

Market Profile: California's water crisis

The cost of complacency in the Cadillac Desert

This summer, the Golden State will face an unprecedented squeeze on its water resources. It is creating exciting opportunities for investors. David Zetland brings the crisis into focus.

California's water crisis has come about as a result of a combination of natural drought conditions (perhaps exacerbated by global warming), and mismanagement of supply (problems with groundwater and conveyance) and demand (inefficient policies for voluntary conservation, rationing and use restrictions). These failures stem from institutional inertia, legal disputes, and the political power of vested interests.

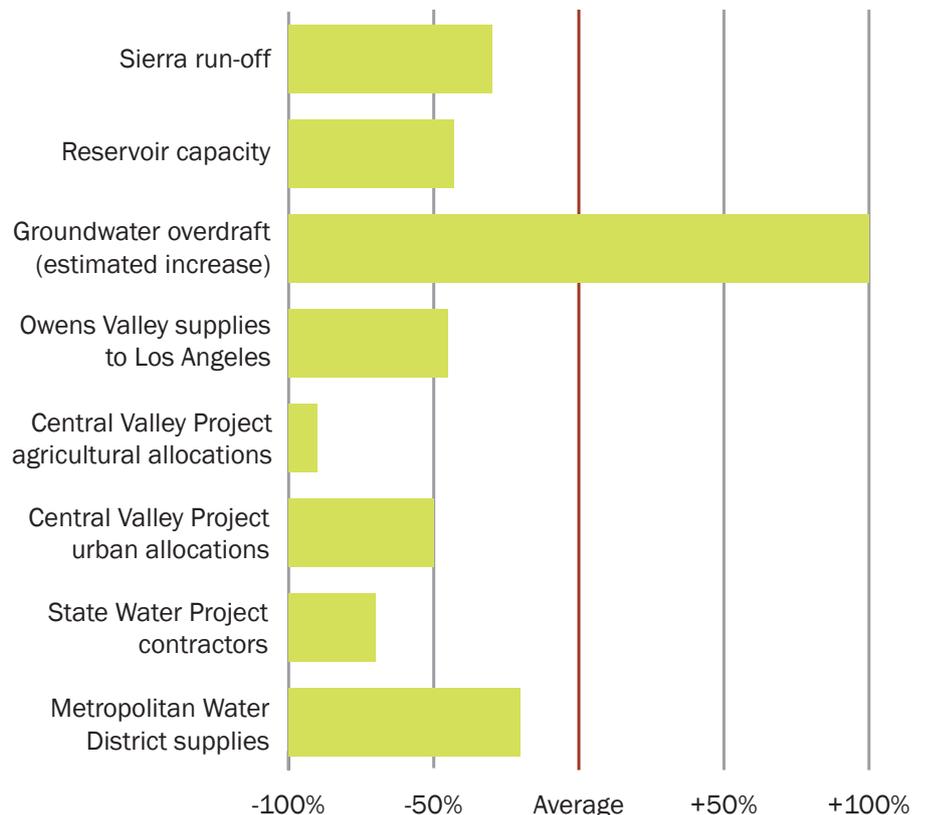
In an average hydrological year, California gets 70% of its water from surface supplies (precipitation and reservoirs) and 30% from groundwater (though this increases to 40% on a localised basis under drought conditions). Supplies in the north of the state increase in winter, and are moved south in summer. A snapshot of California's current supply dynamic follows:

- **Precipitation:** In an average year, 90% of the state's precipitation comes in the October to March rainy season. As of 6th May 2009, precipitation is at 98% of the expected level for the water year to date, and at 90% of the average for the entire water year (Oct-Sep). Average precipitation does not mean average supply – because runoff has been below average for the past two years (58% of average last year and 53% of average the year before), dry soil is absorbing precipitation, reducing the snowpack in the Sierra Nevada mountains, and consequently reducing runoff. The current snowpack is 66% of the average depth, with only 40% of the average water content. Runoff is projected to be 70% of the average. Global warming means that runoff is arriving ten days earlier than normal, which increases flood risk, forcing dams to “spill” more often, and decreasing summer supplies.

