



Natural
Resources
Conservation
Service

Arizona Basin Outlook Report January 1, 2013



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 1, 2013

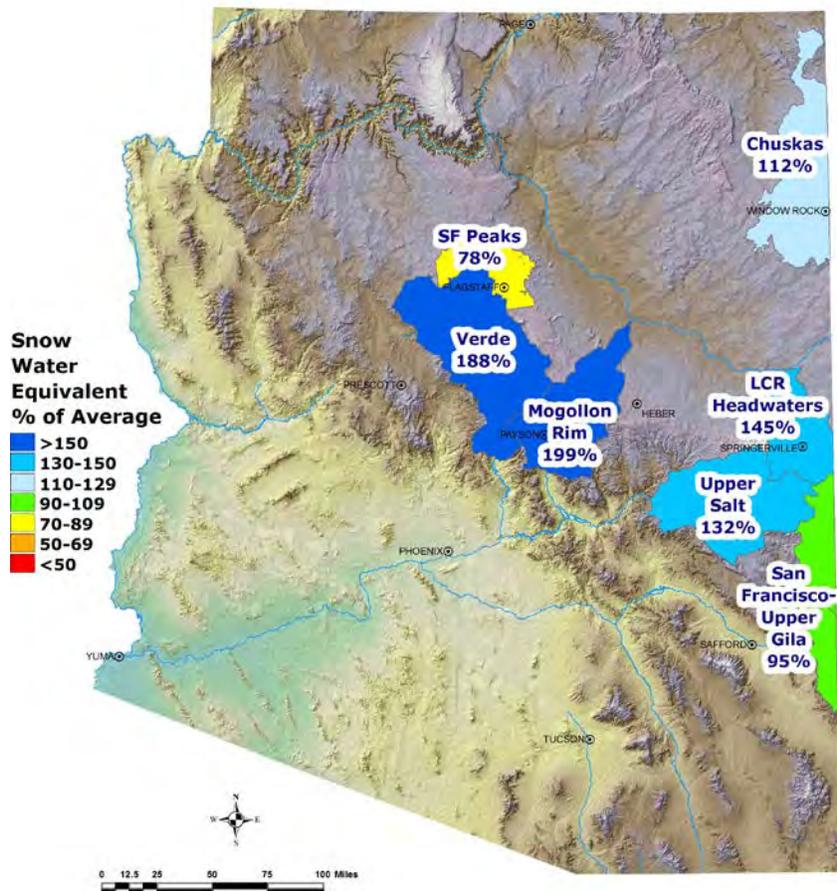
SUMMARY

As of January 1, snowpack levels are normal to well above normal throughout the state, with the exception of the San Francisco Peaks above Flagstaff. Precipitation for the month of December was normal to well above normal in all major river basins. 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 first forecast of the season calls for normal runoff in the Verde River Basin, and below normal to well below normal runoff in the Little Colorado River, Salt River, and San Francisco-Upper Gila River Basins, for the spring runoff period.

SNOWPACK

Snow water equivalent levels in the state's major river basins are normal to well above normal, ranging from 95 percent of median in the San Francisco-Upper Gila River Basin to 188 percent of median in the Verde River Basin. The statewide snowpack is well above normal at 143 percent of median.

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

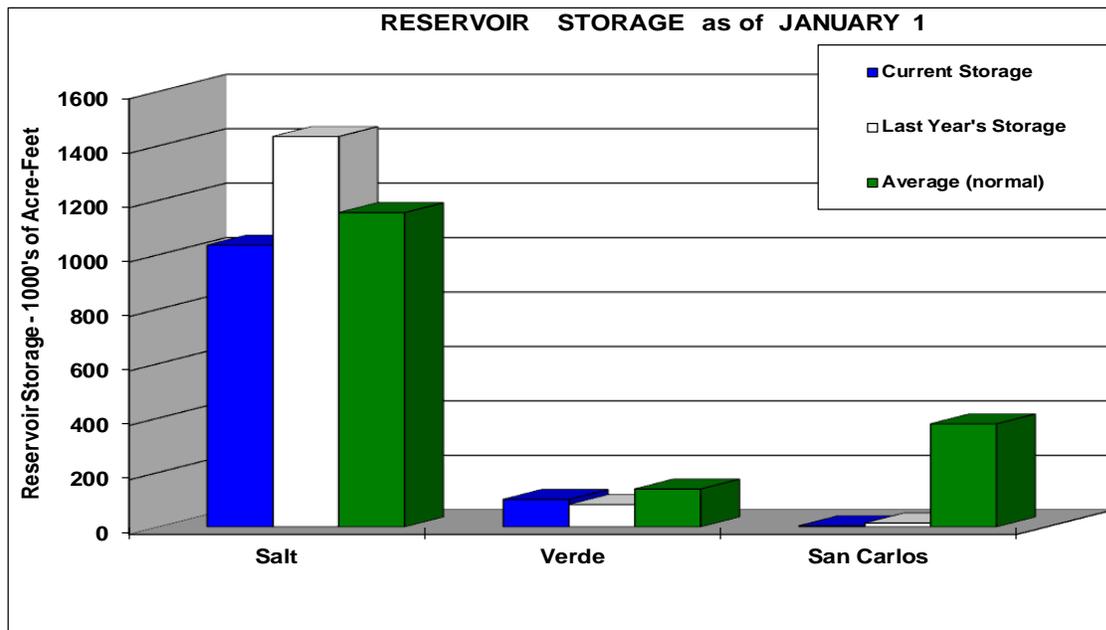


PRECIPITATION

Mountain data from NRCS SNOTEL sites and Cooperator precipitation gages show that December precipitation was normal to well above normal throughout the basins, ranging from 106 percent of average in the San Francisco-Upper Gila River Basin to 149 percent of average in the Little Colorado River Basin. Northwestern Arizona, however, received well below normal precipitation. During the second half of December, a couple of strong winter storms moved across the mountains of Arizona and New Mexico, and brought above normal amounts of precipitation. The region experienced an exceptionally dry fall, however, and cumulative precipitation since October 1 is below normal to well below normal in 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 1, the Salt and Verde River reservoir system stands at 49 percent of capacity. San Carlos Reservoir is currently at less than one percent of capacity.



