



United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Arizona

Basin Outlook Report

March 1, 2010



Issued by

David White
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

David L. McKay
State Conservationist
Natural Resources Conservation Service
Phoenix, Arizona

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:

Dino DeSimone
Water Supply Specialist
230 N. First Ave., Suite 509
Phoenix, AZ 85003-1706
Phone: (602) 280-8786
Email: dino.desimone@az.usda.gov

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ARIZONA Basin Outlook Report as of March 1, 2010

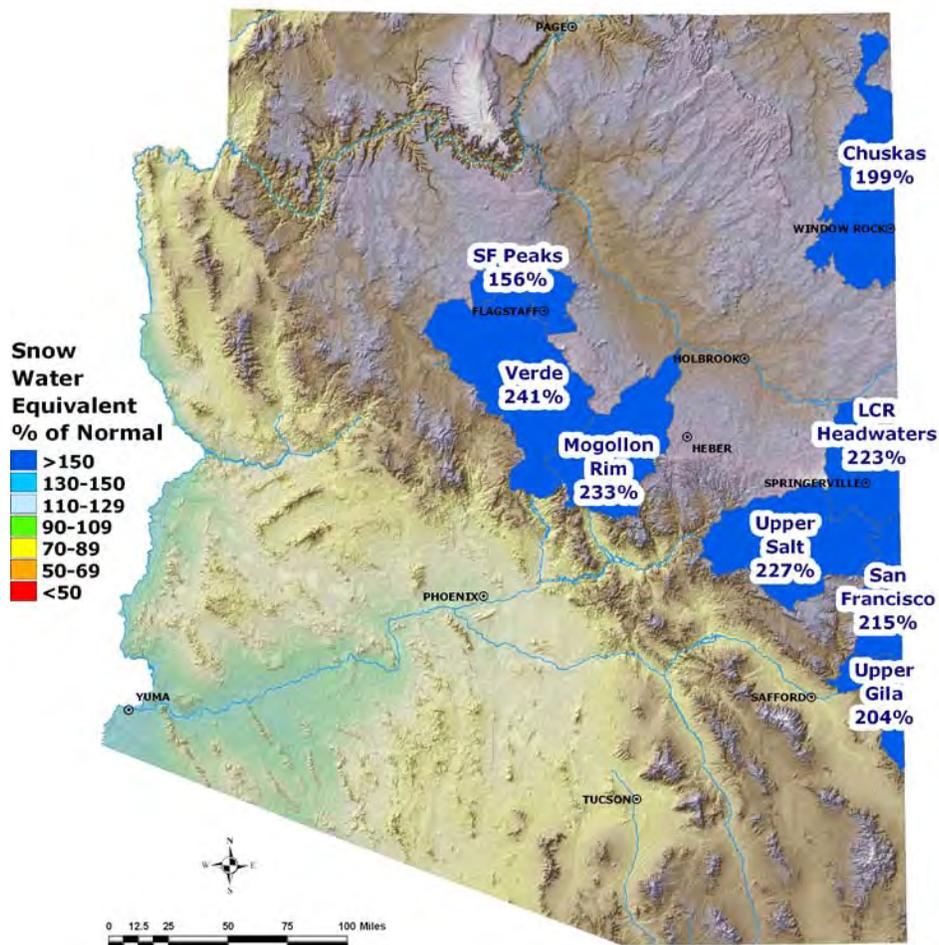
SUMMARY

As of March 1, snowpack levels remain well above normal in all basins. Total precipitation for February ranged from slightly below normal to slightly above normal in the basins. The Salt and Verde River reservoir system stands at 97 percent of capacity. The forecast continues to call for well above normal streamflow levels in all basins for the spring runoff period.

SNOWPACK

Snow water equivalent currently ranges from 204 percent of average in the Upper Gila River Basin to 241 percent of average in the Verde River Basin. The statewide snowpack is also well above normal at 220 percent of average.

**Arizona
Snow Water Equivalent
as of March 1, 2010**

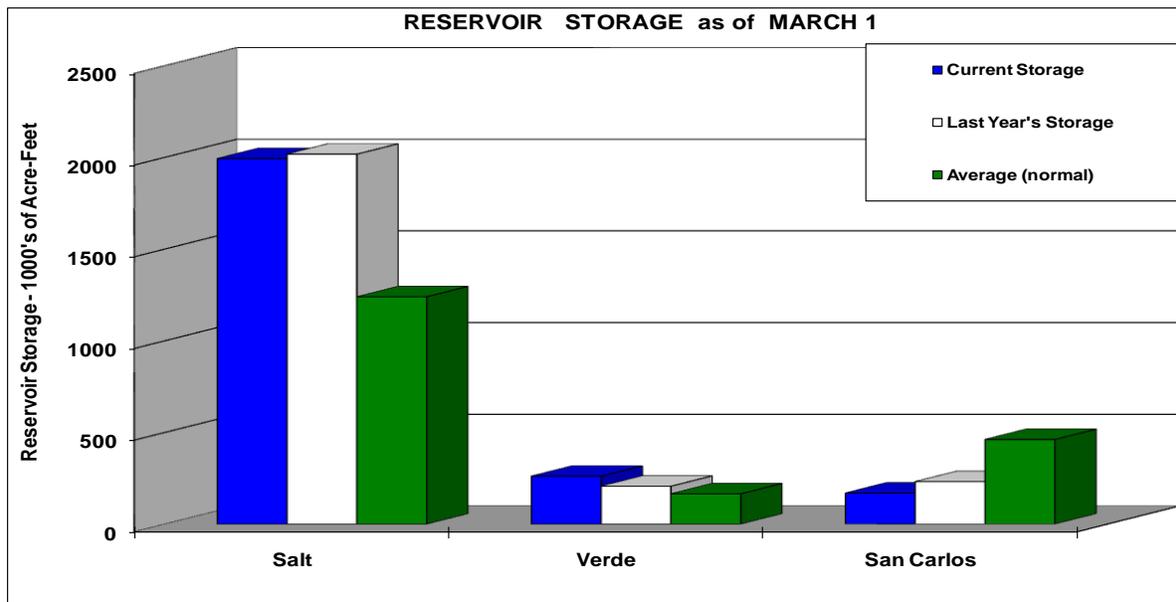


PRECIPITATION

Mountain data from NRCS SNOTEL sites and National Weather Service Cooperator stations show that precipitation during February ranged from slightly below normal to slightly above normal in the basins. Cumulative precipitation since October 1, however, remains above average 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

The Salt and Verde River reservoir system stands at 97 percent of capacity. San Carlos Reservoir continues to improve, but is still below normal for this time of year at about 19 percent of capacity.



