To find out where your water comes from and how your local water agency is planning for the future, visit the Natural Resources Defense Council's new California water web page: **http://www.nrdc.org/water/california-water-systems/**

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Tackling Water Scarcity: Five Southern California Water Agencies Lead the Way to a More Sustainable Tomorrow

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Landscaping with native plants reduces outdoor water use. PHOTO: EDGEPLOT/FLICKR

Rain barrels capture water where it falls.

Water scarcity has long been a fact of life across much of the southwestern United States. People have ingeniously adapted to this reality for centuries, from the irrigation structures built by the Hohokam people nearly a millennium ago to some of the largest concrete structures on earth erected during the dam-building era of the New Deal. In the face of new and mounting water supply and overuse challenges (or inefficiencies), the spirit of innovation must carry on. Changing climate patterns, growing populations, and over-tapped aquifer and river systems call for bold strategies to meet water supply needs for this region. This paper identifies five urban water agencies in California with ambitious plans to reduce or eliminate its use of imported water from the oversubscribed Sacramento-San Joaquin Bay-Delta and Colorado River systems in favor of sustainable, local water supplies.[1] Each of these five water agencies will shrink its dependence on the Bay-Delta and Colorado River systems between 35 percent and 100 percent by 2035, through investments in water conservation, recycling, urban rainwater and stormwater harvesting, and better groundwater management.

These agencies are leading the way in creating reliable water supplies for their customers by reducing the risk of future water supply shortages from the Bay-Delta and Colorado River. Investing in local water supply and demand solutions will allow these water agencies to:

- save money
- create local jobs and improve the local economy
- reduce energy demand and the greenhouse gas emissions associated with transporting water long distances
- clean up groundwater aquifers
- reduce urban runoff
- improve coastal water quality

These effective and affordable solutions, such as water recycling and conservation, address the complex water challenges facing the Bay-Delta—for two-thirds of Californians—as well as the Colorado River. They also generate benefits associated with local water supply investments.

California is currently developing its own long-term water management plan called the Bay Delta Conservation Plan, which aims to improve the reliability of the state's water supplies while restoring the Bay-Delta estuary. A diverse coalition of water districts and municipalities, business groups, local elected officials, and environmental groups have urged California to follow the lead of the five water agencies highlighted here by investing in sustainable, local water supply solutions.[2]

While adopting ambitious water management plans is an important first step toward decreasing water demand and increasing water supply reliability, implementation will be the key to successful environmental and economic outcomes. And financial and technical support for local water supply solutions from state and federal agencies will be essential to making increased investment in these sustainable water supply tools a reality.

ABOUT SUSTAINABLE LOCAL WATER SUPPLIES

Recycled Water Our water supplies stretch much further when we reuse the same drops multiple times. Recycling allows us to treat previously used supplies so that the water can be used again for additional purposes, such as irrigating lawns and parks, or recharging groundwater aquifers.

Efficiency Improving water-use efficiency is about doing more with less. Using smart sprinklers that turn off when the ground is wet or installing low-flow washing machines are efficiency measures that allow us to use less water while continuing to engage in common activities.

Responsible Groundwater Management Cleaning up contaminated groundwater expands our water supplies while also creating underground storage capacity that can be used to capture urban stormwater and recycled wastewater for use in dry years.

Urban Rainwater and Stormwater Harvesting Capturing and reusing stormwater that would otherwise run off our streets and overflow sewer systems increases water supplies and decreases beach pollution.