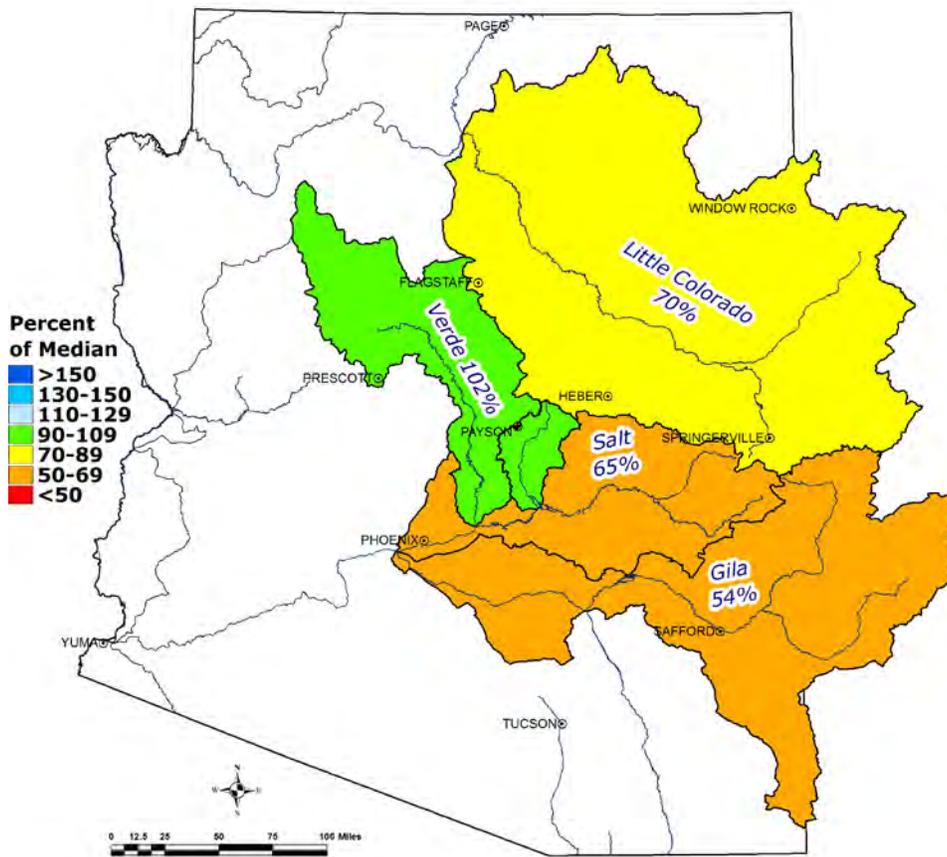
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>	<u>Storage Capacity</u>
Salt River System	1035.5	1434.9	1155.4	2025.8
Verde River System	101.3	82.1	139.5	287.4
San Carlos Reservoir	4.4	14.2	379.1	875.0
Lyman Lake	4.3	9.4	14.1	30.0
Lake Havasu	552.1	537.3	556.4	619.0
Lake Mohave	1571.9	1591.1	1596.6	1810.0
Lake Mead	13647.0	14897.0	21775.0	26159.0
Lake Powell	12689.0	15959.0	18933.0	24322.0

STREAMFLOW

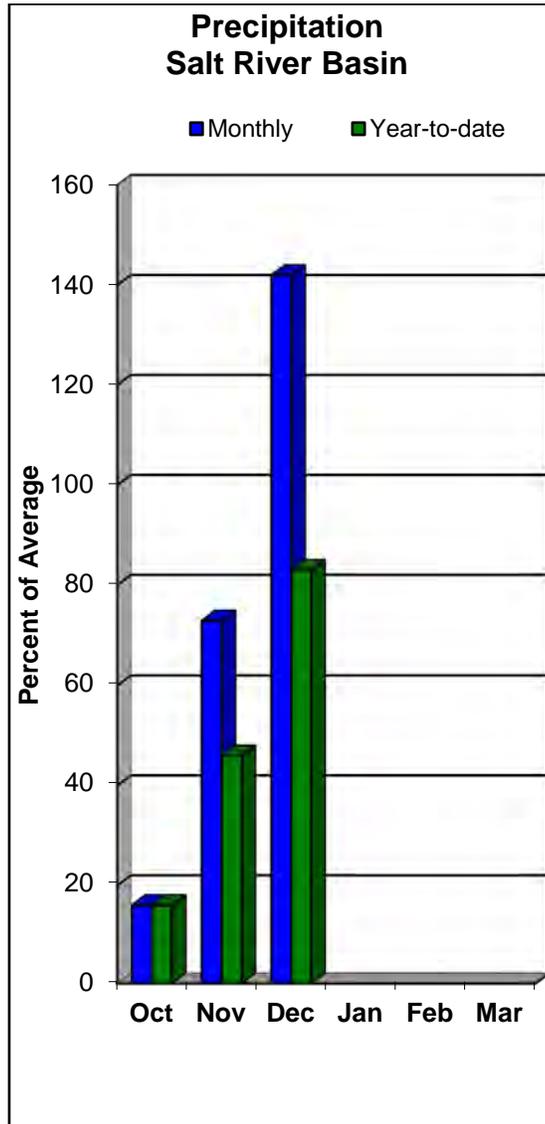
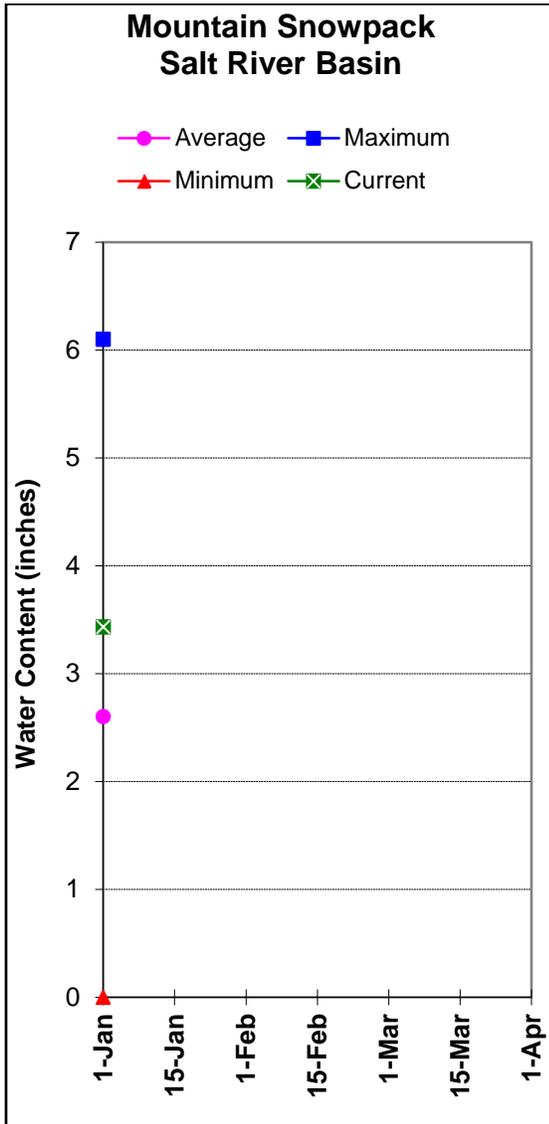
As of January 1, the forecast calls for normal to well below normal streamflow for the spring runoff period, ranging from 54 percent of median in the Gila River near Solomon to 102 percent of median in the Verde River above Horseshoe Dam. Despite the current above normal snowpacks, the initial streamflow forecasts for most basins are low, based in large part on preexisting dry soil moisture conditions, as well as an outlook for below normal precipitation for the remainder of the winter. 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 1, 2013**



