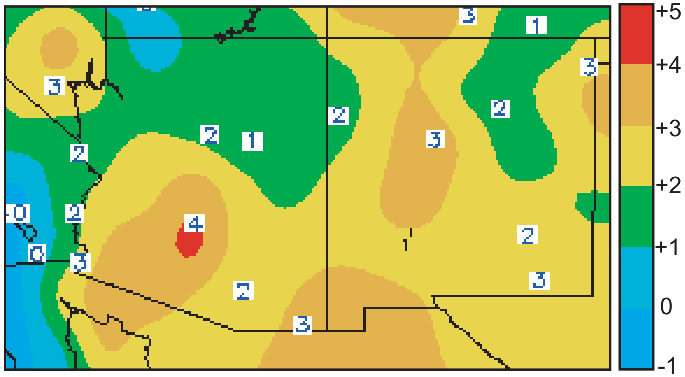
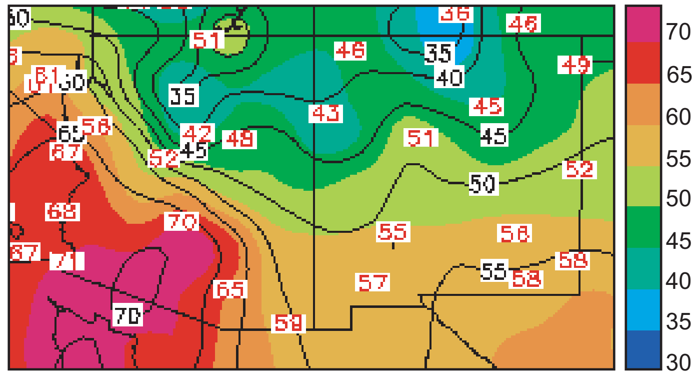
1. Recent Conditions: Temperature (up to 12/17/03) Sources: WRCC, HPRCC

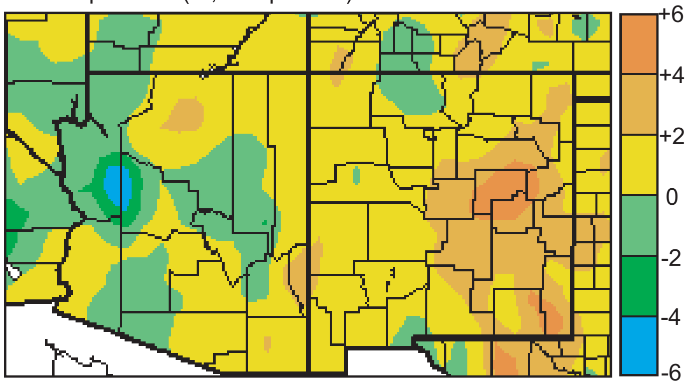
1a. Water year '03-'04 (through 12/16) departure from average temperature (°F).



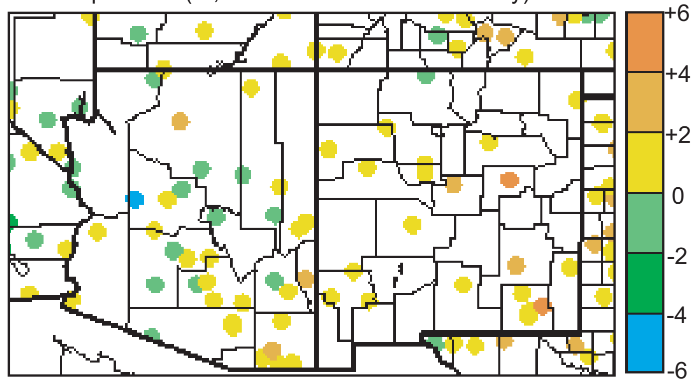
1b. Water year '03-'04 (through 12/16) average temperature (°F).



1c. Previous 30 days (11/18 - 12/17) departure from average temperature (°F, interpolated).



1d. Previous 30 days (11/18 - 12/17) departure from average temperature (°F, data collection locations only).



Highlights: Since the beginning of the water year, temperatures have been above average across all of Arizona and New Mexico (Figure 1a). During the past 30 days, temperatures have been mostly above average across New Mexico, and there has been great spatial variability in temperatures across Arizona (Figures 1c and 1d). Many weather stations in our region have recorded above-average maximum temperatures (not pictured), highlighted by a warm spell during late November and early December. New Mexico's temperatures during the first 11 months of 2003 were the warmest since instrumental records began in 1893 (*Albuquerque Journal*, December 17, 2003). This unusual warmth fit into the global trend—the year 2003 is likely to go down as the third warmest year on record, according to a preliminary analysis by the National Oceanic and Atmospheric Administration's National Climatic Data Center in North Carolina.

For these and other temperature maps, visit: http://www.wrcc.dri.edu/recent_climate.html and http://www.hprcc.unl.edu/products/current.html

For information on temperature and precipitation trends, visit: http://www.cpc.ncep.noaa.gov/trndtext.htm

Notes:

The water year begins on October 1 and ends on September 30 of the following year. Water year is more commonly used in association with precipitation; water year temperature can be used to measure the temperatures associated with the hydrological activity during the water year.

Average refers to the arithmetic mean of annual data from 1971-2000. Data are in degrees Fahrenheit (°F).

Departure from average temperature is calculated by subtracting current data from the average. The result can be positive or negative.

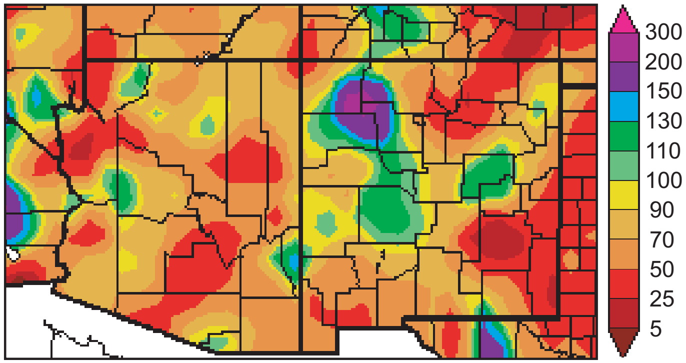
The continuous color maps (Figures 1a, 1b, 1c) are derived by taking measurements at individual meteorological stations and mathematically interpolating (estimating) values between known data points. The blue numbers in Figure 1a, the red numbers in Figure 1b, and the dots in Figure 1d show data values for individual stations.

Note: Interpolation procedures can cause aberrant values in data-sparse regions.

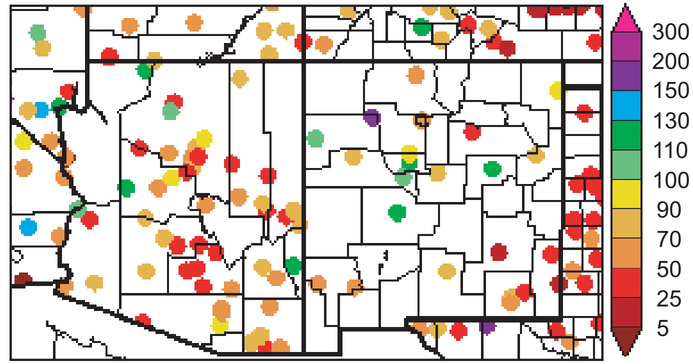
Figures 1c and 1d are experimental products from the High Plains Regional Climate Center (HPRCC).

2. Recent Conditions: Precipitation (up to 12/17/03) Source: High Plains Regional Climate Center

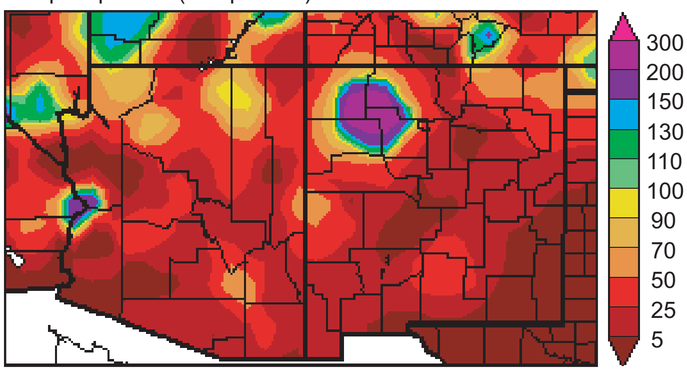
2a. Water year '03-'04 (through 12/17) percent of average precipitation (interpolated).



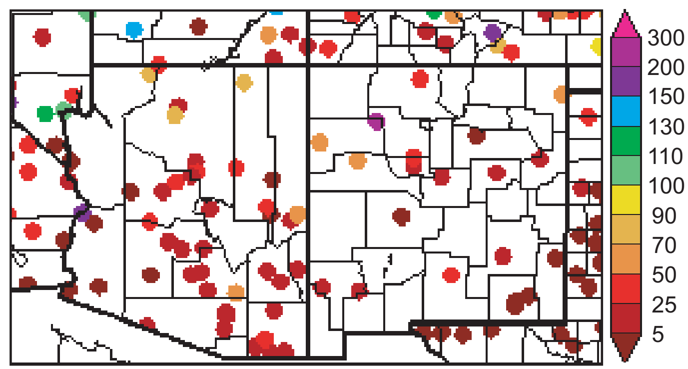
2b. Water year '03-'04 (through 12/17) percent of average precipitation (data collection locations only).



2c. Previous 30 days (11/18 - 12/17) percent of average precipitation (interpolated).



2d. Previous 30 days (11/18 - 12/17) percent of average precipitation (data collection locations only).



Highlights: Dry conditions characterized most of the Southwest during the past 30 days (Figures 2c-d). In particular, the southern half of our region received well below-average precipitation. The National Weather Service Albuquerque forecast office reported that for January-November, 2003, stations such as Animas and Roswell have received less than 40 percent of average precipitation. Much of New Mexico remained so dry that high winds on December 15 lifted enough soil to darken precipitation falling the next day in Wisconsin. The *Associated Press* reported on December 18 that the dirty rain, which also struck Illinois and Michigan, left a coating of dirt on roads and vehicles. Snowfall in northwestern New Mexico on December 8, however, allowed several ski areas to open for business. Reported snowfall ranged from 7-9 inches in Sipapu to 12 inches in the Enchanted Forest Cross Country Ski Area.

For these and other precipitation maps, visit: http://www.hprcc.unl.edu/products/current.html
For National Climatic Data Center monthly precipitation and drought reports for Arizona, New Mexico, and the Southwest region, visit: http://lwf.ncdc.noaa.gov/oa/climate/research/2003/perspectives.html#monthly

Notes:

The water year begins on October 1 and ends on September 30 of the following year. As of October 1, 2003 we are in the 2004 water year. The water year is a more hydrologically sound measure of climate and hydrological activity than is the standard calendar year.

