



United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

# Arizona

## Basin Outlook Report

### January 15, 2013



**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.



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# ARIZONA Basin Outlook Report as of January 15, 2013

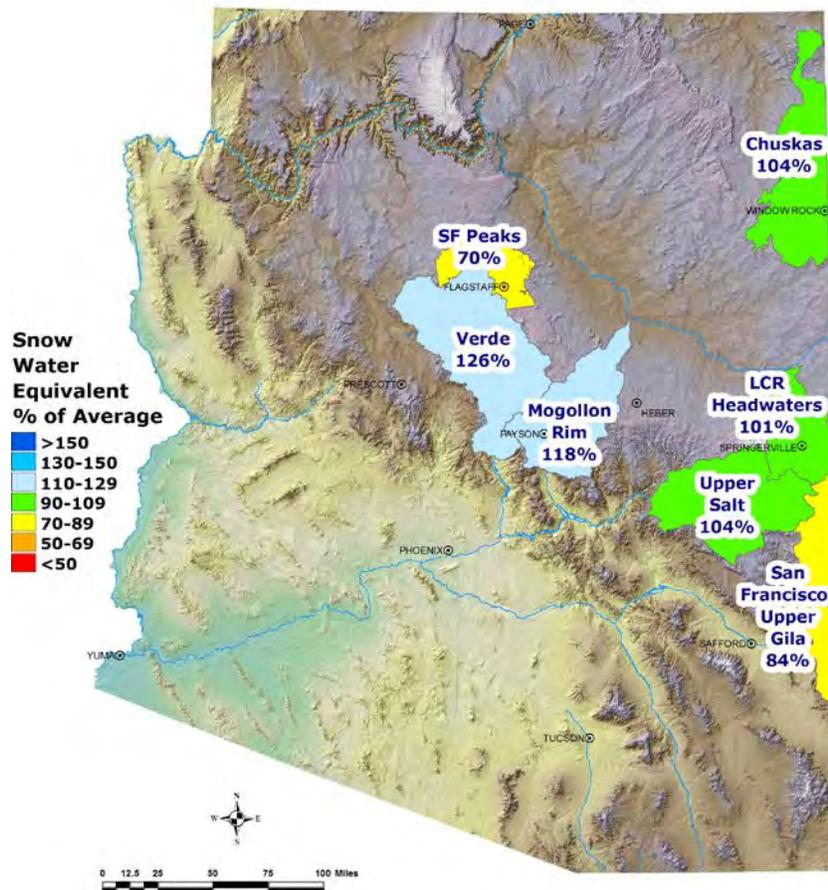
## SUMMARY

As of January 15, snowpack levels are now about normal in the Salt River and Little Colorado River Basins, slightly below normal in the San Francisco-Upper Gila River Basin, and above normal in the Verde River Basin. The Salt and Verde River reservoir system stands at 49 percent of capacity, while San Carlos Reservoir is at less than one percent of capacity. The mid-month forecast calls for below normal to well below normal runoff in all basins for the spring runoff period.

## SNOWPACK

Snow water equivalent levels in the basins are now ranging from a low of 84 percent of average in the San Francisco-Upper Gila River Basin to a high of 126 percent of average in the Verde River Basin. The Chuska Mountains snowpack is about normal at 104 percent of average. The statewide snowpack is also about normal at 107 percent of average.

**Arizona  
Snow Water Equivalent  
as of January 15, 2013**

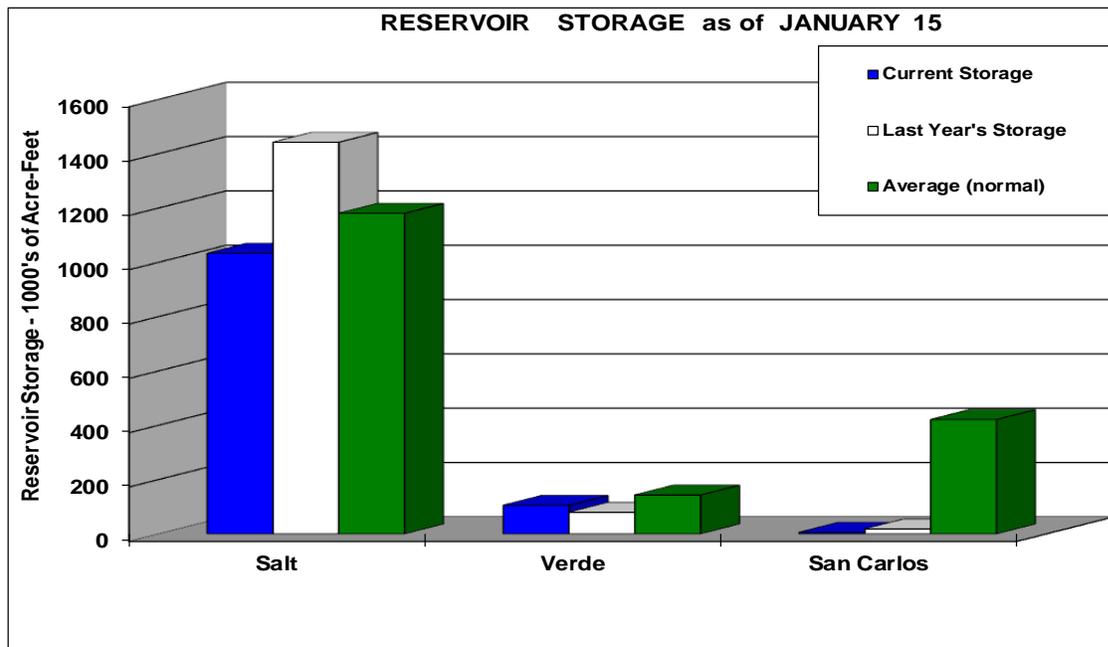


## PRECIPITATION

Mountain data from NRCS SNOTEL sites and Cooperator precipitation gages show that precipitation for the first half of January was below normal in the basins. Cumulative precipitation since October 1 remains well below normal in all 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 49 percent of capacity. San Carlos Reservoir remains well below normal at less than one percent of capacity.



