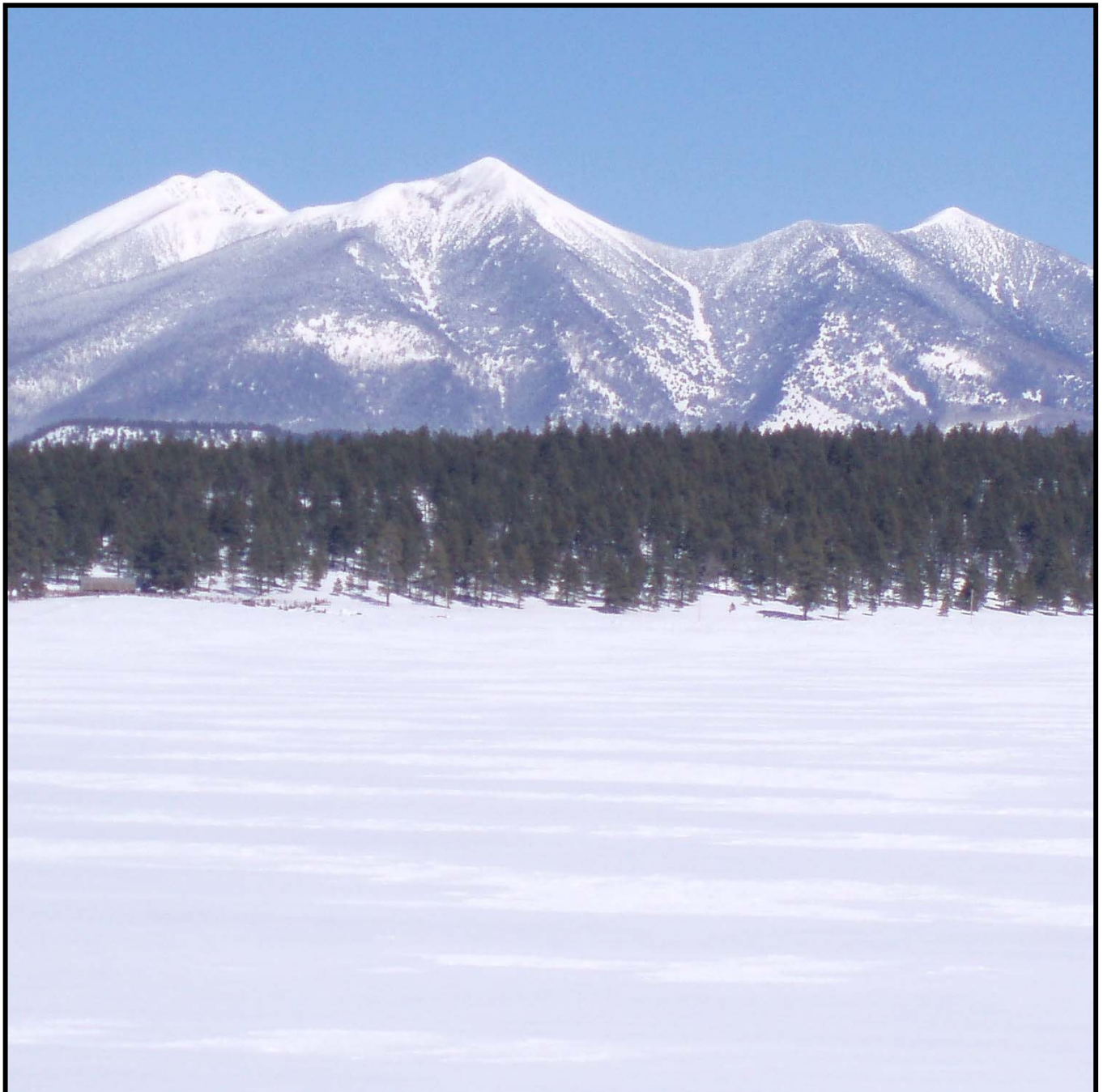




United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Arizona Basin Outlook Report January 15, 2017



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 January 15, 2017

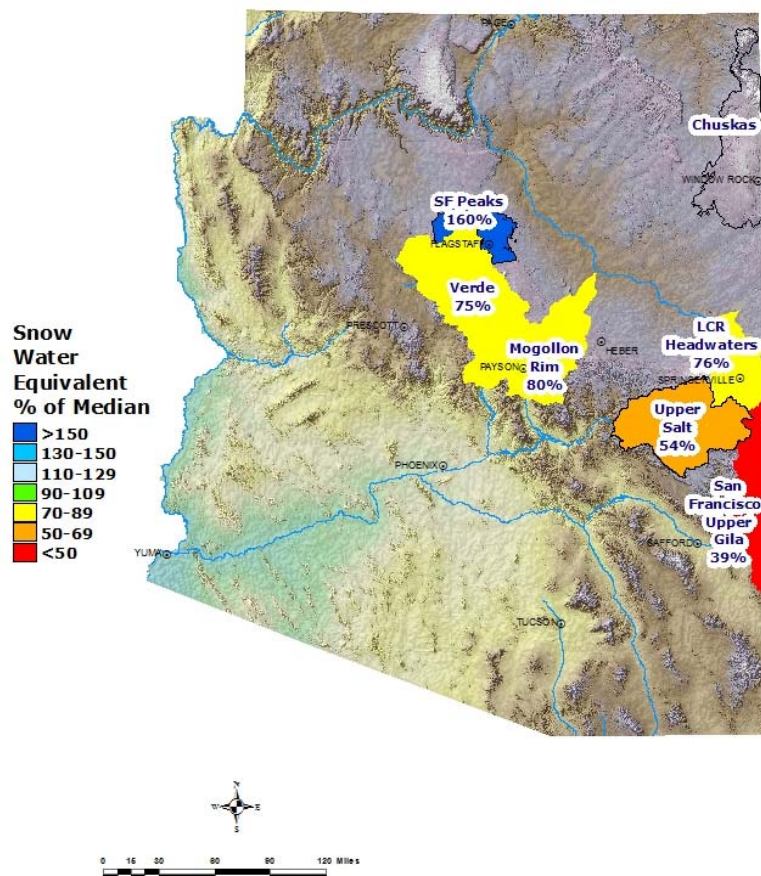
SUMMARY

As of January 15, snowpack levels are below normal to well below normal throughout the major basins of the state. Precipitation for the first half of January ranged from normal to well above normal in the major river basins. The Salt and Verde River reservoir system stands at 52 percent of capacity, while San Carlos Reservoir is at 7 percent of capacity. The mid-month forecast calls for above normal to well above normal runoff in all basins for the spring runoff period.

