



Natural  
Resources  
Conservation  
Service

# Arizona

## Basin Outlook Report

### February 1, 2013



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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 February 1, 2013

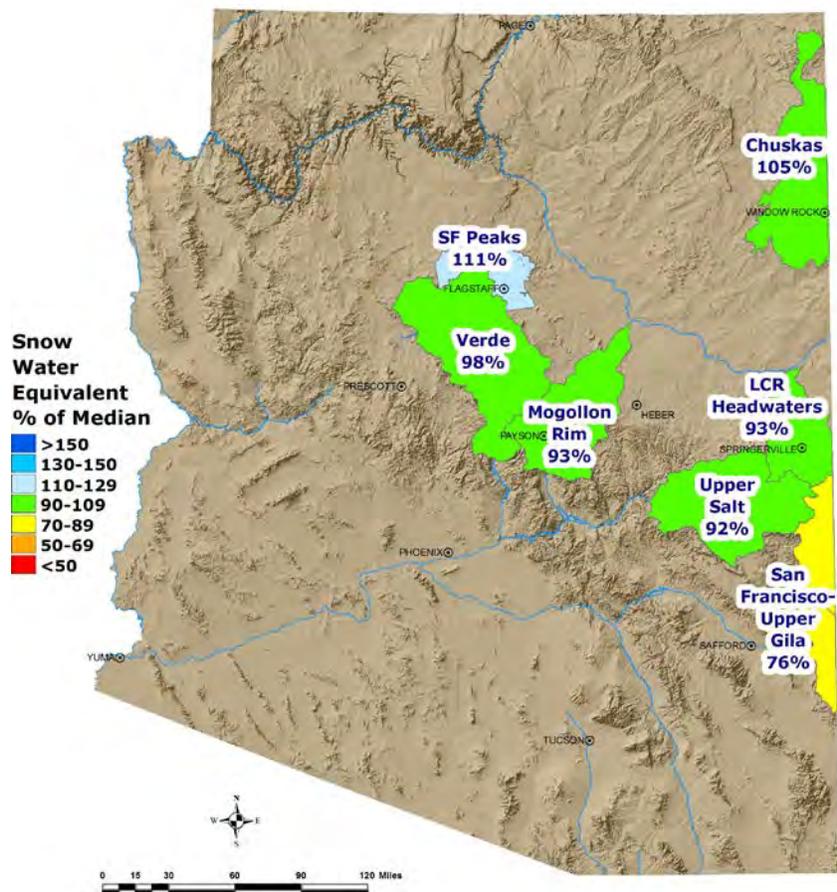
## SUMMARY

As of February 1, snowpack levels are now normal in all basins, with the exception of the San Francisco-Upper Gila River Basin, which remains below normal for snow water equivalent. Precipitation for the month of January ranged from below normal to well above normal in the basins. The Salt and Verde River reservoir system now stands at 55 percent of capacity, while San Carlos Reservoir is at one percent of capacity. The forecast calls for well below normal runoff in all of the basins for the spring runoff period, with the exception of the Verde River Basin, which is forecast at about normal runoff.

## SNOWPACK

Snow water equivalent levels range from well below normal in the San Francisco-Upper Gila River Basin, at 76 percent of median, to about normal in the other major river basins. A late January storm produced mostly rain on snow, which generally reduced the snowpack in the mountains. The statewide snowpack is currently about normal at 98 percent of median.

**Arizona  
Snow Water Equivalent  
as of February 1, 2013**

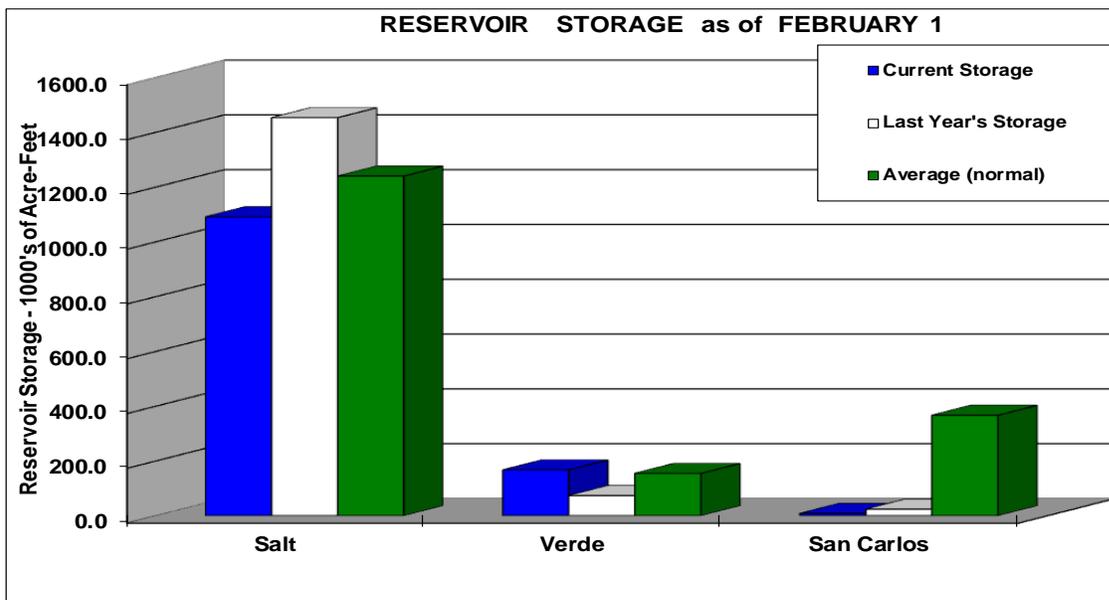


## PRECIPITATION

Mountain data from NRCS SNOTEL sites and Cooperator gages show that January precipitation ranged from 78 percent of average in the San Francisco-Upper Gila River Basin to 149 percent of average in the Verde River Basin. A major storm during the last week of the month produced 5-7 inches of rain and snow at some SNOTEL sites along the Mogollon Rim. Cumulative precipitation since October 1 is now normal in all basins, with the exception of the San Francisco-Upper Gila River Basin, which remains well below normal. Please refer to the precipitation bar graphs found in this report for more information on precipitation levels in the basins.

## RESERVOIR STORAGE

As of February 1, the Salt and Verde River reservoir system stands at 55 percent of capacity. San Carlos Reservoir remains well below normal at only one percent of capacity.