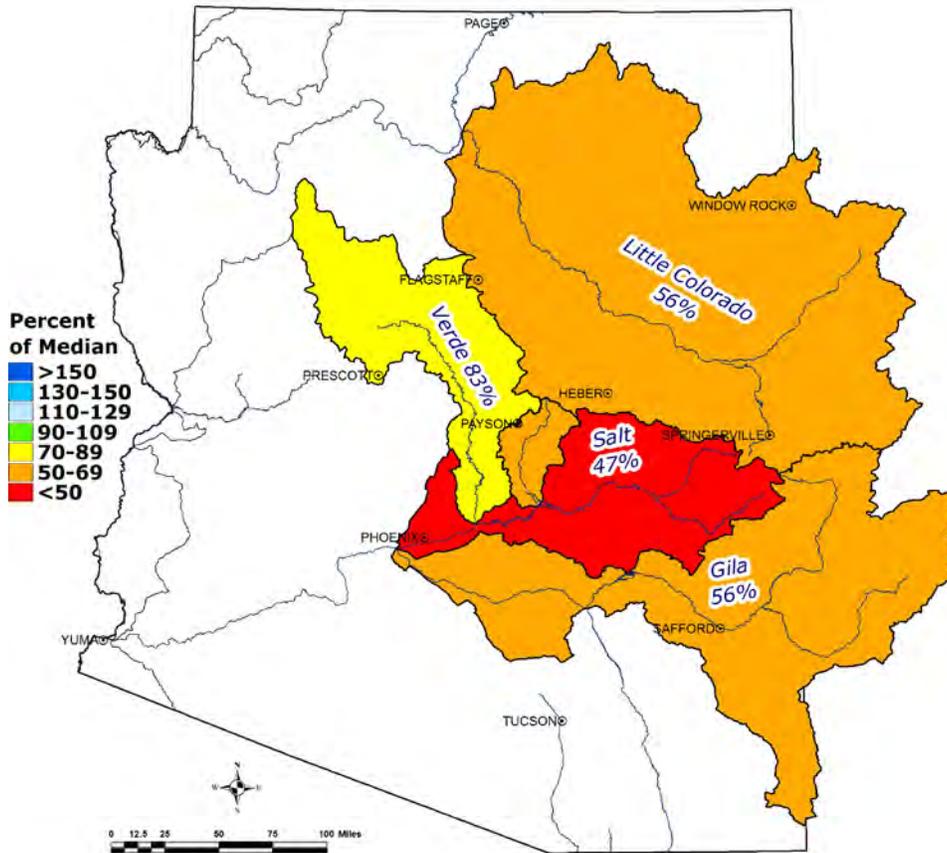
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1033.7	1442.7	1181.2	2025.8
Verde River System	105.7	79.9	143.5	287.4
San Carlos Reservoir	6.1	18.6	421.8	875.0
Lyman Lake	4.3	9.5	14.3	30.0
Lake Havasu	555.6	548.8	557.4	619.0
Lake Mohave	1591.6	1599.1	1657.0	1810.0
Lake Mead	13741.0	15025.0	21868.0	26159.0
Lake Powell	12425.0	15788.0	18748.0	24322.0

# STREAMFLOW

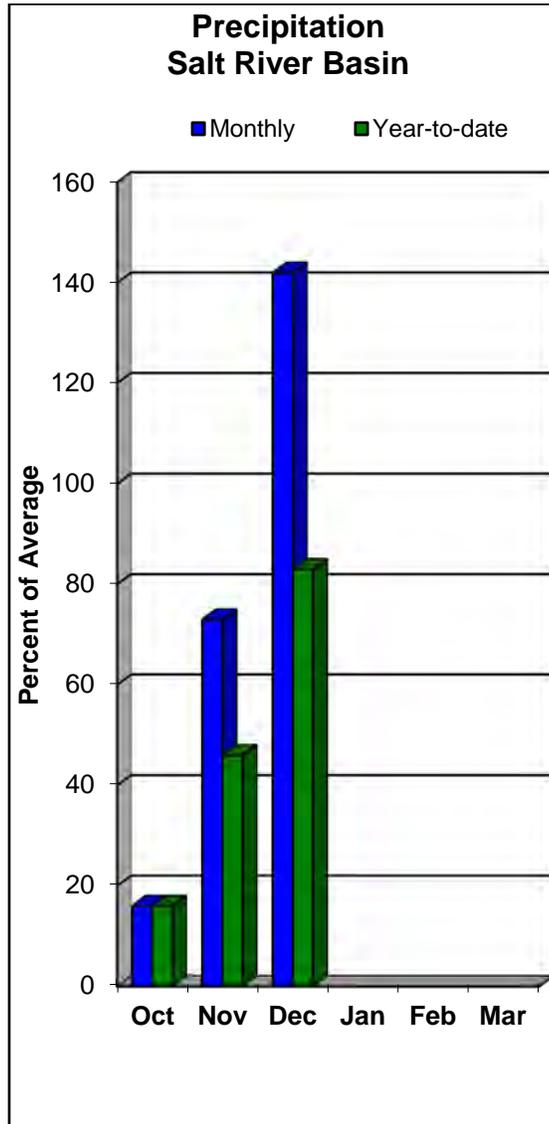
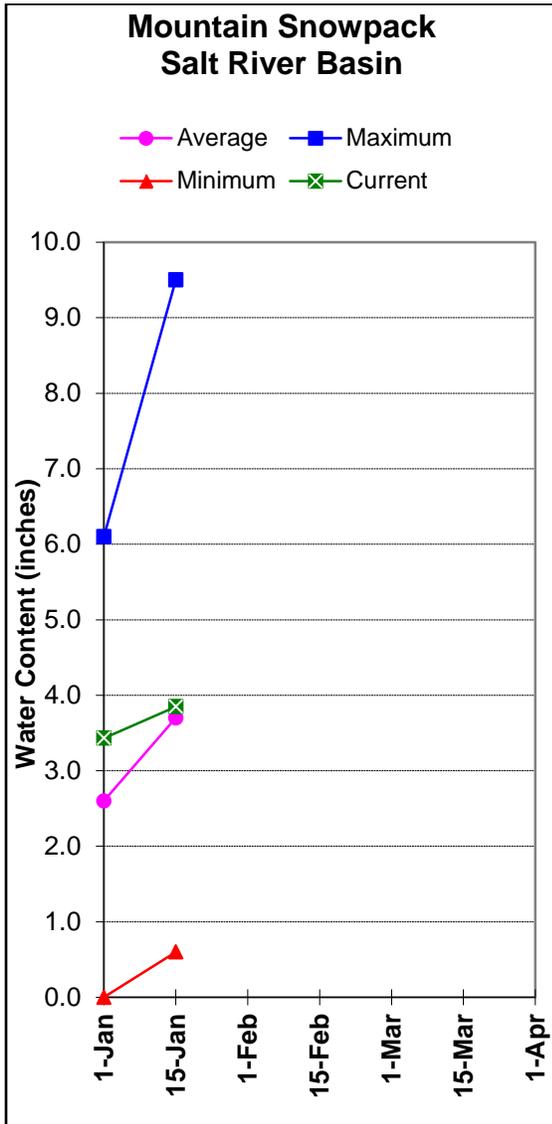
As of January 15, the forecast calls for below normal to well below normal streamflow for the spring runoff period, ranging from 47 percent of median in the Salt River near Roosevelt to 83 percent of median in the Verde River above Horseshoe Dam. The mid-month streamflow forecast reflects predictions for dry conditions to persist through the rest of January and beyond. 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, 2013