Average refers to the arithmetic mean of annual data from 1971-2000.

Percent of average precipitation is calculated by taking the ratio of current to average precipitation and multiplying by 100.

The continuous color maps (Figures 2a, 2c) are derived by taking measurements at individual meteorological stations and mathematically interpolating (estimating) values between known data points.

Note: Interpolation procedures can cause aberrant values in data-sparse regions.

The dots in Figures 2b and 2d show data values for individual meteorological stations.

These figures are experimental products from the High Plains Regional Climate Center (HPRCC).

3. Annual Precipitation Anomalies and Daily Event Totals ♦ Source: NOAA Climate Prediction Center

Notes: Based on a long-term average (1971-2000) of daily precipitation, these graphs contrast how much precipitation actually has accumulated at each station over the past year (beginning in mid-December 2002) with how much precipitation typically is received.

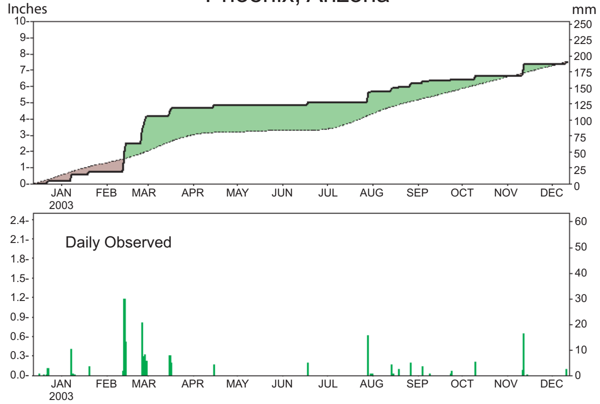
The top of each of the pairs of graphs shows average (dotted line) and actual (solid line) accumulated precipitation (i.e., each day's precipitation total is added to the previous day's total for a 365-day period). If accumulated precipitation is below the long-term average, the region between the long-term average and the actual precipitation is shaded brown, and if accumulated precipitation is above the long-term average, the region between the actual precipitation and the long-term average precipitation is shaded green.

The green bars at the bottom of each of the pairs of graphs show the daily precipitation amounts (in both inches and millimeters) for the past year. Thus, one can get a sense of how frequent and intense individual precipitation events have been at the selected stations.

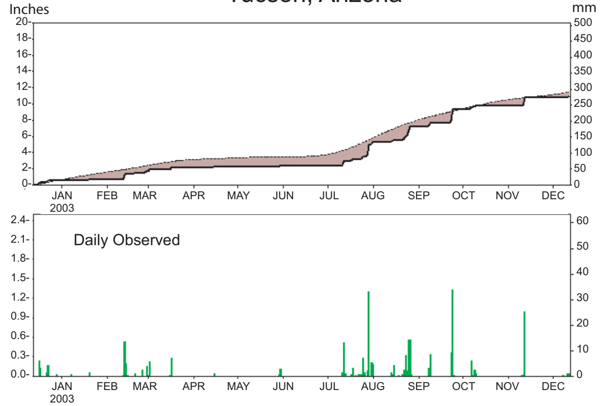
It is important to note that the scales for both the accumulated precipitation and the daily precipitation vary from station to station.

This type of graph is available for several other stations in Arizona and New Mexico as well as for many other places in the world. The graphs are updated daily by NOAA CPC at http://www.cpc.noaa.gov/products/global_monitoring/precipitation/global_precip_accum.html.

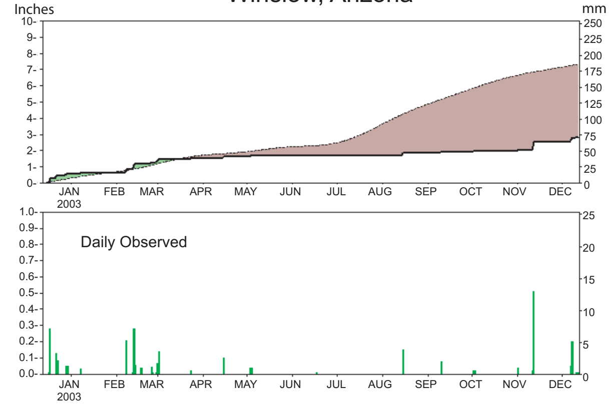
Phoenix, Arizona



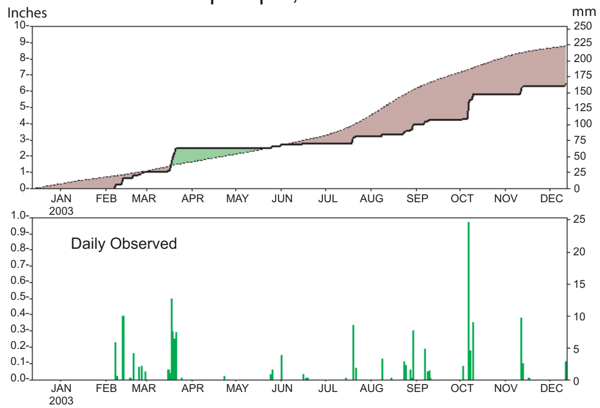
Tucson, Arizona



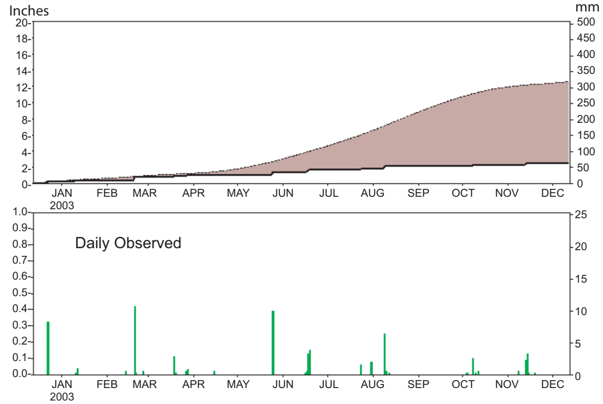
Winslow, Arizona



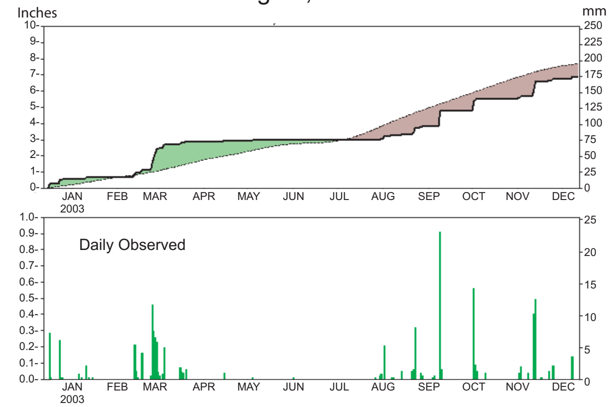
Albuquerque, New Mexico



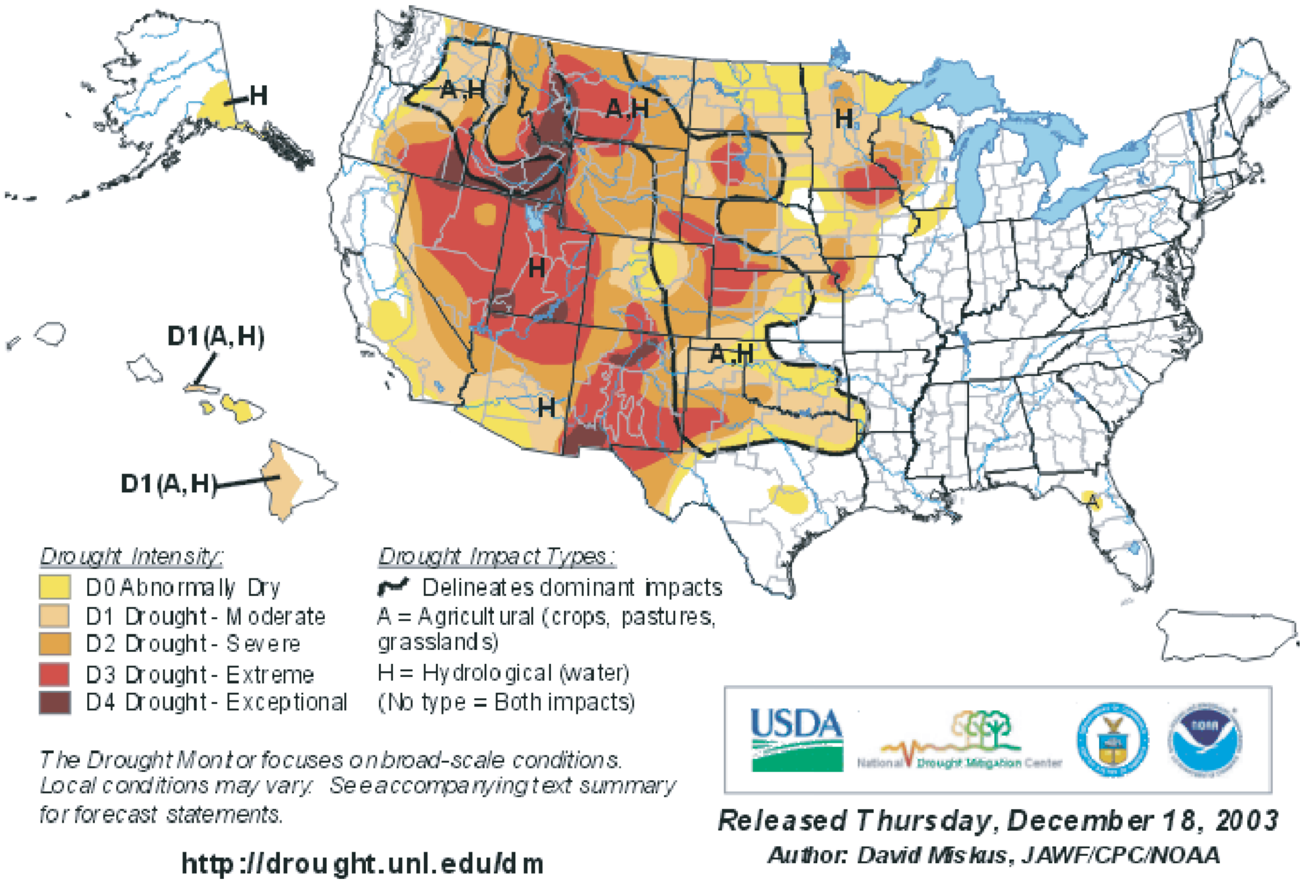
Roswell, New Mexico



Farmington, New Mexico



4. U.S. Drought Monitor (updated 12/18/03) ♦ Source: USDA, NDMC, NOAA



Notes:

The U.S. Drought Monitor is released weekly (every Thursday) and represents data collected through the previous Tuesday. This monitor was released on 12/18 and is based on data collected through 12/16.