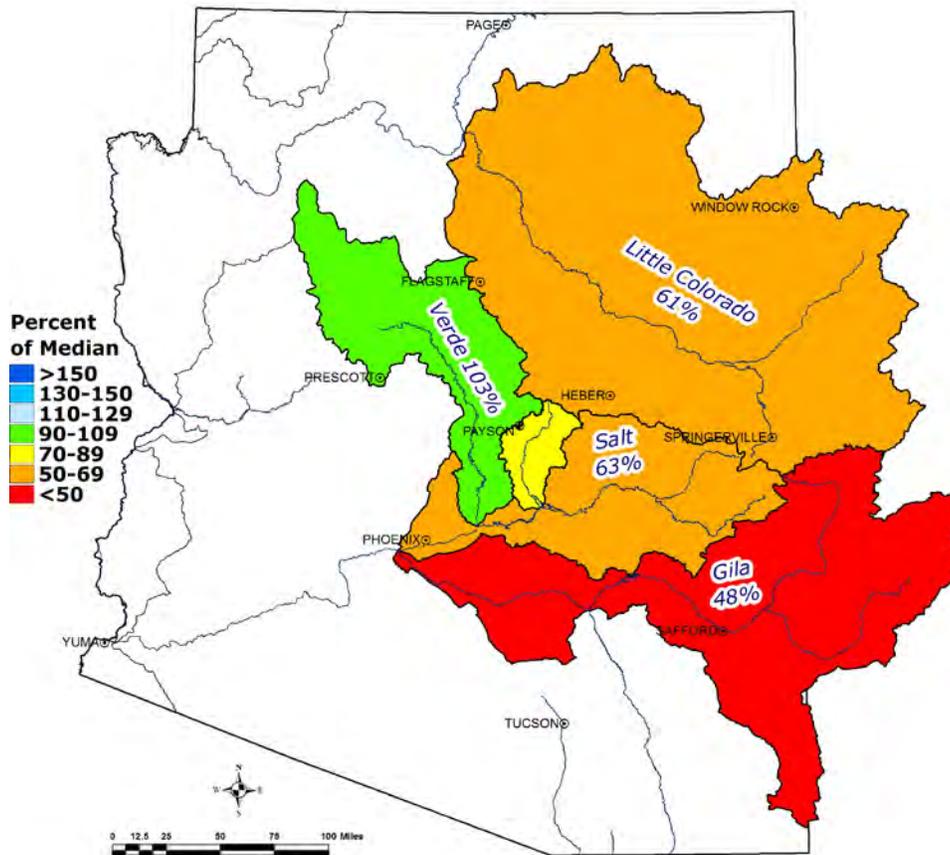
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1091.1	1453.2	1240.0	2025.8
Verde River System	167.2	73.4	154.4	287.4
San Carlos Reservoir	8.3	23.7	366.8	875.0
Lyman Lake	4.4	9.5	12.3	30.0
Lake Havasu	580.2	553.9	556.4	619.0
Lake Mohave	1649.8	1627.7	1676.0	1810.0
Lake Mead	13828.0	15022.0	20452.0	26159.0
Lake Powell	12190.0	15648.0	17338.0	24322.0

# STREAMFLOW

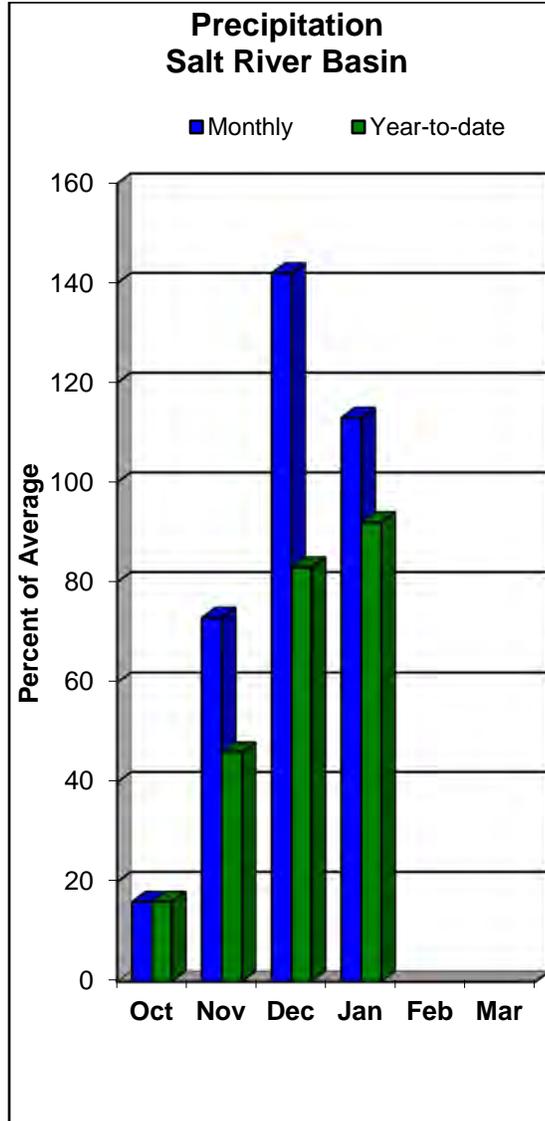
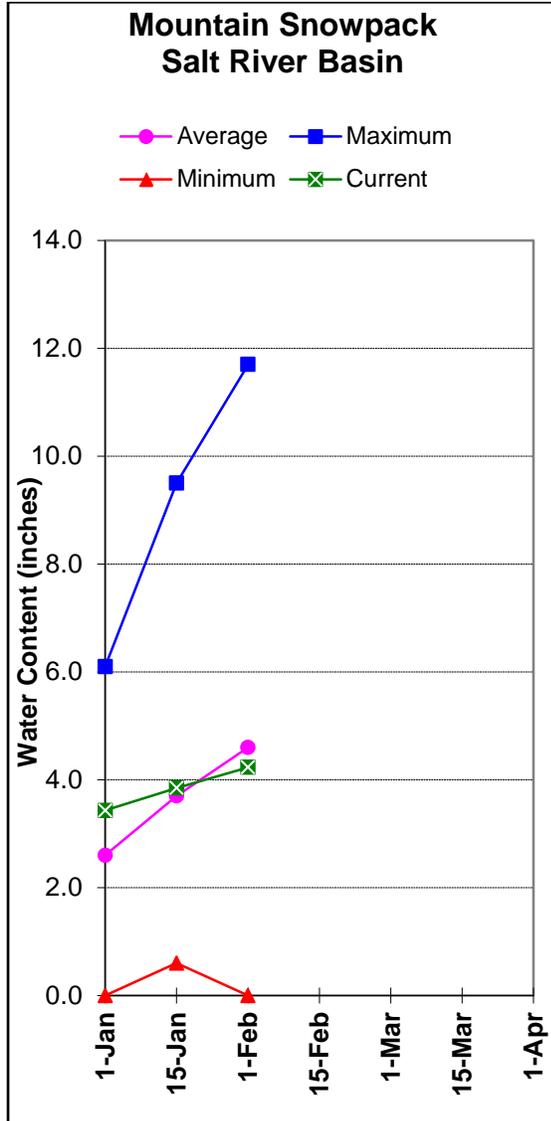
As of February 1, the forecast calls for well below normal to normal streamflow for the spring runoff period, ranging from 48 percent of median in the Gila River near Solomon to 103 percent of median in the Verde River above Horseshoe Dam. The updated streamflow forecasts represent an upgrade for the Salt and Verde River Basins and a slight downgrade for the San Francisco-Upper Gila River Basin. Please refer to the basin forecast tables found in this report for more information regarding water supply forecasts.