## SALT RIVER BASIN as of January 15, 2013

Well below normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 47% of median streamflow through May, while at Tonto Creek, the forecast calls for 58% of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 104% of average.



SALT RIVER BASIN as of January 15, 2013

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=====
                        SALT RIVER BASIN
                    Streamflow Forecasts - January 15, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast     | ===== Chance of Exceeding * ===== |
Period       | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Salt R nr Roosevelt (3)
J15-MAY      46      94      140      47      200      315      300
JANUARY      8.0      33
Tonto Ck ab Gun Ck nr Roosevelt (3)
J15-MAY      8.0     12.9      22      58      35      60      38
JANUARY      1.50     40
=====

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\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

```

=====
                        SALT RIVER BASIN
                    Reservoir Storage (1000AF) Mid-January
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                This Year      Last Year      Average
=====
SALT RIVER RES SYSTEM      2025.8      1033.7      1442.7      1181.2
=====

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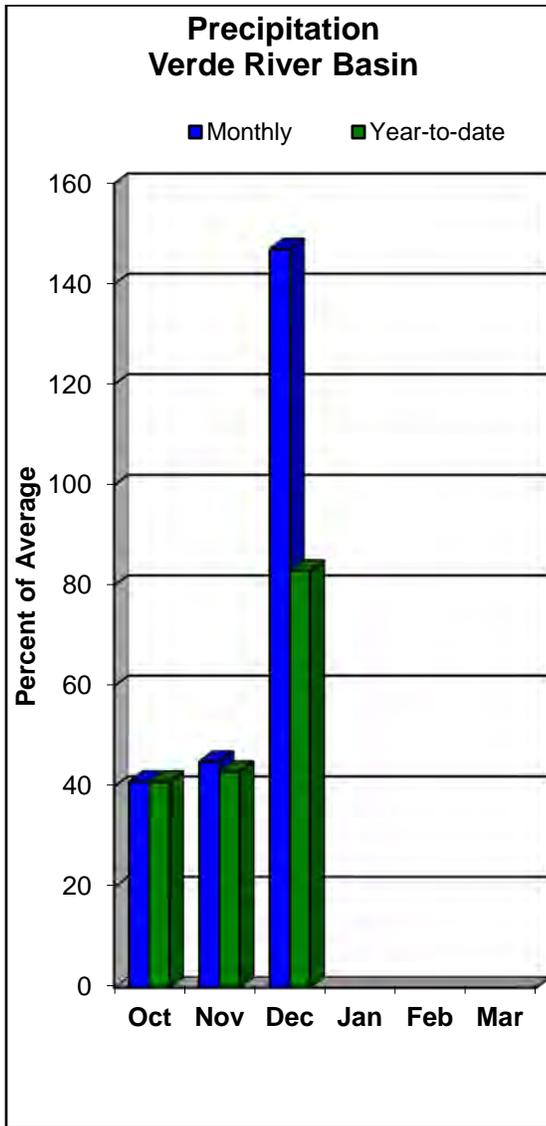
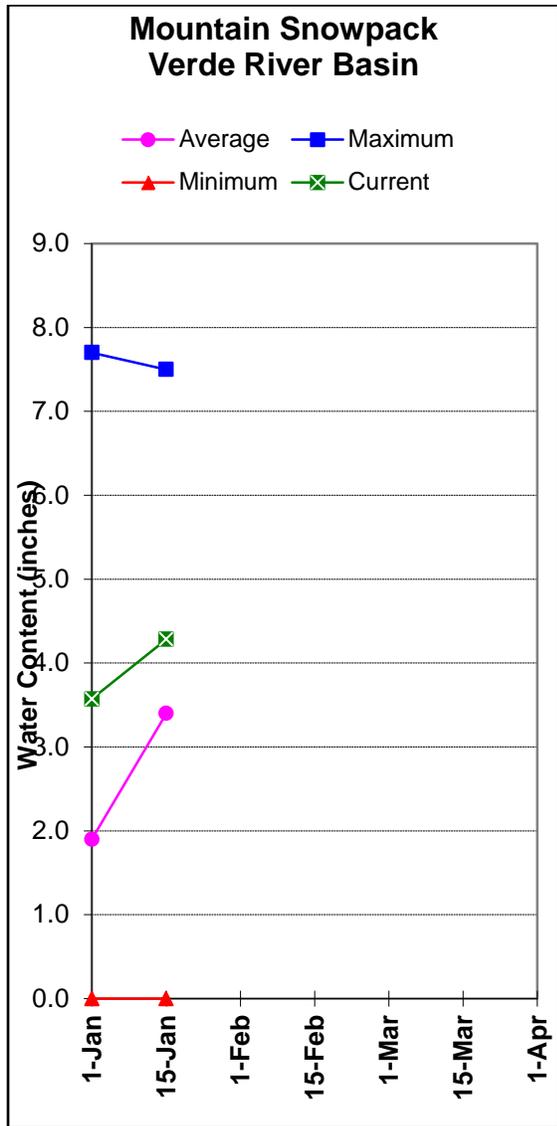
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=====
                        SALT RIVER BASIN
                    Watershed Snowpack Analysis - January 15, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of Last Year      Median
=====
SALT RIVER BASIN      10      101      104
=====

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## VERDE RIVER BASIN as of January 15, 2013

Below normal streamflow levels are forecast for the basin. In the Verde River, at Horseshoe Dam, the forecast calls for 83% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 126% of median.



VERDE RIVER BASIN as of January 15, 2013

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=====
                        VERDE RIVER BASIN
                        Streamflow Forecasts - January 15, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast    | ===== Chance of Exceeding * ===== |
Period      | 90%    70%    | 50%    | 30%    10%    | 30 Yr Med
              |(1000AF) (1000AF)|(1000AF) (% MED.)|(1000AF) (1000AF)| (1000AF)
=====
Verde R bl Tangle Ck ab Horseshoe Dam (3
J15-MAY      50      81      120      83      170      270      145
JANUARY      15.0     65
=====