SALT RIVER BASIN as of January 1, 2013

Near normal to well below normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 65% 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 132% of average.



SALT RIVER BASIN as of January 1, 2013

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=====
                        SALT RIVER BASIN
                    Streamflow Forecasts - January 1, 2013
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
-----|-----|-----|-----|-----|-----|
Forecast | 90% 70% | 50% | 30% 10% | 30 Yr Med
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Salt R nr Roosevelt (3)
JAN-MAY 65 133 200 65 285 455 310
JANUARY 11.0 15.1 29 121 50 95 24

Tonto Ck ab Gun Ck nr Roosevelt (3)
JAN-MAY 5.4 21 40 95 69 132 42
JANUARY 0.62 2.50 5.00 132 8.70 16.90 3.80
=====

```

* 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.

```

=====
                        SALT RIVER BASIN
                    Reservoir Storage (1000AF) End of December
=====
Reservoir | Usable Capacity | ***** Usable Storage *****
           |                 | This Year  Last Year  Average
=====|=====|=====|=====|=====
SALT RIVER RES SYSTEM | 2025.8 | 1035.5 | 1435.0 | 1155.4
=====

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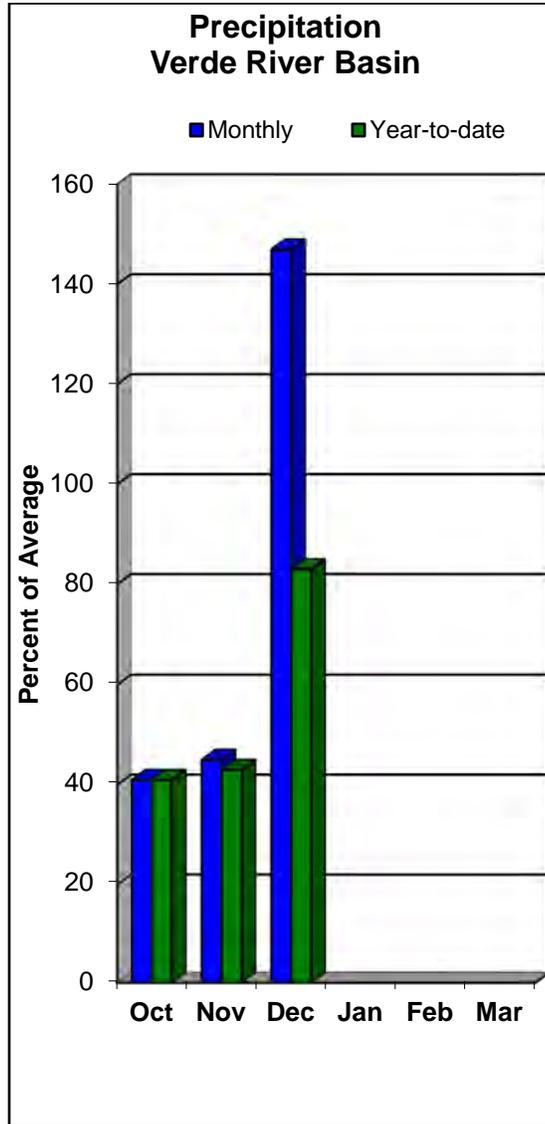
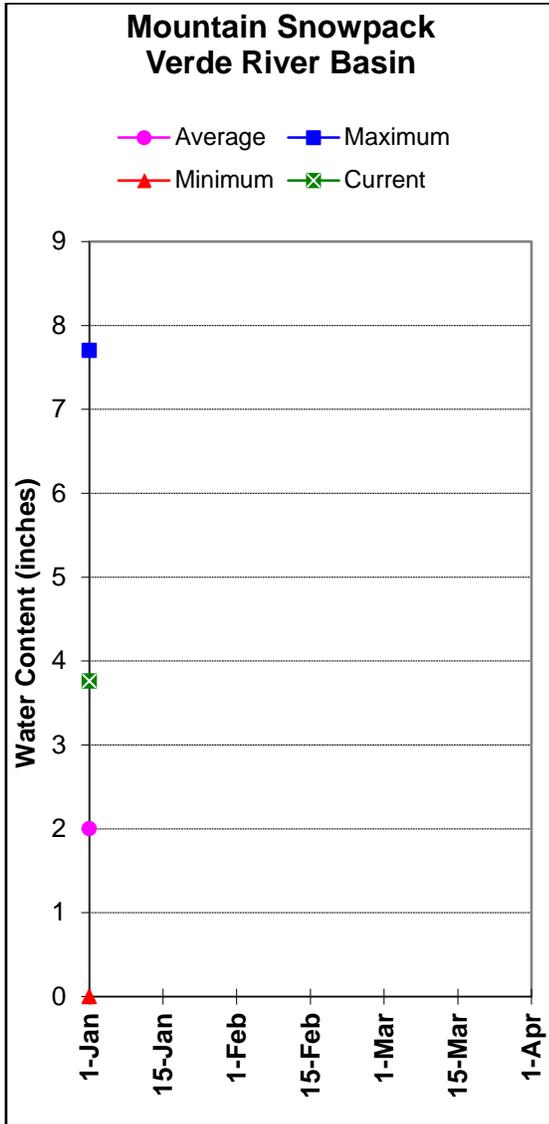
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=====
                        SALT RIVER BASIN
                    Watershed Snowpack Analysis - January 1, 2013
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Median
=====|=====|=====|=====
SALT RIVER BASIN | 10 | 77 | 132
=====

```

VERDE RIVER BASIN as of January 1, 2013

Normal streamflow levels are forecast for the basin. In the Verde River, at Horseshoe Dam, the forecast calls for 102% of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 188% of average.



VERDE RIVER BASIN as of January 1, 2013

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=====
                        VERDE RIVER BASIN
                        Streamflow Forecasts - January 1, 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
JAN-MAY      70    104    160    102    235    375    157
=====