## Arizona Spring Streamflow Forecasts as of February 1, 2013



## SALT RIVER BASIN as of February 1, 2013

Below normal to well below normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 63% of median streamflow through May, while at Tonto Creek, the forecast calls for 86% of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 92% of median.



SALT RIVER BASIN as of February 1, 2013

```

=====
                        SALT RIVER BASIN
                        Streamflow Forecasts - February 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Salt R nr Roosevelt (3)
  FEB-MAY      79      132      180      63      240      345      285
  FEBRUARY           40      103           240      345           39

Tonto Ck ab Gun Ck nr Roosevelt (3)
  FEB-MAY      6.5      17.7      30      86      47      82      35
  FEBRUARY           10.0      97           47      82           10.3
=====

```

\* 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) End of January
=====
Reservoir | Usable Capacity | ***** Usable Storage ***** |
          |                 | This Year | Last Year | Average |
=====
SALT RIVER RES SYSTEM | 2025.8 | 1091.1 | 1452.8 | 1240.0 |
=====

```

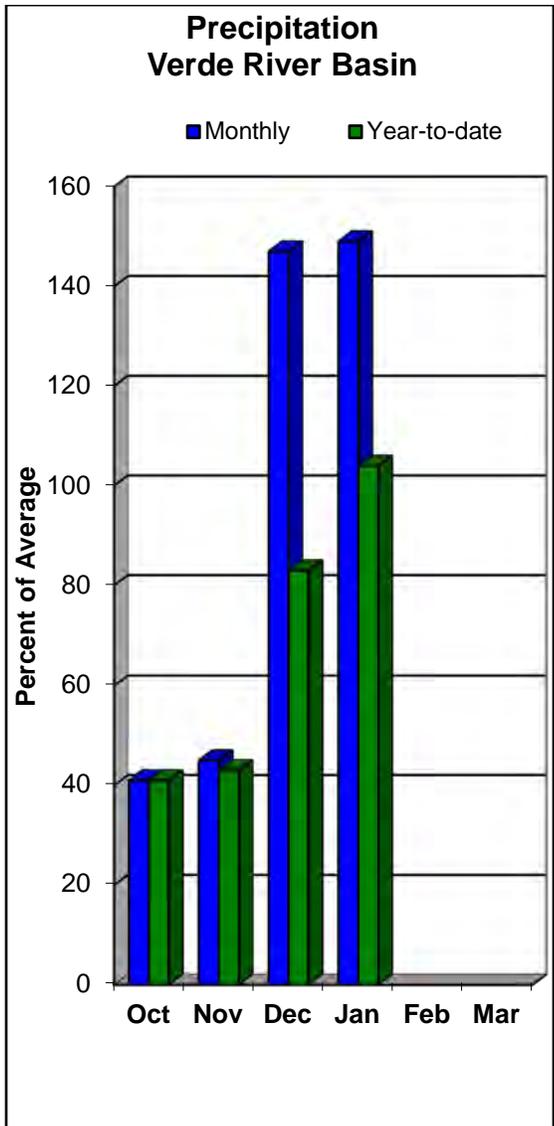
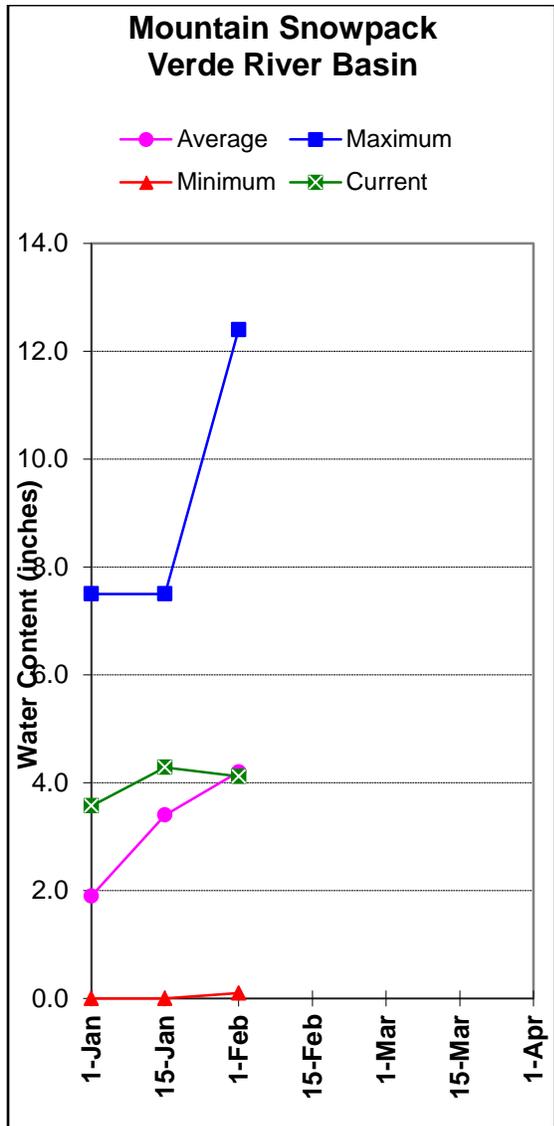
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=====
                        SALT RIVER BASIN
                        Watershed Snowpack Analysis - February 1, 2013
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Median |
=====
SALT RIVER BASIN | 10 | 96 | 92 |
=====

```

## VERDE RIVER BASIN as of February 1, 2013

Normal streamflow levels are forecast for the basin. In the Verde River above Horseshoe Dam, the forecast calls for 103% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 98% of median.