To learn more about alternative water supplies, visit the Natural Resources Defense Council's new California water web page: **http://www.nrdc.org/water/california-water-systems/**

Table 1: Reliance on Imported Water and Total Percentage Reduction

	WATER AGENCY	% IMPORTED WATER, 2009-2010	% IMPORTED WATER, 2035	% REDUCTION
#1	City of Santa Monica	84%	0%	100%
#2	City of Camarillo	64%	7%	85%
#3	Ventura County Water District No.1	78%	20%	62%
#4	Long Beach Water Department	35%	17%	46%
#5	Los Angeles Department of Water and Power	40%	21%	35%

Figure1: Percentage of Water Supply from Imported Sources in 2009-2010 versus Planned 2035

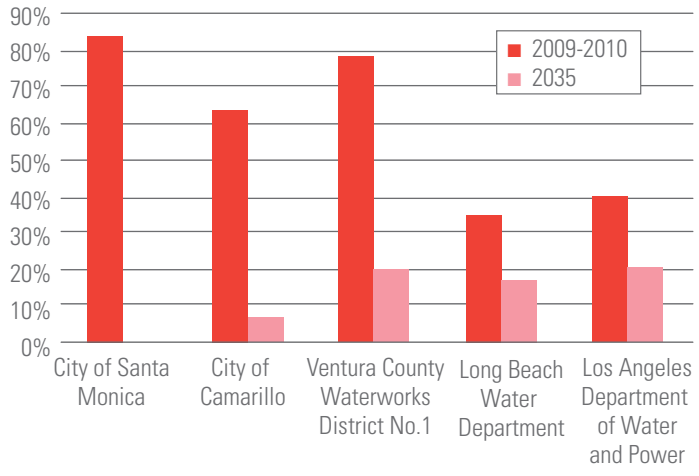
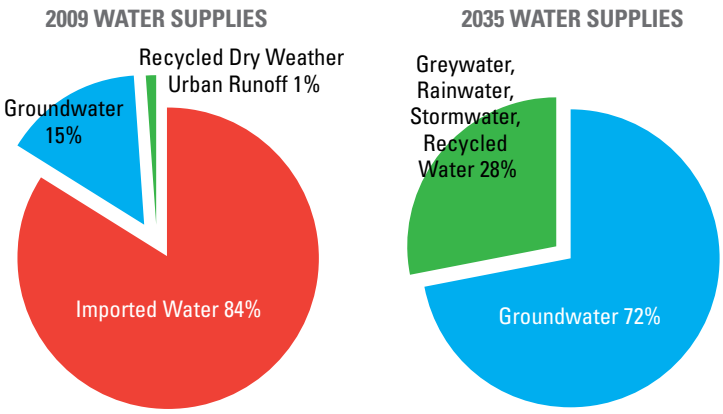


Table 2. Investments in Alternative Water Supplies					
	CITY OF SANTA MONICA	CITY OF CAMARILLO	VENTURA COUNTY WATERWORKS DISTRICT NO. 1	LONG BEACH WATER DEPARTMENT	LOS ANGELES DEPARTMENT OF WATER AND POWER
Improved Efficiency	✓	✓	✓	✓	✓
Recycled Water	✓	✓	✓	✓	✓
Responsible Groundwater Management	✓	✓	✓		✓
Rainwater and Stormwater Harvesting	✓				✓

#1: CITY OF SANTA MONICA



The City of Santa Monica plans to eliminate its demand for water from the San Francisco Bay-Delta and the Colorado River by the year 2020—the most ambitious plan of any of the more than 350 urban water management plans analyzed. In recent years, Santa Monica has invested in major improvements of its local groundwater sources, a move that will save money for the city and reduce demand on the Bay-Delta and Colorado River. According to its Urban Water Management Plan and Sustainable Water Master Plan Status Update, Santa Monica plans to reduce its reliance on imported water by 100 percent under normal conditions by investing in water-use efficiency, as well as the following alternative water supplies: recycled water, greywater, rainwater, stormwater, and sustainable groundwater pumping.