```

* 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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=====
                        VERDE RIVER BASIN
                        Reservoir Storage (1000AF) End of December
=====
Reservoir      Usable          ***** Usable Storage *****
                Capacity      This Year      Last Year      Average
=====
VERDE RIVER RES SYSTEM      287.4          101.3          82.1          139.5
=====

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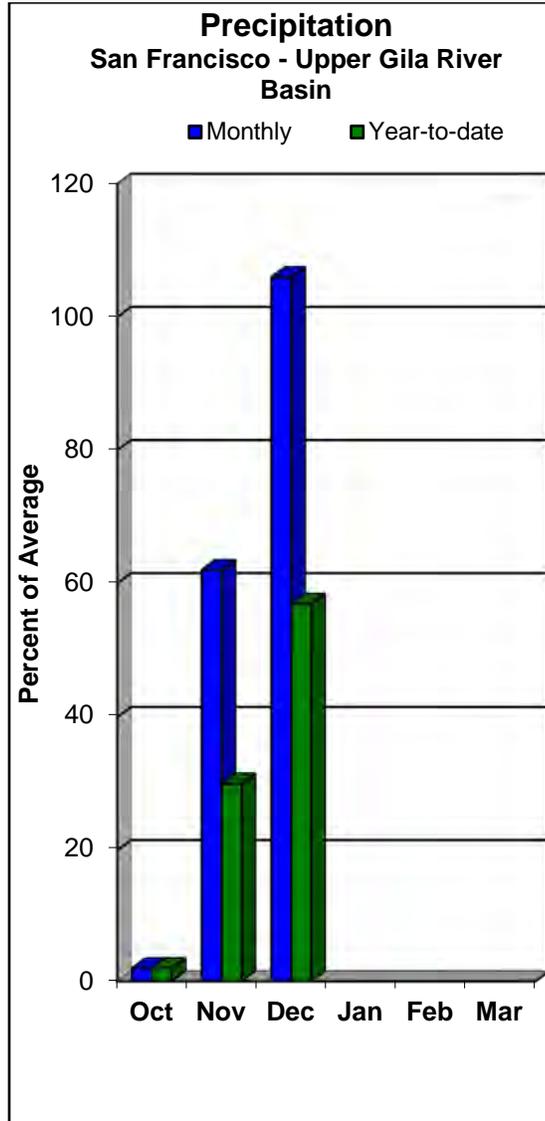
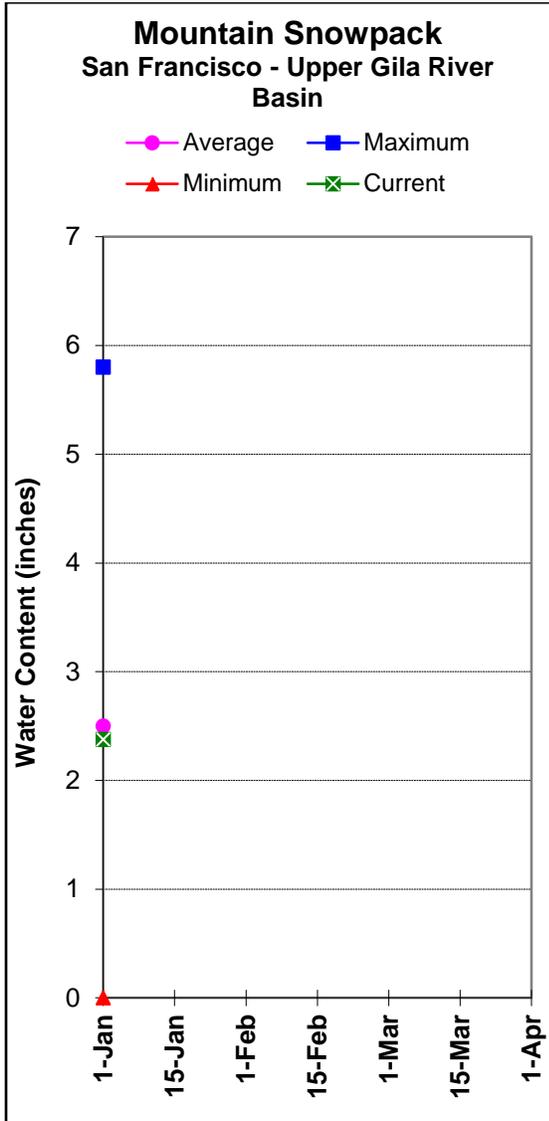
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=====
                        VERDE RIVER BASIN
                        Watershed Snowpack Analysis - January 1, 2013
=====
Watershed      Number of          This Year as Percent of
                Data Sites      Last Year          Median
=====
VERDE RIVER BASIN      11          114          188
SAN FRANCISCO PEAKS    2          112          78
=====

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SAN FRANCISCO-UPPER GILA RIVER BASIN as of January 1, 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 77% of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 54% of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 44% of median through May. Snow survey measurements show the snowpack for this basin to be at 95% of average.