VERDE RIVER BASIN as of February 1, 2013

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=====
                                VERDE RIVER BASIN
                                Streamflow Forecasts - February 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Verde R bl Tangle Ck ab Horseshoe Dam (3
FEB-MAY      52      97      140      103      193      295      136
FEBRUARY      42      120

```

\* 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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- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

```

=====
                                VERDE RIVER BASIN
                                Reservoir Storage (1000AF) End of January
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                This Year      Last Year      Average
=====
VERDE RIVER RES SYSTEM      287.4      167.2      74.0      154.4
=====

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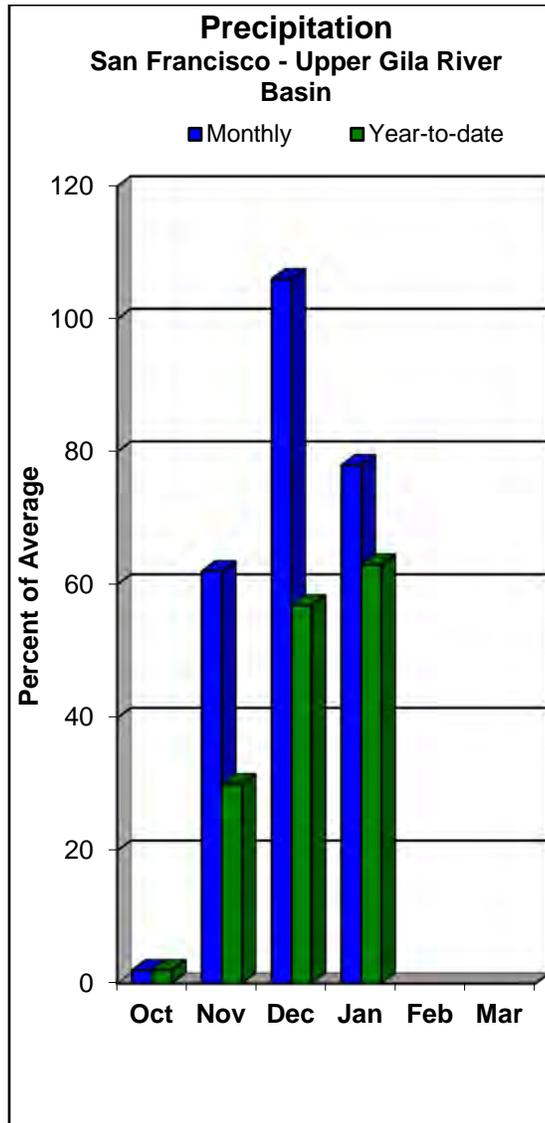
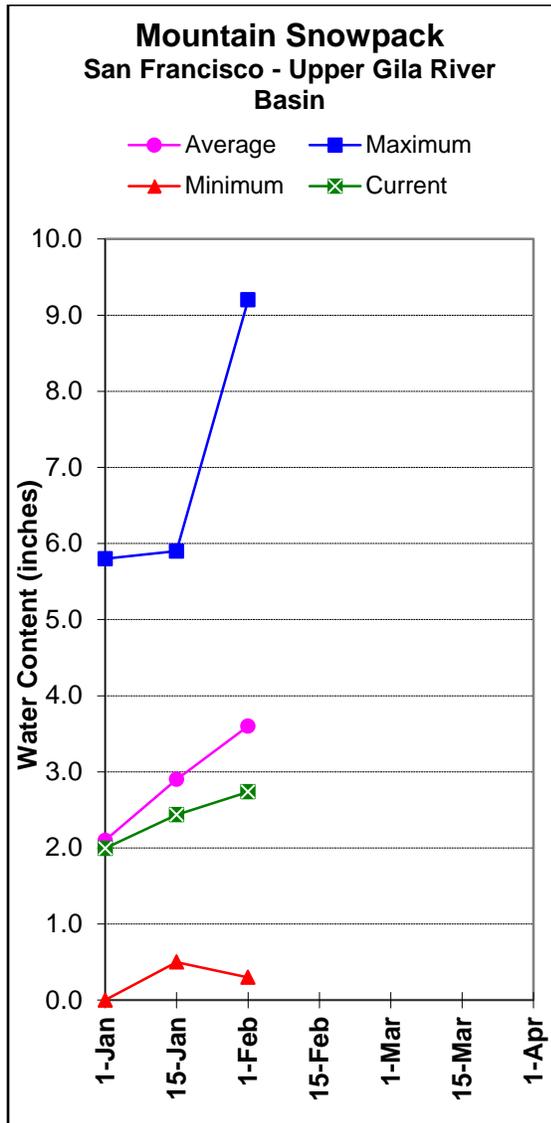
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=====
                                VERDE RIVER BASIN
                                Watershed Snowpack Analysis - February 1, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of Last Year      Median
=====
VERDE RIVER BASIN      11      132      98
SAN FRANCISCO PEAKS      2      150      111
=====

```

## SAN FRANCISCO-UPPER GILA RIVER BASIN as of February 1, 2013

Well below normal streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 63% of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 48% of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 38% of median through May. Snow survey measurements show the snowpack for this basin to be at 76% of median.



SAN FRANCISCO - UPPER GILA RIVER BASIN as of February 1, 2013

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=====
SAN FRANCISCO - UPPER GILA RIVER BASIN
Streamflow Forecasts - February 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Gila R at Gila (3)
FEB-MAY 12.0 16.0 23 46 32 48 50

Gila R bl Blue Ck nr Virden (3)
FEB-MAY 11.0 15.4 28 44 44 75 63

San Francisco R at Glenwood (3)
FEB-MAY 3.8 8.4 13.0 71 19.0 31 18.2

San Francisco R at Clifton (3)
FEB-MAY 6.8 19.6 32 63 47 76 51

Gila R nr Solomon (3)
FEB-MAY 19.0 34 59 48 91 150 123
FEBRUARY 17.0 74 23

San Carlos Reservoir Inflow (2,3)
FEB-MAY 0.0 10.5 31 38 62 128 81