```

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

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=====
                        VERDE RIVER BASIN
                        Reservoir Storage (1000AF) Mid-January
=====
Reservoir    Usable          ***** Usable Storage *****
              Capacity    This Year    Last Year    Average
=====
VERDE RIVER RES SYSTEM    287.4        105.7        79.9        143.5
=====

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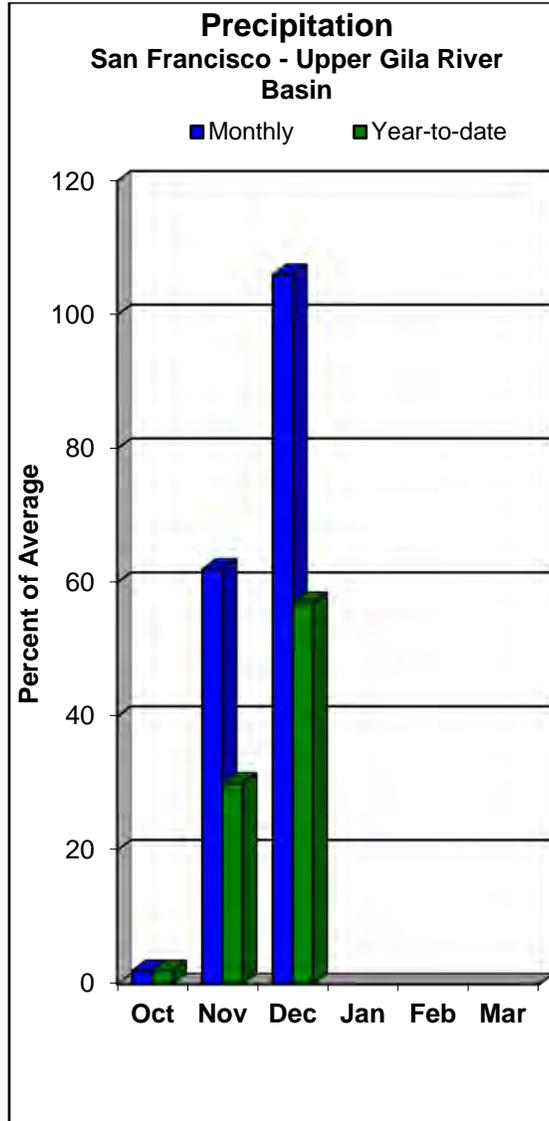
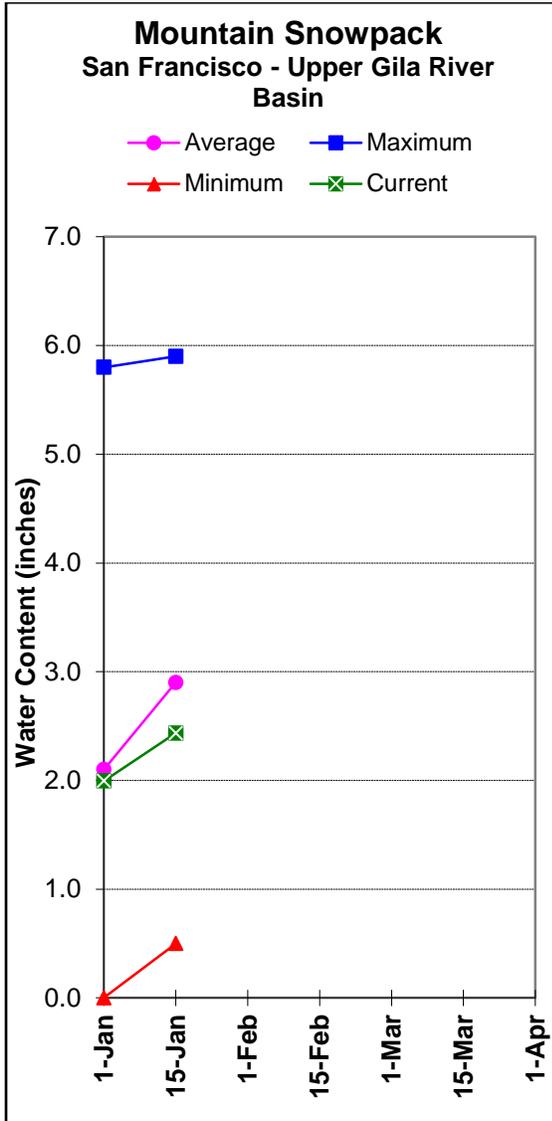
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=====
                        VERDE RIVER BASIN
                        Watershed Snowpack Analysis - January 15, 2013
=====
Watershed    Number of          This Year as Percent of
              Data Sites        Last Year          Median
=====
VERDE RIVER BASIN          10                145                126
SAN FRANCISCO PEAKS        2                 108                70
=====

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## SAN FRANCISCO-UPPER GILA RIVER BASIN as of January 15, 2013

Below normal to well below normal streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 75% of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 56% of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 51% of median through May. Snow survey measurements show the snowpack for this basin to be at 84% of median.



SAN FRANCISCO - UPPER GILA RIVER BASIN as of January 15, 2013

SAN FRANCISCO - UPPER GILA RIVER BASIN  
Streamflow Forecasts - January 15, 2013

Forecast Pt Forecast Period	<=== Drier === Future Conditions === Wetter ===>					30 Yr Med (1000AF)
	Chance of Exceeding * 90% 70% 50% 30% 10%					
	(1000AF)	(1000AF)	(1000AF)	(% MED.)	(1000AF)	(1000AF)
Gila R at Gila (3)						
J15-MAY	14.0	15.8	24	44	35	55
Gila R bl Blue Ck nr Virden (3)						
J15-MAY	13.0	14.6	29	40	48	86
San Francisco R at Glenwood (3)						
J15-MAY	4.9	11.3	17.9	91	27	44
San Francisco R at Clifton (3)						
J15-MAY	12.0	25	42	75	64	105
Gila R nr Solomon (3)						
J15-MAY	25	42	73	56	113	187
JANUARY			9.0	46		19.7
San Carlos Reservoir Inflow (2,3)						
J15-MAY	10.0	18.0	46	51	87	171