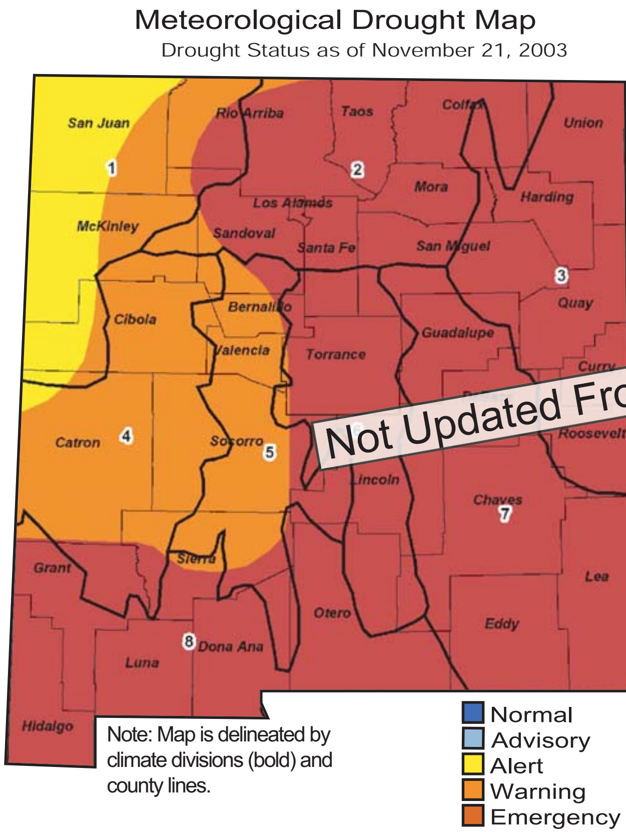
The best way to monitor drought trends is to pay a weekly visit to the U.S. Drought Monitor website (see left and below).

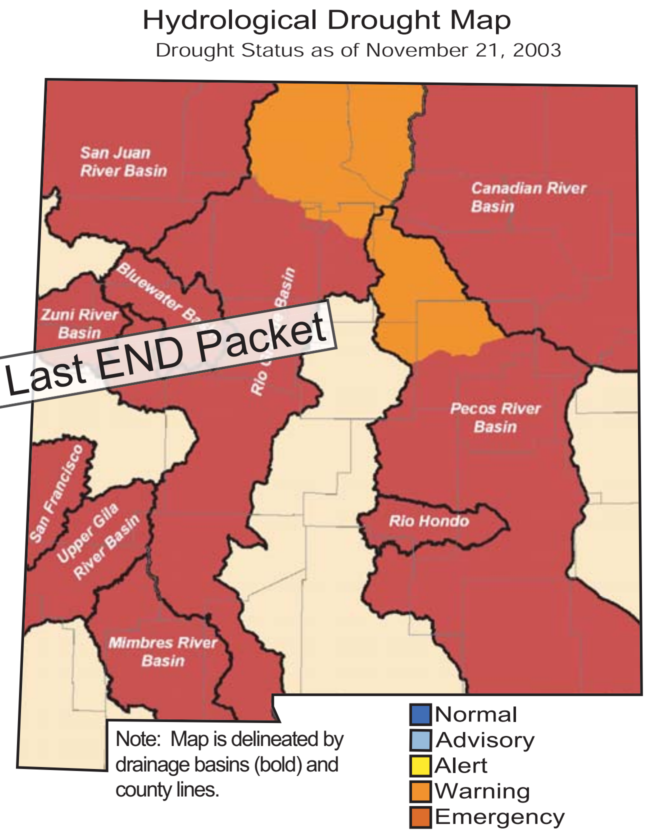
The U.S. Drought Monitor maps are based on expert assessment of variables including (but not limited to) PDSI, soil moisture, stream flow, precipitation, and measures of vegetation stress, as well as reports of drought impacts.

Highlights: Drought status conditions for the southwestern United States are identical to conditions last month, as reported by the U.S. Drought Monitor. Compared to this time last year, drought status in northern Arizona dropped from exceptional to extreme status. Southwestern Arizona drought status has also decreased, going from extreme drought status to moderate or better. Drought index values and satellite vegetation health indices for locations in southeastern Arizona and southwestern New Mexico (not pictured), indicate continued extreme to exceptional drought conditions and vegetation stress. U.S. Drought Monitor status for New Mexico looks much worse than it did at this time last year. Whereas last year only the northwestern corner of the state was declared to be in severe to exceptional drought status, this year severe conditions represent the low end of the range throughout the state. Most of the area deemed in extreme drought this year was in abnormally dry to moderate condition at this time last year. Especially dry conditions have been observed in southeastern New Mexico, where locations such as Carlsbad and Roswell have registered November 12-month Standardized Precipitation Index values lower than any time in the past 8 years.

Animations of the current and past weekly drought monitor maps can be viewed at: http://www.drought.unl.edu/dm/monitor.html

5. Drought: Recent Drought Status for New Mexico (updated 11/21/03) Source: New Mexico NRCS

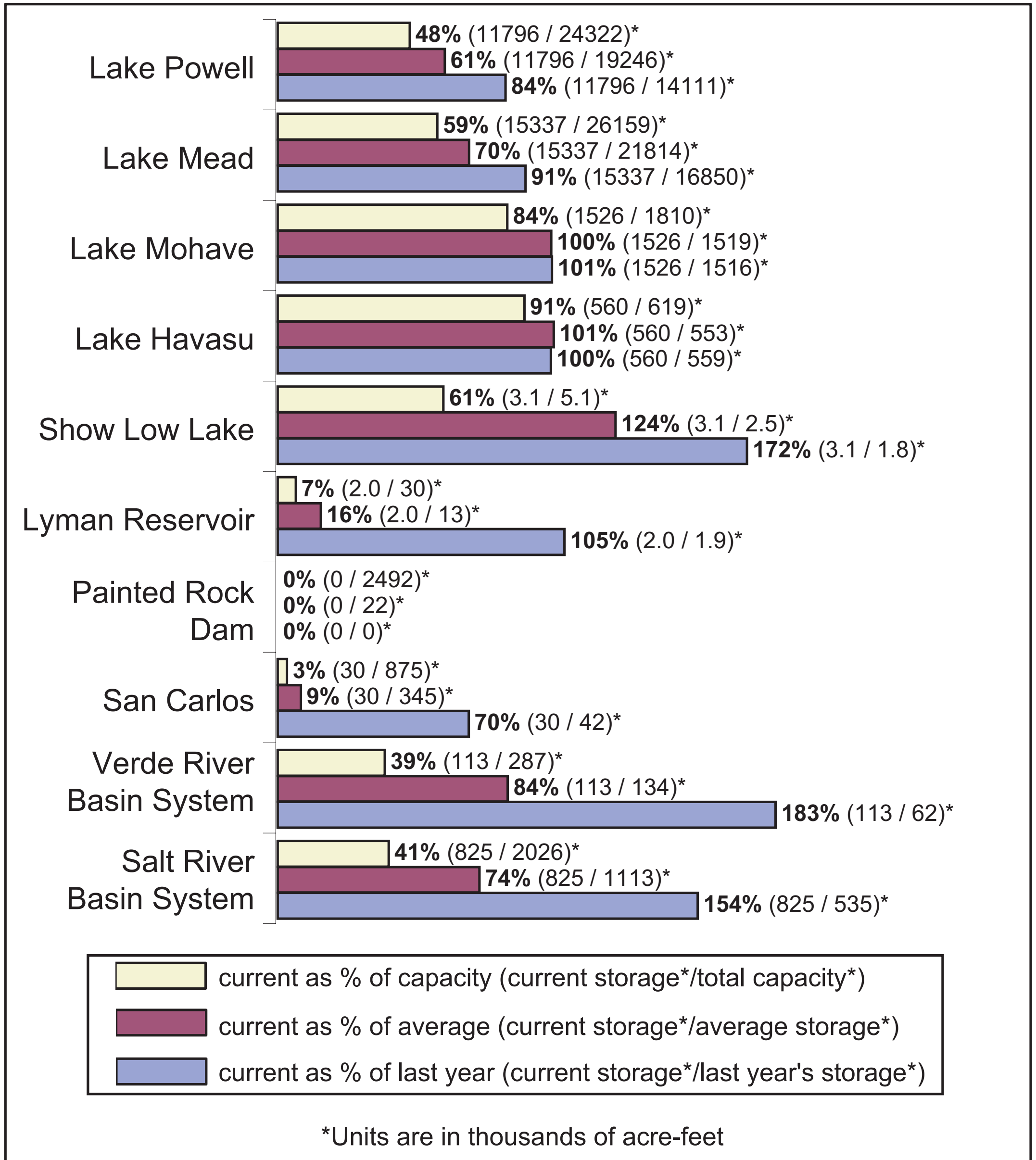




Notes: New Mexico drought status maps are produced by the New Mexico Drought Monitoring Workgroup (NMDMW). As with the U.S. Drought Monitor maps (see page 4) , the New Mexico maps are based on expert assessment of variables including, but not limited to, precipitation, drought indices, reservoir levels, and streamflow. The New Mexico drought status maps (http://www.nm.nrcs.usda.gov/snow/drought/drought.html) are produced monthly. When near-normal conditions exist, they are updated quarterly. Information on Arizona drought can be found at: http://www.water.az.gov/gdtf/

Highlights: The New Mexico Drought Monitoring Workgroup will not update the New Mexico drought status maps until 2004; the following report is based on a variety of information, some of which is usually reviewed by the NMDMW. Precipitation, including autumn snowfall, has provided short-term drought relief to northwestern New Mexico and the headwaters of the San Juan River in southern Colorado. Nevertheless, drought indices (not pictured) indicate sustained drought conditions throughout most of the state. Reservoir levels throughout New Mexico (see page 7) are still well below average. Moreover, the final 2003 USDA state topsoil conditions report (released in late November) indicated that 94 percent of New Mexico topsoil was in the “very dry” category—a statistic graphically corroborated by recent dust storms originating in eastern New Mexico and affecting the Great Plains states.

6. Arizona Reservoir Levels (through the end of November 2003) Source: USDA NRCS



Notes: Reservoir reports are updated monthly and are provided by the National Water and Climate Center (NWCC) of the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS). Portions of the information provided in this figure can be accessed at the NRCS website: http://www.wcc.nrcs.usda.gov/wsf/reservoir/resv_rpt.html

As of 12/15/03, Arizona's report had been updated through the end of November.

