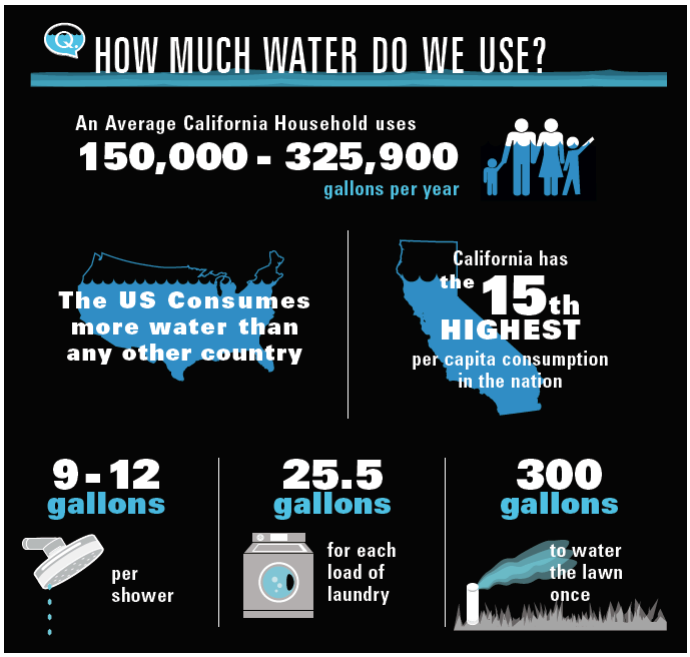
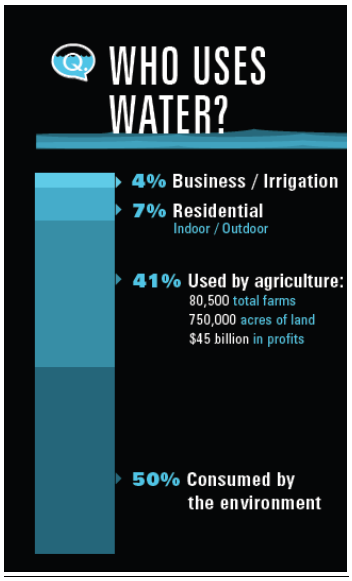
CAWATERCHALLENGE.ORG
More Info

How much water do we use?



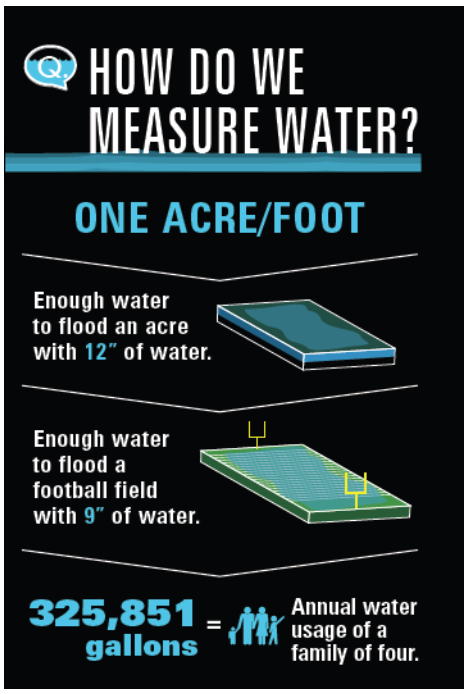
SOURCE: http://saveourh2o.org/content/quick-facts-about-water-use-california-and-why-you-should-conserve, http://www.oecd.org/publications/factbook/34416097.pdf

Who uses water?



SOURCE: http://www.cdfa.ca.gov/statistics/

How do we measure water?



SOURCE: Department of Water Resources

Where does my water come from?