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

SAN FRANCISCO - UPPER GILA RIVER BASIN  
Reservoir Storage (1000AF) Mid-January

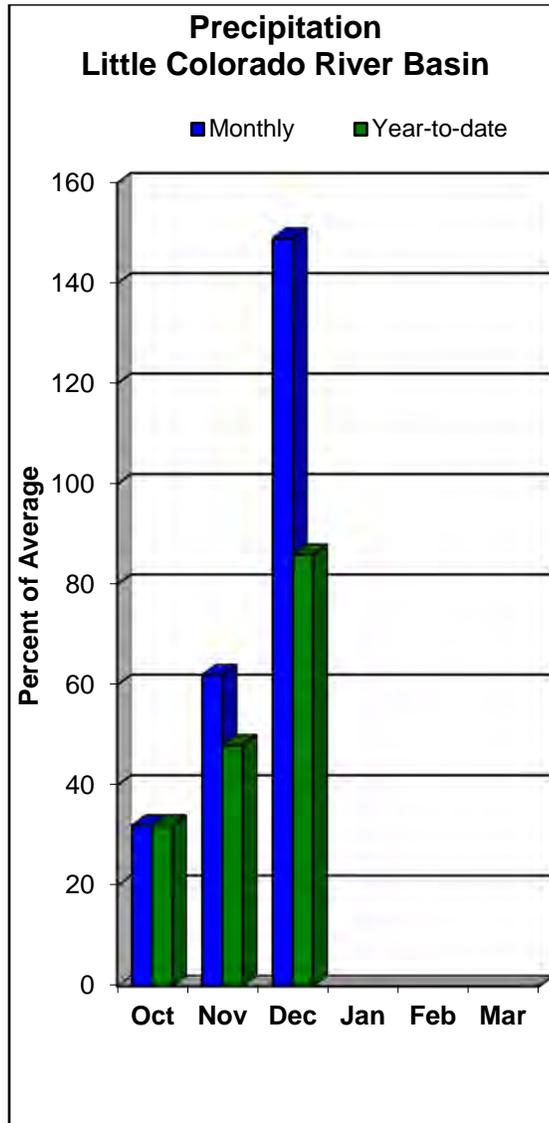
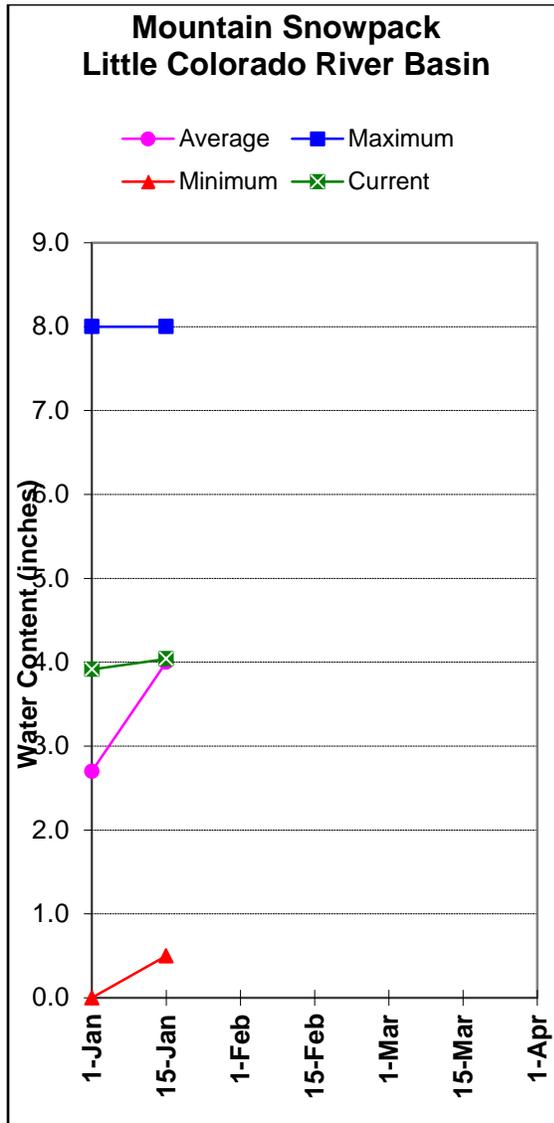
Reservoir	Usable Capacity	***** This Year *****	***** Usable Storage ***** Last Year	***** Average *****
SAN CARLOS	875.0	6.1	18.6	421.8

SAN FRANCISCO - UPPER GILA RIVER BASIN  
Watershed Snowpack Analysis - January 15, 2013

Watershed	Number of Data Sites	This Year as Percent of Last Year	Median
SAN FRANCISCO - UPPER GILA R	9	75	84

## LITTLE COLORADO RIVER BASIN as of January 15, 2013

Well below normal streamflow levels are forecast for the basin. In the Little Colorado River, above Lyman Lake, the forecast calls for 56% of median streamflow through June. At Blue Ridge (C.C. Cragin) Reservoir, inflow to the lake is forecast at 51% of median through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 101% and 118% of average, respectively.



LITTLE COLORADO RIVER BASIN as of January 15, 2013

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=====
                        LITTLE COLORADO RIVER BASIN
                        Streamflow Forecasts - January 15, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast     | ===== Chance of Exceeding * ===== |
Period       | 90%    70%    | 50%    | 30%    10%    | 30 Yr Med
              |(1000AF) (1000AF)|(1000AF) (% MED.)|(1000AF) (1000AF)| (1000AF)
=====
Little Colorado R ab Lyman Lake (3)
  JAN-JUN    1.34    2.70    4.00    56    5.70    8.90    7.10

Blue Ridge Reservoir Inflow (3)
  JAN-MAY    1.7     4.7     8.5     51    12.6    22     16.6