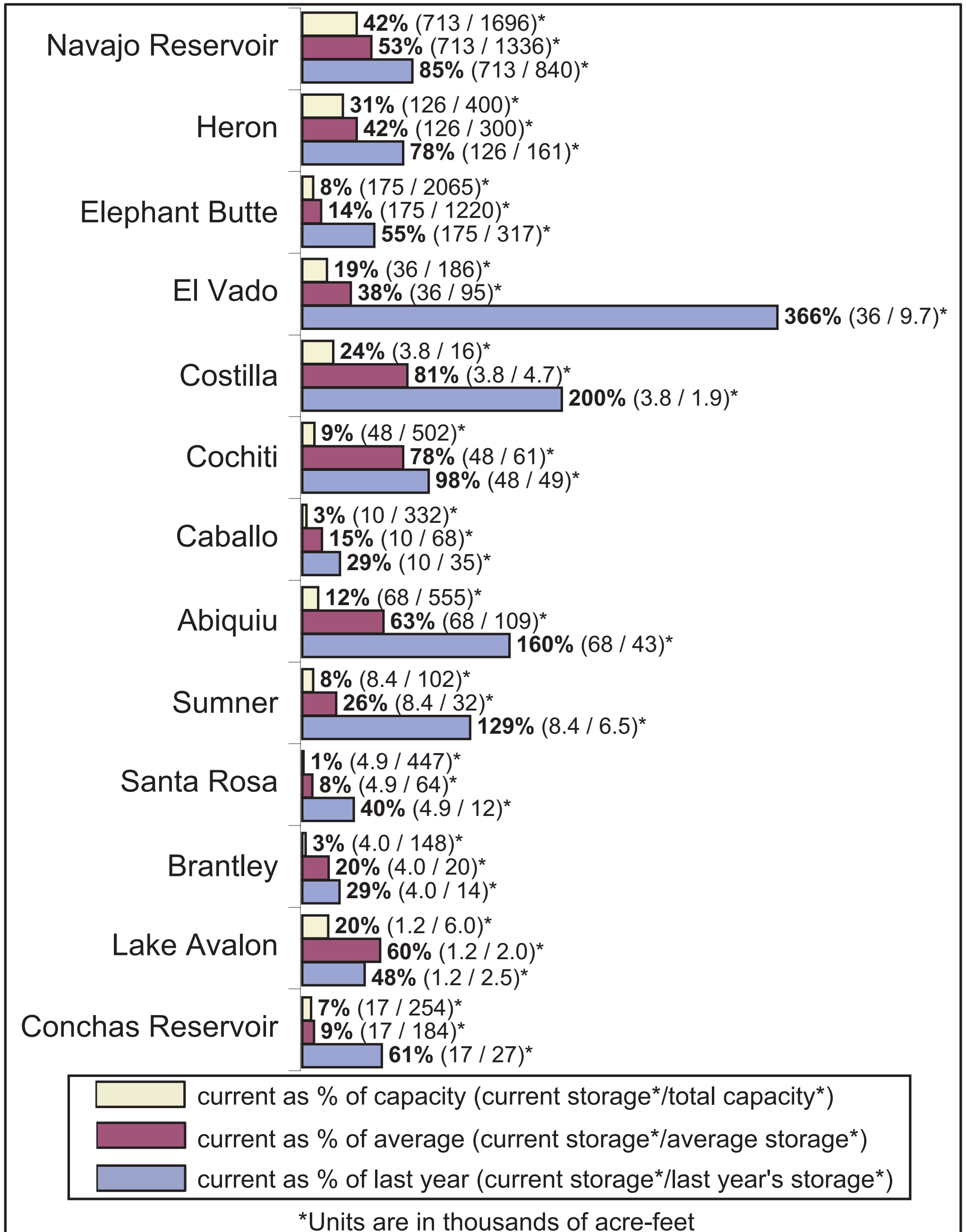
For additional information, contact Tom Pagano of the NWCC-NRCS-USDA (tpagano@wcc.nrcs.usda.gov; 503-414-3010) or Larry Martinez, NRCS, USDA, 3003 N. Central Ave, Suite 800, Phoenix, Arizona 85012-2945; 602-280-8841; Larry.Martinez@az.usda.gov)

Highlights: There was little change in the overall storage of water in the lower Colorado river system from a month ago. Lake Mead's current level as a percent of average for this time of year dropped 2 percent, while Lake Powell remained unchanged. Storage behind the four dams is approximately 266,000 acre-feet less at the end of November compared to the end of October.

Lake Mead's low levels inspired the Southern Nevada Water Authority to issue a "drought alert" for Las Vegas, Nevada, according to a November 23 *Associated Press* story. The alert imposes restrictions, starting January 1, limiting car-washing and grass-growing at homes, and outdoor misting at restaurants.

Water storage in the Verde and Salt River systems is much improved over this time last year (183 percent and 154 percent, respectively). The San Carlos reservoir, on the other hand, is storing only 70 percent of the water it was storing at this time last year.

7. New Mexico Reservoir Levels (through the end of November 2003) Source: USDA NRCS



Notes: Reservoir reports are updated monthly and are provided by the National Water and Climate Center (NWCC) of the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS). Reports can be accessed at their website: http://www.wcc.nrcs.usda.gov/wsf/reservoir/resv_rpt.html.

As of 12/15/03, New Mexico's report had been updated through the end of November.

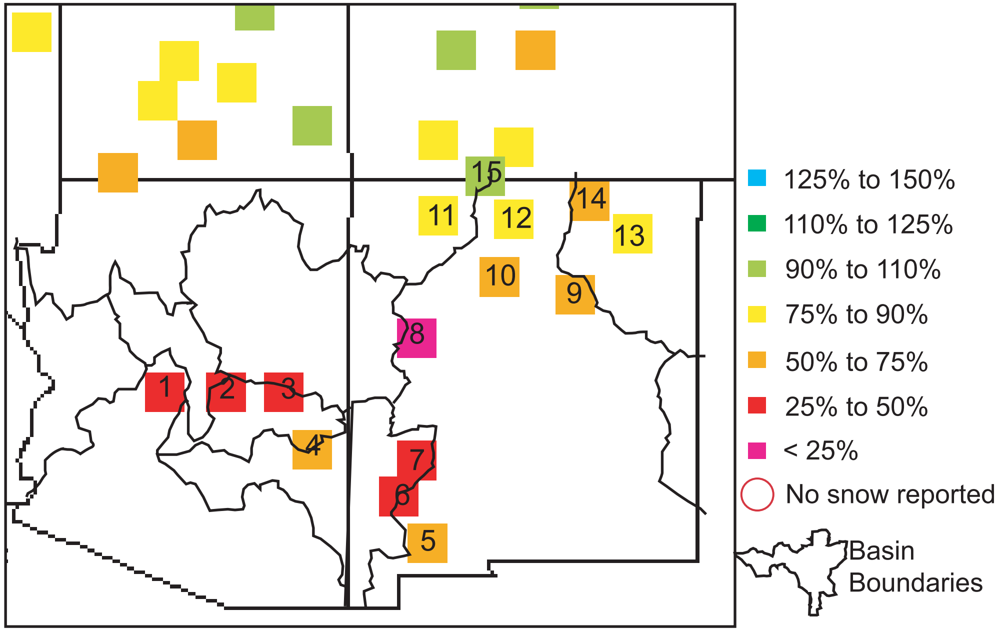
For additional information, contact Tom Pagano of the NWCC-NRCS-USDA (tpagano@wcc.nrcs.usda.gov; 503-414-3010) or Dan Murray, NRCS, USDA, 6200 Jefferson NE, Albuquerque, NM 87109; 505-761-4436; Dan.Murray@nm.usda.gov)

Highlights: Water storage at two major reservoirs, Navajo and Elephant Butte, increased by several thousand acre-feet during November. Most of the levels of the smaller reservoirs in New Mexico also increased compared to last month. In contrast, Heron reservoir lost about 6,000 acre-feet in a month, while Brantley dropped by 3,800 acre-feet and Conchas declined by about 2,000 acre-feet. An acre-foot is the amount of water that would cover an acre 1 foot in depth.

Navajo, Heron, and Elephant Butte reservoirs are all below levels recorded at this time last year. Elephant Butte is the most exceptional, with only 55 percent of the amount recorded last year. This drop occurred even though area farmers were allotted only 8 inches of water per acre of farmland rather than the usual 24 to 36 inches (*Albuquerque Journal* December 14, 2003). Because of the small allotments, little return flow from irrigation entered the Rio Grande south of Elephant Butte, leaving the downstream stretch of river without even its usual trickle. In a December 19 column in the *Albuquerque Journal*, a Southwest Environmental Center spokesperson urged development of a "water bank" to purchase rights from irrigators to improve the Rio Grande's long-term water flow.

8. Snowpack in the Southwestern United States (updated 12/18/03) Source: USDA NRCS, WRCC

8. Basin average snow water content (SWC) for available monitoring sites as of 12/18/03 (% of average).



Arizona Basins

1 Verde River Basin
2 Central Mogollon Rim
3 Little Colorado - Southern Headwaters
4 Salt River Basin

New Mexico Basins

5 Mimbres River Basin
6 San Francisco River Basin
7 Gila River Basin
8 Zuni/Bluewater River Basin
9 Pecos River
10 Jemez River Basin
11 San Miguel, Dolores, Animas, and San Juan River Basins
12 Rio Chama River Basin
13 Cimarron River Basin
14 Sangre de Cristo Mountain Range Basin
15 San Juan River Headwaters

Highlights: Snowpack was below average throughout the Southwest as of December 18, 2003. Conditions did improve in Arizona and in southern New Mexico compared to the previous month, with all stations now reporting at least some snow. Although northern New Mexico technically was in better shape than southern New Mexico, with all stations showing 50 percent or more of typical snow water content (SWC), only station 13 (Cimarron River Basin) improved compared to last month when compared to the average SWC for this time of the year. New Mexico's Gila, San Francisco, and Zuni/Blue Water river basins had particularly low SWC values compared to average. Arizona's Gila and Verde river basins were similarly lacking in snowpack relative to average. All but two Southwest stations were recorded lower SWC values than at about this time last year.

For color maps of SNOTEL basin SWC, visit: http://www.wrcc.dri.edu/snotelanom/basinswe.html
For a numeric version of the SWC map, visit: http://www.wrcc.dri.edu/snotelanom/basinswen.html
For a list of river basin SWC and precipitation, visit http://www.wrcc.dri.edu/snotelanom/snotelbasin

Notes:

The data shown on this page are from snowpack telemetry (SNOTEL) stations grouped according to river basin. These remote stations sample snow, temperature, precipitation, and other parameters at individual sites.

Snow water content (SWC) and snow water equivalent (SWE) are different terms for the *same* parameter.