```

\* 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.

```

=====
SAN FRANCISCO - UPPER GILA RIVER BASIN
Reservoir Storage (1000AF) End of January
=====
Reservoir Usable Capacity ***** Usable Storage ***** Average
This Year Last Year
=====
SAN CARLOS 875.0 8.3 23.7 366.8
=====

```

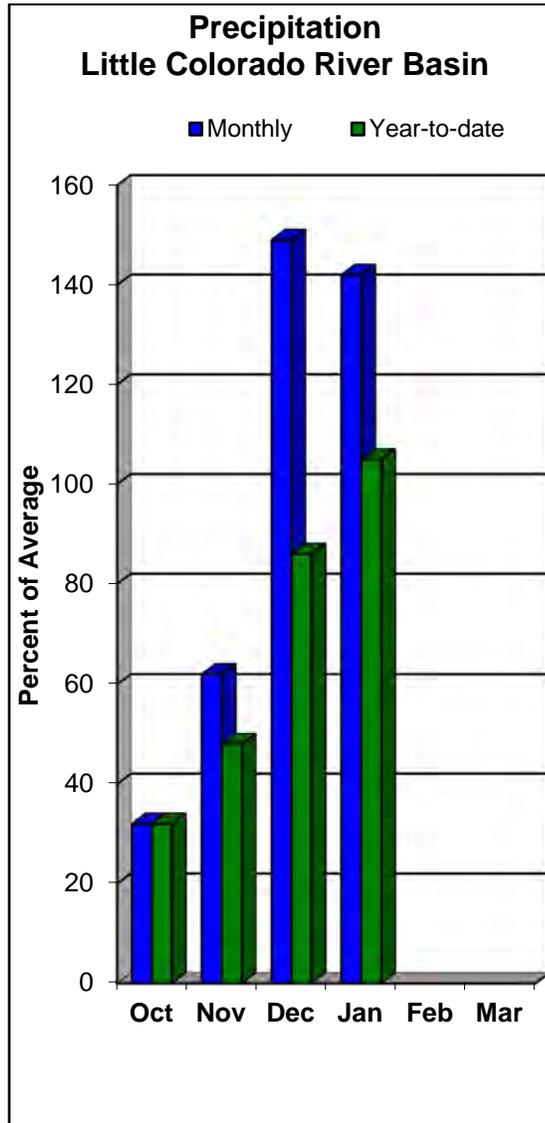
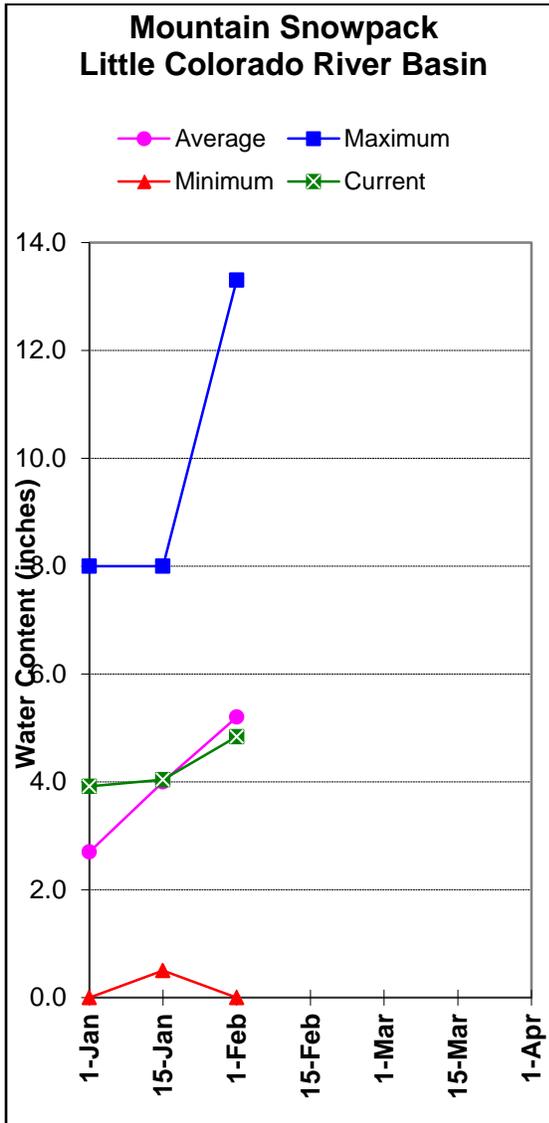
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SAN FRANCISCO - UPPER GILA RIVER BASIN
Watershed Snowpack Analysis - February 1, 2013
=====
Watershed Number of Data Sites This Year as Percent of Last Year Median
=====
SAN FRANCISCO - UPPER GILA R 11 73 76
=====

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## LITTLE COLORADO RIVER BASIN as of February 1, 2013

Well below normal streamflow levels are forecast for the basin. In the Little Colorado River, at Lyman Lake, the forecast calls for 61% of median streamflow through June. At Blue Ridge (C.C. Cragin) Reservoir, inflow to the lake is forecast at 55% of median through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were both measured at 93% of median.



LITTLE COLORADO RIVER BASIN as of February 1, 2013

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=====
                                LITTLE COLORADO RIVER BASIN
                                Streamflow Forecasts - February 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Little Colorado R ab Lyman Lake (3)
FEB-JUN      1.59      2.80      4.00      61      5.40      8.10      6.60

Rio Nutria nr Ramah
FEB-MAY      0.01      0.18      0.50      36      1.08      2.60      1.40

Ramah Reservoir Inflow (3)
FEB-MAY      0.00      0.02      0.27      35      0.79      2.10      0.77

Zuni River ab Black Rock Reservoir (3)
FEB-MAY      0.08      0.21      0.35      92      0.54      0.91      0.38

Blue Ridge Reservoir Inflow (3)
FEB-MAY      1.7       4.7       9.0       55      12.6      22       16.3

Lake Mary Reservoir Inflow (3)
FEB-MAY      1.07      2.10      3.00      70      4.20      6.50      4.30
=====

```

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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.