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

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=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Streamflow Forecasts - January 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)
  JAN-MAY    17.0      21      30      54      42      65      56

Gila R bl Blue Ck nr Virden (3)
  JAN-MAY    16.0      21      37      49      58      97      76

San Francisco R at Glenwood (3)
  JAN-MAY     5.9     13.0      20      95      29      47      21

San Francisco R at Clifton (3)
  JAN-MAY    13.0      29      47      77      70     112      61

Gila R nr Solomon (3)
  JAN-MAY     28      38      74      54     122     215     137
  JANUARY     7.0     12.1     18.5     94      26      40     19.7

San Carlos Reservoir Inflow (2,3)
  JAN-MAY     2.2      28      42      44     109     205      95
  
```

* 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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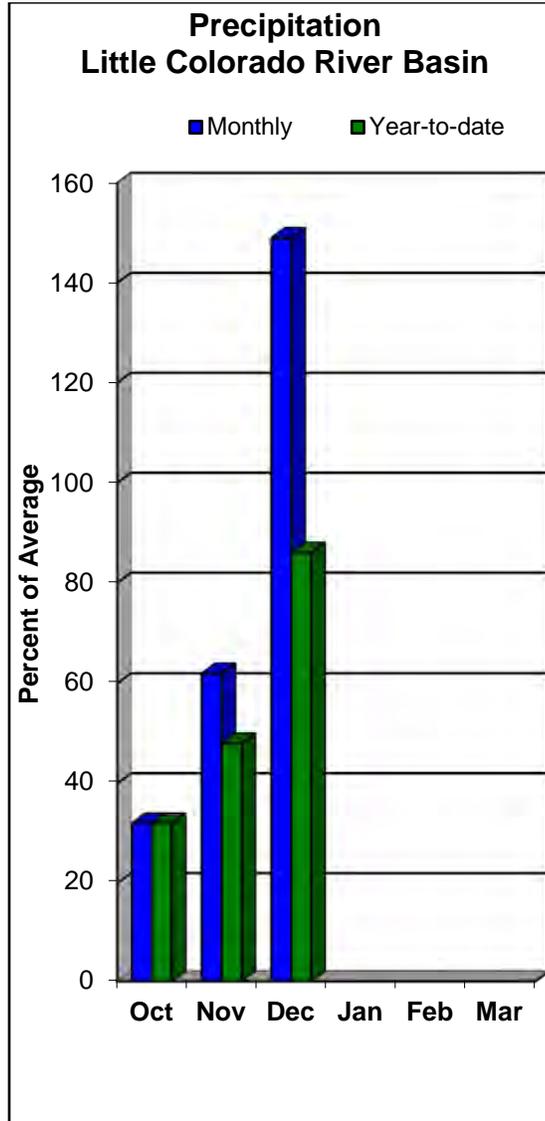
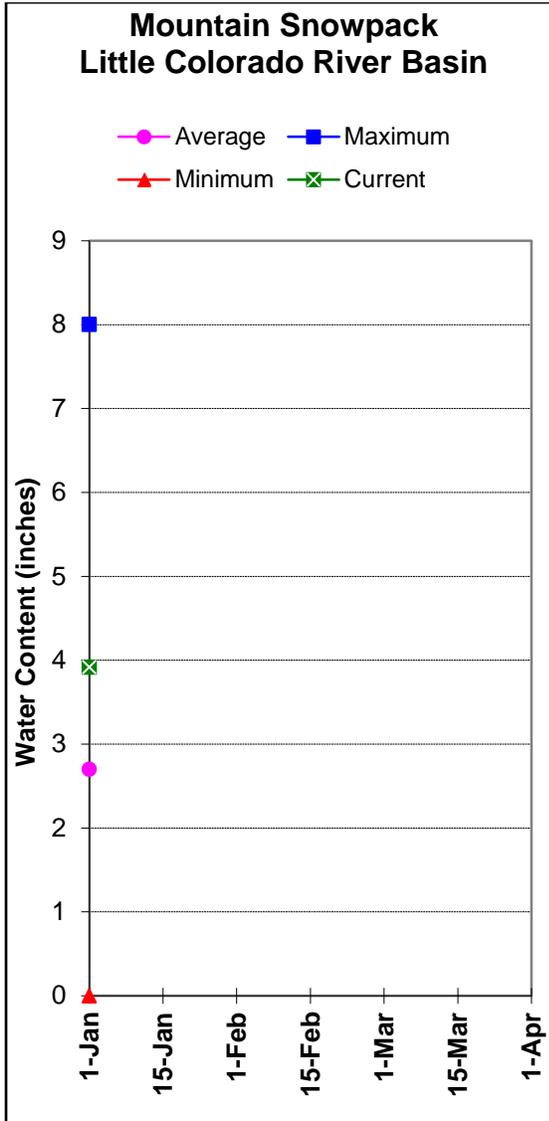
=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Reservoir Storage (1000AF) End of December
=====
Reservoir | Usable Capacity | ***** Usable Storage ***** |
          |                 | This Year   Last Year   Average |
=====
SAN CARLOS | 875.0           | 4.4         14.2         379.1   |
=====
  
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=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Watershed Snowpack Analysis - January 1, 2013
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Median |
=====
SAN FRANCISCO - UPPER GILA R | 9 | 62 | 95 |
=====
  
```

LITTLE COLORADO RIVER BASIN as of January 1, 2013

Below normal streamflow levels are forecast for the basin. In the Little Colorado River, above Lyman Lake, the forecast calls for 70% of median streamflow through June. At Blue Ridge (C.C. Cragin) Reservoir, inflow to the lake is forecast at 72% of median through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 145% and 199% of average, respectively.



LITTLE COLORADO RIVER BASIN as of January 1, 2013

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=====
                        LITTLE COLORADO RIVER BASIN
                        Streamflow Forecasts - January 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)
  JAN-JUN    1.69    3.40    5.00    70    7.10    11.10    7.10

Rio Nutria nr Ramah (3)
  JAN-MAY    0.07    0.54    1.30    92    2.60    5.60    1.42

Ramah Reservoir Inflow (3)
  JAN-MAY    0.01    0.29    0.71    89    1.32    2.60    0.80

Zuni River ab Black Rock Reservoir (3)
  JAN-MAY    0.00    0.05    0.38    81    1.27    4.20    0.47

Blue Ridge Reservoir Inflow (3)
  JAN-MAY    2.1     6.7    12.0    72    19.6    36     16.6
=====

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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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=====
                        LITTLE COLORADO RIVER BASIN
                        Reservoir Storage (1000AF) End of December
=====
Reservoir    Usable Capacity    ***** Usable Storage *****
              | This Year    Last Year    Average
=====
LYMAN RESERVOIR    30.0    4.3    9.4    14.1
=====