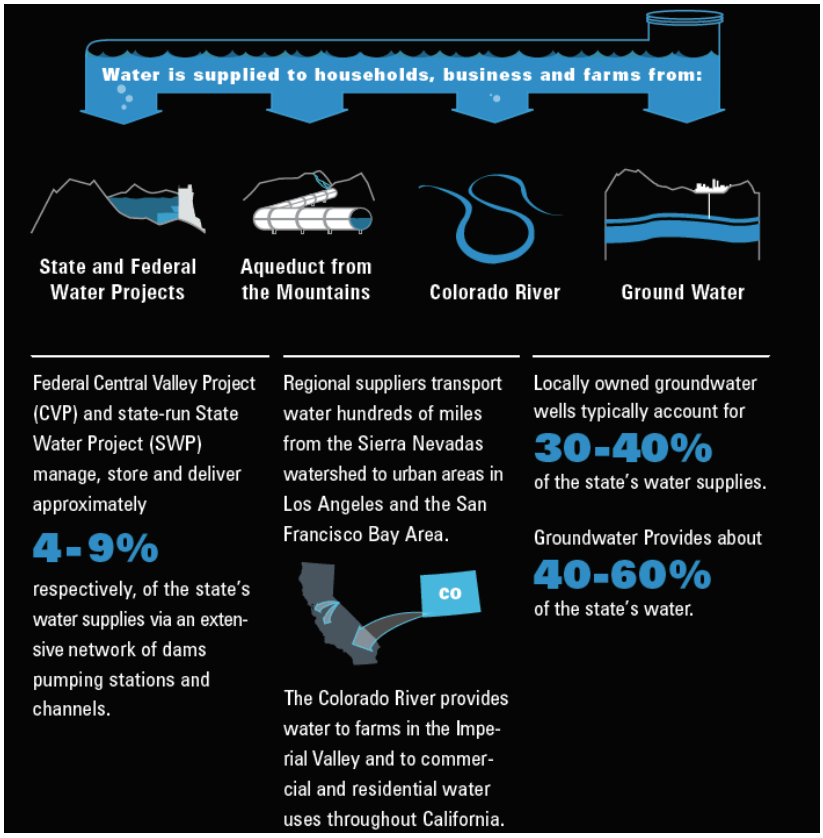
Nature provides about 200 million acre-feet of precipitation to California in average years. Of this total, 65% is lost through evaporation and transpiration by trees and other plants. The remaining 35% stays in the state's system as runoff. More than 30% of this runoff flows out to the Pacific Ocean or other salt sinks. The rest is used by agricultural, urban, and environmental purposes.

About 75% of the annual precipitation falls north of Sacramento, while more than 75% of the demand for water is south of the capital city. Most of the rain and snowfall occurs between October and April, while demand is highest during the hot and dry summer months.

California's water system was developed to address that mismatch. Seven major systems of aqueducts and associated infrastructure exist today to capture and deliver water within the state. Two of the most important projects are the federal Central Valley Project (CVP) and the State Water Project (SWP). The CVP and SWP bring water from Northern California through the Sacramento-San Joaquin River Delta for delivery to users in the San Joaquin Valley, parts of the San Francisco Bay Area and Southern California.

Groundwater serves as a critical buffer against drought and climate change. Locally owned groundwater wells typically represent 30% of the state's water supplies. Groundwater provides between 30-46% of the state's water supplies, depending on if it is a wet or dry year.

Where water comes from and who uses it has been an important subject since California's inception as a state.



SOURCE: http://www.cdfa.ca.gov/State_Board/pdfs/Kamyar_Guivetchi.pdf, http://www.acwa.com/content/california-water-series/californias-water-california-water-systems, http://www.aquafornia.com/index.php/where-does-californias-water-come-from/, http://www.usbr.gov/mp/cvp/docs/Water%20Supply%20and%20Yield%20Study.pdf, http://www.water.ca.gov/groundwater/

DOES WATER USE ENERGY?

Yes! Household use along with pumping, treating and transporting water is energy intensive, using 20% of California's electricity, 30% of the state's natural gas not used by power plants, and 88 million gallons of diesel fuel.