Lake Mary Reservoir Inflow (3)
  JAN-MAY    1.29    2.40    3.50    73    4.80    7.40    4.80
=====

```

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

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=====
                        LITTLE COLORADO RIVER BASIN
                        Reservoir Storage (1000AF) Mid-January
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                |                    | This Year  Last Year  Average
=====
LYMAN RESERVOIR      30.0                4.3      9.5      14.3
=====

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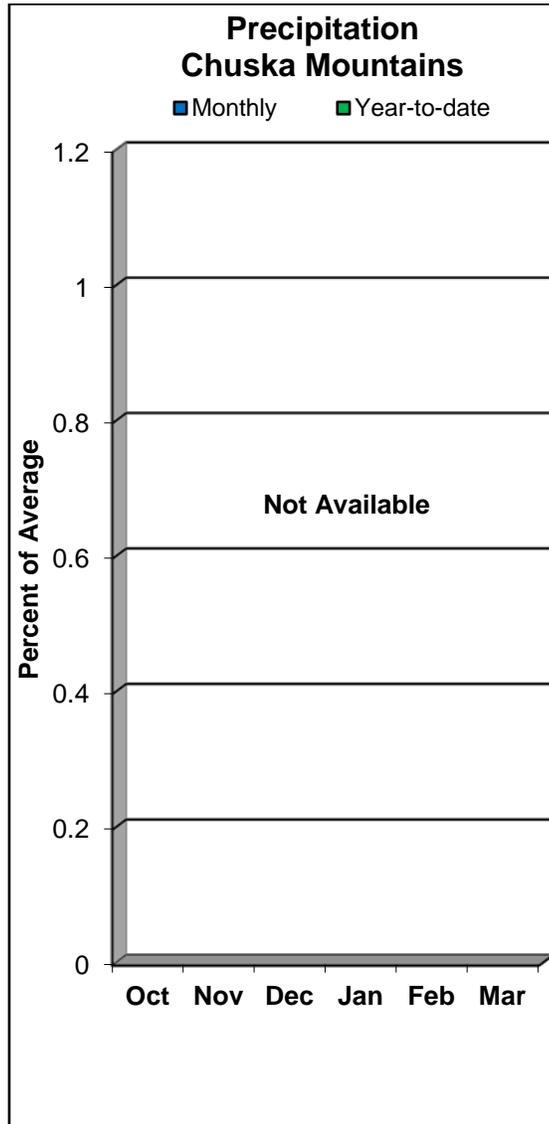
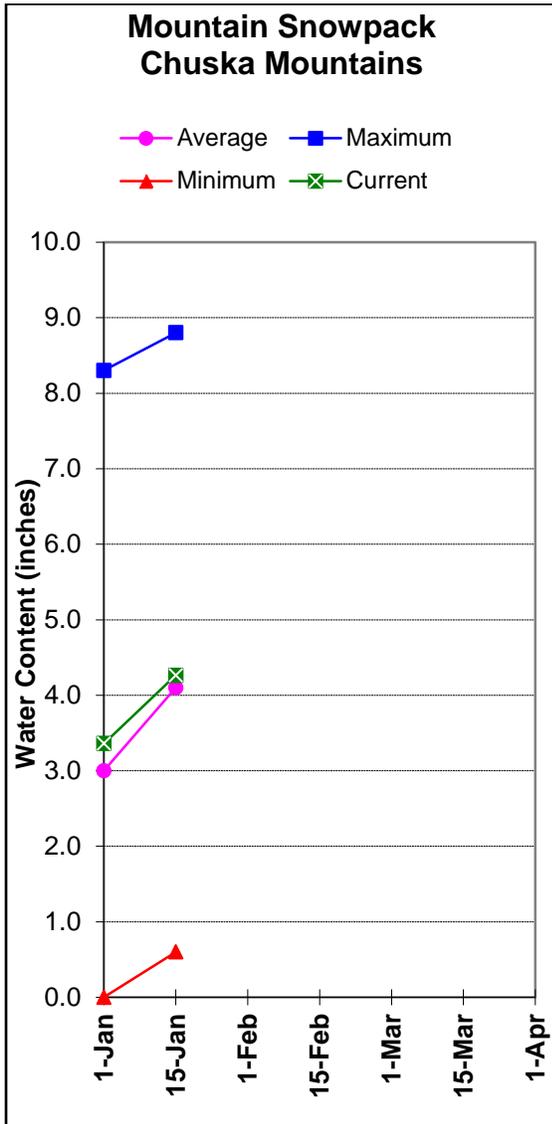
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=====
                        LITTLE COLORADO RIVER BASIN
                        Watershed Snowpack Analysis - January 15, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of
                |                    | Last Year  Median
=====
LITTLE COLORADO - SOUTHERN H      10                89      101
CENTRAL MOGOLLON RIM                4                88      118
=====

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## CHUSKA MOUNTAINS as of January 15, 2013

Snow survey measurements conducted by staff of the Navajo Water Management Branch show the Chuska snowpack to be at 104% of average. Below normal runoff is forecast for Bowl Canyon Creek and Wheatfields Creek, and well below normal runoff is forecast for Captain Tom Wash and Kinlichee Creek.



CHUSKA MOUNTAINS as of January 15, 2013

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=====
                        CHUSKA MOUNTAINS
                    Streamflow Forecasts - January 15, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% AVG.) | (1000AF) (1000AF) | (1000AF)
=====
Captain Tom Wash nr Two Gray Hills
MAR-MAY 0.10 0.53 1.50 58 3.20 7.70 2.60

Wheatfields Ck nr Wheatfields
MAR-MAY 0.48 1.11 1.70 81 2.40 3.70 2.10

Bowl Canyon Ck ab Asaayi Lake
MAR-MAY 0.40 0.59 1.00 77 1.52 2.50 1.30

