue Ck nr Virden <sup>3</sup>								
San Francisco R at Glenwood <sup>3</sup>								
San Francisco R at Clifton <sup>3</sup>								
Gila R nr Solomon <sup>3</sup>								
San Carlos Reservoir Inflow <sup>3</sup>								

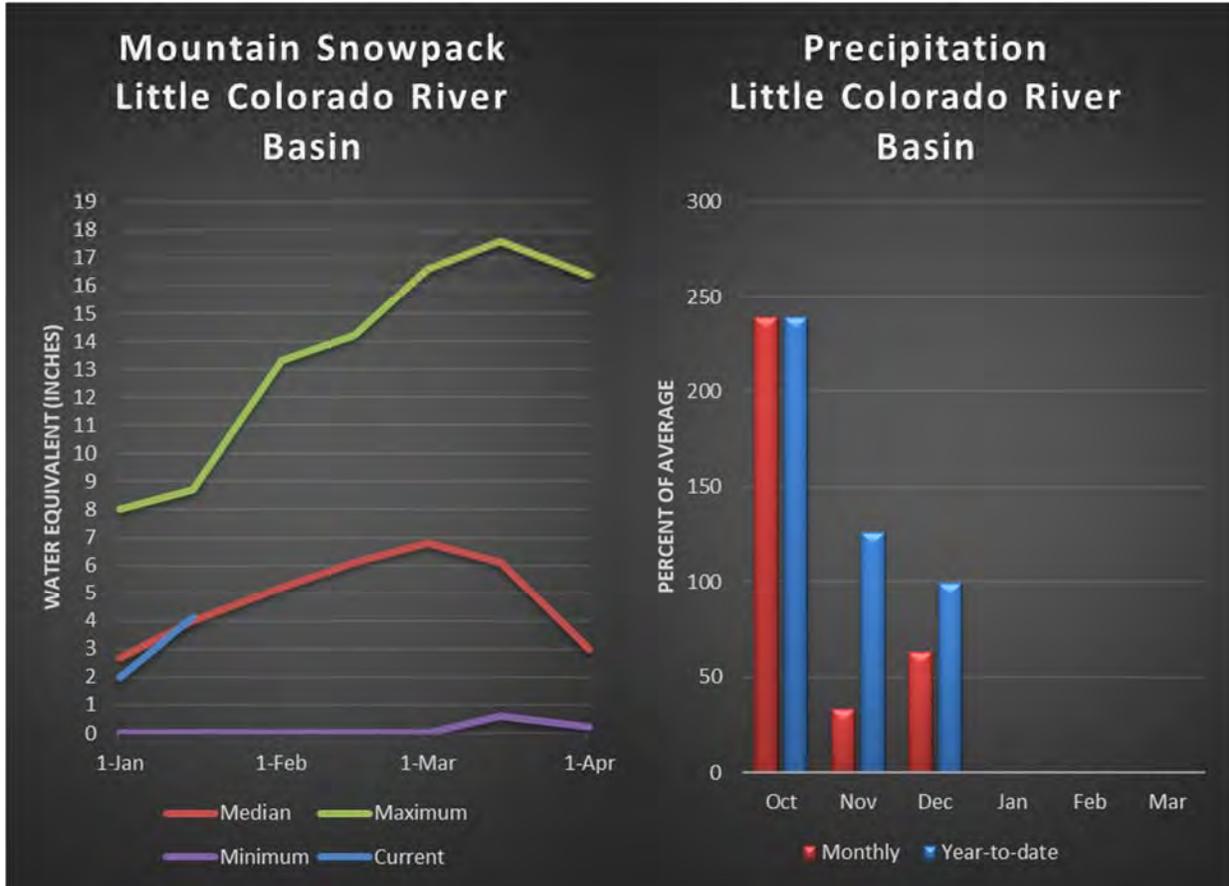
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

<b>Reservoir Storage</b> Middle of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
San Carlos Reservoir	24.5	60.6	355.0	875.0
Basin-wide Total		60.6	355.0	875.0
# of reservoirs	1	1	1	1

<b>Watershed Snowpack Analysis</b> January 16, 2019	# of Sites	% Median	Last Year % Median
SAN FRANCISCO-UPPER GILA RIVER BASIN	7	94%	10%

## LITTLE COLORADO RIVER BASIN as of January 15, 2019

Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 103% and 102% of median, respectively. Due to current staffing, most official forecasts only will be available February through May. If you rely on the January forecasts, please contact Travis Kolling, [travis.kolling@az.usda.gov](mailto:travis.kolling@az.usda.gov), or Cara McCarthy, [cara.s.mccarthy@por.usda.gov](mailto:cara.s.mccarthy@por.usda.gov).