```

=====
                                LITTLE COLORADO RIVER BASIN
                                Reservoir Storage (1000AF) End of January
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                This Year      Last Year      Average
=====
LYMAN RESERVOIR      30.0      4.4      9.5      12.3
=====

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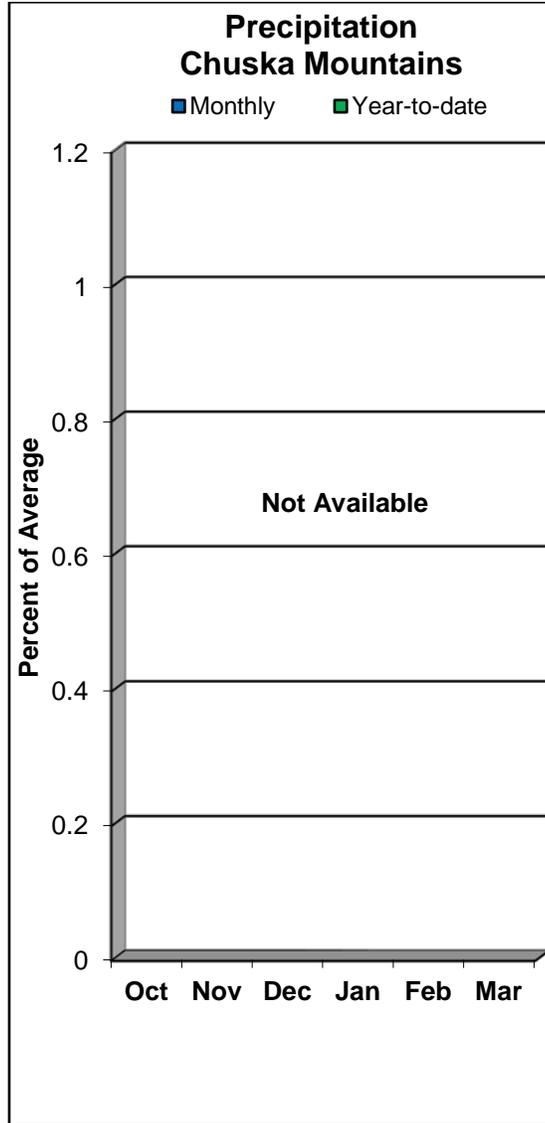
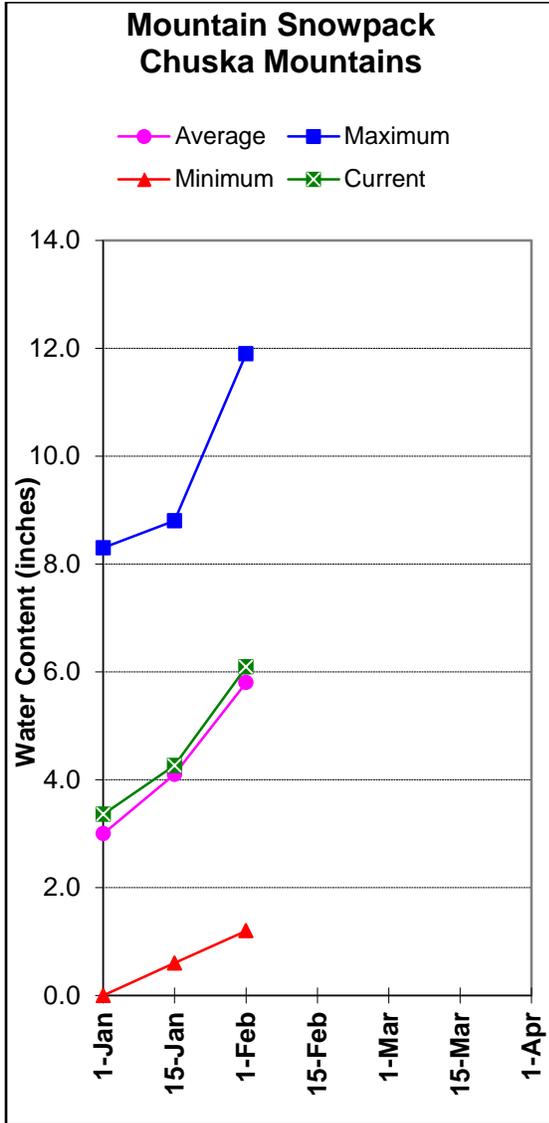
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=====
                                LITTLE COLORADO RIVER BASIN
                                Watershed Snowpack Analysis - February 1, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of Last Year      Median
=====
LITTLE COLORADO - SOUTHERN H      10      91      93
CENTRAL MOGOLLON RIM      4      90      93
=====

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## CHUSKA MOUNTAINS as of February 1, 2013

Snow survey measurements conducted by staff of the Navajo Nation Water Management Branch show the Chuska snowpack to be at 105% of median. Below normal runoff is forecast for Captain Tom Wash and Kinlichee Creek, and about normal runoff is forecast for Bowl Canyon Creek.



CHUSKA MOUNTAINS as of February 1, 2013

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=====
                                CHUSKA MOUNTAINS
                                Streamflow Forecasts - February 1, 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 0.24 0.96 1.88 72 3.20 6.30 2.60