SNOWPACK

Snow water equivalent levels in the state's major river basins are below normal to well below normal, ranging from 39 percent of median in the San Francisco – Upper Gila River Basin to 76 percent of median in the Little Colorado River Basin. The statewide snowpack is also below normal at 86 percent of median.

**Arizona
Snow Water Equivalent
as of January 15, 2017**

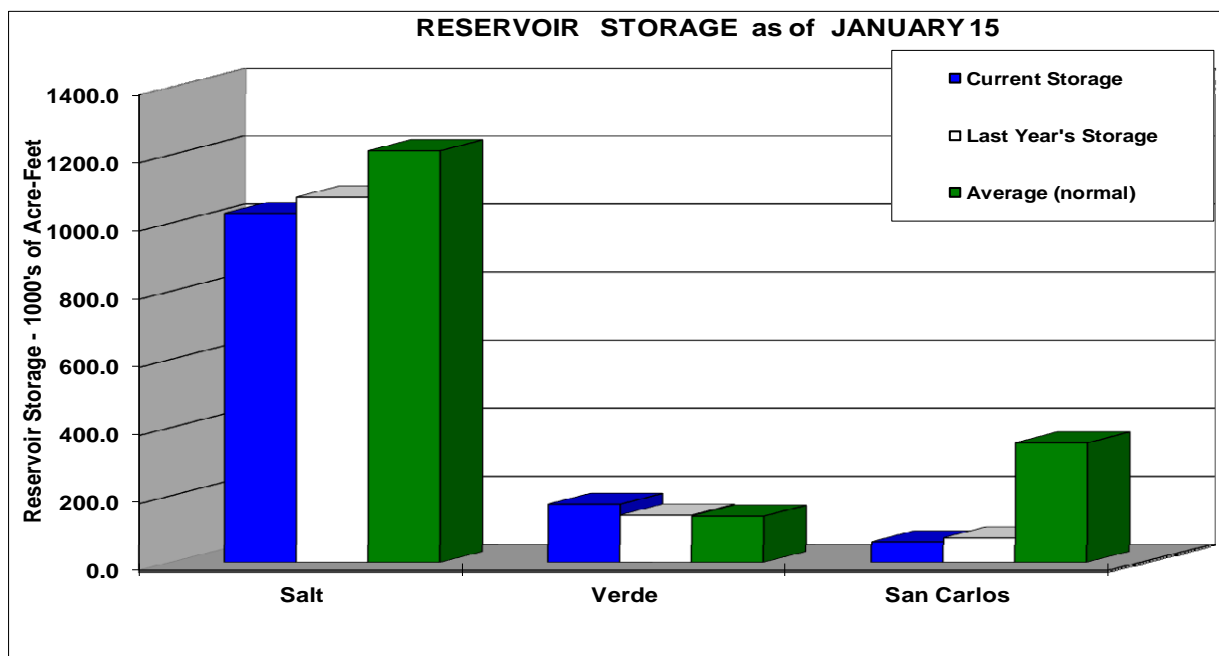


PRECIPITATION

Mountain data from NRCS SNOTEL sites and NWS Cooperator gages show that precipitation for the first half of January was average to well above average in the major river basins. Cumulative precipitation since October 1 is now above normal to well 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 52 percent of capacity. San Carlos Reservoir is currently at 7 percent of capacity.



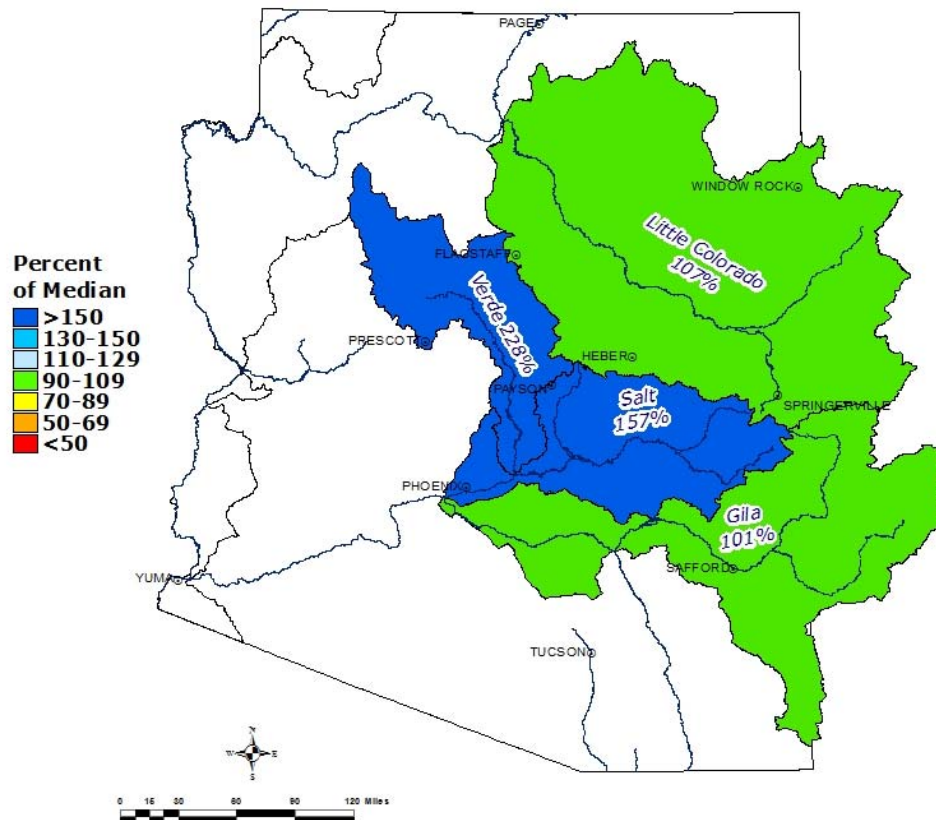
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1028.3	1075.8	1212.0	2025.8
Verde River System	175.0	143.0	140.2	287.4
San Carlos Reservoir	64.7	76.2	355.0	875.0
Lyman Lake	6.5	7.7	12.0	30.0
Lake Havasu	582.5	561.2	561.2	619.0
Lake Mohave	1721.0	1667.2	1659.0	1810.0
Lake Mead	1024.1	10186.0	20361.0	26159.0
Lake Powell	11573.0	11617.0	17553.0	24322.0