The SWC in Figure 8 refers to the snow water content found at selected SNOTEL sites in or near each basin compared to the *average* value for those sites on this day. *Average* refers to the arithmetic mean of annual data from 1971-2000. SWC is the amount of water currently in snow. It depends on the density and consistency of the snow. Wet, heavy snow will produce greater SWC than light, powdery snow.

Each box on the map represents a river basin for which SWC data from individual SNOTEL sites have been averaged. Arizona and New Mexico river basins for which SNOTEL SWC estimates are available are numbered in Figure 8. The colors of the boxes correspond to the percent of average SWC in the river basins.

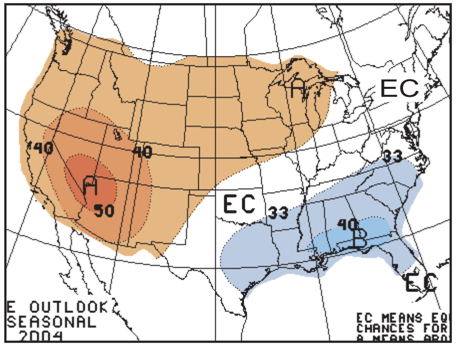
The dark lines within state boundaries delineate large river basins in the Southwest.

These data are provisional and subject to revision. They have not been processed for quality assurance. However, they provide the best available land-based estimates during the snow measurement season.

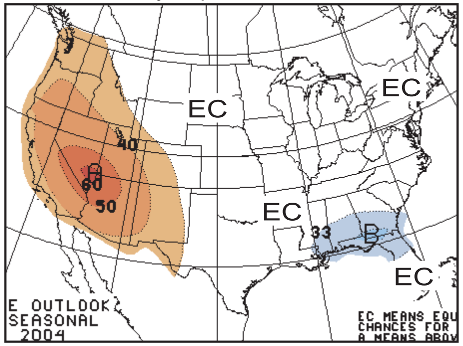
9. Temperature: Multi-season Outlooks ♦ Source: NOAA Climate Prediction Center

Overlapping 3-month long-lead temperature forecasts (released 12/18/03).

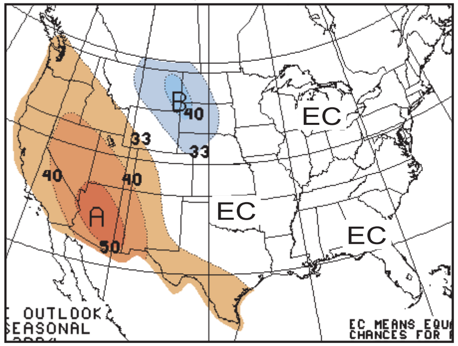
9a. Long-lead national temperature forecast for January - March 2004.



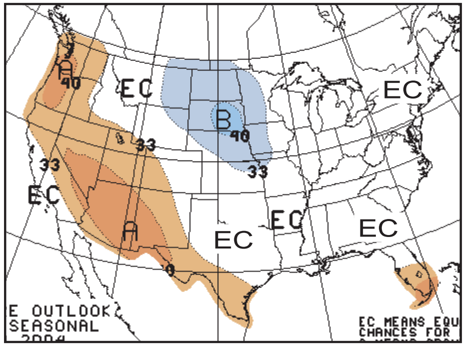
9b. Long-lead national temperature forecast for February - April 2004.



9c. Long-lead national temperature forecast for March - May 2004.



9d. Long-lead national temperature forecast for April - June 2004.



Percent Likelihood of Above and Below Average Temperatures*

A = Above
- > 60%
- 50% - 59.9%
- 40% - 49.9%
- 33% - 39.9%

B = Below
- 33% - 39.9%
- 40% - 49.9%

*EC indicates no forecasted anomalies due to lack of model skill.

Highlights: The NOAA-CPC temperature outlooks for January through June 2004 forecast considerably increased probabilities of above-average temperatures for most of the Southwest (Figures 9a-d). The maximum likelihood of above-average temperatures (greater than 60 percent, which indicates only a 7 percent likelihood of below-average temperatures) is centered over northwestern Arizona for winter and early spring (Figure 9b). The CPC predictions are based on strong agreement among statistical models and long-term temperature trends for the region, and they assume a continuation of ENSO-neutral conditions in the Pacific Ocean. In additon, the predictions indicate very good agreement among dynamical models regarding an atmospheric circulation pattern that favors high pressure (thus, high temperatures and low precipitation) over the western United States. The International Research Institute for Climate Prediction (IRI) temperature forecasts (not pictured) also indicate increased probabilities of above-average temperature for the southwestern United States.

For more information on CPC forecasts, visit:
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html
Please note that this website has many graphics and may load slowly on your computer.

For IRI forecasts, visit: http://iri.columbia.edu/climate/forecast/net_asmt/

Notes:

The NOAA CPC (National Oceanic and Atmospheric Administration Climate Prediction Center) outlooks predict the likelihood (chance) of above-average, average, and below-average temperature, but not the magnitude of such variation. The numbers on the maps do not refer to degrees of temperature.

In a situation where there is no forecast skill, one might look at average conditions in order to get an idea of what might happen. Using past climate as a guide to average conditions and dividing the past record into 3 categories, there is a 33.3 percent chance of above-average, a 33.3 percent chance of average, and a 33.3 percent chance of below-average temperature.

Thus, using the NOAA CPC likelihood forecast, in areas with light brown shading there is a 33.3-40.0 percent chance of above-average, a 33.3 percent chance of average, and a 26.7-33.3 percent chance of below-average temperature.

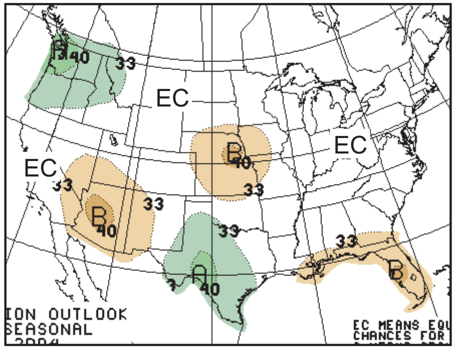
The term average refers to the 1971-2000 average. This practice is standard in the field of climatology.

Equal Chances (EC) indicates areas where reliability (i.e., the 'skill') of the forecast is poor and no anomaly prediction is offered.

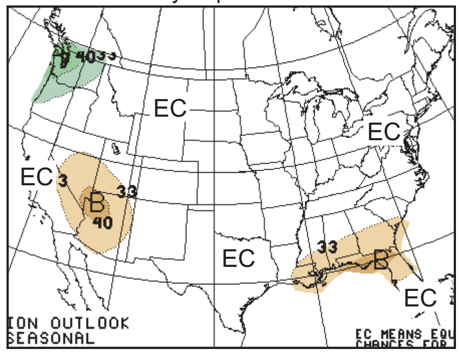
10. Precipitation: Multi-season Outlooks ♦ Source: NOAA Climate Prediction Center

Overlapping 3-month long-lead precipitation forcasts (released 12/18/03).

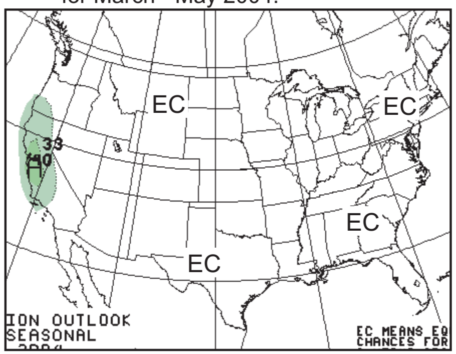
10a. Long-lead U.S. precipitation forecast for January - March 2004.



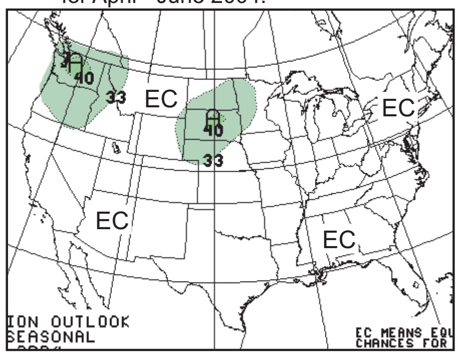
10b. Long-lead U.S. precipitation forecast for February - April 2004.



10c. Long-lead U.S. precipitation forecast for March - May 2004.



10d. Long-lead U.S. precipitation forecast for April - June 2004.



Percent Likelihood of Above or Below Average Precipitation*

> 40%
33% - 40%
A = Above

33% - 40%
> 40%
B = Below

*EC indicates no forecasted anomalies due to lack of model skill.

Highlights: The NOAA-CPC forecast for January-March 2004 indicates slightly increased probabilities of below-average precipitation for Arizona and western New Mexico, whereas slightly increased probabilities of above-average precipitation are predicted for southeastern New Mexico (Figure 10a). Increased probabilities of below-average precipitation are predicted for Arizona for February-April 2004 (Figure 10b). CPC forecasters have reserved judgment regarding precipitation in the Southwest for the spring months (Figures 10c-d). The January-April 2004 IRI precipitation forecasts (not pictured) indicate slightly increased probabilities (40-45 percent) of below-average precipitation for Feb-April 2004, covering most of the Southwest. An experimental forecast from the NOAA-Climate Diagnostic Center (not pictured), calls for a 38-48 percent likelihood of below-average precipitation across most of northern New Mexico this winter (Jan-March 2004); this forecast indicates near-average conditions for Arizona this winter and spring. NOAA CPC climate outlooks are released on Thursday, between the 15th and 21st of each month.

For more information, visit:
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html
Please note that this website has many graphics and may load slowly on your computer.
For more information about IRI experimental forecasts, visit: http://iri.columbia.edu/climate/forecast/net_asmt/

Notes:

The NOAA CPC (National Oceanic and Atmospheric Administration Climate Prediction Center) outlooks predict the likelihood (chance) of above-average, average, and below-average precipitation, but **not** the magnitude of such variation. The numbers on the maps **do not** refer to inches of precipitation.

In a situation where there is no forecast skill, one might look at *average* conditions in order to get an idea of what might happen. Using past climate as a guide to average conditions and dividing the past record into 3 categories, there is a 33.3 percent chance of above-average, a 33.3 percent chance of average, and a 33.3 percent chance of below-average precipitation.

Thus, using the NOAA CPC likelihood forecast, in areas with light green shading there is a 33.3-40.0 percent chance of above-average, a 33.3 percent chance of average, and a 26.7-33.3 percent chance of below-average precipitation.

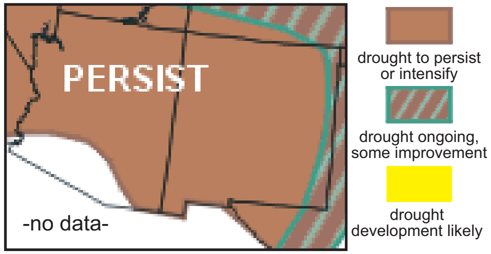
The term *average* refers to the 1971-2000 average. This practice is standard in the field of climatology.