Bowl Canyon Ck ab Asaayi Lake
MAR-MAY 0.44 0.85 1.20 92 1.61 2.30 1.30

Kinlichee Ck
MAR-MAY 0.09 0.54 1.21 80 2.30 4.80 1.52
=====

```

\* 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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- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average.

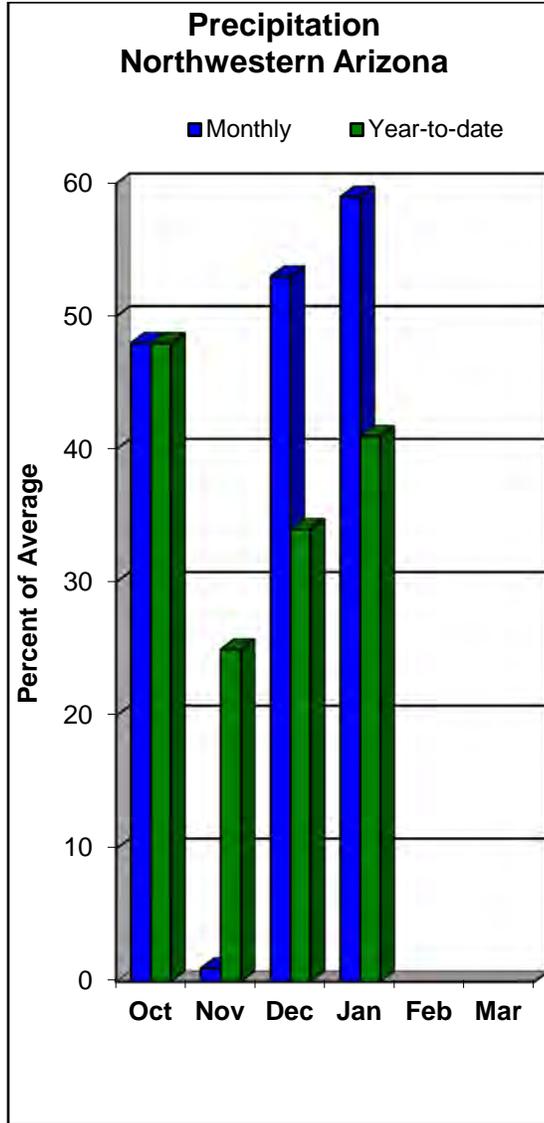
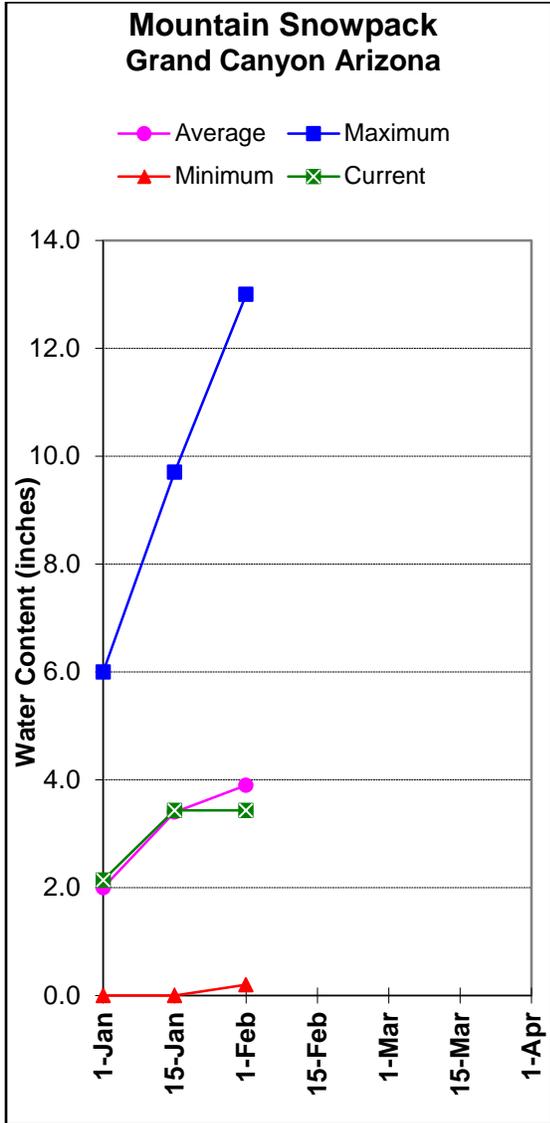
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=====
                                CHUSKA MOUNTAINS
                                Watershed Snowpack Analysis - February 1, 2013
=====
Watershed | Number of | This Year as Percent of |
| Data Sites | Last Year | Median |
=====
CHUSKA MOUNTAINS | 6 | 173 | 105 |
DEFIANCE PLATEAU | 2 | 265 | 110 |
=====

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## NORTHWESTERN ARIZONA as of February 1, 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 88% of median.



NORTHWESTERN ARIZONA as of February 1, 2013

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=====
                                NORTHWESTERN ARIZONA
                                Streamflow Forecasts - February 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% AVG.) | (1000AF) (1000AF) | (1000AF)
=====
Virgin R at Littlefield
APR-JUL      17.0      30      46      71      66      101      65

Lake Powell Inflow (2)
APR-JUL      1733     2841     3750     52     4785     6536     7160
    
```

\* 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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- (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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=====
                                NORTHWESTERN ARIZONA
                                Reservoir Storage (1000AF) End of January
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                This Year      Last Year      Average
=====
LAKE HAVASU      619.0      580.2      555.8      556.4
LAKE MOHAVE      1810.0     1649.8     1629.0     1676.0
LAKE MEAD        26159.0    13828.0    15022.0    20452.0
LAKE POWELL      24322.0    12190.0    15641.0    17338.0
    