STREAMFLOW

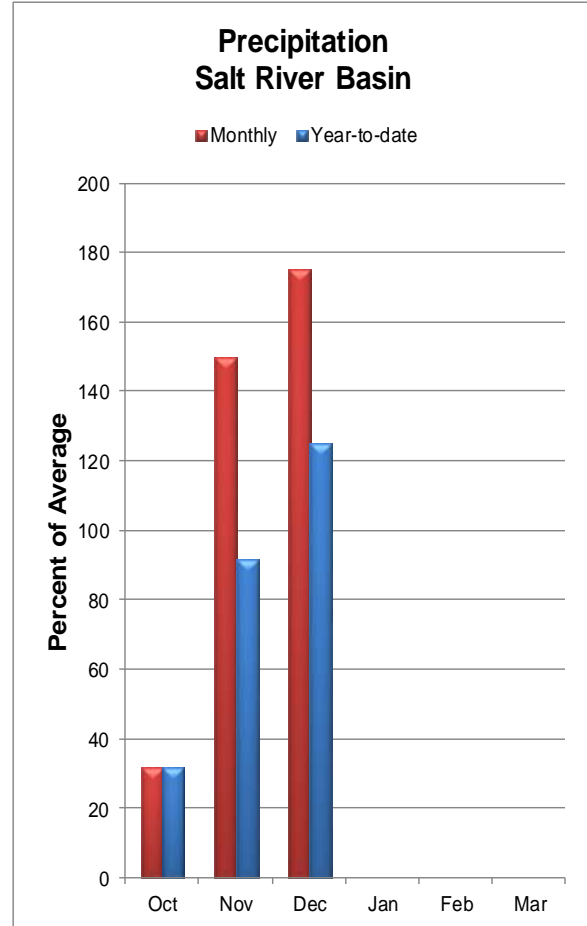
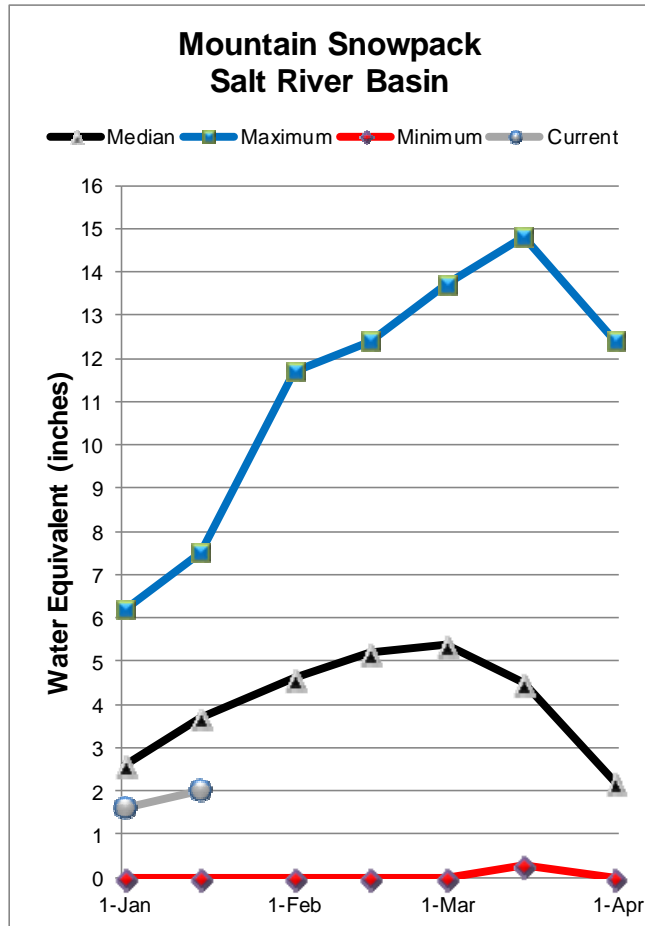
As of January 15, the forecast calls for normal to well above normal streamflow for the spring runoff period, ranging from 101 percent of median in the Gila River near Solomon to 228 percent of median in the Verde River above Horseshoe Dam. Total precipitation since the beginning of the water year has been above average, saturating the soils, and producing ideal conditions for runoff. There is an expectation for above normal precipitation through the end of January according to the latest weather forecast. Please refer to the basin forecast tables found in this report for more information regarding water supply forecasts.

Arizona Spring Streamflow Forecasts as of January 15, 2017



SALT RIVER BASIN as of January 15, 2017

Well above normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 157% of median streamflow through May, while at Tonto Creek, the forecast calls for 195% of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 54% of median.