## Little Colorado River Basin Streamflow Forecasts - January 16, 2019

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 <sup>3</sup>								
Blue Ridge Reservoir Inflow <sup>3</sup>								
Lake Mary Reservoir Inflow <sup>3</sup>								

- 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

<b>Reservoir Storage Middle of January, 2019</b>	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lyman Reservoir	3.7	11.2	12.0	30.0
Basin-wide Total		11.2	12.0	30.0
# of reservoirs	1	1	1	1

<b>Watershed Snowpack Analysis January 16, 2019</b>	# of Sites	% Median	Last Year % Median
LITTLE COLORADO RIVER BASIN	9	103%	12%
CENTRAL MOGOLLON RIM	4	102%	6%

**Basinwide Summary: January 16, 2019**  
**(Averages/Medians based on 1981-2010 reference period)**

Snowpack Summary for January 16, 2019
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<b>SALT RIVER BASIN</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baldy	SNOTEL		9125	20	5.5	5.0	110%	1.4	28%
Beaver Head	SNOTEL		7990	11	2.9	3.2	91%	0.0	0%
Buck Spring	SC		7400			2.3		0.4	17%
Coronado Trail	SNOTEL		8400	7	2.7	2.8	96%	0.0	0%
Hawley Lake	SNOTEL		8300	30	7.7			1.4	
Coronado Trail	SC		8350			2.2		0.0	0%
Fort Apache	SC		9160	24	5.3	5.2	102%	1.1	21%
Hannagan Meadows	SNOTEL		9020	27	6.7	6.1	110%	1.5	25%
Maverick Fork	SNOTEL		9200	23	5.2	5.2	100%	0.5	10%
Nutrioso	SC		8500			1.3		0.0	0%
Nutrioso	SNOTEL		8500	2	1.0			0.0	
Wildcat	SNOTEL		7850	7	2.7	2.4	113%	0.0	0%
Workman Creek	SNOTEL		6900	8	2.9	3.1	94%	0.0	0%
<b>Basin Index</b>							<b>103%</b>		<b>14%</b>
# of sites							8		8
<b>VERDE RIVER BASIN</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL		7300	14	3.4	2.9	117%	0.0	0%
Baker Butte No. 2	SC		7700	18	3.4	5.6	61%	0.4	7%
Baker Butte Smt	SNOTEL		7700	28	6.1			0.7	
Bar M	SNOTEL		6393	3	2.0			0.0	
Chalender	SC		7100	8	0.9	1.6	56%	0.4	25%
Chalender	SNOTEL		7100	11	3.5			0.2	
Fort Valley	SC		7350	7	1.2	1.8	67%	0.4	22%
Fort Valley	SNOTEL		7350	5	1.8			0.0	
Fry	SNOTEL		7200	20	4.9	4.0	123%	1.0	25%
Happy Jack	SNOTEL		7630	16	4.3	3.0	143%	0.3	10%
Happy Jack	SC		7630			2.8		0.2	7%
Mormon Mountain	SNOTEL		7500	10	3.2	2.8	114%	0.0	0%
Mormon Mountain Summit #2	SC		8470	22	5.6	5.4	104%	0.8	15%
Mormon Mtn Summit	SNOTEL		8500	18	4.4			0.6	
Newman Park	SC		6750	7	1.6	1.4	114%	0.2	14%
White Horse Lake	SNOTEL		7180	11	3.2	3.0	107%	0.0	0%
Williams Ski Run	SC		7720	15	2.5	4.8	52%	0.8	17%
<b>Basin Index</b>							<b>94%</b>		<b>12%</b>
# of sites							11		11
<b>SAN FRANCISCO PEAKS</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Snow Bowl #2	SC		11200			10.8		2.0	19%
Snowslide Canyon	SNOTEL		9730	36	10.2	9.7	105%	1.5	15%
<b>Basin Index</b>							<b>105%</b>		<b>15%</b>
# of sites							1		1
<b>SAN FRANCISCO-UPPER GILA RIVER BASIN</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Beaver Head	SNOTEL		7990	11	2.9	3.2	91%	0.0	0%
Coronado Trail	SNOTEL		8400	7	2.7	2.8	96%	0.0	0%
Coronado Trail	SC		8350			2.2		0.0	0%
Frisco Divide	SNOTEL		8000	7	2.0	2.0	100%	0.0	0%
Hannagan Meadows	SNOTEL		9020	27	6.7	6.1	110%	1.5	25%
Hummingbird - Aerial And Snow Course	SC		10550						