This is not surprising, given that millions of gallons are transported hundreds of miles from the natural point of origin in the northern and eastern parts of the state to users in the coastal and southern regions. Understanding the relationship

between water and energy is crucial to reducing water-related energy consumption, which not only lowers the cost of water but also provides additional environmental benefits such as reducing the greenhouse gas emissions associated with producing that energy.

SOURCE: http://www.energy.ca.gov/research/iaw/water.html, http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF, http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf

DO WE HAVE ENOUGH WATER?

By 2030, the Bureau of Reclamation estimates that California will have an annual unmet water demand (or water gap) of almost 4.9 million acre-feet (1.5 trillion gallons) in an average year and more in a dry year. This long-term water gap is one focus of the California Water Challenge, however, this is a simplified take on water in California, as each region has its own water supply and demand that is not connected to other regions or the state as a whole.

SOURCE: http://www.usbr.gov/mp/cvp/docs/Water%20Supply%20and%20Yield%20Study.pdf

What do Californians think about water?

88% of California voters believe the state is experiencing a serious water shortage. However, there is no clear consensus about whether the state's current situation is due more to not having enough water storage and supply facilities or users not using existing supplies efficiently

SOURCE: Field Poll http://field.com/fieldpollonline/subscribers/Rls2468.pdf

What are some of the current efforts to reduce consumption or increase supply?

- Farmers have increased the use of drip irrigation from only 15% of all irrigated cropland in 1991 to over 38% by 2010.
- Residential conservation efforts such as requiring low-flow toilets and showerheads and encouraging drought-tolerant landscaping, have cut water use in half while real per capita state GDP has doubled.

SOURCE: http://www.water.ca.gov/landwateruse/surveys.cfm, http://www.ppic.org/content/pubs/report/R_114EH2R.pdf

How does the drought impact the Water Challenge?

California's current drought is one of the most severe on record. Meeting the state's most crucial water needs with the limited supplies available will surely require many bold and creative ideas. The purpose of the Water Challenge, however, is to

address the chronic shortages the state is expected to face in the future even during years of average rainfall.

SOURCE: http://www.ppic.org/content/pubs/report/R_114EH2R.pdf

Who pays for water?

Households, businesses and farmers pay for water directly through their monthly water bills. Some users pay a flat fee regardless of how much water they use, but increasingly water use is "metered" so that costs are based on the amount of water used.

Other costs, especially infrastructure costs such as dams and canals, are initially funded by bonds issued by federal, state and local government agencies. These bonds are paid off over time by taxpayers or through fees that are specifically collected for that purpose.

When public agencies issue bonds, they borrow money from investors (bondholders), who provide funds in exchange for the agencies' commitment to repay the amount borrowed plus interest. Bonds can be repaid from either the state's General Fund (General Obligation bond) or from a specific revenue source, such as fees or sales tax revenues (Revenue bond). General Obligation bonds must be approved by the voters. Typically, amounts borrowed using a General Obligation bond are paid back over a period ranging from 20 to 30 years. Economists believe that because the benefits from the sort of projects funded from a bond measure are realized over a long period of time, it is appropriate to ask future taxpayers to help pay back the funds borrowed. Bond measures can be placed on the ballot for voters' approval through the initiative process or by the Legislature.

The voters have approved a number of bonds to fund water projects over the years. The Legislature initially placed an $11.1 billion General Obligation water bond on the November 2010 ballot, but later moved it to November 2012 and then to the November 2014 ballot. Recently, the Legislature and the Governor replaced that bond measure with a $7.5 billion water bond measure. The bond measure now on the ballot includes funding for drought relief, water supply reliability, Delta sustainability, water system operational improvements, conservation and watershed protection, groundwater protection, water quality and water recycling.

SOURCE: http://www.watereducation.org/doc.asp?id=1362

What is the BDCP?

The Bay Delta Conservation Plan (BDCP) is a 50-year habitat conservation plan to both restore the Sacramento-San Joaquin Delta ecosystem and secure California water supplies.