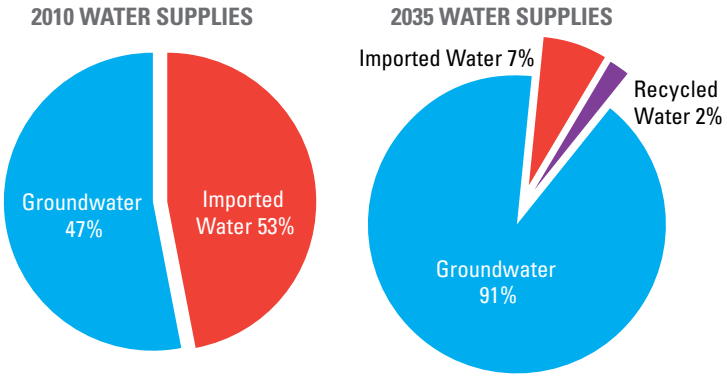
In February 2011, the city completed a groundwater remediation effort that opened five wells, increasing the amount of locally produced water to approximately 70 percent. The city's cost of purchasing treated water from the Bay-Delta and Colorado River is $794 per acre-foot, compared with approximately $330 per acre-foot for producing its own groundwater.[3] Also, like most water agencies in California, Santa Monica has the capacity to reduce its water use through expanded conservation efforts.

"In addition to maximizing the use of groundwater resources at a sustainable level, achieving this goal will require increased water efficiency efforts and the use of various other non-potable water supply strategies (recycled water, greywater, rainwater, and stormwater) to replace potable water use, primarily for outdoor uses. While these efforts will require substantial investments in the short term, it is anticipated that they will result in long-term cost savings for all water users in the city as well as the security of a sustainable water supply as the city moves into an uncertain water availability future."[4]

104,300

The annual amount of water projected to be saved from the Bay-Delta and Colorado River by the City of Santa Monica is equivalent to that used by **104,300 people** in their homes in one year.[5]

#2: CITY OF CAMARILLO



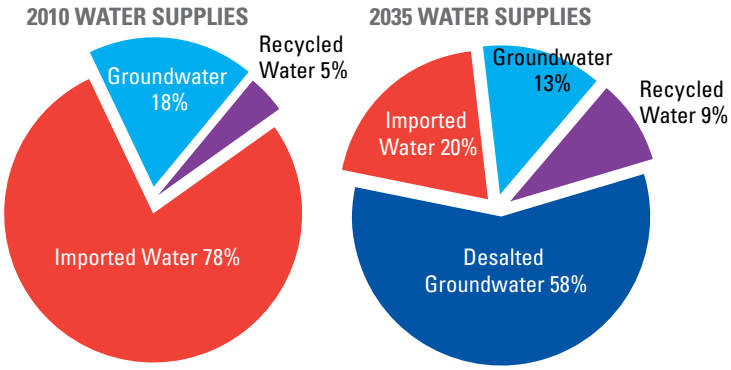
Like Santa Monica, the City of Camarillo, located northwest of Los Angeles, plans to wean itself almost entirely of imported Bay-Delta and Colorado River water, with an 85 percent planned reduction in demand between 2010 and 2035. The city, which currently relies on imported water for

more than half of its water supply, plans to rely mostly on groundwater in the future, thanks to the construction of the new Camarillo Regional Groundwater Desalter, projected to be completed by 2016 or 2017. This desalter will increase Camarillo's groundwater allocation by 5,000 acre-feet per year. The city plans to maximize its groundwater allocations first, and fulfill the remaining demand with imported water.[6] Additionally, the city generates recycled water that is currently utilized outside of its service area by neighboring water agencies and nearby agriculture. Future infrastructure investments connecting Camarillo Sanitary District with Camrosa Water District, and use within the city's service area for irrigation, are planned to eliminate the discharge of wastewater into Conejo Creek and reduce projected water demand within the city's service area. In the future, all recycled wastewater from the Camarillo Water Reclamation Plant will be used for agricultural irrigation, and industrial irrigation and reuse.

56,700

The projected annual amount of water to be saved from the Bay-Delta and Colorado River by the City of Camarillo is equivalent to the amount of water **56,700 people** would use in their homes in one year.