Salt River Basin Streamflow Forecasts - January 16, 2017

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								
	JAN			90	375%			24
	MAR-MAY	163	255	330	138%	420	585	240
	J15-MAY	235	360	470	157%	600	825	300
Tonto Ck ab Gun Ck nr Roosevelt ³								
	JAN			35	921%			3.8
	J15-MAY	29	52	74	195%	101	151	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

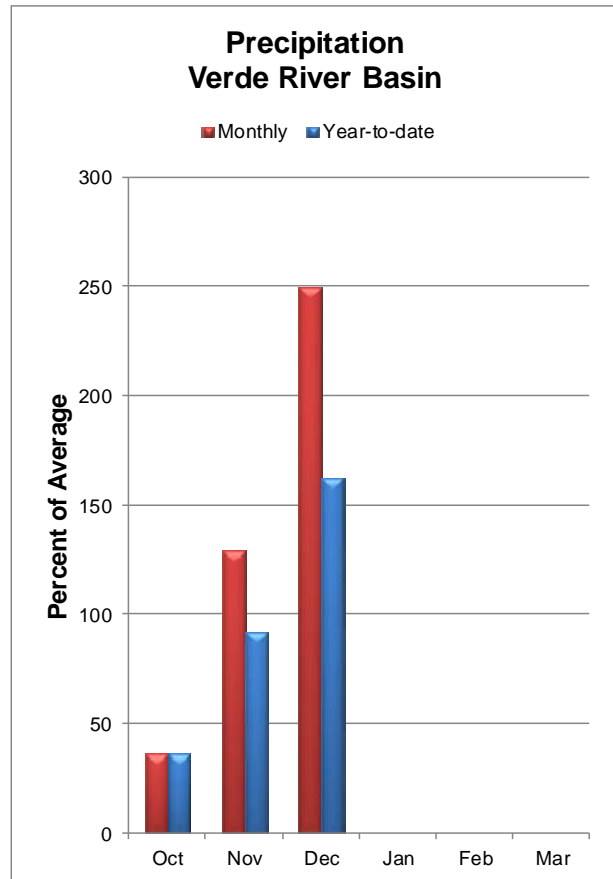
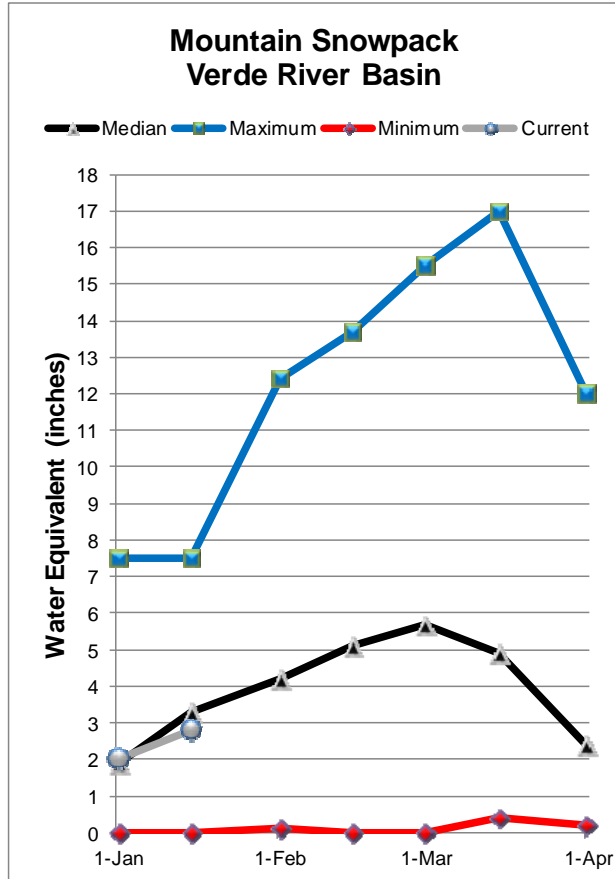
3) Median value used in place of average

Reservoir Storage Middle of December, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Salt River Reservoir System	1028.3	1075.8	1212.0	2025.8
Basin-wide Total	1028.3	1075.8	1212.0	2025.8
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 16, 2017	# of Sites	% Median	Last Year % Median
SALT RIVER BASIN	11	54%	120%

VERDE RIVER BASIN as of January 15, 2017

Well above normal streamflow levels are forecast for the basin. In the Verde River above Horseshoe Dam, the forecast calls for 228% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 75% of median.



Verde River Basin

Streamflow Forecasts - January 16, 2017

 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	JAN			85	370			23
	J15-MAY	157	250	330	228%	425	595	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

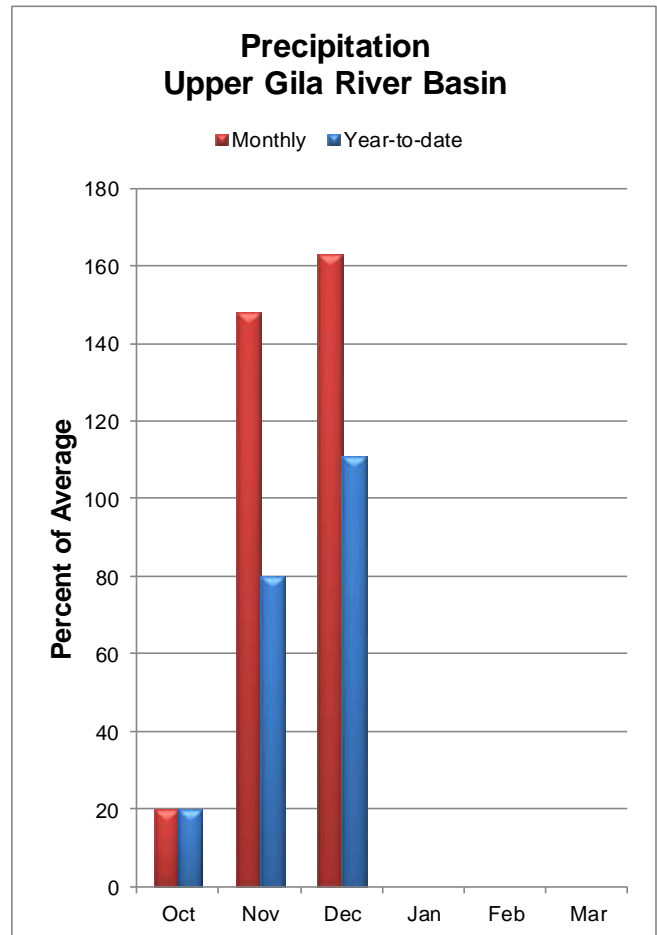
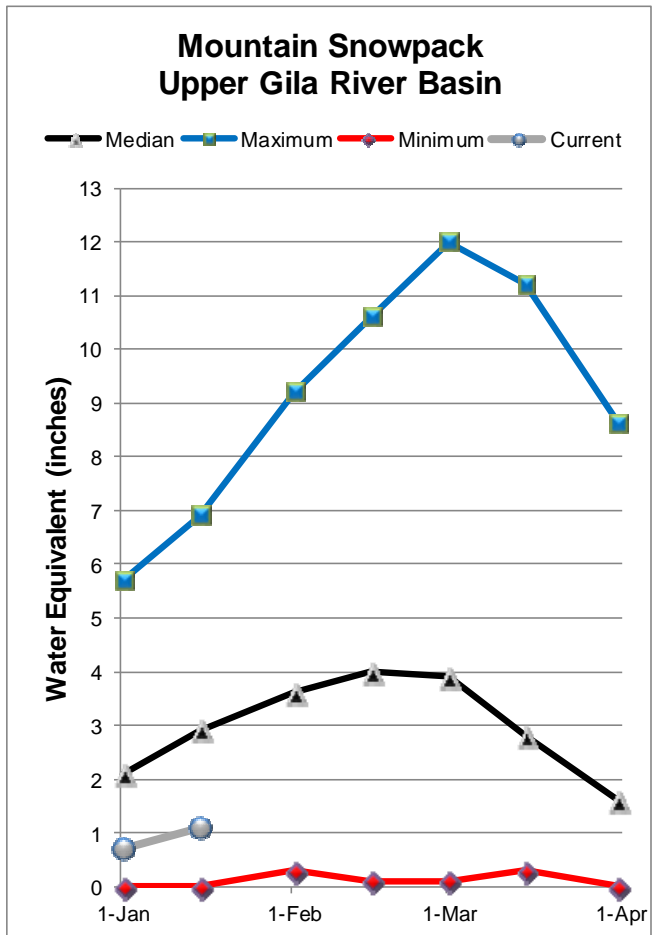
3) Median value used in place of average