The BDCP includes many specific plans, called "Conservation Measures," aimed at improving the Delta ecosystem, such as restoring natural habitats, controlling invasive fish species, enforcing fishing regulations, and developing fish hatcheries. Integral to the plan is the construction of two 40-foot diameter, 30-mile-long tunnels more than 150 feet below ground to move water from the Delta to the current pumping stations that send the water to farmers and households in the Central Valley and Southern California. According to the BDCP, these tunnels will be constructed and operated to improve the Delta ecosystem, including installing modern fish screens and managing water flows through the Delta at the appropriate times to benefit threatened fish and wildlife. It will also improve the quality of water supplies by taking water from further upstream in the Delta, thereby reducing levels of both agricultural runoff and saltwater that mixes with the Delta freshwater as it gets closer to the San Francisco Bay, a problem that is expected to get worse with climate change and the associated rise in sea levels. In addition, the tunnels will provide a more secure source of water in the event of a major earthquake, which could cause current Delta levies to fail and result in seawater contaminating Delta water supplies.

The total cost of the BDCP over its 50 year period is currently estimated to be almost $20 billion in constant 2012 dollars, with the tunnels accounting for almost $15 billion of that total. Some funding will come from the state and federal government, but most of the costs for the BDCP will be paid by the agricultural, industrial and residential water users who receive their water from the Delta, either through higher water rates or potentially through additional property taxes or assessments. Because the main benefits of the BDCP relate to improving the environmental health of the Delta and improving the security of the water deliveries, rather than increasing water supplies, it has not been included here as a policy option.

SOURCE: http://baydeltaconservationplan.com/AboutBDCP/WhatistheBDCP.aspx

What Is Consumptive Vs. Non-Consumptive Water Use?

Non-consumptive use returns the water to streams or groundwater basins where it is available for other uses, while consumptive water use occurs when the water is not available to be used again.

An example of non-consumptive use would be a town that draws its water from a river, uses that water for various purposes, then treats the wastewater to an acceptable standard and returns the treated wastewater to the stream where it is available to be treated and used by other downstream water users. Some irrigation techniques are also non-consumptive for some portion of the water they use, since they allow water not taken up by the plants to percolate down through the soil and replenish the groundwater aquifer.

Consumptive use results in the water no longer being available to be used again because it has evaporated, transpired via plant-based photosynthesis, been

incorporated into products and crops, or consumed by man or livestock. Water may also be lost to subsequent use if it flows into "saline sinks" such as the Salton Sea or the Pacific Ocean, or if it becomes unfit for re-use due to pollution such as pesticides or industrial chemicals.

Water Rights and Regulation in California

Water rights are defined at the state level, and California's complex system creates many challenges to monitoring and regulating the efficient use of water throughout the state.

There are two main types of water rights: "Riparian" and "Appropriative." Riparian rights traditionally give a property owner the right to use water adjoining his or her land for use on that land, such as taking water from a river or lake next to a farm to irrigate crops on that land. Appropriative rights, also known as "Prior Appropriation", do not require the land where the water is used to adjoin the water source. Instead, appropriative rights are based on historical use of the water, are given priority based on timing ("first-in-time, first-in-right"), may be forfeited or lost if not used over some period of time, and may require a state permit. Prior Appropriation evolved from California's mining past, when water was needed for mining activities that sometimes occurred far from the state's streams and rivers. California recognizes both types of property rights. Generally, riparian rights have higher priority over appropriative rights if the two conflict.

To further complicate matters, California regulates surface water and ground water differently. Surface water is regulated at the state level and its use is fairly transparent and well regulated. Groundwater supplies, however, are not regulated by the state, though groundwater pumping may be regulated at the local level or as the result of specific court decisions. This complexity creates many challenges, especially for activities such as conjunctive groundwater management, which involves both surface water sources and ground water supplies to store excess water during wet periods for use during dry periods.

Many other laws and regulations, such as the Endangered Species Act, public health concerns, and other environmental considerations further affect how and where water may be used—in fact, there are nine separate State agencies and eight Federal agencies that regulate water supply, quality and flood control within the state.