Lookout Mountain	SNOTEL	8500	1	0.5	1.8	28%	0.0	0%
Nutriosio	SC	8500			1.3		0.0	0%
Nutriosio	SNOTEL	8500	2	1.0			0.0	
Signal Peak	SNOTEL	8360	4	1.2	3.1	39%	0.0	0%
Silver Creek Divide	SNOTEL	9000	21	5.9	4.4	134%	0.9	20%
State Line	SC	8000			1.4			
Whitewater - Aerial And Snow Course	SC	10750						

**Basin Index** **94%**  
**10%**  
# of sites 7 7

<b>LITTLE COLORADO RIVER BASIN</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	14	3.4	2.9	117%	0.0	0%	
Baker Butte No. 2	SC	7700	18	3.4	5.6	61%	0.4	7%	
Baker Butte Smt	SNOTEL	7700	28	6.1			0.7		
Baldy	SNOTEL	9125	20	5.5	5.0	110%	1.4	28%	
Buck Spring	SC	7400			2.3		0.4	17%	
Cheese Springs	SC	8700	17	4.0	3.4	118%	0.6	18%	
Fort Apache	SC	9160	24	5.3	5.2	102%	1.1	21%	
Heber	SNOTEL	7640	20	4.4	3.1	142%	0.0	0%	
Lake Mary	SC	6930	9	1.8	2.2	82%	0.0	0%	
Maverick Fork	SNOTEL	9200	23	5.2	5.2	100%	0.5	10%	
Promontory	SNOTEL	7930	26	6.2	5.4	115%	0.7	13%	

**Basin Index** **103%**  
**12%**  
# of sites 9 9

<b>CENTRAL MOGOLLON RIM</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	14	3.4	2.9	117%	0.0	0%	
Baker Butte No. 2	SC	7700	18	3.4	5.6	61%	0.4	7%	
Baker Butte Smt	SNOTEL	7700	28	6.1			0.7		
Heber	SNOTEL	7640	20	4.4	3.1	142%	0.0	0%	
Promontory	SNOTEL	7930	26	6.2	5.4	115%	0.7	13%	

**Basin Index** **102%**  
**6%**  
# of sites 4 4

<b>CHUSKA MOUNTAINS</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Beaver Spring	SC	9220	18	4.3	5.0	86%			
Beaver Spring	SNOTEL	9200	23	5.3			1.0		
Bowl Canyon	SC	8980	20	3.8	4.0	95%			
Hidden Valley	SC	8480	18	2.9					
Missionary Spring	SC	7940	12	3.3	2.5	132%			
Tsaile Canyon #1	SC	8160	18	4.1	3.2	128%			
Tsaile Canyon #3	SC	8920	23	5.5	5.4	102%			
Whiskey Creek	SC	9050	21	4.7	4.4	107%			
Navajo Whiskey Ck	SNOTEL	9050	26	6.4			0.0		