Reservoir Storage Middle of December, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Verde River Reservoir System	175.0	143.0	140.2	287.4
Basin-wide Total	175.0	143.0	140.2	287.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 16, 2017	# of Sites	% Median	Last Year % Median
VERDE RIVER BASIN	11	75%	177%

SAN FRANCISCO-UPPER GILA RIVER BASIN as of January 15, 2017

Near normal streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 88% of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 101% of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 116% of median through May. Snow survey measurements show the snowpack for this basin to be at 39% of median.



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San Francisco-Upper Gila River Basin Streamflow Forecasts - January 16, 2017

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	J15-MAY	23	39	53	98%	70	102	54
Gila R bl Blue Ck nr Virden ³	J15-MAY	23	51	75	104%	105	157	72
San Francisco R at Glenwood ³	J15-MAY	6.2	13.4	21	107%	30	49	19.6
San Francisco R at Clifton ³	J15-MAY	10.2	30	49	88%	72	115	56
Gila R nr Solomon ³	JAN	22	31	39	198%	47	60	19.7
	J15-MAY	40	88	131	101%	183	275	130
San Carlos Reservoir Inflow ³	J15-MAY	15.5	59	104	116%	163	275	90

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

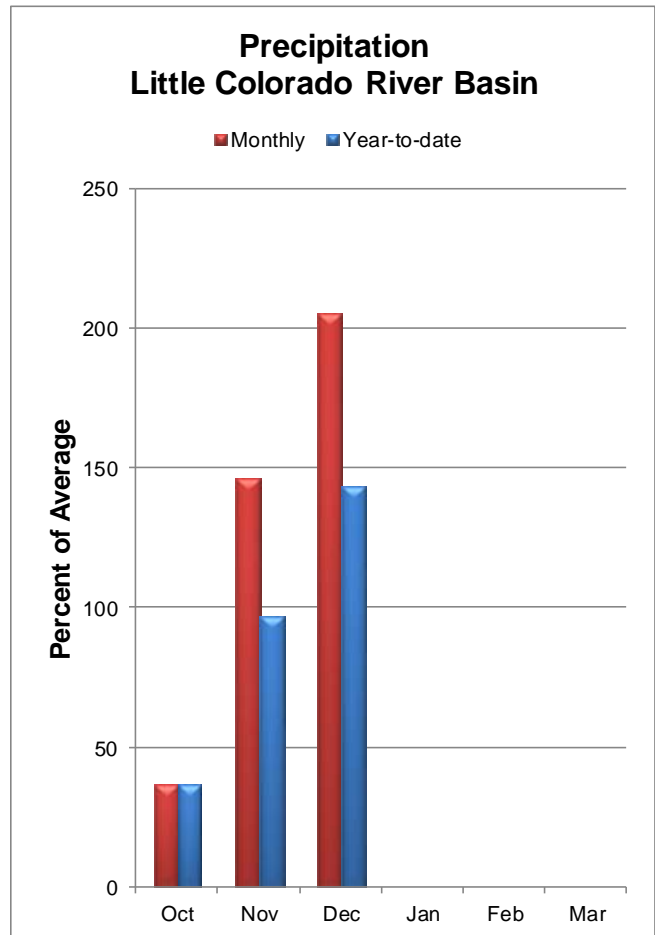
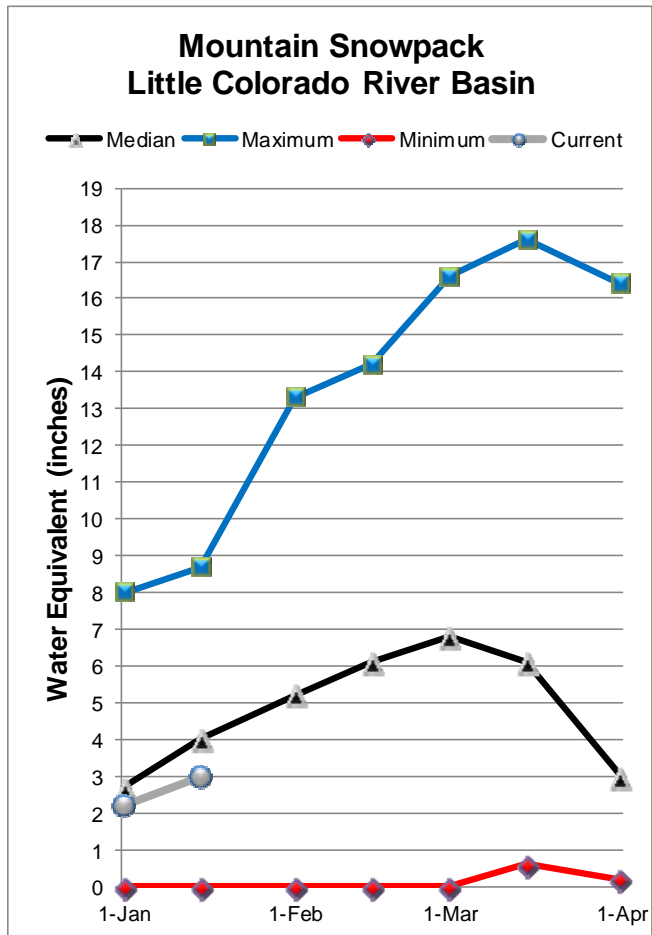
3) Median value used in place of average