Kinlichee Ck
MAR-MAY 0.25 0.31 1.00 66 2.30 5.90 1.52
=====

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\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

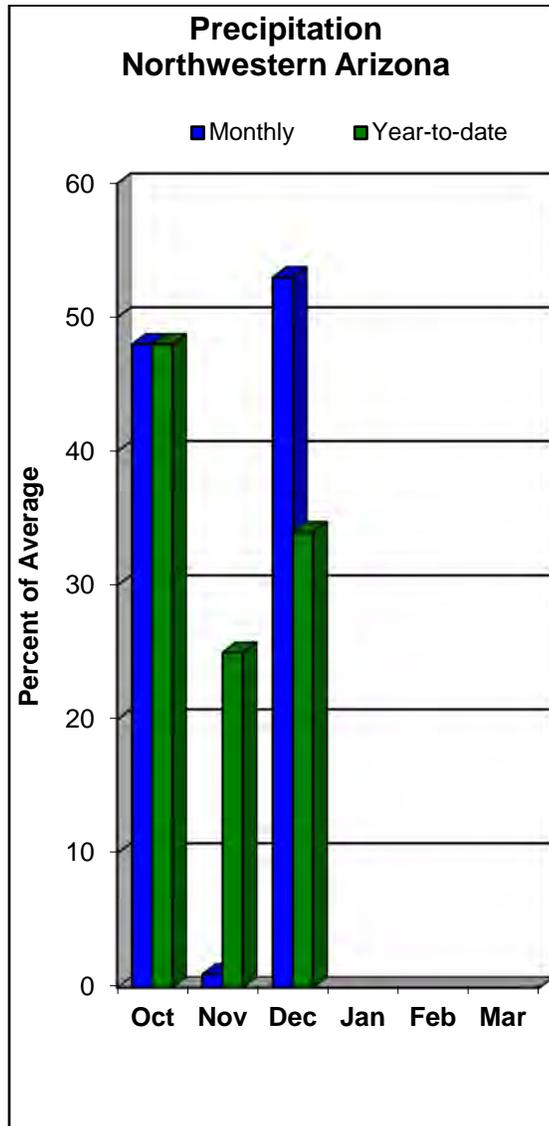
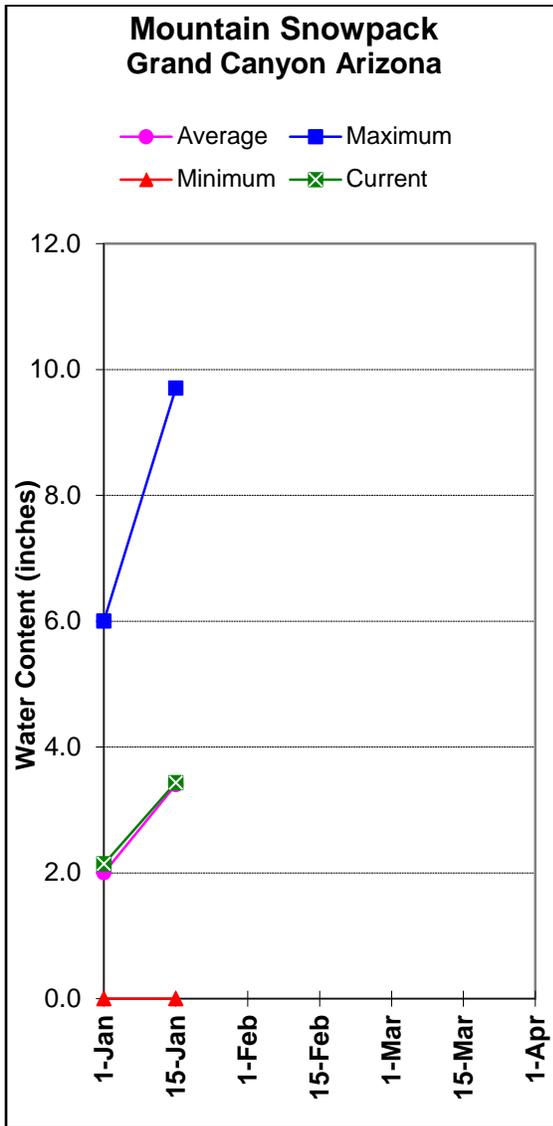
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=====
                        CHUSKA MOUNTAINS
                    Watershed Snowpack Analysis - January 15, 2013
=====
Watershed | Number of | This Year as Percent of |
           | Data Sites | Last Year | Median
=====
CHUSKA MOUNTAINS | 6 | 168 | 104
DEFIANCE PLATEAU | 2 | 229 | 133
=====

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## NORTHWESTERN ARIZONA as of January 15, 2013

On the Colorado River, well below normal inflow to Lake Powell is forecast at 52% 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 only 101% of average.



NORTHWESTERN ARIZONA as of January 15, 2013

NORTHWESTERN ARIZONA  
Streamflow Forecasts - January 15, 2013

Forecast Pt Forecast Period	<=== Drier === Future Conditions === Wetter ===>					30 Yr Avg (1000AF)
	Chance of Exceeding * 90% 70% 50% 30% 10%					
	(1000AF)	(1000AF)	(1000AF) (% AVG.)	(1000AF)	(1000AF)	(1000AF)

Lake Powell Inflow (2)							
APR-JUL	345	2370	3750	52	5130	7160	7160

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

NORTHWESTERN ARIZONA  
Reservoir Storage (1000AF) Mid-January

Reservoir	Usable Capacity	***** Usable Storage *****		
		This Year	Last Year	Average
LAKE HAVASU	619.0	555.6	548.8	557.4
LAKE MOHAVE	1810.0	1591.6	1599.1	1657.0
LAKE MEAD	26159.0	13741.0	15025.0	21868.0
LAKE POWELL	24322.0	12425.0	15788.0	18748.0

NORTHWESTERN ARIZONA  
Watershed Snowpack Analysis - January 15, 2013

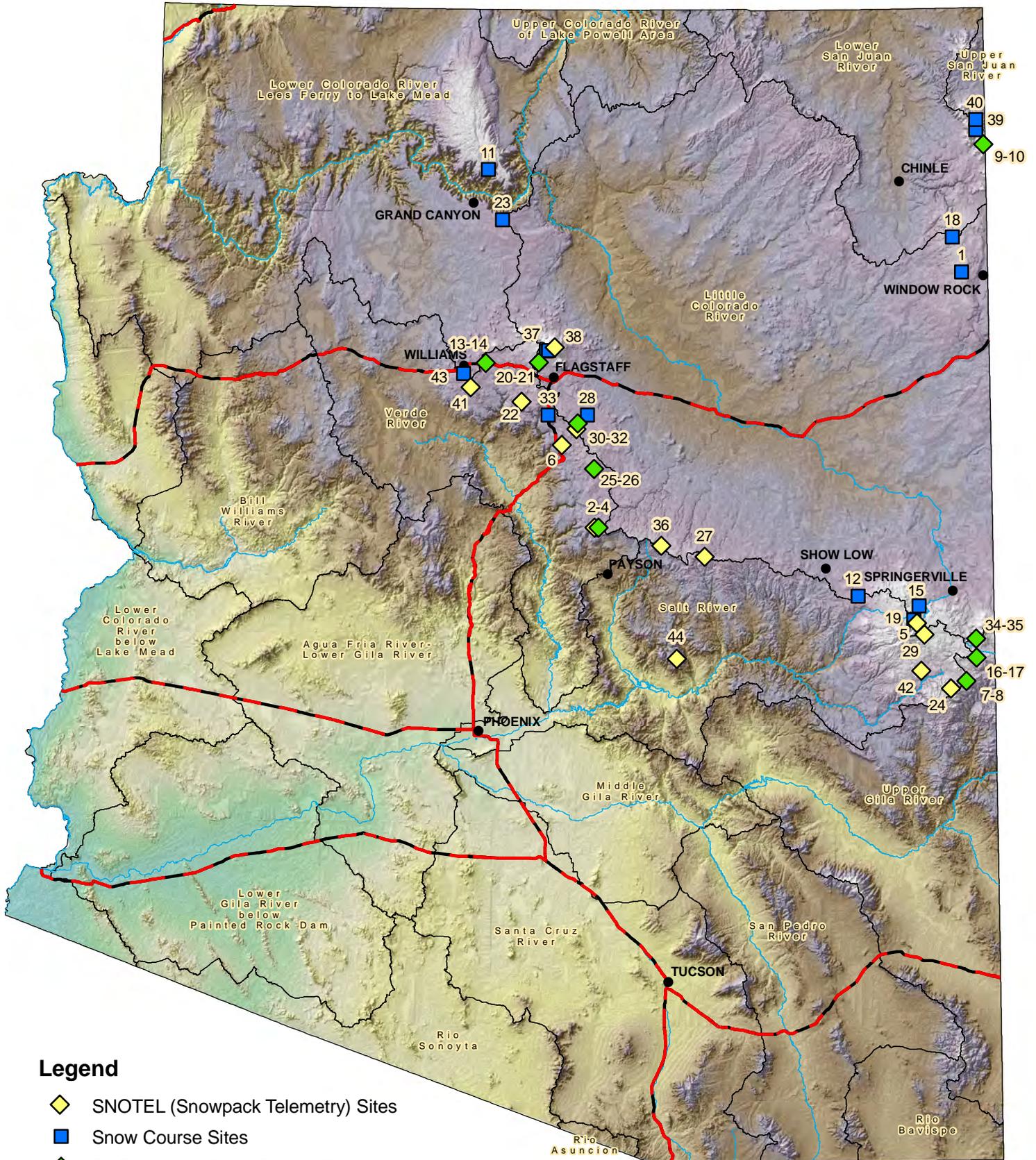
Watershed	Number of Data Sites	This Year as Percent of	
		Last Year	Median
GRAND CANYON	2	531	101

S N O W   S U R V E Y   D A T A

JANUARY 15, 2013

MAP NUM	SNOW COURSE	ELEV	DATE	SNOW DEPTH	SNOW WATER	LAST YEAR	AVG 81-10
1.	ARBABS FOREST (AK)	7680	1/14	12	2.2	.9	1.6