Equal Chances (EC) indicates areas where reliability (i.e., the 'skill') of the forecast is poor and no anomaly prediction is offered.

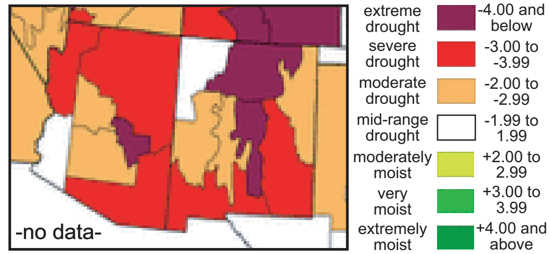
11. Drought: Seasonal Drought and PHDI Outlook Maps ♦ Sources: NOAA-CPC, NCDC

Notes:
The delineated areas in the Seasonal Drought Outlook (Fig. 11a) are defined subjectively and are based on expert assessment of numerous indicators, including outputs of short- and long-term forecasting models.

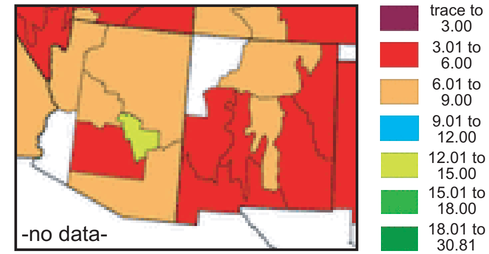
11a. Seasonal drought outlook through March 2004 (accessed 12/18).



11b. November 2003 PHDI conditions (accessed 12/18).

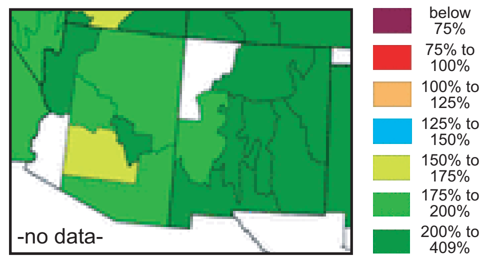


11c. Precipitation (in.) required to end current drought conditions in three months.



Figures 11b-e are based on the Palmer Hydrological Drought Index (PHDI), which reflects long-term precipitation deficits. PHDI is a measure of reservoir and groundwater level impacts, which take a relatively long time to develop and to recover from drought. Figure 11b shows the current PHDI status for Arizona and New Mexico.

11d. Percent of average precipitation required to end current drought conditions in three months.



11e. Probability of receiving precipitation required to end current drought conditions in three months.

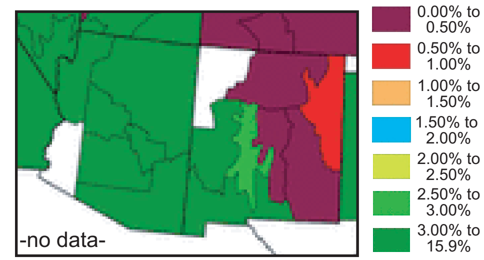


Figure 11c shows the amount of precipitation, in inches, needed over the next three months to change a region's PHDI status to -0.5 or greater—in other words, to end the drought. Regions shown in white have a current PHDI value greater than –2.0 (e.g., in Figure 11b - e, these regions are not in hydrological drought).

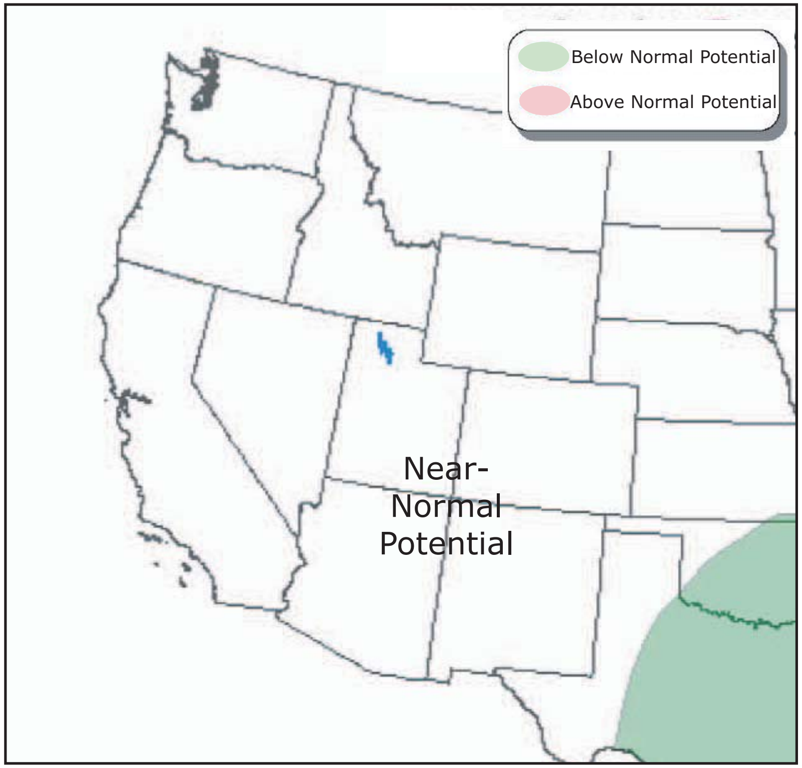
The season in which the precipitation falls greatly influences the amount of precipitation needed to end a drought. For example, during a typically wet season more precipitation may be required to end a drought than during a typically dry season. Also, because soil moisture conditions generally are lower in the dry seasons, the precipitation needed to bring soil conditions back to normal may be less than that required to return soil moisture conditions to normal during a generally wetter season. Figure 11d shows the percent of average precipitation needed to end drought conditions in three months, based on regional precipitation records from 1961–1990. A region that typically experiences extreme precipitation events during the summer, for example, may be more likely to receive enough rain to end a drought than a region that typically is dry during the same season. The seasons with the greatest probability of receiving substantially more precipitation than average are those subject to more extreme precipitation events (such as hurricane-related rainfall), not necessarily those seasons that normally receive the greatest average amounts of precipitation. Figure 11e shows the probability, based on historical precipitation patterns, of regions in Arizona and New Mexico receiving enough precipitation in the next three months to end the drought. Note that these probabilities do not take into account atmospheric and climatic variability (such as El Niño-Southern Oscillation), which also influence seasonal precipitation probabilities.

Highlights: The U.S. Seasonal Drought Outlook (Figure 11a) indicates that drought is likely to persist. The probability of ending drought within the next three months is still exceedingly low for most of the Southwest, especially eastern New Mexico. Gila County, Arizona, and the eastern three-fourths of New Mexico require at least 200 percent of average precipitation during the next three months in order to end hydrological drought conditions.

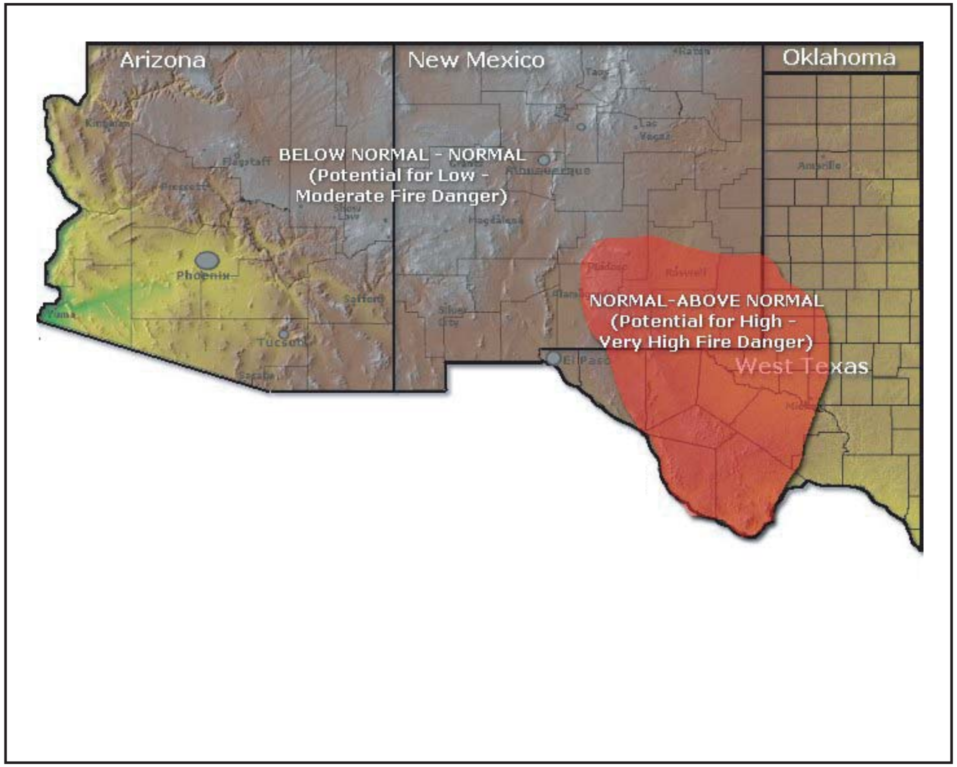
For more information, visit: http://www.drought.noaa.gov/ —and— http://www.ncdc.noaa.gov/oa/climate/research/drought/drought.html

12. National Wildland Fire Outlook Source: National Interagency Coordination Center

12a. Monthly wildfire outlook (valid December 1 - 31).



12b. Monthly fire danger outlook (valid December 1 - 31).