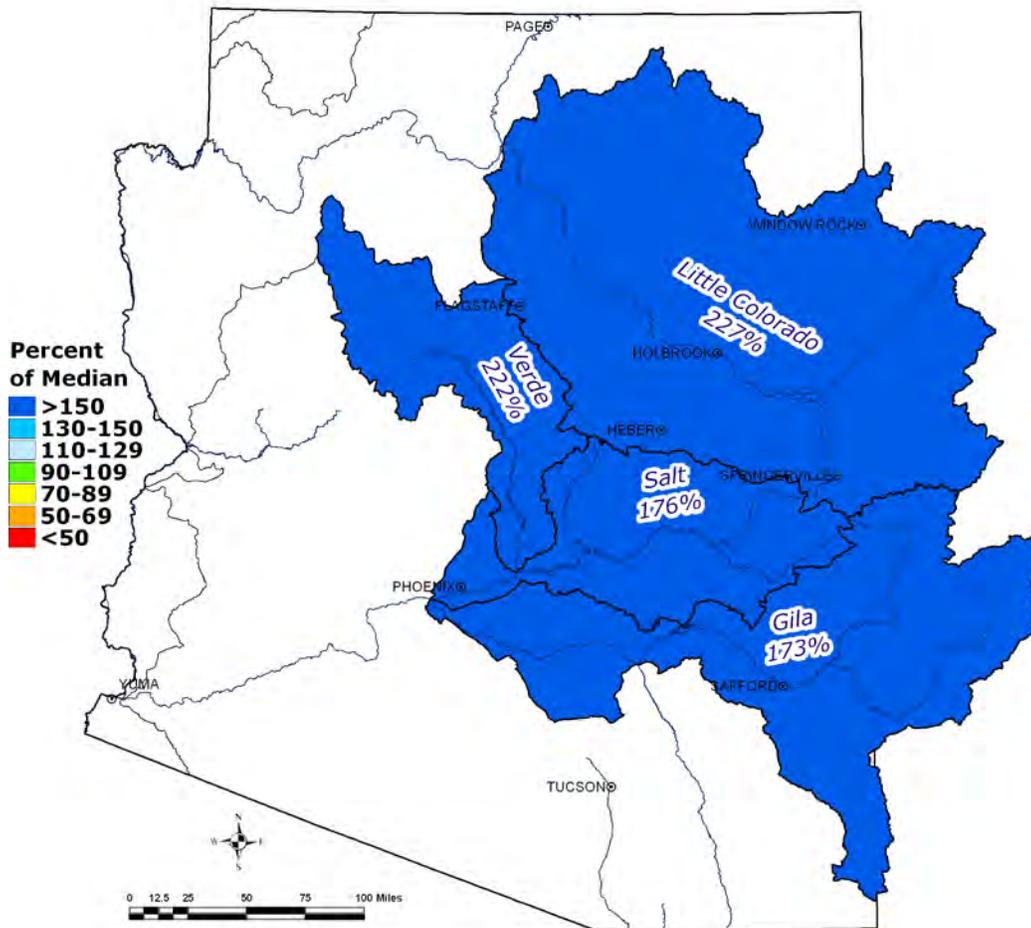
Key storage volumes displayed in thousands of acre-feet (x1000):

<u>Reservoir</u>	<u>Current Storage</u>	<u>Last Year Storage</u>	<u>30-Year Average</u>
Salt River System	1993.1	2017.3	1239.7
Verde River System	261.4	206.5	165.3
San Carlos Reservoir	169.4	231.4	461.4
Lyman Lake	11.2	14.6	15.4
Lake Pleasant	743.7	697.0	----
Lake Havasu	548.0	541.8	552.4
Lake Mohave	1679.9	1675.2	1675.1
Lake Mead	11780.0	12533.0	22122.0
Lake Powell	13788.0	12934.0	18236.0

STREAMFLOW

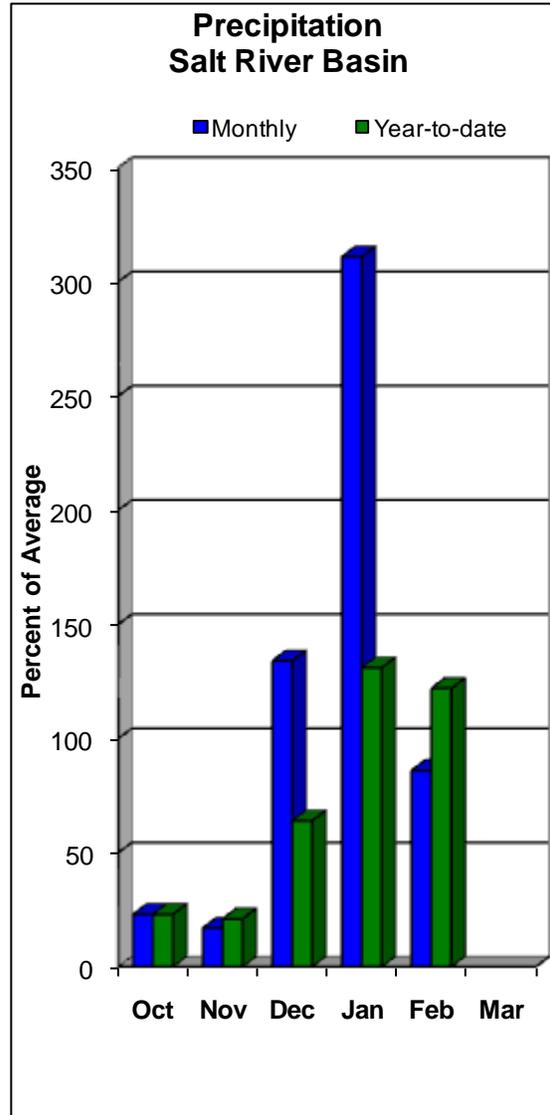
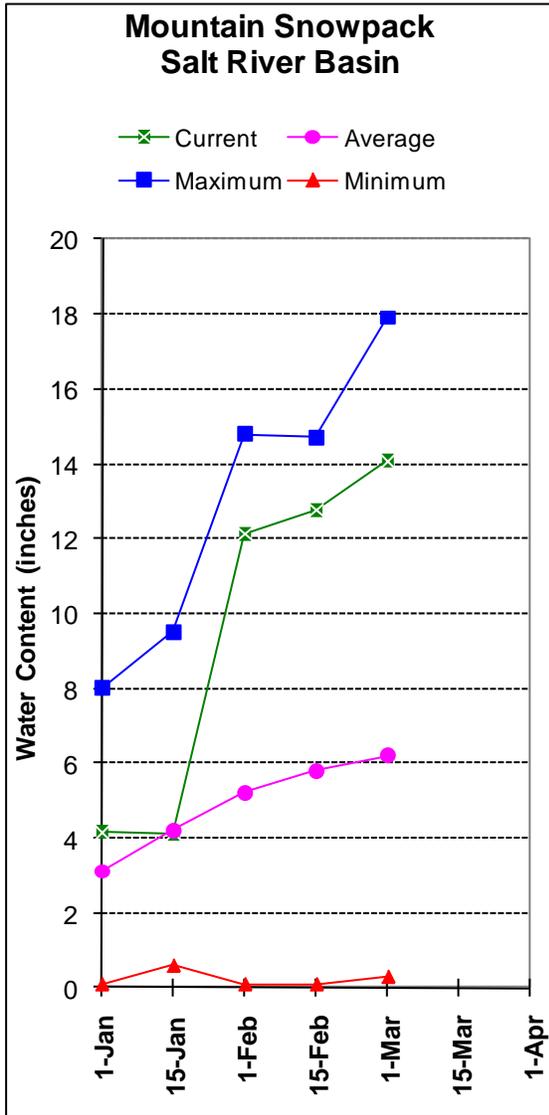
As of March 1, the forecast continues to call for well above normal streamflow levels in all basins for the spring runoff period, ranging from 152 percent of median in the Gila River near Solomon to 227 percent of median in the Little Colorado River at Woodruff. Lake Powell inflow from the Upper Colorado River Basin, however, is only forecast at 68 percent of average for the April-July forecast period. The forecasts reflect the above normal snowpack conditions and a continued outlook for an El Niño pattern. Please refer to the basin forecast tables found in this report for more information regarding water supply forecasts.