- **Storage:** California's reservoirs have a total capacity of 38.7 million acre feet/47.8 billion m³ – roughly one year of agricultural and urban water demand. As of 30 April, reservoirs are at 57% of capacity and 77% of average levels. Shasta Reservoir, the 4.5MAF/5.56 billion m³ capacity main reservoir for the US Bureau of Reclamation's Central Valley Project (CVP), is at 79% of average. Lake Oroville, the 3.5MAF/4.32 billion m³ capacity main reservoir of the State

Water Project (SWP), is at 74% of average. The largest reservoir in Southern California (Diamond Valley Lake, an 810,000AF/1 billion m³ reservoir built and operated by the Metropolitan Water District of Southern California – MWDSC) is only 46% full. Reservoirs have as much water as at this time last year – but only because demand has shifted to groundwater resources. The bad news that reservoirs are only at 70% capacity has been worsened by restrictions

Water resources in California in 2009, versus historic average



on moving water through the Sacramento-San Joaquin Delta to the canals of the CVP and SWP. In 2007, Judge Wanger ruled that pumping harmed the Delta Smelt – a fish protected under the Endangered Species Act – and restricted the exporting of water from the Delta. That decision has jeopardized annual exports that used to average 7MAF/8.65 billion m³ (of which about 60% went into agriculture). Although there is some hope that a “Peripheral Canal” can solve the fish problem by routing water around the Delta, negotiations over the timing, impact and cost (\$5-7 billion) will take several years.

- **Groundwater:** Adjudicated groundwater is subject to limits on withdrawals, and is recharged with surface water (“conjunctive use”). Adjudication has taken place in areas subject to saltwater intrusion, or else supplies have been managed as groundwater banks (e.g. Kern County Water Bank – KCWB). Unfortunately, most groundwater is neither adjudicated nor managed, and over-pumping results. This problem is most common in the mainly agricultural Central Valley, where the estimated groundwater overdraft (the amount by which withdrawals exceed recharge) has increased from an average of 2MAF to 4MAF (from 2.47 billion m³ to 4.94 billion m³). Desperate farmers are paying nearly \$1 million apiece for new thousand-foot-plus wells.

- **Colorado River:** California’s annual rights to 4.4MAF/5.43 billion m³ of Colorado River water will not be augmented by “surplus” flows this year. Agricultural areas receive 3.85MAF/4.76 billion m³, and the rest goes to the Metropolitan Water District of Southern California. Urban areas will buy about 450,000AF/560 million m³ this year from farmers’ drawdown reserves stored on the Colorado. Total urban supplies are limited to the 1.3MAF/1.6 billion m³ capacity of the Colorado River Aqueduct.

- **Owens Valley:** Historically, Los Angeles has received 500,000AFY/620 million m³/yr from the Owens Valley (on the east side of the Sierra Nevada mountains). Poor snow conditions and court-ordered dust mitigation projects will reduce supplies to 275,000AFY/340 million m³/yr for the foreseeable future.

- **CVP and SWP:** Limited precipitation, low storage, and environmental restrictions mean that agricultural and urban CVP contractors will get 10% and 50% allocations, respectively, this year. SWP contractors will get 30% allocations.