Reservoir Storage Middle of December, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
San Carlos Reservoir	64.7	76.2	355.0	875.0
Basin-wide Total	64.7	76.2	355.0	875.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 16, 2017	# of Sites	% Median	Last Year % Median
SAN FRANCISCO-UPPER GILA RIVER BASIN	9	39%	119%

LITTLE COLORADO RIVER BASIN as of January 15, 2017

Slightly above normal streamflow levels are forecast for the basin. In the Little Colorado River, above Lyman Lake, the forecast calls for 107% of median streamflow through June. At Blue Ridge (C.C. Cragin) Reservoir, inflow to the lake is forecast at 111% of median through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 76% and 80% of median, respectively.



Little Colorado River Basin Streamflow Forecasts - January 16, 2017

 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	JAN-JUN	3.2	5.5	7.6	107%	10.1	14.7	7.1
Blue Ridge Reservoir Inflow ³	JAN-MAY	6.2	12.5	18.4	111%	26	41	16.6
Lake Mary Reservoir Inflow ³	JAN-MAY	4.8	7.3	9.5	198%	12	16.5	4.8

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

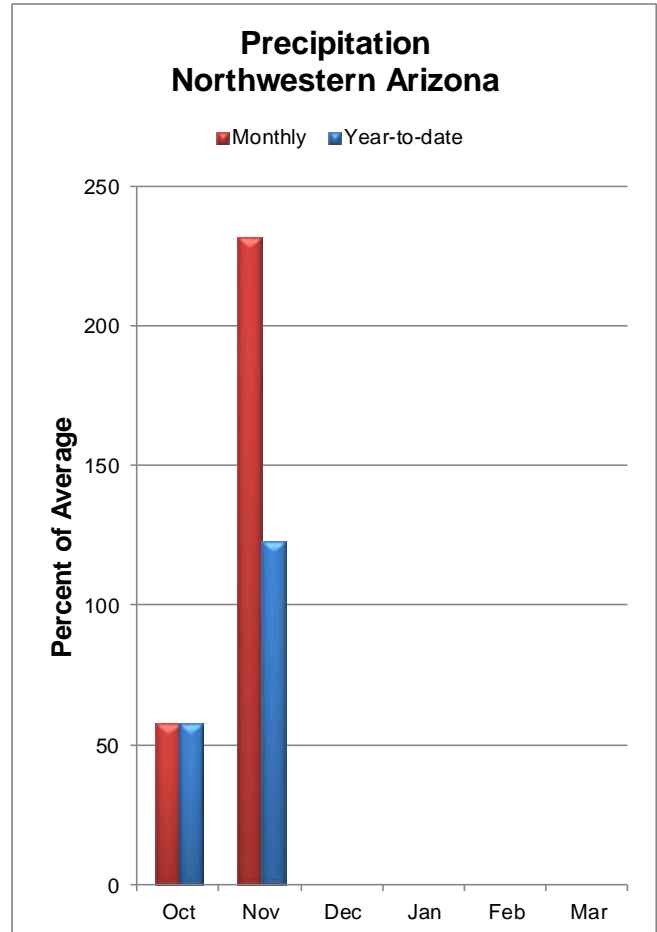
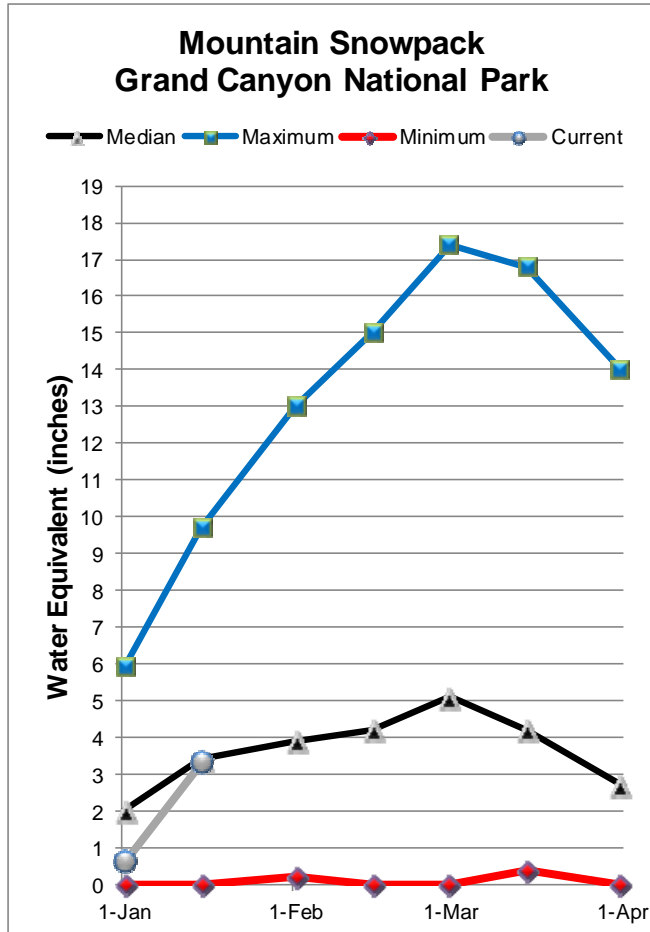
3) Median value used in place of average

Reservoir Storage Middle of December, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lyman Reservoir	6.5	7.6	12.0	30.0
Basin-wide Total	6.5	7.6	12.0	30.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 16, 2017	# of Sites	% Median	Last Year % Median
LITTLE COLORADO RIVER BASIN	10	76%	146%
CENTRAL MOGOLLON RIM	4	80%	182%

NORTHWESTERN ARIZONA as of January 15, 2017

On the Colorado River, well above normal inflow to Lake Powell is forecast at 140% of the 30-year average for the forecast period April-July. At the Grand Canyon, measurements conducted by park rangers show the snowpack to be at 96% of median.