Arizona Spring Streamflow Forecasts as of March 1, 2010



SALT RIVER BASIN as of March 1, 2010

Well above normal streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 176 percent of median streamflow through May, while at Tonto Creek, the forecast calls for 212 percent of median streamflow through May. Snow survey measurements show the Salt snowpack to be at 227 percent of average.



SALT RIVER BASIN as of March 1, 2010

```

=====
                        SALT RIVER BASIN
                    Streamflow Forecasts - March 1, 2010
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Salt River nr Roosevelt
MAR-MAY      270      385      475      176      580      765      270
MARCH              190      145              131

Tonto Creek ab Gun Creek nr Roosevelt
MAR-MAY      16.7      36      55      212      80      129      26
MARCH              35      207              16.9
=====

```

* 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 1971-2000 base period.

```

=====
                        SALT RIVER BASIN
                    Reservoir Storage (1000AF) End of February
=====
Reservoir | Usable Capacity | ***** Usable Storage ***** |
| | This Year | Last Year | Average |
=====
SALT RIVER RES SYSTEM | 2025.8 | 1993.1 | 2017.3 | 1239.7
=====

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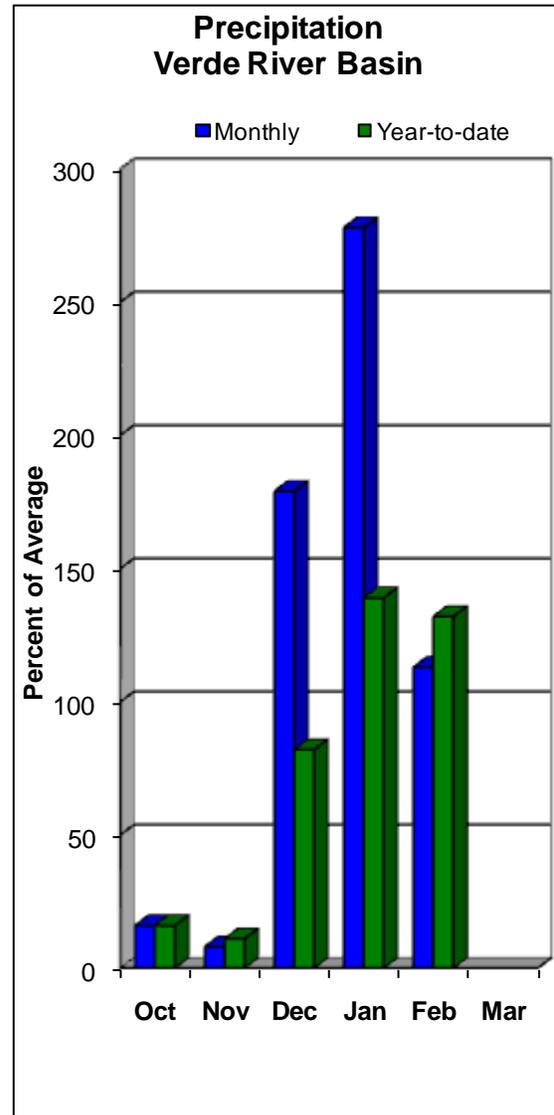
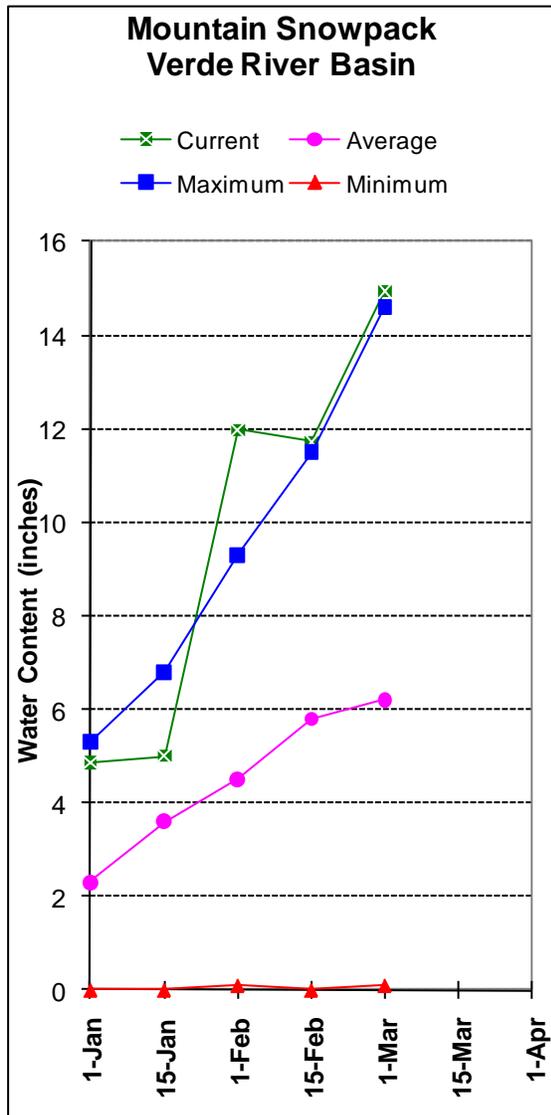
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=====
                        SALT RIVER BASIN
                    Watershed Snowpack Analysis - March 1, 2010
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Average |
=====
SALT RIVER BASIN | 8 | 244 | 227
=====

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VERDE RIVER BASIN as of March 1, 2010

Well above normal streamflow levels are forecast for the basin. In the Verde River, above Horseshoe Dam, the forecast calls for 222 percent of median streamflow through May. Snow survey measurements show the Verde snowpack to be at 241 percent of average.



VERDE RIVER BASIN as of March 1, 2010

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=====
                        VERDE RIVER BASIN
                        Streamflow Forecasts - March 1, 2010
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Verde River abv Horseshoe Dam
MAR-MAY      158      245      320      222      410      565      144
MARCH              180      360              50
  