#3: VENTURA COUNTY WATERWORKS DISTRICT NO. 1

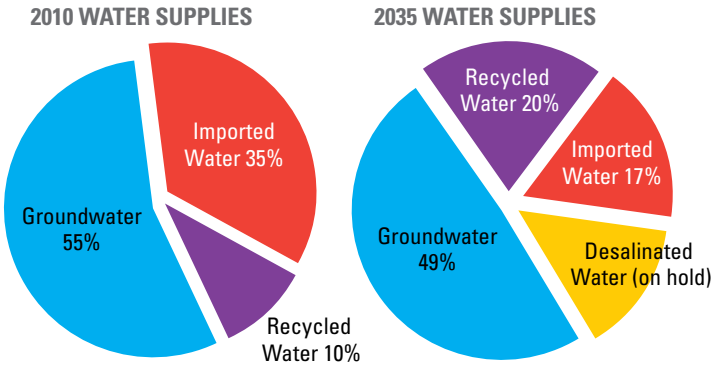


Ventura County Water District No. 1, which supplies water to the City of Moorpark, located just east of Camarillo, and unincorporated areas to the north and west, intends to reduce its demands on Bay-Delta and Colorado River water by more than 62 percent by 2035. Imported water currently accounts for 78 percent of the district's water supply. The water district will be able to reduce its demand for imported water thanks to local investment in a new brackish groundwater treatment plant, the Moorpark Desalter. This desalter is planned to be a 5-million-gallon-per-day facility that would employ reverse osmosis treatment technology to produce potable-quality water from groundwater, which would otherwise be too high in salts and dissolved solids for potable use. According to the district, the use of the new desalter will also create space for better stormwater infiltration to percolate into the local aquifer. The majority of stormwater flows now bypass the recharge areas because the shallow Las Posas Aquifer is full.[7] Additionally, the Moorpark Wastewater Treatment Plant, which produces recycled water, plans to double in treatment capacity, and to expand the distribution system to serve additional customers, with additional recycled water available between 2015 and 2020 for use in landscape and irrigation applications.

51,000

The annual amount of water projected to be saved from the Bay-Delta and Colorado River by Ventura County Water District No. 1 is equivalent to the amount of water **51,000 people** would use in their homes in one year.

#4: LONG BEACH WATER DEPARTMENT



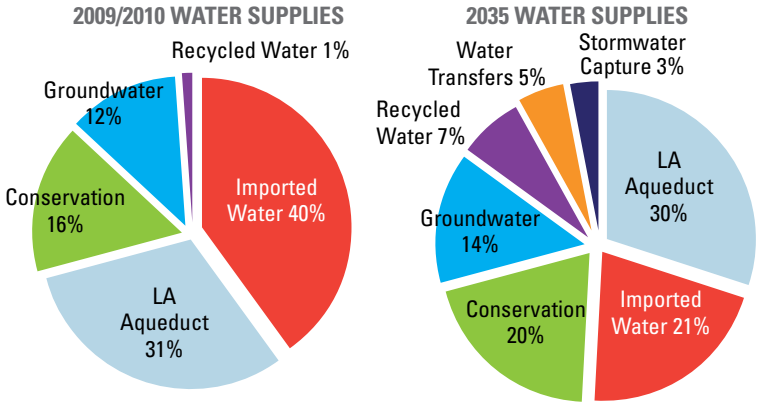
Long Beach Water Department—the water supplier for residents of the City of Long Beach—plans to cut its demands on imported water sources by nearly half by 2035.[8] This reduction in demand is partially attributed to the water department's ambitious pursuit of increasing recycled water distribution for beneficial municipal and industrial use. According to the water department, the Long Beach Water Reclamation Plant, operated by the Sanitation Districts of Los Angeles County, treats up to 25 million gallons of wastewater each day, resulting in high quality recycled water that is suitable for irrigation purposes, and meets all of California's standards for reuse. The constraint to putting more of the Reclamation Plant's output to beneficial use is the high cost of extending the recycled water distribution system to new customers. Long Beach Water Department is responsible for planning for the future use and distribution of recycled water in the City of Long Beach, and plans to increase that distribution substantially by 2035.[9] Additionally, the water department has responded to drought and regulatory conditions by employing innovative programs and public outreach to promote water conservation. An example of