Water rights market splutters into life

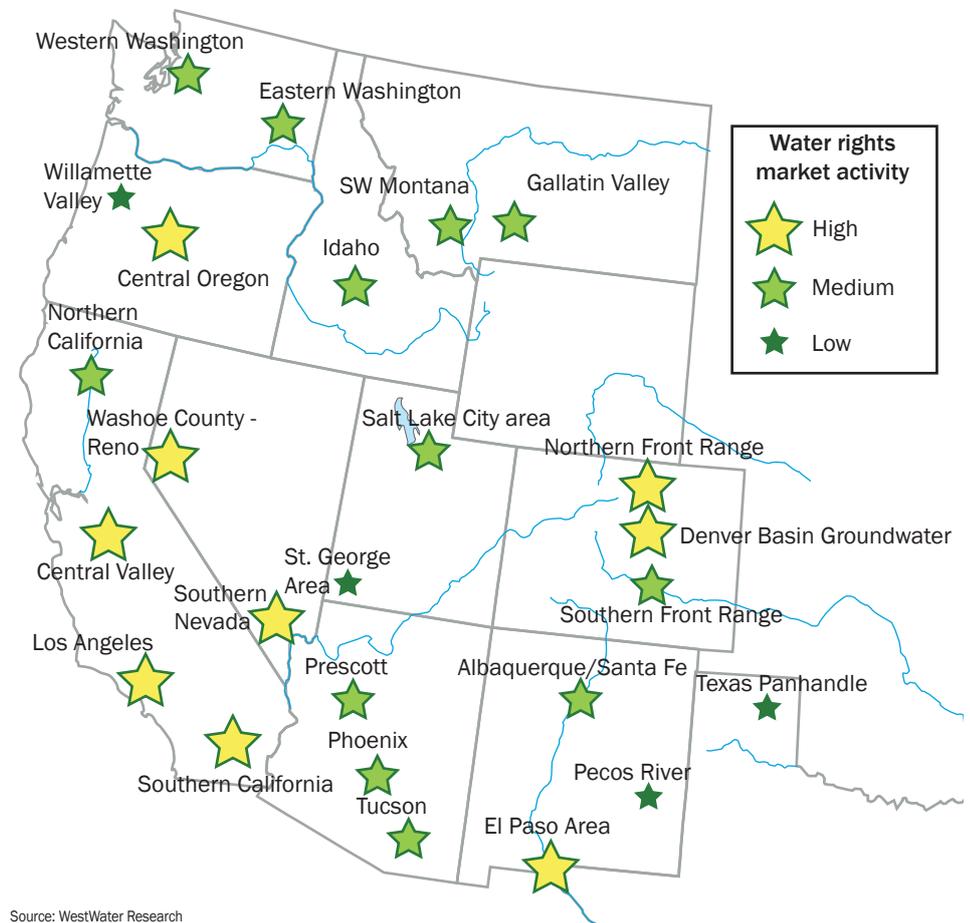
There has not been much interest in the Drought Water Bank, but the spot market for water leases has seen rapid price rises.

Direct economic losses from water shortages in California have been estimated at \$1-2 billion and 20,000-40,000 jobs in the southern Central Valley. The indirect costs of urban rationing and political and legal disputes at the local, state and federal levels are perhaps much higher. The state’s immediate response to the water crisis has been to promote conservation and to set up a Drought Water Bank, with a view to ensuring that water is moved across the state to where it is needed. In the longer term, Governor Schwarzenegger is promoting more dams and the Peripheral Canal to ensure that more water can be withdrawn from the San Joaquin Delta without harming the environment.

The Drought Water Bank has yet to have

a significant impact on the water shortage in the southern Central Valley, however. In theory, it should enable “willing” sellers and buyers to trade up to 600,000AF/740 million m³ at market prices. In reality, the negotiations began with a cartel of buyers on one side of the table, and a cartel of sellers on the other side, each hoping to fix an advantageous price. The Department of Water Resources fixed the price for buying water from sellers north of the Delta at \$275/AF (\$0.22/m³). The “canal-side” price paid by users south of the Delta to buy water is between \$380/AF and \$450/AF (\$0.31/m³ - \$0.36/m³). The large bid-offer spread reflects the cost of moving the water across the state, and the administrative costs of the system.

Water rights markets in the West



It is not just the price which is deterring users of the DWB. It is also the fact that the water can only be delivered after July at the earliest, which is too late for many farmers. Insiders suggest that the bank has yet to register any transactions. The Department of Water Resources would not comment on this suggestion.