```

* 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 1971-2000 base period.

```

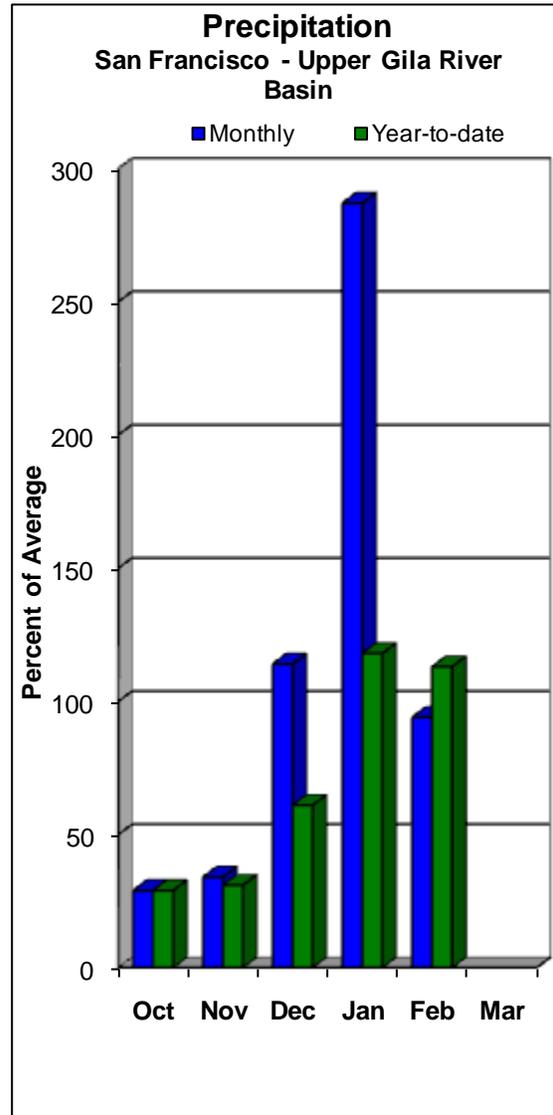
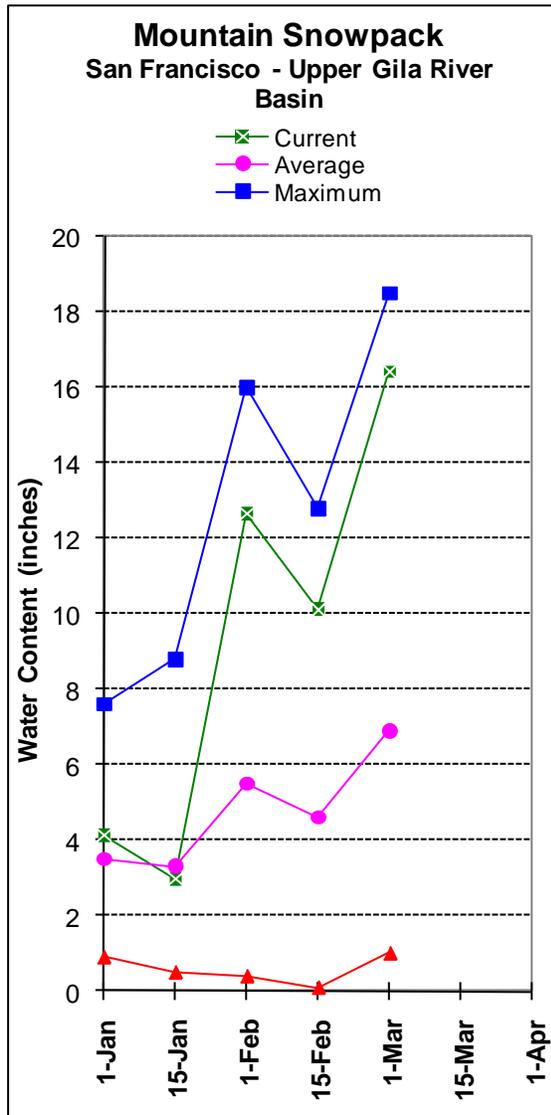
=====
                        VERDE RIVER BASIN
                        Reservoir Storage (1000AF) End of February
=====
Reservoir | Usable Capacity | ***** Usable Storage ***** |
           |                 | This Year   Last Year   Average |
=====
VERDE RIVER RES SYSTEM | 287.4 | 261.4   206.5   165.3 |
=====
  
```

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=====
                        VERDE RIVER BASIN
                        Watershed Snowpack Analysis - March 1, 2010
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Average |
=====
VERDE RIVER BASIN | 11 | 204 | 241 |
SAN FRANCISCO PEAKS | 3 | 128 | 156 |
=====
  
```

SAN FRANCISCO-UPPER GILA RIVER BASIN as of March 1, 2010

Well above normal streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 191 percent of median streamflow levels through May. In the Gila River, near Solomon, the forecast calls for 152 percent of median streamflow levels through May. At San Carlos Reservoir, inflow to the lake is forecast at 173 percent of median through May. Snow survey measurements show the snowpack for this basin to be at 221 percent of average.



SAN FRANCISCO - UPPER GILA RIVER BASIN as of March 1, 2010

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=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Streamflow Forecasts - March 1, 2010
=====
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)
=====
Gila River at Gila
MAR-MAY      46      50      60      177      71      90      34

Gila River nr Virden
MAR-MAY      60      68      81      172      94     114     47

San Francisco River at Glenwood
MAR-MAY      21      31      40      244      50      69     16.4

San Francisco River at Clifton
MAR-MAY      51      68      80      191      92     109     42

Gila River nr Solomon
MAR-MAY      114     123     160     152     197     225     105
MARCH                85     160                53

San Carlos Reservoir Inflow
MAR-MAY      64      85     110     173     135     162     64
    
```

* 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 1971-2000 base period.