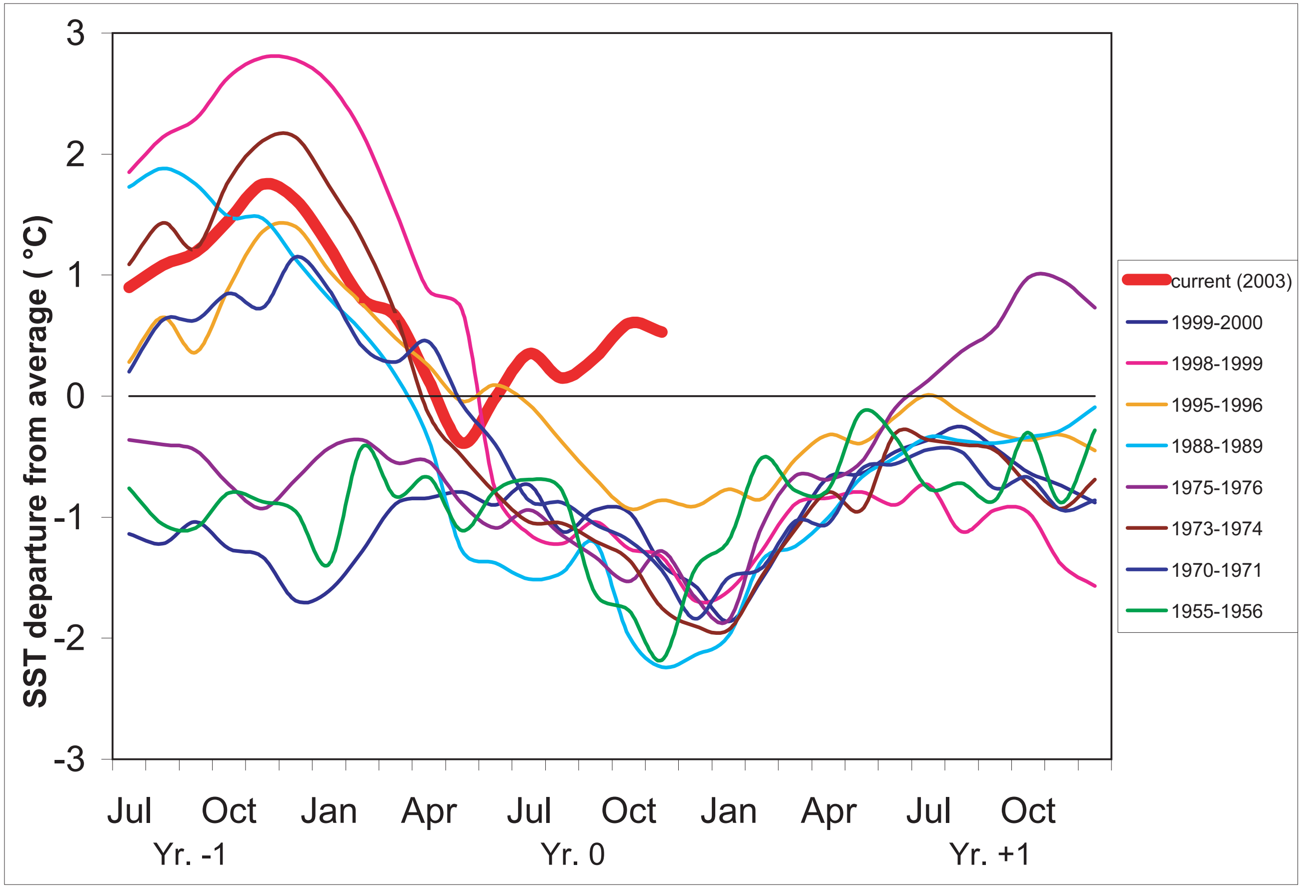
Notes: The National Interagency Coordination Center (NICC) at the National Interagency Fire Center (NIFC) produces monthly (Figure 12a) wildland fire outlooks. These forecasts consider climate forecasts and surface-fuels conditions in order to assess fire potential. They are subjective assessments, based on synthesis of regional fire danger outlooks. The Southwest Coordination Center (SWCC) produces more detailed monthly subjective assessments for Arizona, New Mexico, and west Texas (Figure 12b).

Highlights: The December 1-31, 2003 NICC wildfire outlook is for near-normal fire potential for Arizona and New Mexico. The SWCC forecast (Figure 12b) indicates below normal-to-normal fire danger potential for much of our region; however, SWCC predicts normal-to-above normal fire danger across southeastern New Mexico and west Texas. As of December 20, 2003, observations of large fuel moisture readings (1000-hour fuels), as well as experimental measures of vegetation health and greenness for the Southwest (not pictured) indicate relatively low fuel moisture across southern Arizona, and southern and eastern New Mexico.

For more detailed discussions, visit the National Wildland Fire Outlook web page: http://www.nifc.gov/news/nicc.html
and the Southwest Area Wildland Fire Operations (SWCC) web page: http://www.fs.fed.us/r3/fire/
For an array of climate and fire assessment tools, visit the Desert Research Institute program for Climate, Ecosystem, and Fire Applications (CEFA) web page: http://cefa.dri.edu/Assessment_Products/assess_index.htm

13. Tropical Pacific Sea Surface Temperature Forecast Sources: NOAA-CPC, IRI

13. Current (red) and past La Niña event sea surface temperature anomalies (°C) for the Niño 3.4 monitoring region of the equatorial Pacific Ocean.



Notes: The graph (Figure 13) shows sea-surface temperature (SST) departures from the long-term average for the Niño 3.4 region in the central-eastern equatorial Pacific Ocean. SSTs in this region are a sensitive indicator of ENSO conditions.

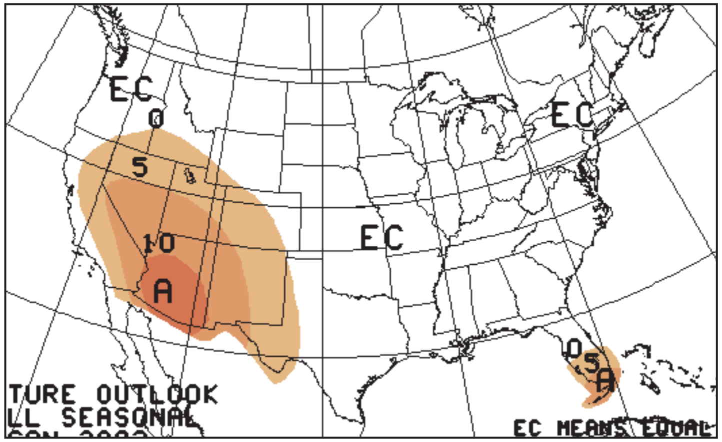
Each line on the graph represents SST departures for previous La Niña events, beginning with the year before the event began (Yr. –1), continuing through the event year (Yr. 0), and into the decay of the event during the subsequent year (Yr. +1).

The most recent SST departures are plotted as a thick red line. The magnitude of the SST departure, its timing during the seasonal cycle, and its exact location in the equatorial Pacific Ocean are some of the factors that determine the degree of impacts experienced in the Southwest.

Highlights: Sea-surface temperatures (SSTs) remained above average for most of the equatorial Pacific Ocean; however, these conditions are considered below the threshold required for NOAA to declare a weak El Niño episode. Significant further warming and the development of classic El Niño conditions is believed to be unlikely. Nevertheless, the International Research Institute for Climate Prediction (IRI) states that the chance that an El Niño episode will develop is considered slightly greater than that of an average year, but still less than 50 percent. The IRI probabilistic forecast (not pictured), based on a consensus of El Niño forecast models, shows that neutral ENSO conditions are most likely through autumn 2004. In a December 11, 2003 diagnostic discussion, NOAA's Climate Prediction Center noted that weak El Niño conditions have not shown consistent temperature and precipitation impacts outside the tropical Pacific Ocean, and are not likely to have significant impacts on winter temperature and precipitation over the United States.

For a technical discussion of current El Niño conditions, visit: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/
For more information about El Niño and to access graphics similar to the figure above, visit: http://iri.columbia.edu/climate/ENSO/

14a. Long-lead U.S. temperature forecast for September - November 2003.



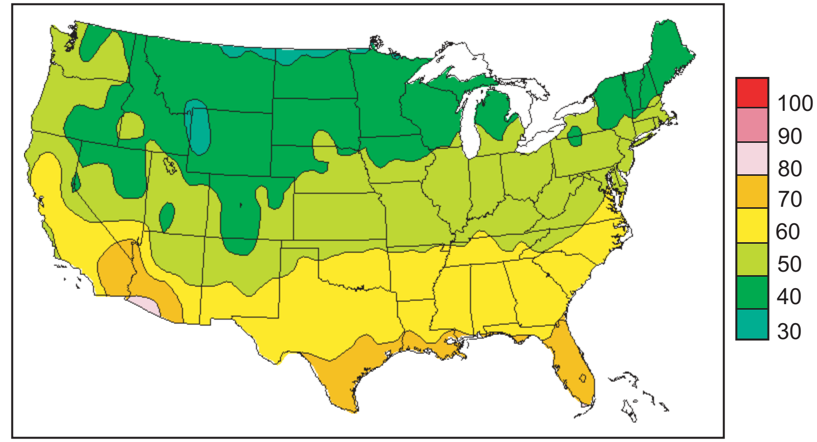
Percent Likelihood of Above and Below Average Temperatures*

- 10% - 20%
- 5% - 10%
- 0% - 5%

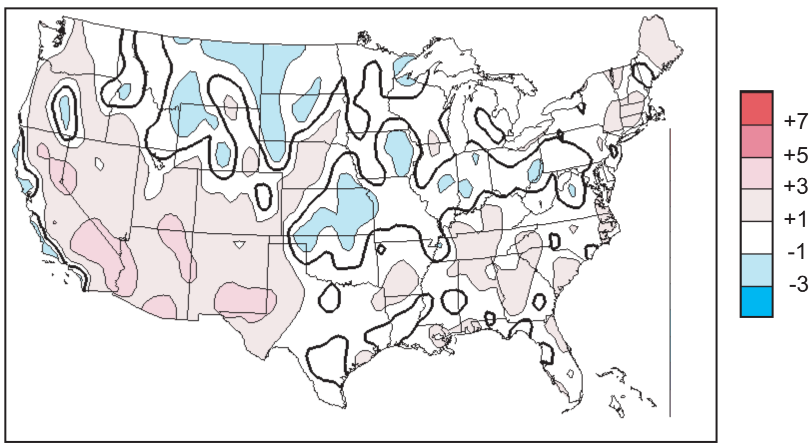
A = Above

*EC indicates no forecasted anomalies due to lack of model skill.

14b. Average temperature (in °F) for September - November 2003.



14c. Average temperature departure (in °F) for September - November 2003.



Highlights: The NOAA-CPC September-November temperature outlook forecast increased probabilities for above-average temperatures for virtually all of the southwestern United States (Figure 14a). During the forecast period, above-average temperatures were observed in the region (Figure 14c). Increased probabilities of above-average temperature for southern Florida, however, were less skillful.

Notes: Figure 14a shows the NOAA Climate Prediction Center (CPC) temperature outlook for the months September–November 2003. This forecast was made in August 2003.

The September–November 2003 NOAA CPC outlook predicts the excess likelihood (chance) of above-average, average, and below-average temperature, but not the magnitude of such variation. The numbers on the maps do not refer to inches of precipitation. Care should be exercised when comparing the forecast (probability) map with the observed temperature maps described below.