Although the DWB has proven unsuccessful, there have been a growing number of direct water rights trades between users south of the Delta. Clay Landry of WestWater Research, the leading water rights brokerage in the West, said: "Since 1990, we've seen average prices vary from \$50-\$240/AF (\$0.04 - \$0.19/m³), adjusted to current dollars, and the highest was in 1993. Prices have generally ranged in the last few years in the \$100-150/AF (\$0.08 - \$0.12/m³) range. We do have some price forecasts which suggest that prices on average are going to go almost as high as \$300/AF (\$0.24/m³)."

"Anecdotally, we have heard of lease prices that are in excess of \$300/AF (\$0.24/m³), so what we're seeing is that average prices are likely to double, if not triple, this year from what they have been in the past."

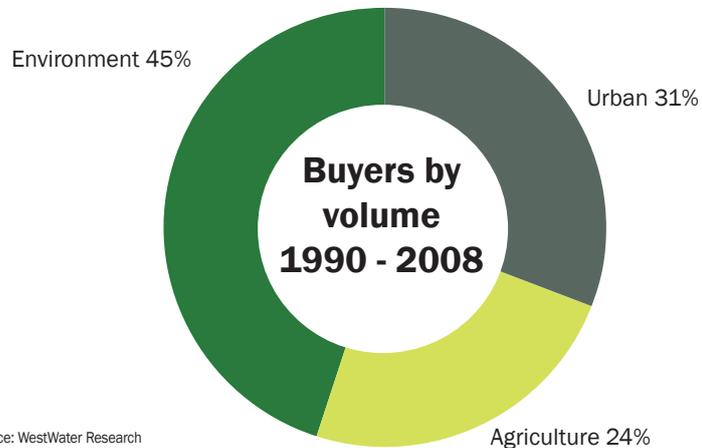
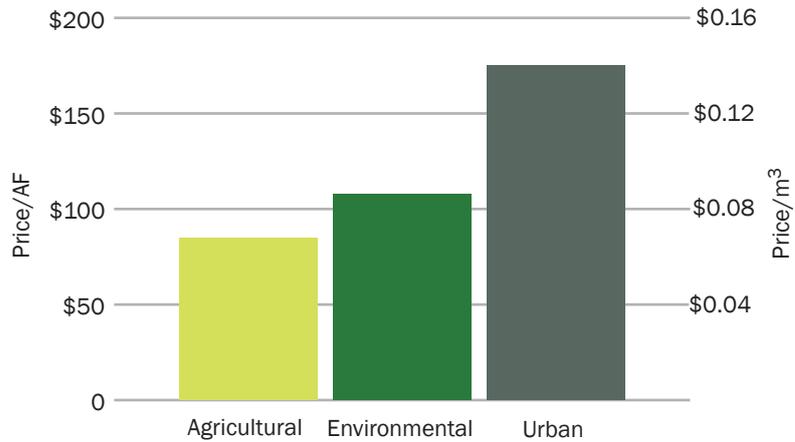
MWDSC paid \$340/AF (\$0.29/m³) for 66,000AF/82 million m³ of water from the Palo Verde Irrigation District (PVID), which usually charges farmers \$12.00/AF (\$0.01/m³). Spot prices among Westlands Water District farmers (the largest CVP contractor) have hit \$650/AF (\$0.53/m³). In neighbouring irrigation districts, farmers are paying \$6-10/AF (less than one US cent per cubic metre).

Prices have benefitted from the fact that one of the largest water vendors in the region, the Glenn-Colusa Irrigation District, is out of the market. Concerns about the livelihood of the Giant Garter Snake have meant that the district is not allowed to export water this year.