**Basin Index**

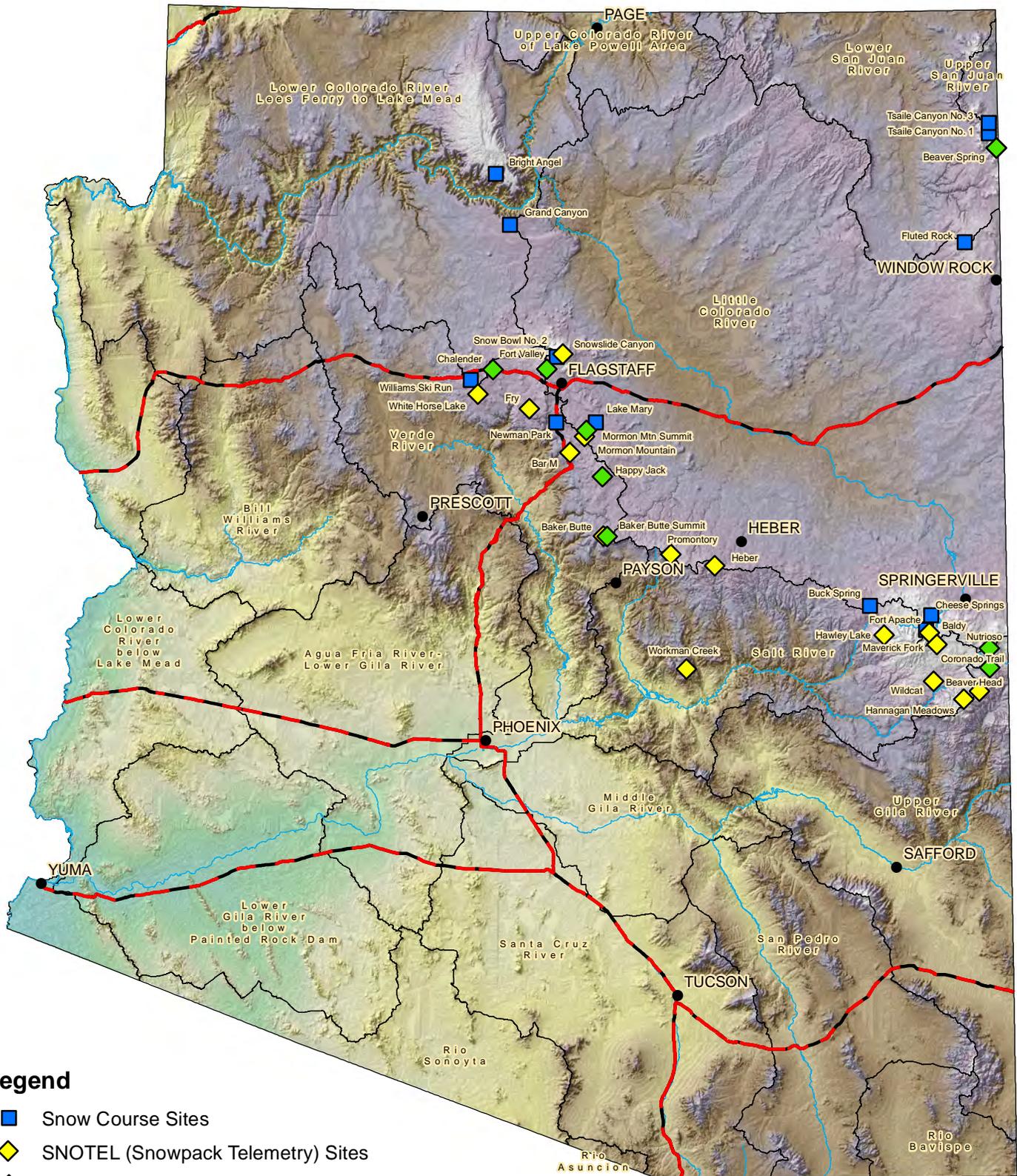
<b>DEFIANCE PLATEAU</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Fluted Rock	SC	7800	14	3.6	2.0	180%			

**Basin Index**

<b>NORTHWESTERN ARIZONA</b>		Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Bright Angel	SC	8400	15	1.2	5.1	24%	0.5	10%	
Grand Canyon	SC	7500			1.7		0.0	0%	

**Basin Index** **24%**  
**10%**  
# of sites 1 1

# Arizona Snow Survey Data Sites



## Legend

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