the department's innovative conservation programs is its Lawn to Garden landscape conversion program, in which residents are provided a rebate, based on square footage, for converting water-loving lawns to water-efficient gardens. More than 800 homes have been retrofitted thus far. Through such efforts, per capita water use declined from 167 gallons per person per day in 1980 to 110 gallons per person per day in 2010. By 2035, Long Beach Water Department expects efficiency improvements to reduce water use to 100 gallons per person per day.

92,000

The annual amount of water projected to be saved from the Bay-Delta and Colorado River by the Long Beach Water Department is equivalent to the amount of water **92,000 people** would use in their homes in one year.

#5: LOS ANGELES DEPARTMENT OF WATER AND POWER



Los Angeles Department of Water and Power (LADWP)—water supplier for 3.9 million residents in the Los Angeles metropolitan area—plans to reduce its normal year demands on Bay-Delta and Colorado River water by 35 percent by 2035.[10] LADWP plans to significantly diversify its water supply portfolio in the coming decades by investing in stormwater capture, recycled water, water transfers, and efficiency measures. To offset imported water use, the department plans to increase recycled water use to 59,000 acre-feet per year by 2035 through both groundwater replenishment and non-potable reuse projects. LADWP also plans to increase conservation by 56,972 acre-feet beyond 2010 levels by 2035. While conservation is planned for all of the agencies highlighted here, LADWP is the only agency that accounts for conservation on the supply side in its Urban Water Management Plan. Additionally, the department has begun to look beyond the 2035 horizon, considering long-term concepts where, theoretically, 100 percent of imported water could be offset if water recycling was maximized in the future.[11] The ambitious use of groundwater replenishment and non-potable reuse is projected to save the department significant capital. The City of Los Angeles calculates that the present value for the cost of recycled water projects ranges from $1,142 to $1,170 per acre-foot. In comparison, the present value of imported Bay-Delta and Colorado River water is conservatively estimated at $1,366 per acre-foot (17 to 30 percent more expensive than recycled water).[12] Furthermore, LADWP plans to increase stormwater capture both for groundwater recharge and reuse. That effort will increase groundwater-pumping rights and direct supply availability through capture and reuse solutions such as rain barrels and cisterns. [13]

"While these (recycled water) projects require significant investments, they also come with long-term benefits in developing a sustainable local resource. Recycled water is a safe, local, and reliable source. For each acre-foot of recycled water delivered, an equivalent amount of imported water is saved. With the increasing cost of imported water, use of recycled water is projected to save the city money in the long term."[14]

809,300

The annual amount of water projected to be saved from the Bay-Delta and Colorado River by the Los Angeles Department of Water and Power is equivalent to the amount of water **809,300 people** would use in their homes in one year.

CONCLUSIONS:

Cumulatively the City of Santa Monica, City of Camarillo, Ventura County Waterworks District No. 1, Long Beach Water Department, and Los Angeles Department of Water and Power plan to reduce their demand for imported Bay-Delta and Colorado River water by more than 40 billion gallons per year, equivalent to the amount of water 1.11 million people would use in one year.[15] The alternative supplies these agencies plan to employ are greener, cleaner, and more reliable than the import-dependent status quo. These planned reductions in imported supplies are encouraging first steps towards a future of reduced water- supply vulnerability and better environmental outcomes. However, implementation will be the key to realizing the potential benefits associated with these ambitious urban water management plan projections.