Most of the water trades in California are on the "spot" market, which deals with water for use this year. Permanent water rights change hands more rarely. "There are several kinds of water rights in California," Landry explains. "Most of what we're seeing traded in the lease market are water supply contracts – contracts that individuals have for water supply from water storage. Then there are natural flow water rights, and within that, there are various priority dates that have more meaning than others, meaning that there are certain types of older water rights that have fewer restrictions than newer water rights. And then there are some riparian rights, which are not usually traded."

Historically, the spot market for water

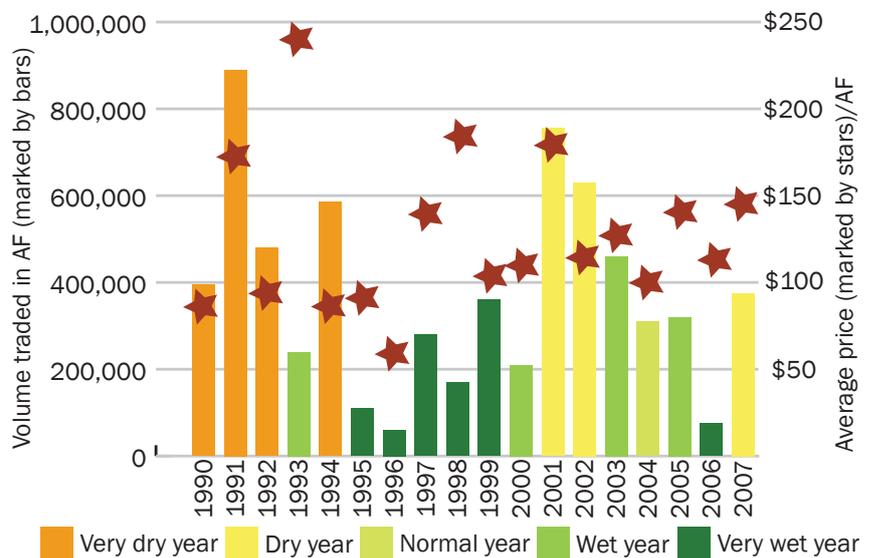
California's Central Valley spot water market 1990 - 2008



Source: WestWater Research

leases has been highly volatile. The volume and/or the value of trades can plummet when there is plenty of precipitation (see chart below). Despite this, investors are being attracted to the market (see report overleaf).

California's Central Valley spot water market: volume and value



Source: WestWater Research/GWI

The right way to invest in water?

As California runs out of water, buying water rights is looking like an increasingly smart investment play.

The water rights market is superficially attractive to investors, but the devil lies in the detail. Although the supply of water is fixed and demand is continuously growing, the value of water rights is highly complex. The most important issue is portability: can the right be sold to users beyond the immediate vicinity of the current owner? Politics, agricultural commodity prices and demographics also play an important role in shaping the market. For that reason, water rights investment looks set to remain the province of the specialist investment funds.

The current market leader is probably the Water Property Investors fund managed by New York-based Water Asset Management. Set up in 2007, it scored a notable coup when it paid \$67 million for a permanent right to 2,724AFY of water in Arizona in November 2007 – equivalent to \$24,650/AFY (\$20.16/m³/yr). Aqua Capital Management, founded in 2006 in Omaha, Nebraska, has also been active in the market, although it retains a low profile. The firm's CEO is David Penrice. The largest fully funded water resources fund is thought to be Summit Water Development Group LLC, which closed a \$150 million financing round in June 2008. It is managed by John Dickerson's Summit Asset Management. Pico Holdings' Vidler Water subsidiary is perhaps the most established player in the market. Both Summit and Water Asset Management have benefitted from the diaspora of Vidler staff.

"There's under half a dozen real investment players in the market that know what they're doing, and it's largely uncrowded," comments Clay Landry of WestWater Research, the leading water rights broker in the West. "Prior to the economic crunch, we saw a lot more private equity funds expressing interest in water [i.e. in buying water rights] and trying to learn about it, and that has slowed down considerably. I think that the primary issue is that, for private equity funds that have money right now, it's a target-rich environment for them, meaning that there's a lot of opportunities out there for them to deploy their money. What they're looking for are investments that have liquidity, and they're willing to pay a premium for that liquidity. For the most part, water rights projects don't offer the level of liquidity that other investments do."

