

# DROUGHT FAQs

## Drought Frequently Asked Questions

### Conditions

#### **What differentiates a normal rainfall year from a dry year?**

Most of California's precipitation comes from storms moving across the Pacific Ocean. The path followed by the storms is determined by the position of an atmospheric high pressure belt that normally shifts southward during the winter months, allowing low pressure systems to move into the state. On average, 75 percent of California's annual precipitation occurs between November and March, with 50 percent occurring between December and February. If a persistent Pacific high pressure zone takes hold over California mid-winter, there is a tendency for the water year to be dry.

For comparison, a typical water year produces about 100" of rainfall over the North Coast, 50" of precipitation (combination of rain and snow) over the Northern Sierra, 18" in the Sacramento area, and 15" in the Los Angeles area. In extremely dry years, these annual totals can fall to as little as one half, or even one third of these amounts.

#### **What is a "water year"?**

Water agencies often report hydrologic data on a water year basis. The water year extends from October 1st through September 30th. For example, "water year 2009" means October 1, 2008 through September 30, 2009. This compares to the National Weather Service's precipitation year, which refers to one location's rainfall. It is defined from July 1 through June 30, for example, July 1, 2008 through June 30, 2009.

#### **How is drought defined?**

Defining when drought begins is a function of the impacts of drought to water users, and includes consideration of the supplies available to local water users as well as the stored water they may have available in surface reservoirs or groundwater basins. Different local water agencies will have different criteria for defining drought conditions in their jurisdictions. Some agencies will issue drought watch or drought warning announcements to their customers.

Determinations of regional or statewide drought conditions are usually based on a combination of hydrologic and water supply factors. The Department uses hydrologic indices to define water year types for the Sacramento and San Joaquin River basins, the source of much of California's developed water supplies. There are five classification indices based on streamflow and runoff; "Critical" is the driest, with "Dry" being the second-lowest, then "Below Normal, Above Normal, and Wet". Water year 2006-07 was classified as "Dry" for the Sacramento

River Region, and "Critical" for the San Joaquin River Region. Water year 2007-08 ended with both regions classified as "Critical." Projections are that water year 2008-09 will end "Dry" for both. Information and historical data for the indices can be found on the water supply conditions page:

<http://cdec.water.ca.gov/cgi-progs/iodir/wsihist>

See the "Background" page for defining drought in California from a water supply perspective:

<http://www.water.ca.gov/drought/docs/CalDrought.pdf>

As described by the National Drought Mitigation Center, further definition of drought can be based on meteorological or socioeconomic perspectives.

#### **Are we in a drought now?**

California is experiencing its third dry year. Governor Schwarzenegger's Feb. 27, 2009 proclamation declared a state of emergency due to drought conditions. The current drought condition for the state is Severe. Additional information can be found here:

[http://www.water.ca.gov/drought/docs/button\\_explain.pdf](http://www.water.ca.gov/drought/docs/button_explain.pdf)

#### **What was California's driest year of record?**

Within California's roughly 100-year period of recorded hydrologic data, the driest single water year for runoff was 1976-77. Statewide runoff in major rivers from the Sierra, was only about 15 million acre-feet (MAF), representing 21 percent of the average annual amount, which is 44 MAF. Total statewide runoff, including coastal and Southern California watersheds, is approximately 71 MAF per year.

#### **When was California's last major drought?**

California's last major statewide drought was 1987-92. Additional historical information on this drought and others, including the drought of 1976-77, can be found here:

<http://www.water.ca.gov/drought/assist/archive.cfm>

At a regional level, parts of Southern California experienced a series of consecutive dry years in the late 1990s and early 2000s, with water year 2002 setting records for single driest precipitation year in cities such as Los Angeles and San Diego. Colorado River inflow into Lake Powell, a major indicator for water supply conditions for Southern California, has been below average in all but two years since 2000. Natural flow of the Colorado River at the Lees Ferry Compact Point indicate that the period 2000-2008 was the lowest nine-year average in the river's period of historical record.