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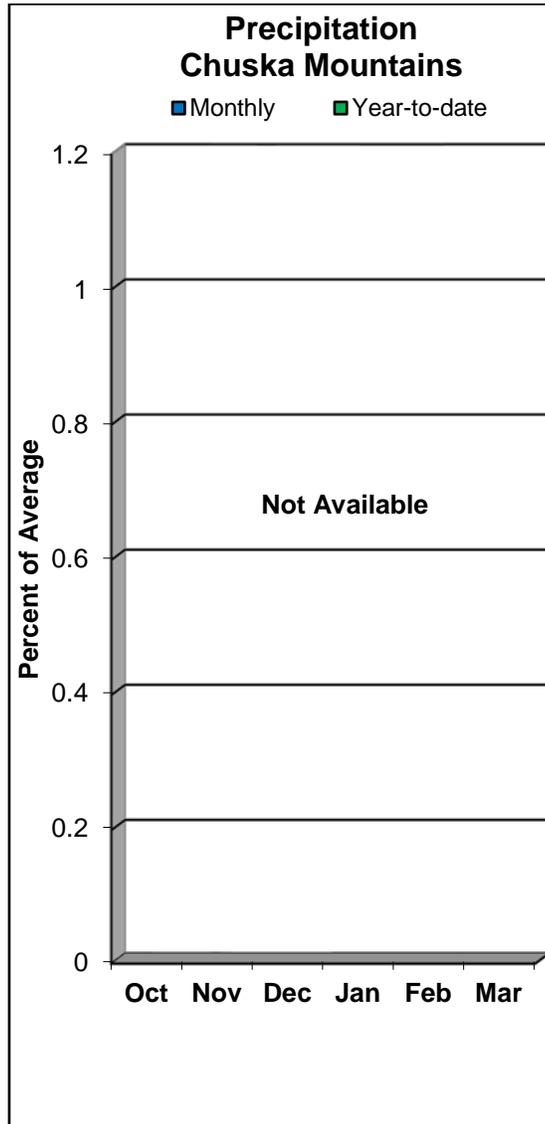
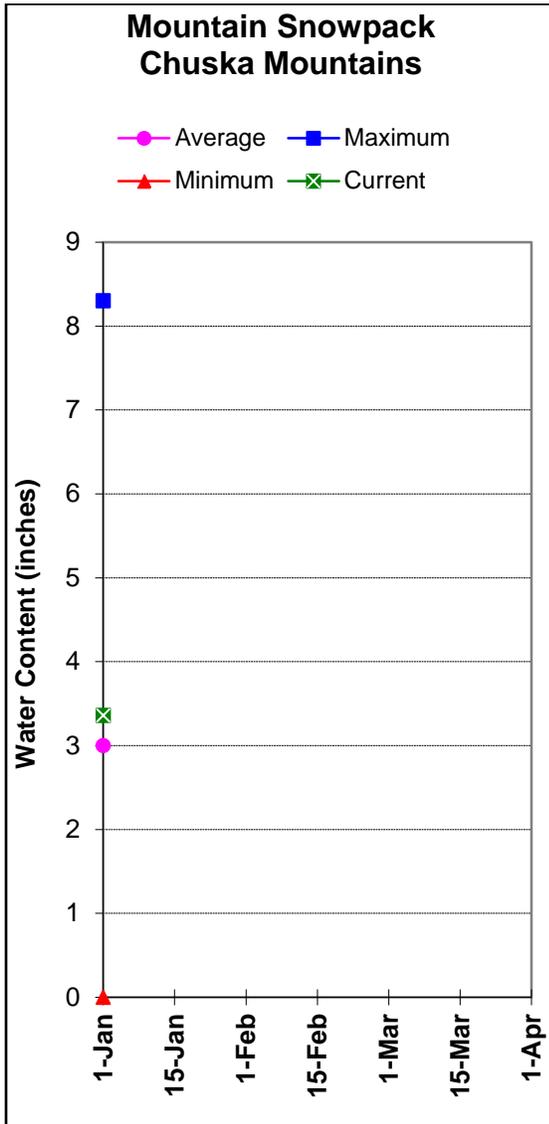
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                        LITTLE COLORADO RIVER BASIN
                        Watershed Snowpack Analysis - January 1, 2013
=====
Watershed    Number of Data Sites    This Year as Percent of Last Year    Median
=====
LITTLE COLORADO - SOUTHERN H    10    75    145
CENTRAL MOGOLLON RIM    4    81    199
=====

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CHUSKA MOUNTAINS as of January 1, 2013

Snow survey measurements conducted by staff of the Navajo Nation Water Management Branch show the Chuska snowpack to be at 112% of average. Near normal (average) runoff is forecast for Wheatfields Creek, while below normal to well below runoff is forecast for Captain Tom Wash, Bowl Canyon Creek, and Kinlichee Creek.



CHUSKA MOUNTAINS as of January 1, 2013

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=====
                                CHUSKA MOUNTAINS
                                Streamflow Forecasts - January 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     0.00    0.34    1.52    59    4.10    11.69    2.60

Wheatfields Ck nr Wheatfields
MAR-MAY     0.16    0.95    1.88    90    3.10    5.50    2.10

Bowl Canyon Ck ab Asaayi Lake
MAR-MAY     0.14    0.60    1.09    84    1.73    2.90    1.30

Kinlichee Ck
MAR-MAY     0.00    0.23    1.01    66    2.70    7.70    1.52
=====

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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.