Typically, the sellers of permanent

water rights are either agricultural concerns or distressed industrial water users (such as Geneva Steel, which raised \$102.5 million by selling its water rights in 2005 – the company's other assets fetched \$101.8 million). The credit crunch has brought a new kind of seller onto the market: distressed real estate developers looking to free up some cash. On the buy side, municipalities and power generators have

been active.

"From my standpoint," Landry comments, "I think this is a good opportunity for funds to get into the water sector, but there are high barriers to entry into this market. There's not an easy, readily available source of information that a fund can go out and acquire in a short period of time – it requires staffing up and really making a commitment to investing in this area."

Municipal water strategies in focus

California's utilities are reluctant to use price to cut demand or push ahead with additional investment in supply. Do they have a long-term alternative?

At the municipal level, the most significant response to the drought has been to try to reduce water consumption. 59 local (urban) water agencies are urging voluntary water conservation, and 32 agencies have implemented mandatory conservation. Although some agencies have increased prices by 10-30%, most conservation measures involve restrictions on outdoor watering (e.g. alternate days, ten minutes maximum), car washing, and so on. Some districts have implemented rationing based on historic use, an unpopular allocation method that cuts water wasters and misers by the same percentage. Although a few agencies have raised prices (with good effect), water managers and politicians prefer rationing.

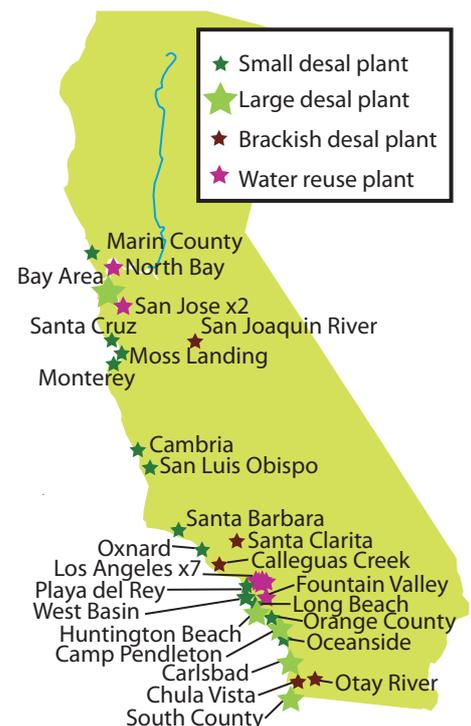
Water utilities which rely on bulk water supplies from the Metropolitan Water District are under the greatest pressure to reduce demand. From 1st July, the agency will reduce supplies to its members by 20%.

There remains much slack in the system: cheap water (\$27-33/month) is accompanied by high use (from 100 gallons per capita per day (379 l/c/d) in San Francisco to 280 g/c/d (1,060 l/c/d) in Sacramento, which is only partially metered). In comparison, note that the residents of Brisbane, Australia reduced their water consumption to below 35 g/c/d (132 l/c/d) in the face of drought. Drought also brought a major build-out of desalination plants across Australia. There has been no such movement in California. The last full-scale seawater desalination plant to be built in the state was at Santa Barbara. It was dismantled shortly after completion in 1992.

Recent precipitation has reduced pressure for long-term change. Agricul-

tural areas suffering from shortages are under the radar of most people. Governor Schwarzenegger's plan to build dams and the Peripheral Canal is financially and politically difficult. It does nothing to address groundwater overdraft, rigid water markets, and unsustainable urban demand. If the drought continues into 2010, the increase in economic, environmental and social pain may drive reform of California's water management system. Higher consumer water prices might open the way for increased investment in infrastructure.

Proposed water plants in California



Source: GWI Desal Tracker/Reuse Tracker