## ***Can we predict when droughts will occur in California?***

No. The capability to accurate, detailed long-term weather forecasting does not yet exist. However, significant progress is being made in climate research that helps us understand fundamental oceanic and atmospheric conditions associated with drought. Climate modeling and Paleoclimate research can provide some insight into California drought, and were topics of the 2008 Winter Outlook Workshop. A webcast of the research presentations can be found here:

<http://www.water.ca.gov/drought/archive/>

## ***Will global climate change increase drought in California?***

The possibility of longer or more severe droughts is likely in a warming global climate. Modeling studies indicate that the frequency of southwestern U.S. dry spells will increase as conditions warm, and downward air currents intensify. It is important to realize that there is a trend toward greater variability of weather conditions, with floods increasing in intensity as the climate warms, as well. For more on the impact of climate change on California's water supply, see this website:

<http://www.water.ca.gov/climatechange/>

## ***Water Use and Water Supply During Droughts***

### ***What were typical reductions in urban water use during the last drought?***

During the most recent drought from 1987-92, large urban water agencies used measures such as voluntary conservation, mandatory rationing, and extensive education and outreach programs to achieve water use reductions in the 20-30 percent range. Some suppliers achieved water use reductions in the 45-50 percent range.

### ***How do droughts affect groundwater use?***

In an average year, about 30 percent of California's urban and agricultural water supplies come from groundwater pumping. Reliance on groundwater increases during droughts due to the reduced availability of surface water. During the 1987-92 drought the total number of well driller reports filed with the Department were in the range of 25,000 reports per year for several years, up from fewer than 15,000 reports per year prior to the drought. Most of the new wells were for private residential use.

Increased groundwater pumping during drought results in lowering of water levels in groundwater basins. Information about groundwater levels included in the Department's groundwater monitoring program is available here:

<http://wdl.water.ca.gov/>

For additional information on groundwater conditions across the state, access the Groundwater tab on this page:

<http://www.water.ca.gov/drought/conditions/>

## ***Miscellaneous***

### ***Are water suppliers required to plan for droughts?***

The Urban Water Management Act requires that urban suppliers having 3,000 or more connections or delivering more than 3,000 acre-feet per year prepare plans describing how they would respond to cutbacks of up to 50 percent, and submit the plans to the Department. Updates are to be submitted every 5 years. The most recent were due December, 2005. This requirement applies to more than 400 water suppliers statewide, and is a statutory condition for suppliers' eligibility for State drought assistance.

### ***Why isn't seawater desalination the answer to meeting water needs during droughts?***

Although improvements in desalting technology are increasing its efficiency, the high energy costs associated with seawater desalting make it too expensive for most water agencies, compared to other alternatives. However, as technology improves and prices become more competitive, there is the potential for increased use of seawater desalination to help meet the state's water supply needs. The present capacity of California municipal seawater desalting plants represents less than one-tenth of a percent of California's urban water use.

### ***Does weather modification (cloud seeding) help during droughts?***

During the 1987-92 drought, the number of weather modification programs operating in California (most located in Coast Range and Sierra Nevada watersheds) increased from perhaps a dozen to 20 programs. However, the lack of cloud masses suitable for seeding is a limiting factor on the potential for water supply augmentation during droughts. For more information, see volume 2, chapter 10 of the California Water plan Update 2009:

<http://www.waterplan.water.ca.gov/cwpu2009>

### ***Where can I find information about reservoir levels or river flows?***

The Department's California Data Exchange Center provides this information for the State's major reservoirs and rivers:

<http://cdec.water.ca.gov/>

Additional information for many reservoirs and streams in California is provided by the US Geologic Survey's National Water Information System and the US Army Corps of Engineers Sacramento District:

<http://waterdata.usgs.gov/ca/nwis/nwis>

<http://www.spk-wc.usace.army.mil/default.htm>