Northwestern Arizona Streamflow Forecasts - January 16, 2017

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

NORTHWESTERN ARIZONA	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Lake Powell Inflow ²	APR-JUL	6050	8290	10000	140%	11900	14900	7160

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 December, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Havasu	582.5	563.9	561.2	619.0
Lake Mohave	1721.0	1664.0	1659.0	1810.0
Lake Mead	10241.0	10186.0	20361.0	26159.0
Lake Powell	11573.0	11617.0	17553.0	24322.0
Basin-wide Total	24117.5	24030.9	40134.2	52910.0
# of reservoirs	4	4	4	4

Watershed Snowpack Analysis January 16, 2017	# of Sites	% Median	Last Year % Median
NORTHWESTERN ARIZONA	2	96%	119%

Basinwide Summary: January 16, 2017
(Averages/Medians based on 1981-2010 reference period)

Snowpack Summary for January 16, 2017

SALT RIVER BASIN	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baldy	SNOTEL	9125	13	4.3	5.0	86%	4.2	84%
Beaver Head	SNOTEL	7990	0	0.0	3.2	0%	3.4	106%
Buck Spring	SC	7400	0	0.0	2.3	0%	3.6	157%
Coronado Trail	SNOTEL	8400	3	0.3	2.8	11%	2.5	89%
Hawley Lake	SNOTEL	8300	19	5.6			10.8	
Coronado Trail	SC	8350	0	0.0	2.2	0%	2.3	105%
Fort Apache	SC	9160	17	4.4	5.2	85%	6.1	117%
Hannagan Meadows	SNOTEL	9020	8	4.2	6.1	69%	5.2	85%
Maverick Fork	SNOTEL	9200	18	6.7	5.2	129%	5.3	102%
Nutriosio	SC	8500	0	0.0	1.3	0%	1.7	131%
Nutriosio	SNOTEL	8500	0	0.0			1.1	
Wildcat	SNOTEL	7850	1	0.4	2.4	17%	3.2	133%
Workman Creek	SNOTEL	6900	1	0.5	3.1	16%	9.2	297%
Basin Index						54%		120%
# of sites						11		11
VERDE RIVER BASIN	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	11	2.2	2.9	76%	6.6	228%
Baker Butte No. 2	SC	7700	9	3.1	5.6	55%	6.7	120%
Baker Butte Smt	SNOTEL	7700	19	4.8			9.5	
Bar M	SNOTEL	6393	3	0.7			4.9	
Chalender	SC	7100	0	0.0	1.6	0%	3.4	213%
Chalender	SNOTEL	7100	1	0.3			3.4	
Fort Valley	SC	7350	4	0.9	1.8	50%	2.0	111%
Fort Valley	SNOTEL	7350	1	0.5			2.2	
Fry	SNOTEL	7200	8	4.0	4.0	100%	6.8	170%
Happy Jack	SNOTEL	7630	11	3.3	3.0	110%	6.3	210%
Happy Jack	SC	7630	6	1.6	2.8	57%	4.6	164%
Mormon Mountain	SNOTEL	7500	10	4.2	2.8	150%	6.1	218%
Mormon Mountain Summit #2	SC	8470	22	7.4	5.4	137%		
Mormon Mtn Summit	SNOTEL	8500	23	6.7			7.6	
Newman Park	SC	6750	1	0.5	1.4	36%	5.5	393%
White Horse Lake	SNOTEL	7180	4	2.1	3.0	70%	4.8	160%
Williams Ski Run	SC	7720	11	3.5	4.8	73%	6.8	142%
Basin Index						75%		177%
# of sites						11		11
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	57	14.8	10.8	137%	10.8	100%
Snowslide Canyon	SNOTEL	9730	60	18.1	9.7	187%	9.3	96%
Basin Index						160%		98%
# of sites						2		2
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	3.2	0%	3.4	106%
Coronado Trail	SNOTEL	8400	3	0.3	2.8	11%	2.5	89%
Coronado Trail	SC	8350	0	0.0	2.2	0%	2.3	105%
Frisco Divide	SNOTEL	8000	1	0.2	2.0	10%	2.3	115%
Hannagan Meadows	SNOTEL	9020	8	4.2	6.1	69%	5.2	85%
Hummingbird - Aerial And Snow Course	SC	10550						

Lookout Mountain	SNOTEL	8500	6	1.5	1.8	83%	3.1	172%
Nutriosio	SC	8500	0	0.0	1.3	0%	1.7	131%
Nutriosio	SNOTEL	8500	0	0.0			1.1	
Signal Peak	SNOTEL	8360	4	1.0	3.1	32%	5.2	168%
Silver Creek Divide	SNOTEL	9000	15	3.3	4.4	75%	6.3	143%
State Line	SC	8000			1.4			
Whitewater - Aerial And Snow Course	SC	10750						