2.	BAKER BUTTE SNOTEL	7330	1/15	18	3.7	3.4	2.9
3.	BAKER BUTTE #2	7700	1/14	20	5.9	7.2	5.6
4.	BAKER BUTTE SMT SNTL	7700	1/15	24	5.9	7.7	-
5.	BALDY SNOTEL	9220	1/15	20	4.0	4.6	5.0
6.	BAR M SNOTEL	6393	1/15	10	3.2	-	-
7.	BEAVER HEAD	8000	1/15	11	2.3	2.1	2.2
8.	BEAVER HEAD SNOTEL	7990	1/15	12	3.0	3.6	3.2
9.	BEAVER SPRING	9220	1/09	17	4.5	2.6	5.0
10.	BEAVER SPRING SNOTEL	9200	1/15	20	4.6	3.5	-
11.	BRIGHT ANGEL	8400	1/14	18	4.3	1.2	5.1
12.	BUCK SPRING	7400	1/15	12	3.2	2.4	2.3
13.	CHALENDER	7100	1/14	10	2.4	.5	1.6
14.	CHALENDER SNOTEL	7100	1/15	13	2.6	1.2	-
15.	CHEESE SPRINGS	8600	1/14	14	2.7	3.5	3.4
16.	CORONADO TRL SNOTEL	8400	1/15	13	2.8	1.8	2.8
17.	CORONADO TRAIL	8400	1/15	12	3.0	2.2	2.2
18.	FLUTED ROCK	7800	1/14	14	2.6	1.2	2.0
19.	FORT APACHE	9160	1/14	21	4.7	5.8	5.2
20.	FORT VALLEY	7350	1/14	12	2.5	.6	1.8
21.	FORT VALLEY SNOTEL	7350	1/15	-	2.1	.0	-
22.	FRY SNOTEL	7220	1/15	19	3.9	3.2	4.0
23.	GRAND CANYON	7500	1/14	10	2.6	.1	1.7
24.	HANNAGAN MDWS SNOTEL	9020	1/15	24	4.9	6.8	6.1
25.	HAPPY JACK	7630	1/14	16	4.0	1.8	2.8
26.	HAPPY JACK SNOTEL	7630	1/15	21	5.1	3.0	3.0
27.	HEBER SNOTEL	7640	1/15	18	3.9	4.2	3.1
28.	LAKE MARY	6970	1/14	16	2.2	1.9	2.2
29.	MAVERICK FORK SNOTEL	9200	1/15	19	4.0	4.8	5.2
30.	MORMON MTN SNOTEL	7500	1/15	19	4.1	2.0	2.8
31.	MORMON MT. SUMMIT #2	8470	1/14	23	6.4	4.0	-
32.	MORMON MTN SUMMIT SN	8500	1/15	21	4.6	3.4	-
33.	NEWMAN PARK	6750	1/14	10	2.3	1.2	1.4
34.	NUTRIOSO	8500	1/15	9	1.8	.0	1.3
35.	NUTRIOSO SNOTEL	8500	1/15	-	1.5	.0	-
36.	PROMONTORY SNOTEL	7900	1/15	27	6.6	7.0	5.4
37.	SNOW BOWL #2	11000	1/13	30	6.8	6.6	10.8
38.	SNOWSLIDE CYN SNTL	9750	1/15	34	7.6	6.7	9.7
39.	TSAILE CANYON #1	8160	1/09	18	4.6	1.4	3.2
40.	TSAILE CANYON #3	8920	1/09	20	5.1	2.7	5.4
41.	WHITE HORSE SNOTEL	7180	1/15	14	3.3	1.1	3.0
42.	WILDCAT SNOTEL	7850	1/15	16	3.1	2.8	2.4
43.	WILLIAMS SKI RUN	7720	1/14	20	5.8	3.2	4.8
44.	WORKMAN CREEK SNOTEL	6900	1/15	24	6.5	6.5	3.1

# Arizona Snow Survey Data Sites



## Legend

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