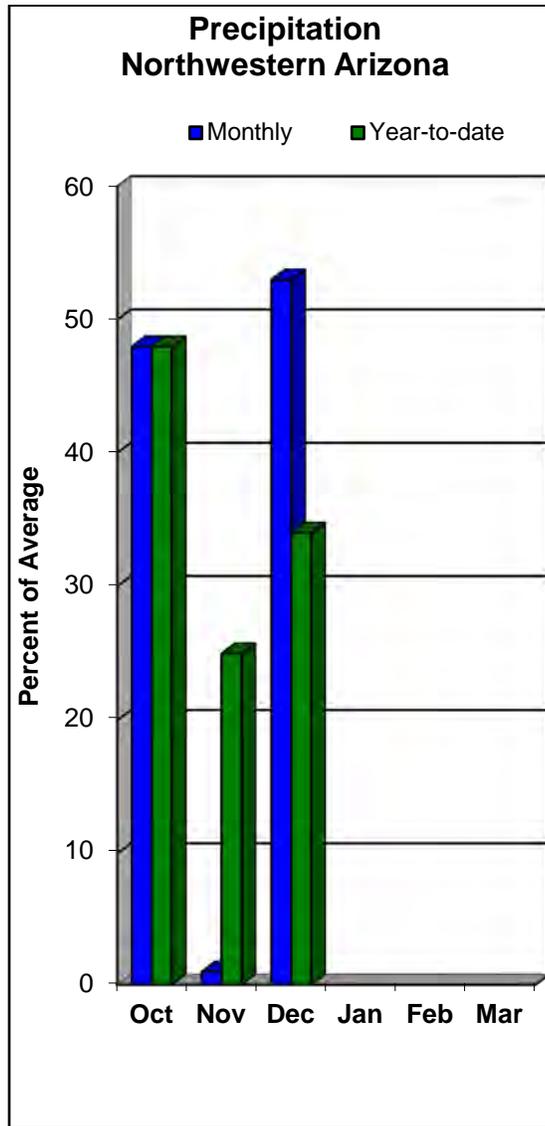
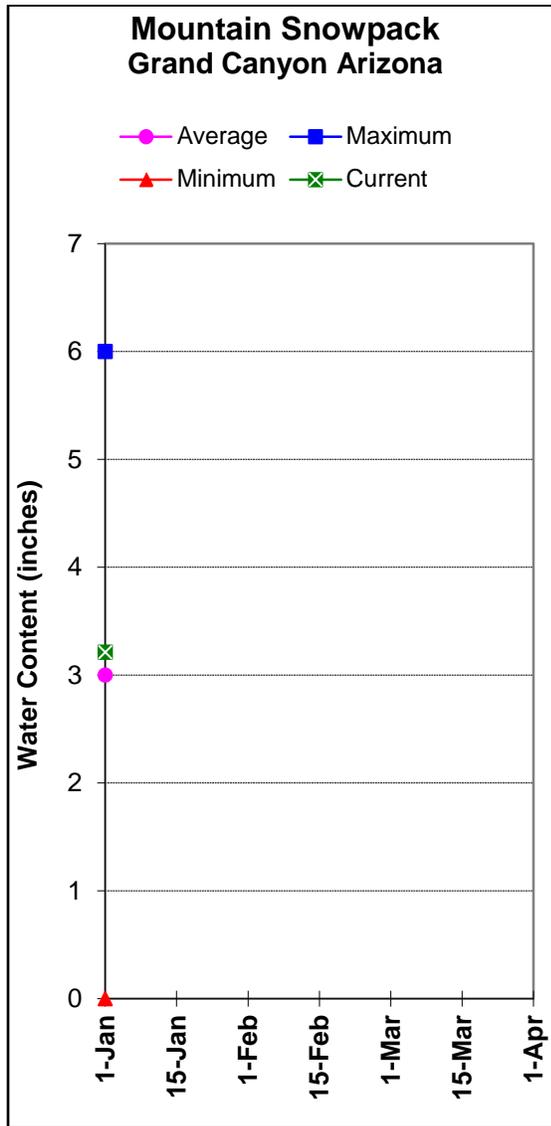
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=====
                                CHUSKA MOUNTAINS
                                Watershed Snowpack Analysis - January 1, 2013
=====
Watershed          Number of          This Year as Percent of
                   Data Sites        Last Year          Median
=====
CHUSKA MOUNTAINS          7                158                112
DEFIANCE PLATEAU         2                179                226
=====

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NORTHWESTERN ARIZONA as of January 1, 2013

On the Colorado River, well below normal inflow to Lake Powell is forecast at 56% 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 107% of average.



NORTHWESTERN ARIZONA as of January 1, 2013

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=====
                                NORTHWESTERN ARIZONA
                                Streamflow Forecasts - January 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      18.0      28      46      71      69      112      65

Lake Powell Inflow (2)
APR-JUL      1810     3010     4000     56      5130     7040     7160
=====

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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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=====
                                NORTHWESTERN ARIZONA
                                Reservoir Storage (1000AF) End of December
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                | This Year      Last Year      Average
=====
LAKE HAVASU      619.0      552.1      539.5      556.4
LAKE MOHAVE      1810.0     1571.9     1591.1     1596.6
LAKE MEAD        26159.0    13647.0    14897.0    21775.0
LAKE POWELL      24322.0    12689.0    15973.0    18933.0
=====

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=====
                                NORTHWESTERN ARIZONA
                                Watershed Snowpack Analysis - January 1, 2013
=====
Watershed      Number of Data Sites      This Year as Percent of Last Year      Median
=====
GRAND CANYON      1      114      107
=====