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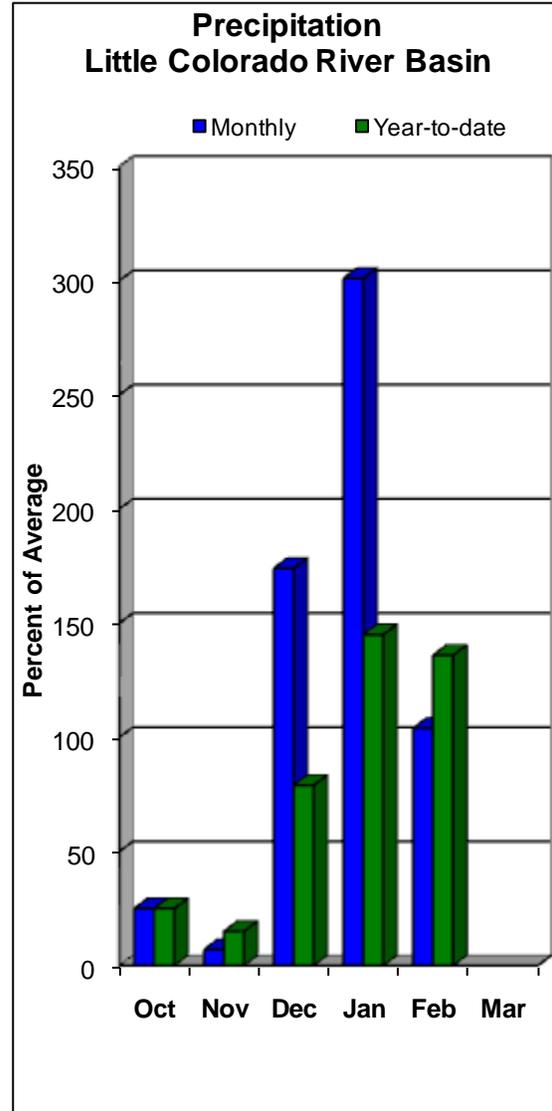
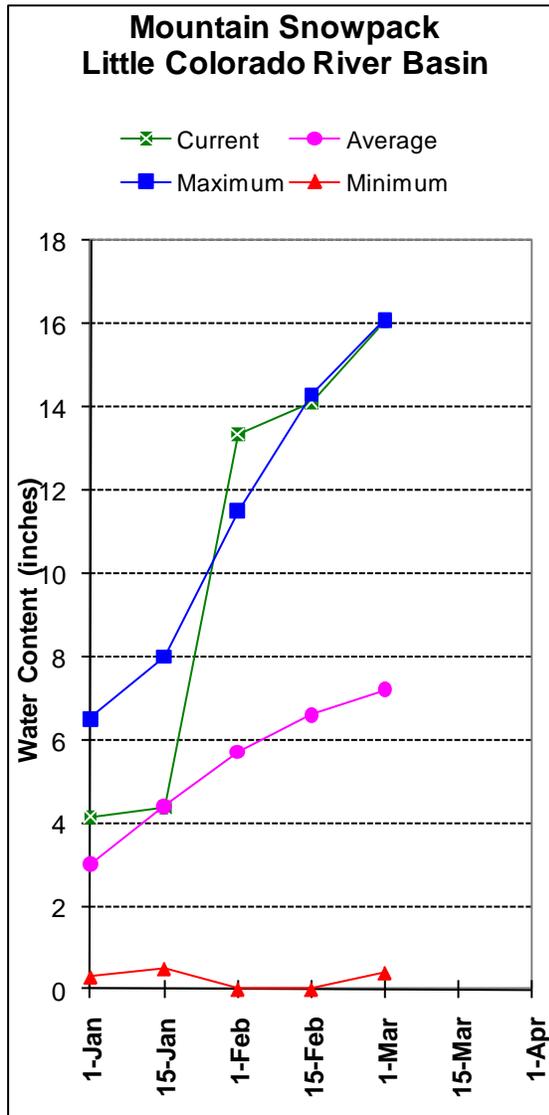
=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Reservoir Storage (1000AF) End of February
=====
Reservoir    Usable Capacity    ***** Usable Storage *****
              |                    | This Year  Last Year  Average
=====
SAN CARLOS   875.0              169.4    231.4    461.4
PAINTED ROCK DAM              NO REPORT
    
```

```

=====
                        SAN FRANCISCO - UPPER GILA RIVER BASIN
                        Watershed Snowpack Analysis - March 1, 2010
=====
Watershed    Number of Data Sites    This Year as Percent of
              |                    | Last Year  Average
=====
SAN FRANCISCO - UPPER GILA R    11              372    221
    
```

LITTLE COLORADO RIVER BASIN as of March 1, 2010

Well above normal streamflow levels are forecast for the basin. In the Little Colorado River, above Lyman Lake, the forecast calls for 222 percent of median streamflow through June, while at Woodruff, the forecast calls for 227 percent of median streamflow through May. Snowpacks along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 223 percent and 233 percent of average, respectively.



LITTLE COLORADO RIVER BASIN as of March 1, 2010

```

=====
                        LITTLE COLORADO RIVER BASIN
                        Streamflow Forecasts - March 1, 2010
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% MED.) | (1000AF) (1000AF) | (1000AF)
=====
Little Colorado R ab Lyman Lk
MAR-JUN      6.39   10.51   14.00   222   18.19   25.99   6.30

Little Colorado River at Woodruff
MAR-MAY      1.18    3.00    5.00   227    7.70   13.20   2.20

Blue Ridge Reservoir Inflow
MAR-MAY      15.9     23     28   219     34     45   12.8