```

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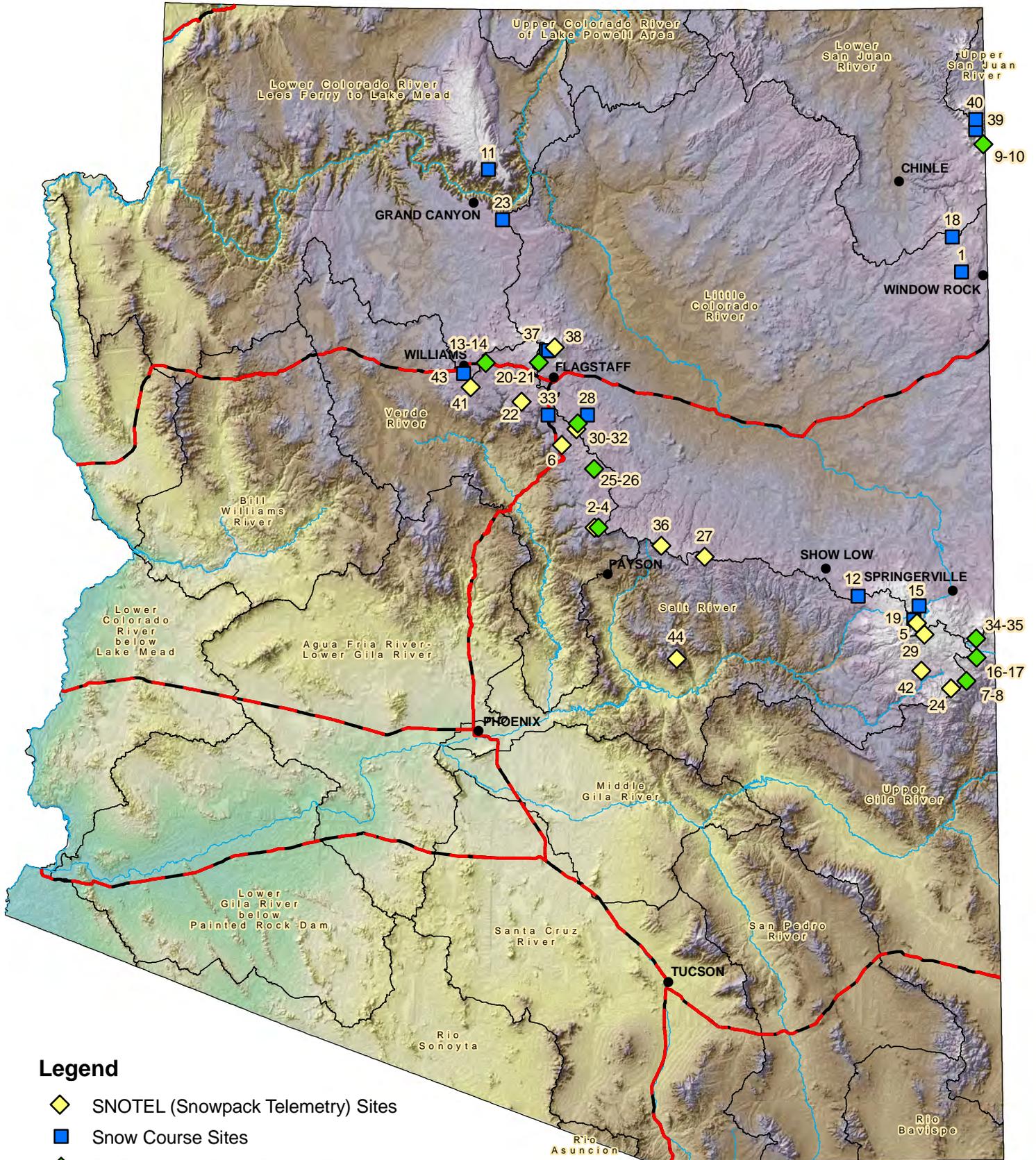
=====
                                NORTHWESTERN ARIZONA
                                Watershed Snowpack Analysis - February 1, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of Last Year      Median
=====
GRAND CANYON      2      162      88
    
```

S N O W   S U R V E Y   D A T A

FEBRUARY 1, 2013

MAP NUM.	SNOW COURSE	ELEV.	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	MEDIAN 81-10
1.	ARBABS FOREST (AK)	7680	1/31	10	3.0	1.0	2.2
2.	BAKER BUTTE SNOTEL	7330	2/01	10	3.0	3.3	4.3
3.	BAKER BUTTE #2	7700	1/31	19	6.4	7.9	6.9
4.	BAKER BUTTE SMT SNTL	7700	2/01	21	7.1	8.5	-
5.	BALDY SNOTEL	9220	2/01	22	5.8	6.2	6.4
6.	BAR M SNOTEL	6393	2/01	2	1.8	-	-
7.	BEAVER HEAD	8000	1/31	4	1.3	1.9	2.0
8.	BEAVER HEAD SNOTEL	7990	2/01	5	2.0	3.8	3.4
9.	BEAVER SPRING	9220	1/30	32	7.7	4.3	7.7
10.	BEAVER SPRING SNOTEL	9200	2/01	28	8.4	4.7	-
11.	BRIGHT ANGEL	8400	1/31	19	6.3	3.2	5.4
12.	BUCK SPRING	7400	2/01	7	1.8	2.6	2.0
13.	CHALENDER	7100	1/31	5	1.2	.0	1.8
14.	CHALENDER SNOTEL	7100	2/01	7	1.8	1.3	-
15.	CHEESE SPRINGS	8600	1/30	14	3.4	4.3	4.2
16.	CORONADO TRL SNOTEL	8400	2/01	5	2.5	.6	3.2
17.	CORONADO TRAIL	8350	1/31	4	1.2	.0	2.0
18.	FLUTED ROCK	7800	1/31	9	2.3	1.0	2.6
19.	FORT APACHE	9160	1/30	26	6.7	6.7	6.8
20.	FORT VALLEY	7350	1/31	8	2.0	.0	1.8
21.	FORT VALLEY SNOTEL	7350	2/01	1	1.7	.0	-
22.	FRY SNOTEL	7220	2/01	11	4.0	4.2	5.0
23.	GRAND CANYON	7500	1/28	5	.5	1.0	2.3
24.	HANNAGAN MDWS SNOTEL	9020	2/01	25	7.3	8.6	8.3
25.	HAPPY JACK	7630	1/31	13	3.7	1.7	3.2
26.	HAPPY JACK SNOTEL	7630	2/01	18	5.7	3.9	3.8
27.	HEBER SNOTEL	7640	2/01	10	3.6	4.2	4.6
28.	LAKE MARY	6930	1/31	12	2.8	2.7	3.0
29.	MAVERICK FORK SNOTEL	9200	2/01	22	6.4	6.6	6.8
30.	MORMON MTN SNOTEL	7500	2/01	17	4.9	3.1	4.0
31.	MORMON MT. SUMMIT #2	8470	1/31	26	8.6	5.4	7.7
32.	MORMON MTN SUMMIT SN	8500	2/01	19	6.8	4.3	-
33.	NEWMAN PARK	6750	1/31	4	1.1	1.6	2.0
34.	NUTRIOSO	8500	1/31	3	.7	.0	1.2
35.	NUTRIOSO SNOTEL	8500	2/01	1	.6	.0	-
36.	PROMONTORY SNOTEL	7900	2/01	23	8.5	8.0	7.2
37.	SNOW BOWL #2	11000	1/30	48	11.4	7.2	11.6
38.	SNOWSLIDE CYN SNOTEL	9750	2/01	45	12.5	8.7	10.0
39.	TSAILE CANYON #1	8160	1/27	15	5.0	2.2	4.8
40.	TSAILE CANYON #3	8920	1/27	26	6.9	4.0	6.3
41.	WHITE HORSE SNOTEL	7180	2/01	7	2.5	.5	3.4
42.	WILDCAT SNOTEL	7850	2/01	13	3.3	4.3	3.0
43.	WILLIAMS SKI RUN	7720	1/31	20	5.8	3.5	5.6
44.	WORKMAN CREEK SNOTEL	6900	2/01	14	5.5	5.0	4.5

# Arizona Snow Survey Data Sites



## Legend

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