Endnotes

1 This ranking is based on an analysis conducted by the Natural Resources Defense Council assessing California urban water suppliers' 2010 Urban Water Management Plans, data provided by the Department of Water Resources summarizing the plans, and subsequently released information from individual water districts. To learn more about water use in California across the state, including urban water use efficiency targets, visit the Natural Resources Defense Council's web page: http://www.nrdc.org/water/california-water-systems/.

2 Alameda County Water District, City of San Diego, Contra Costa Water District, East Bay Municipal Utility District, Otay Water District, San Diego County Water Authority, San Francisco Public Utilities Commission, and the City of Sacramento; http://switchboard.nrdc.org/blogs/bnelson/coalition_releases_a_new_portf.html.

3 Gil Borboa, Water Resources Manager, City of Santa Monica City of Santa Monica Sustainable Water Master Plan Status Update, November 5, 2012, retrieved from http://www.smgov.net/WorkArea/DownloadAsset.aspx?id=35737; Water Resources Division, Public Works Department, *2010 City of Santa Monica Urban Water Management Plan*, Prepared by SA Associates, Consulting Engineers, available at http://www.smgov.net/uploadedFiles/Departments/Public_Works/Water/Final%202010%20UMWP_July%202011.pdf.

4 Memo from Gil Borboa, Water Resources Manager, City of Santa Monica, Subject: Sustainable Water Master Plan Status Update, November 5, 2012, available at http://www.smgov.net/WorkArea/DownloadAsset.aspx?id=35737, March 18, 2013.

5 Assumes average per capita domestic use of 100 gallons per person per day.

6 *2010 City of Camarillo Urban Water Management Plan*, Prepared by Tom Smith, water superintendent, and Ingre Wiersema, project manager at Carollo Engineers, May 2011, available at http://www.ci.camarillo.ca.us/docs/2010%20UWMP%20Final%20Draft.pdf.

7 *2010 Ventura County Waterworks District No. 1 Urban Water Management Plan*, June 28, 2011, prepared by PSOMAS, available at http://www.water.ca.gov/.urbanwatermanagement/2010uwmps/Ventura%20County%20Waterworks%20District%20%231/Final%202010%20VCWWD1%20UWMP%206-28-2011.pdf.

8 Long Beach Water Department's 2010 Urban Water Management Plan includes the projected development of desalinated water supplies. However, according to correspondence with Kevin Wattier, general manager of Long Beach Water Department, their desalination plans are on-hold indefinitely (direct email communication, March 8, 2013). However, Long Beach has not indicated the sources they plan will make up that previously planned supply..

9 *2010 Long Beach Water Department Urban Water Management Plan*, June 2, 2011, available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Long%20Beach%20Water%20Department/2010%20UWMP%20FINAL%20Board-adopted%20110602.pdf .

10 *2010 Los Angeles Department of Water and Power Urban Water Management Plan*, adopted May 2011, available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Los%20Angeles%20Department%20of%20Water%20and%20Power/LADWP%20UWMP_2010_LowRes.pdf, and email communication with Penny Falcon, LADWP Water Conservation Policy Manager, March 28, 2013.

11 Los Angeles Department of Water and Power and Department of Public Works, *City of Los Angeles Recycled Water Master Planning Executive Summary,* prepared by RMC in association with CDM Smith, October 2012, available at https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-recycledwater/a-w-rw-projects?_adf.ctrl-state=ylhkxjiaq_41&_afrLoop=167248415426000.

12 Ibid.

13 *2010 Los Angeles Department of Water and Power Urban Water Management Plan,* adopted May 2011, available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Los%20Angeles%20Department%20of%20Water%20and%20Power/LADWP%20UWMP_2010_LowRes.pdf.

14 Los Angeles Department of Water and Power and Department of Public Works, *City of Los Angeles Recycled Water Master Planning Executive Summary*, prepared by RMC in association with CDM Smith, October 2012, available at https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-recycledwater/a-w-rw-projects?_adf.ctrl-state=ylhkxjiaq_41&_afrLoop=167248415426000.

15 In comparison to the amount demanded in 2009 and 2010.