Lake Mary Inflow
MAR-MAY      6.70    9.60   12.00   293   14.80   19.60   4.10
    
```

* 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 1971-2000 base period.

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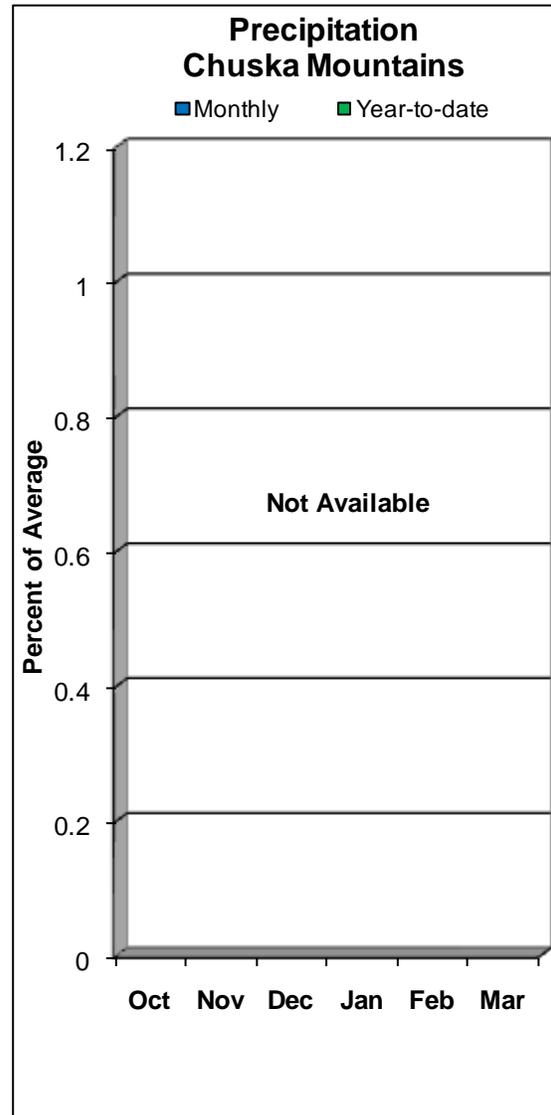
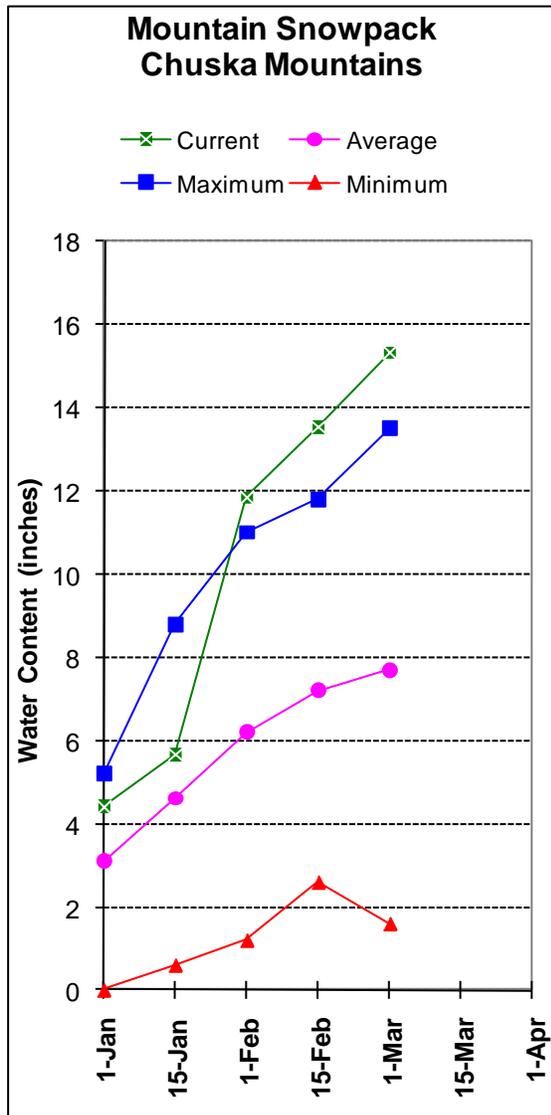
=====
                        LITTLE COLORADO RIVER BASIN
                        Reservoir Storage (1000AF) End of February
=====
Reservoir | Usable Capacity | ***** Usable Storage ***** |
           |                 | This Year   Last Year   Average |
=====
LYMAN RESERVOIR | 30.0 | 11.2   14.6   15.4 |
SHOW LOW LAKE   |      | NO REPORT |
    
```

```

=====
                        LITTLE COLORADO RIVER BASIN
                        Watershed Snowpack Analysis - March 1, 2010
=====
Watershed | Number of Data Sites | This Year as Percent of Last Year | Average |
=====
LITTLE COLORADO - SOUTHERN H | 9 | 190 | 223 |
CENTRAL MOGOLLON RIM | 4 | 200 | 233 |
    
```

CHUSKA MOUNTAINS as of March 1, 2010

Snow survey measurements conducted by staff of the Navajo Water Management Branch show the Chuska snowpack to be at 199 percent of average. Well above average runoff is forecast for Captain Tom Wash, Wheatfields Creek, Bowl Canyon Creek, and Kinlichee Creek.



CHUSKA MOUNTAINS as of March 1, 2010

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=====
                        CHUSKA MOUNTAINS
                    Streamflow Forecasts - March 1, 2010
=====
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 2.60 5.40 8.00 283 11.41 18.01 2.83