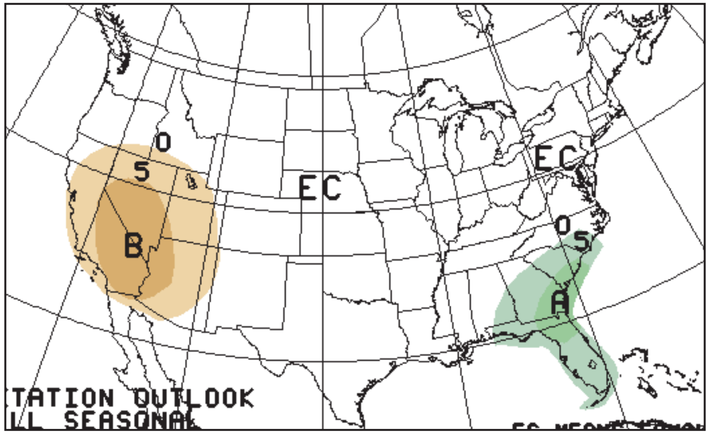
Using past climate as a guide to average conditions and dividing the past record into 3 categories, there is a 33.3 percent chance of above-average, a 33.3 percent chance of average, and a 33.3 percent chance of below-average temperature. Thus, using the NOAA CPC likelihood forecast, in areas with light brown shading there is a 33.3-38.3 percent chance of above-average, a 33.3 percent chance of average, and a 28.3-33.3 percent chance of below-average precipitation. Equal Chances (EC) indicates areas where reliability (i.e., the skill) of the forecast is poor and no excess likelihood prediction is offered.

Figure 14b shows the observed average temperature between September–November 2003 (°F). Figure 14c shows the observed departure of temperature (°F) from the average for September–November 2003.

In all of the figures on this page, the term average refers to the 1971-2000 average. This practice is standard in the field of climatology.

15. Precipitation Verification: September – November 2003 Source: NOAA Climate Prediction Center

15a. Long-lead U.S. precipitation forecast for September - November 2003.



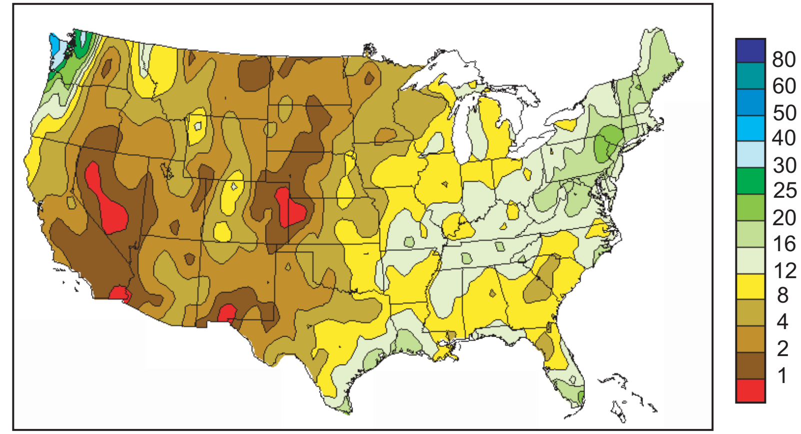
Percent Likelihood of Above or Below Average Precipitation*

5% - 10%
0% - 5%
A = Above

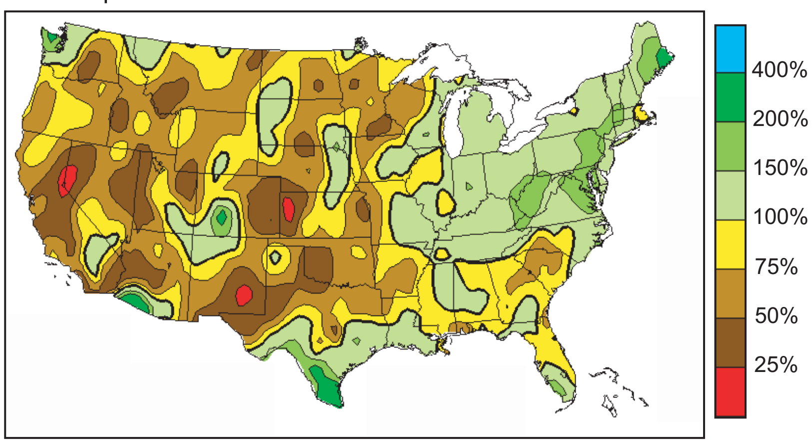
0% - 5%
5% - 10%
B = Below

*EC indicates no forecasted anomalies due to lack of model skill.

15b. Observed precipitation for September - November 2003 (inches).



15c. Percent of average precipitation observed between September - November 2003.



Highlights: The NOAA-CPC September-November 2003 precipitation outlook forecast increased probabilities of below-average precipitation for much of the Great Basin, California, and Arizona (Figure 15a). Above-average precipitation fell in the center of the area of increased probabilities, as well as in southern Arizona and southeastern Utah (Figure 15c). Otherwise, below-average precipitation predominated in the region. Forecasts for the southeastern United States (Figure 15c) mostly lacked skill.

Notes: Figure 15a shows the NOAA Climate Prediction Center (CPC) precipitation outlook for the months September–November 2003. This forecast was made in August 2003.

The September–November 2003 NOAA CPC outlook predicts the excess likelihood (chance) of above-average, average, and below-average precipitation, but not the magnitude of such variation. The numbers on the forecast map (Figure 15a) do not refer to inches of precipitation. Care should be exercised when comparing the forecast (probability) map with the observed precipitation maps described below.

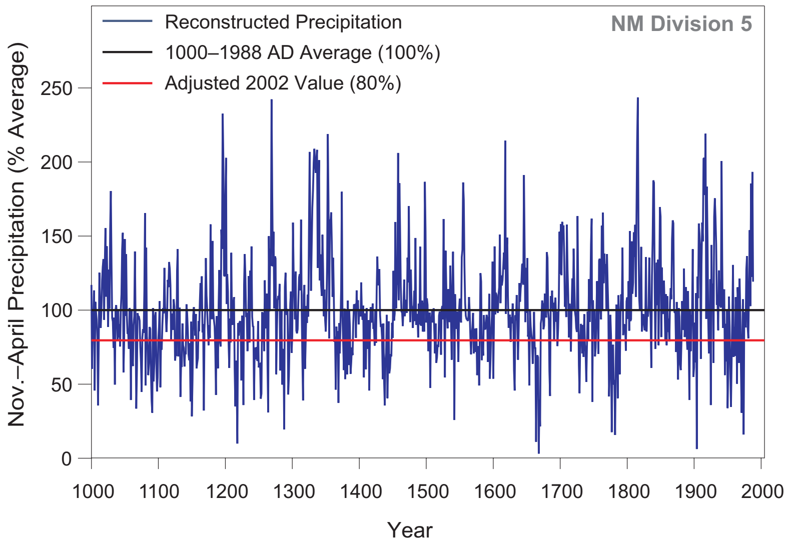
Using past climate as a guide to average conditions and dividing the past record into 3 categories, there is a 33.3 percent chance of above-average, a 33.3 percent chance of average, and a 33.3 percent chance of below-average precipitation. Thus, using the NOAA CPC likelihood forecast, in areas with light green shading there is a 33.3-38.3 percent chance of above-average, a 33.3 percent chance of average, and a 28.3-33.3 percent chance of below-average precipitation. Equal Chances (EC) indicates areas where reliability (i.e., the skill) of the forecast is poor and no excess likelihood prediction is offered.

Figure 15b shows the total precipitation observed between September–November 2003 in inches. Figure 15c shows the observed percent of average precipitation for September–November 2003.

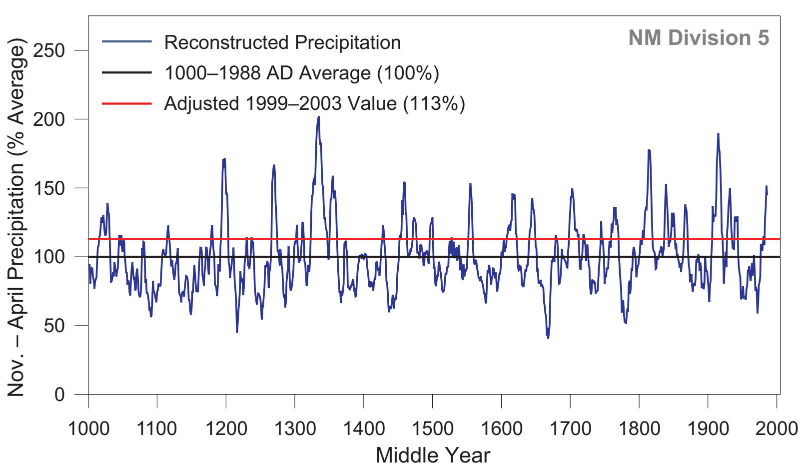
In all of the figures on this page, the term average refers to the 1971-2000 average. This practice is standard in the field of climatology.

16. Millennium-long Climate Reconstructions for Southwest Climate Divisions

16a. Single-year reconstruction for AD 1000 - 1988 for New Mexico climate division 5.



16b. Five-year average reconstruction for AD 1000 - 1988 (% average) for New Mexico climate division 5.



Notes: Visitors to the CLIMAS web site can view 1000-year cool-season precipitation reconstructions for each of the seven climate divisions in Arizona and each of the eight climate divisions in New Mexico. The reconstructions (AD 1000-1988), based on long-lived trees in the West and Southwest whose tree-ring widths correlate with November-April precipitation in each division, are accessible via this link: http://www.ispe.arizona.edu/climas/research/paleoclimate/product.html. Once at the site, click on "Research Methods" and other links for more information on how the reconstructions were developed by Fenbiao Ni of the University of Arizona Laboratory of Tree-Ring Research and his colleagues. The year 2002 refers to the cool season that begins in November 2001 and ends in April 2002. Because the reconstructions end in 1988, the 2002 and 1999-2003 averages were determined as a percentage of average precipitation during a period when instrumental and tree-ring data were both available (1896-1988). This percentage was applied to the reconstruction average over the same same time period to set the level of the red line.

Highlights: New Mexico Division 5, which includes Albuquerque, is highlighted in the examples at left. In this division, winter 2002 precipitation was lower than the long-term mean (Figure 16a), whereas 1999-2003 average winter precipitation was actually greater than the long-term mean (Figure 16b). In the cases of New Mexican divisions 3 and 7, cool-season precipitation during both the year 2002 and the period from 1999-2003 were above the long-term average. Yet based on the 30-year record (1961-1990), all three of these New Mexico divisions remained in severe to exceptional drought as of December 2003. This indicates that the 30-year period of record was quite a bit wetter than would be expected from the long-term record, or that warm-season precipitation trends contributed more to drought conditions than cool-season precipitation trends. Based on the reconstruction and other evidence, it is probably the former.

Cool-season precipitation values in all of Arizona's seven divisions, whether judged by the year 2002 or the period 1999-2003, were lower than average for the long-term record.