Basin Index	39%	119%
# of sites	9	9

LITTLE COLORADO RIVER BASIN	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	11	2.2	2.9	76%	6.6	228%
Baker Butte No. 2	SC	7700	9	3.1	5.6	55%	6.7	120%
Baker Butte Smt	SNOTEL	7700	19	4.8			9.5	
Baldy	SNOTEL	9125	13	4.3	5.0	86%	4.2	84%
Buck Spring	SC	7400	0	0.0	2.3	0%	3.6	157%
Cheese Springs	SC	8700	6	1.7	3.4	50%	4.2	124%
Fort Apache	SC	9160	17	4.4	5.2	85%	6.1	117%
Heber	SNOTEL	7640	7	2.6	3.1	84%	5.8	187%
Lake Mary	SC	6930	0	0.0	2.2	0%	4.4	200%
Maverick Fork	SNOTEL	9200	18	6.7	5.2	129%	5.3	102%
Promontory	SNOTEL	7930	20	5.7	5.4	106%	11.8	219%

Basin Index	76%	146%
# of sites	10	10

CENTRAL MOGOLLON RIM	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Baker Butte	SNOTEL	7300	11	2.2	2.9	76%	6.6	228%
Baker Butte No. 2	SC	7700	9	3.1	5.6	55%	6.7	120%
Baker Butte Smt	SNOTEL	7700	19	4.8			9.5	
Heber	SNOTEL	7640	7	2.6	3.1	84%	5.8	187%
Promontory	SNOTEL	7930	20	5.7	5.4	106%	11.8	219%

Basin Index	80%	182%
# of sites	4	4

CHUSKA MOUNTAINS	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Beaver Spring	SC	9220			5.0		7.9	158%
Beaver Spring	SNOTEL	9200	20	7.7			8.6	
Bowl Canyon	SC	8980			4.0		7.4	185%
Hidden Valley	SC	8480					4.9	
Missionary Spring	SC	7940			2.5		2.1	84%
Tsaile Canyon #1	SC	8160			3.2		5.0	156%
Tsaile Canyon #3	SC	8920			5.4		7.8	144%
Whiskey Creek	SC	9050			4.4		8.8	200%
Navajo Whiskey Ck	SNOTEL	9050	22	7.2			8.2	

Basin Index		
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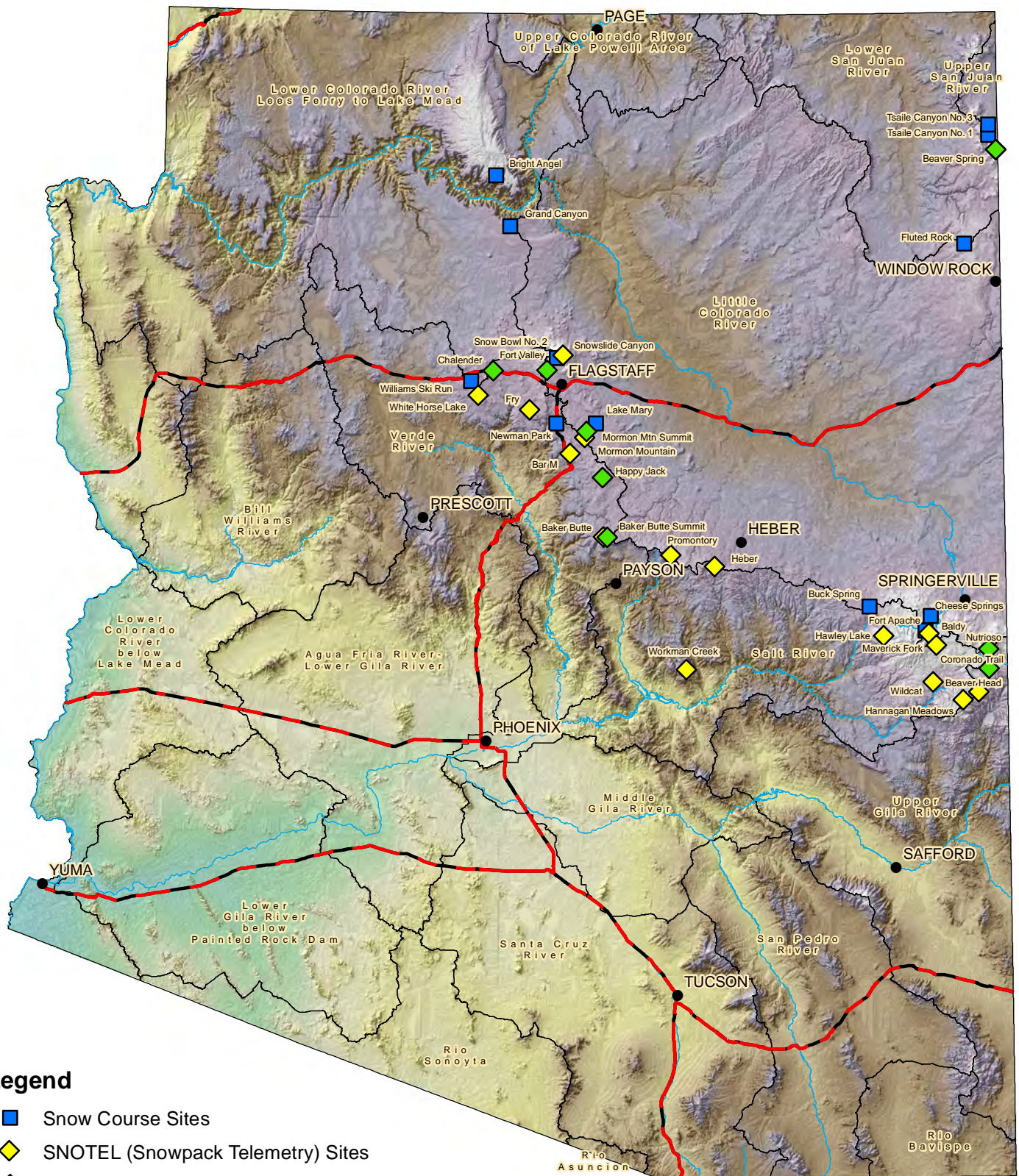
DEFIANCE PLATEAU	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Fluted Rock	SC	7800			2.0		3.0	150%

Basin Index		
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NORTHWESTERN ARIZONA	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Bright Angel	SC	8400	21	5.5	5.1	108%	5.1	100%
Grand Canyon	SC	7500	5	1.0	1.7	59%	3.0	176%

Basin Index	96%	119%
# of sites	2	2

Arizona Snow Survey Data Sites



Legend

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