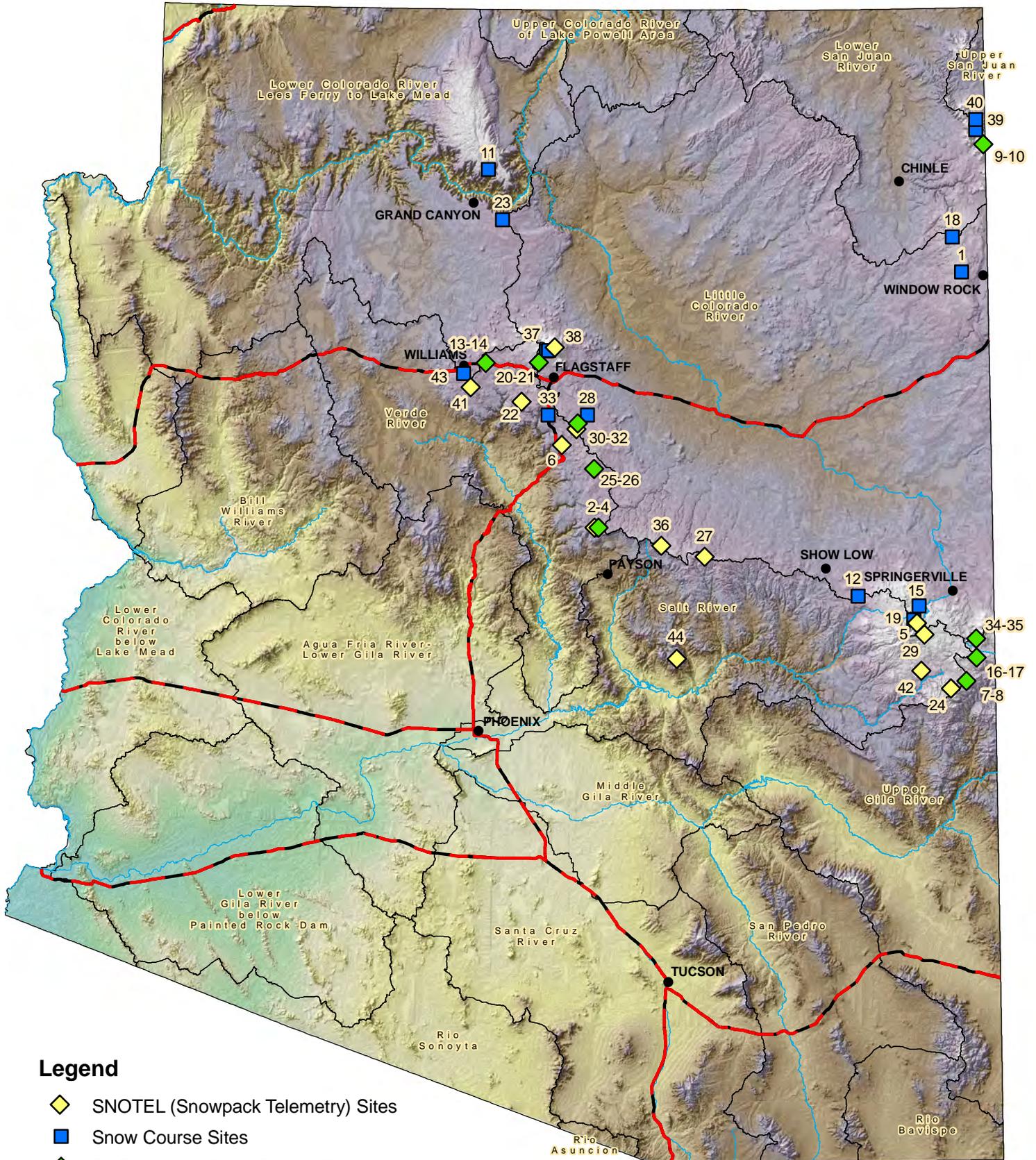
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S N O W S U R V E Y D A T A

JANUARY 1, 2013

MAP NUM.	SNOW COURSE	ELEV.	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 71-00
1.	ARBABS FOREST (AK)	7680	12/29	12	2.1	1.2	1.2
2.	BAKER BUTTE SNOTEL	7330	1/01	19	4.3	4.3	2.3
3.	BAKER BUTTE #2	7700	12/28	22	5.1	8.0	4.2
4.	BAKER BUTTE SMT SNTL	7700	1/01	27	5.9	8.1	-
5.	BALDY SNOTEL	9220	1/01	17	3.7	4.7	3.5
6.	BAR M SNOTEL	6393	1/01	15	3.8	-	-
7.	BEAVER HEAD	8000	12/28	10	2.0	2.1	1.6
8.	BEAVER HEAD SNOTEL	7990	1/01	13	2.7	3.4	1.9
9.	BEAVER SPRING	9220	12/28	22	4.0	2.0	3.9
10.	BEAVER SPRING SNOTEL	9200	1/01	21	4.2	3.1	-
11.	BRIGHT ANGEL	8400	12/26	20	3.2	2.8	3.9
12.	BUCK SPRING	7400	12/28	11	2.0	4.4	2.7
13.	CHALENDER	7100	12/28	12	2.0	1.0	1.3
14.	CHALENDER SNOTEL	7100	1/01	14	2.6	1.2	-
15.	CHEESE SPRINGS	8600	12/27	13	2.4	3.6	2.5
16.	CORONADO TRL SNOTEL	8400	1/01	15	2.8	3.0	1.8
17.	CORONADO TRAIL	8350	12/28	10	2.0	2.6	1.6
18.	FLUTED ROCK	7800	12/29	12	2.2	1.2	1.4
19.	FORT APACHE	9160	12/27	17	3.7	6.1	3.8
20.	FORT VALLEY	7350	12/28	12	2.1	1.2	1.2
21.	FORT VALLEY SNOTEL	7350	1/01	2	2.3	1.0	-
22.	FRY SNOTEL	7220	1/01	19	3.9	3.1	2.8
23.	GRAND CANYON	7500	no report	-	-	.4	1.6
24.	HANNAGAN MDWS SNOTEL	9020	1/01	29	4.9	6.7	5.5
25.	HAPPY JACK	7630	12/26	16	1.7	2.2	2.0
26.	HAPPY JACK SNOTEL	7630	1/01	23	4.9	3.1	2.1
27.	HEBER SNOTEL	7640	1/01	20	3.9	4.5	2.3
28.	LAKE MARY	6930	12/28	15	3.3	3.0	1.5
29.	MAVERICK FORK SNOTEL	9200	1/01	20	3.7	4.9	4.2
30.	MORMON MTN SNOTEL	7500	1/01	22	4.2	2.5	2.4
31.	MORMON MT. SUMMIT #2	8470	12/28	22	5.7	5.1	4.8
32.	MORMON MTN SUMMIT SN	8500	1/01	20	4.6	4.0	-
33.	NEWMAN PARK	6750	12/28	11	1.8	2.1	.9
34.	NUTRIOSO	8500	12/28	7	1.5	1.6	1.0
35.	NUTRIOSO SNOTEL	8500	1/01	5	1.6	1.2	-
36.	PROMONTORY SNOTEL	7900	1/01	28	6.4	7.6	4.6
37.	SNOW BOWL #2	11000	12/27	31	5.4	4.8	9.0
38.	SNOWSLIDE CYN SNOTEL	9750	1/01	33	7.2	6.4	7.0
39.	TSAILE CANYON #1	8160	12/27	22	3.5	1.2	2.6
40.	TSAILE CANYON #3	8920	12/27	27	4.5	2.4	3.6
41.	WHITE HORSE SNOTEL	7180	1/01	17	3.4	1.8	2.0
42.	WILDCAT SNOTEL	7850	1/01	18	3.0	2.9	1.7
43.	WILLIAMS SKI RUN	7720	12/28	20	3.3	3.6	3.5
44.	WORKMAN CREEK SNOTEL	6900	1/01	28	6.4	6.7	2.9

Arizona Snow Survey Data Sites



Legend

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