Wheatfields Creek nr Wheatfields
MAR-MAY 6.10 7.20 8.00 276 8.81 10.20 2.90

Bowl Canyon Creek abv Asaayi Lake
MAR-MAY 2.00 2.60 3.00 300 3.50 4.30 1.00

Kinlichee Creek
MAR-MAY 4.50 5.90 7.00 412 8.20 10.20 1.70
    
```

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

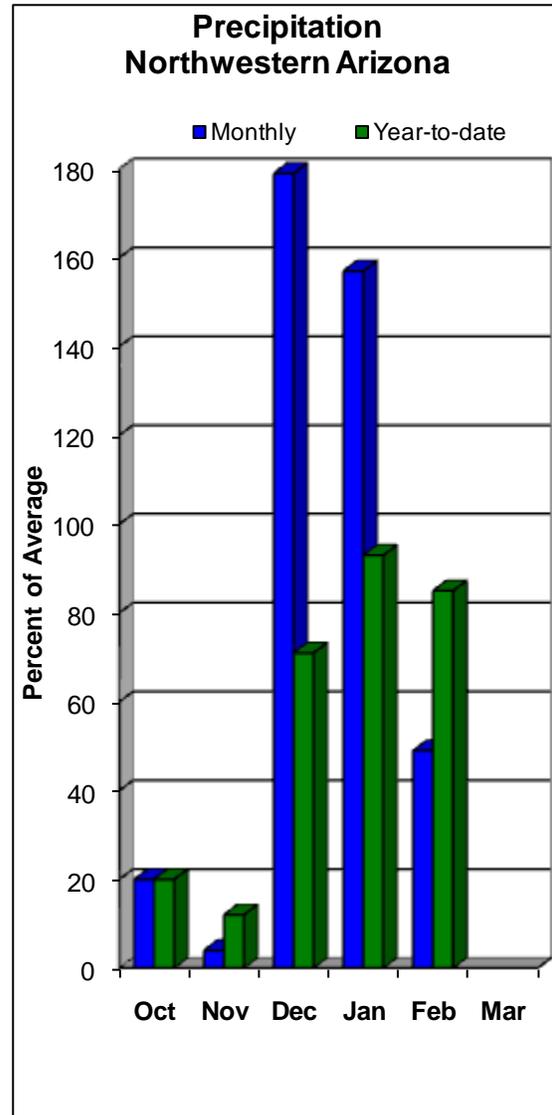
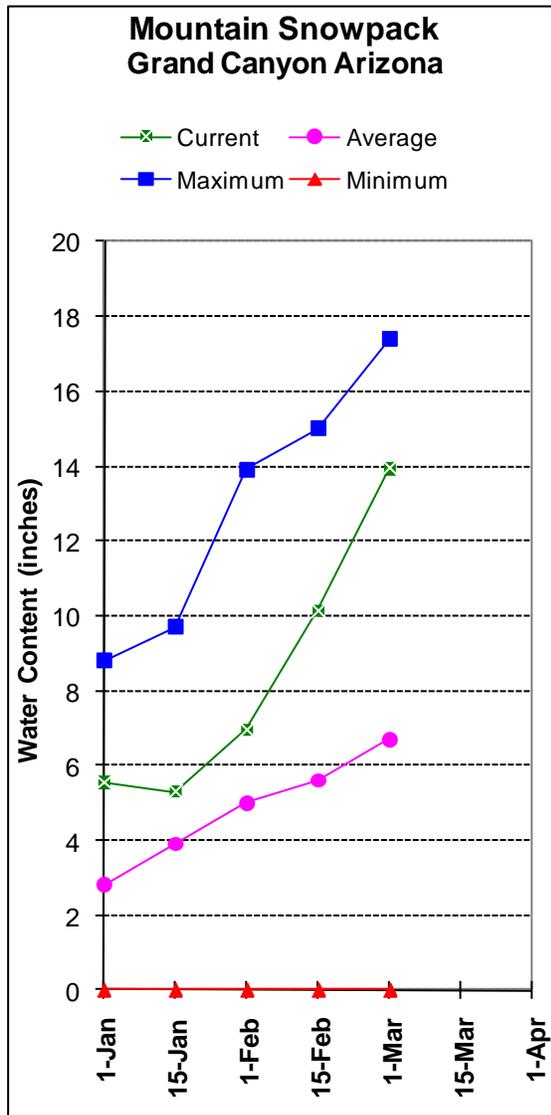
The average is computed for the 1971-2000 base period.

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=====
                        CHUSKA MOUNTAINS
                    Watershed Snowpack Analysis - March 1, 2010
=====
Watershed | Number of | This Year as Percent of |
           | Data Sites | Last Year | Average |
=====
CHUSKA MOUNTAINS | 7 | 164 | 199 |
DEFIANCE PLATEAU | 2 | 306 | 279 |
=====
    
```

NORTHWESTERN ARIZONA as of March 1, 2010

On the Colorado River, below normal inflow to Lake Powell is forecast at 68 percent of the 30-year average for the April-July forecast period. At the Grand Canyon, snow survey measurements conducted by park rangers show the snowpack to be at 208 percent of average.



NORTHWESTERN ARIZONA as of March 1, 2010

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=====
                                NORTHWESTERN ARIZONA
                                Streamflow Forecasts - March 1, 2010
=====
Forecast Pt | <=== Drier === Future Conditions === Wetter ===> |
-----|-----|-----|-----|-----|-----|
Forecast | ===== Chance of Exceeding * ===== |
Period | (1000AF) (1000AF) | (1000AF) (% AVG.) | (1000AF) (1000AF) | (1000AF)
-----|-----|-----|-----|-----|-----|
Virgin River at Littlefield
APR-JUL      53      75      92      124      111      142      74