SOURCE: http://ucanr.org/sites/wsheduvr/files/79369.pdf,
http://aic.ucdavis.edu/events/outlook05/Sawyer_primer.pdf,
http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.pdf

Water Markets and Water Transfers in California

Water markets provide a mechanism for the voluntary transfer of the right to use water from one party to another and are especially useful both for coping with short

term water supply shortfalls and for facilitating longer-term shifts in economic activity throughout the state.

Short-term water transfers (within a given year) are especially useful for coping with droughts or local disruptions in water supplies. Long-term and permanent transfers facilitate regional development plans, and as such are a vital component of economic growth.

Water transfers usually involve compensation of some sort, but may also involve the transfer of water supplies between parties at different times (e.g., one water user transfers 100 acre-feet of water to another user this year in exchange for 110 acre-feet of water next year). Some water transfers require review and approval by various state and federal agencies, depending on whether the water being transferred is surface water or groundwater, whether it is being transferred within or across hydrologic regions, and whether state or federal dams, pumps and canals are involved in storing or moving the water. In addition to the legal and regulatory hurdles facing some water transfers, there is often public concern regarding the economic and social impact of transferring water outside of its source region, and many counties have passed ordinances restricting such transfers.

In spite of these obstacles, a 2012 study by the Public Policy Institute of California (PPIC) found that water transfers have increased substantially from only a few hundred acre-feet in the 1980s to over 2 million acre-feet in 2010, and are expected to grow even more. Thus, while water markets do not necessarily produce new water supplies or reduce overall demand, they nonetheless represent an important tool for efficiently allocating scarce water supplies by enabling water rights holders with relatively low-value uses to transfer water to higher-value users who may be facing supply constraints. In addition, the market prices negotiated for these transfers provide important information regarding the economic value of water, which creates incentives both to conserve water and to make needed investments in the infrastructure used to store and convey water throughout the state.

SOURCE: http://www.ppic.org/content/pubs/report/R_1112EHR.pdf

Water Quality

In addition to the many issues related to managing water supply and demand that are the subject of the California Water Challenge, state and local agencies play an important role in helping to ensure that water quality is maintained for water used by residents and businesses in the state. The Federal Clean Water Act gives States the primary responsibility for protecting surface water quality. This responsibility is carried out by the State Water Resources Control Board and nine regional Water Quality Control Boards, which, for example, regulate businesses that discharge substances into the water supply.

In addition, numerous local water agencies, as the primary suppliers of the water used in our homes and businesses, are on the front lines in terms of ensuring that water is safe for drinking and other uses. Federal and state law sets standards for water quality and requires local agencies to provide the public with information about the quality of drinking water. Among the current challenges that water suppliers face are issues related to the availability of drinking water because of the drought, the impact of disposal of medicines in the water supply and the safety of water supplies in agricultural regions of the state as a result of the use of fertilizers and pesticides.

SOURCE: http://www.mywaterquality.ca.gov/

Flood Control

Numerous federal, state and local agencies share responsibility for flood control in California. At the federal level the Army Corps of Engineers, the Bureau of Reclamation and the Federal Emergency Management Agency have the major responsibilities, For the state, the California Department of Water Resources (DWR) has primary responsibility for managing the State's flood control efforts, aided by numerous other state agencies. And, local agencies have responsibility for land use planning. According to DWR, more than 7 million people live in California's floodplains. California faces numerous challenges to protecting those people and their homes and businesses from flooding.

The Central Valley is a floodplain that historically was frequently under water. Population growth and development pressures have increased the challenge of flood management. Various factors, including funding shortfalls, have led to a backlog of levee maintenance, which means that river and Delta levees may be susceptible to failure and resulting flooding. In addition, areas of the state that regularly experience wildfires, such as Southern California, are vulnerable to flooding as a result of a loss of vegetation. Lastly, climate change may increase the state's flood risk by producing higher peak water flows and a shift toward more intense winter precipitation.

SOURCE: http://www.water.ca.gov/sfmp/