Lake Powell Inflow (2)
APR-JUL      3500     4320     5400     68      6880     8200     7930
=====

```

* 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 1971-2000 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.

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=====
                                NORTHWESTERN ARIZONA
                                Reservoir Storage (1000AF) End of February
=====
Reservoir      Usable Capacity      ***** Usable Storage *****
                This Year      Last Year      Average
-----|-----|-----|-----|-----|
LAKE HAVASU      619.0      548.0      541.8      552.4
LAKE MOHAVE      1810.0     1679.9     1675.2     1675.1
LAKE MEAD       26159.0    11780.0    12533.0    22122.0
LAKE POWELL     24322.0    13788.0    12934.0    18236.0
=====

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=====
                                NORTHWESTERN ARIZONA
                                Watershed Snowpack Analysis - March 1, 2010
=====
Watershed      Number of Data Sites      This Year as Percent of
                Last Year      Average
-----|-----|-----|-----|
GRAND CANYON          2                360                208
=====

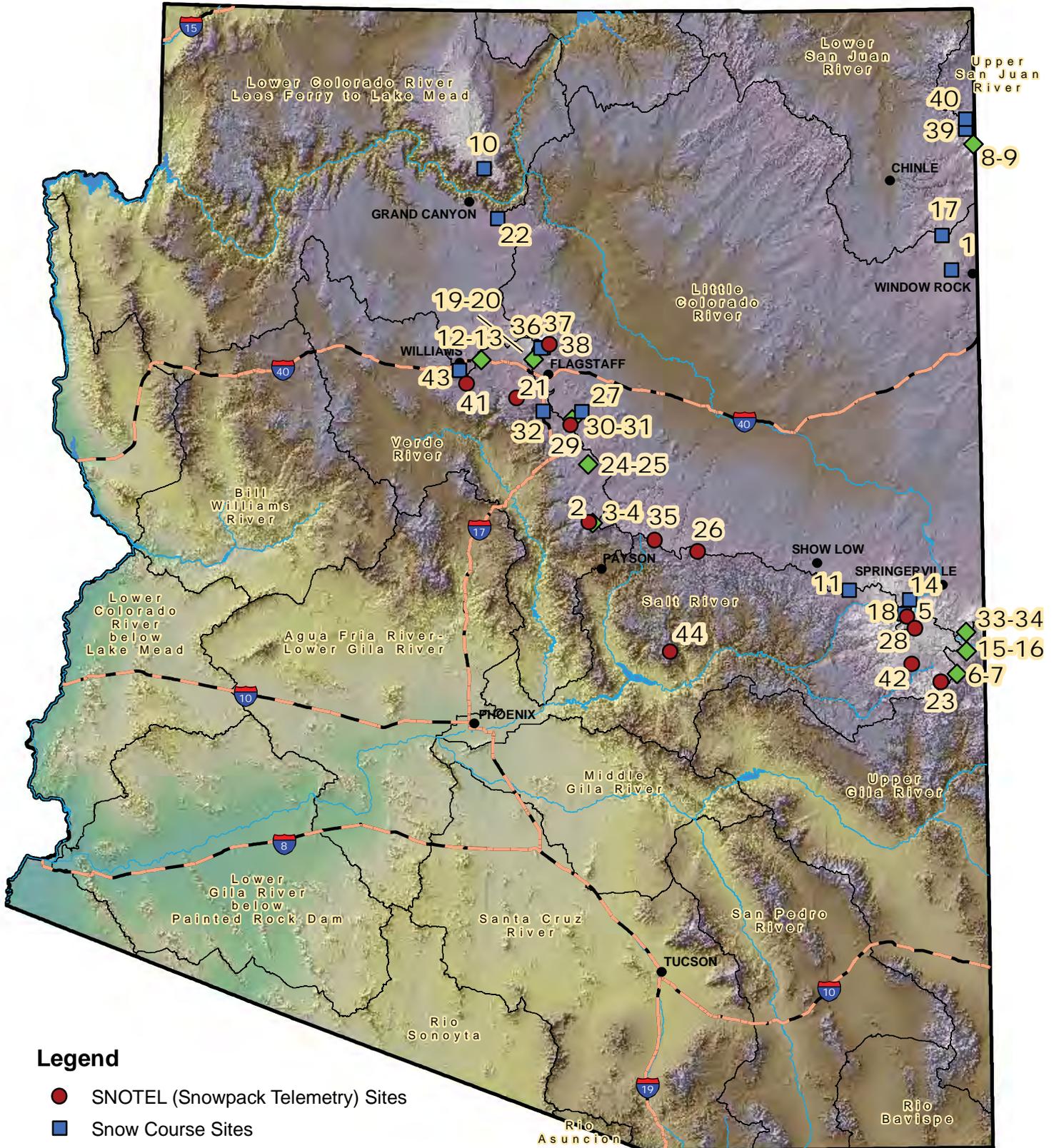
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S N O W S U R V E Y D A T A

MARCH 1, 2010

MAP NUM.	SNOW COURSE	ELEV.	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 71-00
1.	ARBABS FOREST (AK)	7680	2/25	29	7.6	1.4	2.1
2.	BAKER BUTTE SNOTEL	7330	3/01	46	16.2	6.5	5.9
3.	BAKER BUTTE #2	7700	2/25	65	23.4	13.3	12.3
4.	BAKER BUTTE SMT SNTL	7700	3/01	73	22.3	-	-
5.	BALDY SNOTEL	9220	3/01	49	14.2	9.1	8.0
6.	BEAVER HEAD	8000	2/26	28	8.8	.4	2.9
7.	BEAVER HEAD SNOTEL	7990	3/01	39	11.4	2.9	3.0
8.	BEAVER SPRING	9220	2/26	57	17.4	-	9.7
9.	BEAVER SPRING SNOTEL	9200	3/01	51	15.2	-	-
10.	BRIGHT ANGEL	8400	2/26	61	20.7	7.4	10.9
11.	BUCK SPRING	7400	2/26	28	9.4	3.0	3.8
12.	CHALENDER	7100	2/24	29	9.7	2.7	3.3
13.	CHALENDER SNOTEL	7100	3/01	33	10.1	-	-
14.	CHEESE SPRINGS	8600	2/26	38	10.7	6.2	5.9
15.	CORONADO TRL SNOTEL	8400	3/01	38	11.7	.0	3.3
16.	CORONADO TRAIL	8350	2/26	35	11.2	.0	3.0
17.	FLUTED ROCK	7800	2/25	31	8.0	3.7	3.5
18.	FORT APACHE	9160	2/26	52	16.1	9.7	7.9
19.	FORT VALLEY	7350	2/26	29	8.8	2.4	2.6
20.	FORT VALLEY SNOTEL	7350	3/01	23	10.8	.3	-
21.	FRY SNOTEL	7220	3/01	50	17.8	11.4	6.8
22.	GRAND CANYON	7500	2/25	26	7.0	.3	2.4
23.	HANNAGAN MDWS SNOTEL	9020	3/01	63	17.9	8.7	11.7
24.	HAPPY JACK	7630	2/25	40	12.1	4.6	4.8
25.	HAPPY JACK SNOTEL	7630	3/01	51	16.3	8.4	6.1
26.	HEBER SNOTEL	7640	3/01	45	17.7	6.0	5.0
27.	LAKE MARY	6930	2/26	34	10.5	6.3	3.3
28.	MAVERICK FORK SNOTEL	9200	3/01	52	16.2	12.2	10.2
29.	MORMON MTN SNOTEL	7500	3/01	53	19.0	8.1	6.7
30.	MORMON MT. SUMMIT #2	8470	2/25	73	24.2	15.5	14.2
31.	MORMON MTN SUMMIT SN	8500	3/01	67	21.8	15.0	-
32.	NEWMAN PARK	6750	2/26	34	12.1	3.8	2.5
33.	NUTRIOSO	8500	2/26	23	7.1	.0	1.8
34.	NUTRIOSO SNOTEL	8500	3/01	11	4.7	.0	-
35.	PROMONTORY SNOTEL	7900	3/01	69	26.8	16.2	12.9
36.	SNOW BOWL #1 ALT.	10260	2/24	63	19.0	14.0	12.3
37.	SNOW BOWL #2	11000	2/24	69	21.6	15.6	17.2
38.	SNOWSLIDE CYN SNOTEL	9750	3/01	78	24.6	21.3	12.4
39.	TSAILE CANYON #1	8160	2/24	52	15.1	-	6.1
40.	TSAILE CANYON #3	8920	2/25	60	16.4	-	8.7
41.	WHITE HORSE SNOTEL	7180	3/01	38	13.0	4.3	5.3
42.	WILDCAT SNOTEL	7850	3/01	35	10.5	1.9	4.4
43.	WILLIAMS SKI RUN	7720	2/24	58	19.6	12.5	8.9
44.	WORKMAN CREEK SNOTEL	6900	3/01	44	19.3	7.8	5.3

Arizona Snow Survey Data Sites



Legend

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

February 2010
 Data Sources: NRCS / ALRIS
 Projection: UTM Zone 12 Datum: NAD83
 For Further Information Contact:
 Arizona NRCS State Headquarters - (602) 280-8831
 230 N. 1st Ave., Suite 509, Phoenix, AZ 85003

