
San Diego's Challenge of the Century

Cutting edge strategies to make San Diego the world's most water-wise region



August 5, 2008



Legend & Glossary

The following symbols are utilized throughout this report to symbolize best practices:



Best Practice: The UCAN Watchdog symbol indicates a best practice in technology or policy. These best practices typically imply a watchdog role for UCAN to ensure implementation or compliance in the San Diego region.



Conservation Savings: Specific conservation savings resulting from implementation of technologies or best practices for residential, industrial, commercial, and agriculture.



Cost: Water conservation technologies often come with a price tag, however, the return on the water-saving investment (ROI) can be significant!

TECHNICAL TERMS:

Graywater - Wastewater from household baths and washing machines that is recycled especially for use in gardening or for flushing.

Blackwater - Wastewater from household toilets.

Desalination - Removing dissolved salt and other minerals from seawater to create potable water through the use of reverse osmosis and/or membrane-filtering technologies.

Water Conservation Banking - A system in which funds derived from conservation would be deposited, then subsequently used to finance environmental restoration and enhancement.

Rate Structures - The rate schedules that determine what customers pay. Generally, they are made up of three types of charges: Fixed, Volumetric, and Surcharges. The combination of these kinds of charges determines what each customer pays for water/sewer services.

Prescriptive usage - Specific water-use restrictions placed upon customers. Violation of such measures subjects a customer to penalties, rate surcharges or fines.



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2 Challenge of the Century

This report essentially asks: is San Diego up to the challenge of the century? This challenge involves water; cool, clear, constitutive, chlorinated, chemically-reconstructed water. It is the commodity whose absence would dramatically change life as we know it in San Diego.

When it comes to infrastructure issues such as energy, communications, water and housing, San Diego, like so many other regions, has lots of controversies and precious few areas of regional consensus. However, water – Mark’s Twain’s fighting fuel - will prove to be the topic of this century. In the face of a recent drought and long-term predictions of reduced snow pack, San Diego policy makers have begun to slowly grapple with the realities of and the ramifications of a dwindling water supply. And the convergence of this restricted supply along with the decades of unchecked growth has led region to an inexorable coming-to-terms moment.

As noted by the County Water Authority, in 2007, Sierra snowpack supplying the State Water Project fell to 30 percent of its normal values and a federal court issued a ruling that will reduce pumping from the Bay-Delta to San Diego County. The Colorado River system is experiencing an eight-year drought and locally, San Diego received only 37 percent of its normal rainfall in 2007 and is in the driest two-year period since record keeping began in 1802.

Most informed commentators and policymakers agree that San Diegans must get serious about water conservation. With water districts calling for voluntary water usage cutbacks, this has become an inarguably serious matter. However, there appears to be little agreement upon how to achieve those cutbacks.

As consumers are increasingly called upon to take personal responsibility for reducing their own water demand, they need to know that their water sources are safe, reliable, and are of reasonable and equitable cost. Further, they need assurance that their own efforts to conserve water are appreciated, effective, and don’t merely promote the often irrational growth and billing policies of the water agencies that serve them.

The pressing challenge to this region is how to cost-effectively achieve an ethic of wiser water use amongst its citizenry. This report examines the true constraints placed on San Diego’s water supply, what best practices are appropriate and what we can learn from other communities who are achieving measures of success with wiser water use. .

UCAN occupies a unique position in this discussion. As San Diego’s highly successful and reputable consumer advocacy organization, UCAN’s reasoned approach to consumer education and advocacy has earned it an important role in any consumer-related policy discussion. This report offers UCAN’s observations about the nature of the problem and some potential solutions that warrant discussion within policy-making circles.....and even around the office water coolers, neighborhood pools and evening watering holes (bars). Everyone in San Diego should be discussing this region’s water demands in the face of the predicted chronic drought gripping the West.

If there is magic on this planet, it is contained in water.

LOREN EISELY, The Immense Journey, 1957



3 Executive Summary

Amongst all of the water-related controversies, one issue that shouldn't be very controversial is that the Western United States is entering a period of intense stress related to water supply. **A second non-controversial issue should be that the region's water policy discussions require a coordinated approach that is reasoned and factual, but also innovative, and must produce both near-term and long-term results.**

San Diego County is particularly vulnerable as approximately 90% of the water consumed here is imported via pipelines and aqueducts from the Colorado River via the Colorado River Aqueduct and from Northern California via the Bay Delta and Central Valley Projects. The effects of increasing drought conditions, and loss of watershed-holding capacity due to the fire events of 2003 and 2007, are all contributing to increasing reliance on imported water.

UCAN offers a paper designed to further spark the local dialogue about how the San Diego County Water Authority, water districts and customers can implement innovative and effective measures to better manage this essential resource. UCAN has conducted a survey of water efficiency measures used throughout the world and has chosen some of the most successful measures deployed elsewhere. We also offer some original approaches that warrant consideration by local policy makers. Most of the suggestions are focused upon water usage, rather than enhancing water supply. However, the differentiation between the two is largely illusory – every gallon of water saved is a very low-cost gallon earned.

UCAN views this matter as a challenge to San Diego. As the self-proclaimed “America’s Finest City”, San Diego and the surrounding region has an opportunity to demonstrate leadership in water conservation, in keeping with its claim to being among America’s elite regions. As our analysis shows, San Diego has not yet met that challenge.

Calls for voluntary conservation are largely ineffectual. Rationing is inherently inequitable and could result in unintended consequences, as well as political and social backlash. UCAN suggests that neither of these tools should be relied upon.

"Water is the only drink for a wise man."

Henry David Thoreau (1817 - 1862)

Instead, UCAN recommends a set of measures that need to be considered by the region's policymakers that include:

- Pricing strategies: San Diego water districts must provide customers with clearer economic signals through better rate design and rate incentive programs;
- Community involvement: Local communities must be engaged to help with enforcement of water usage rules.



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- Linkage of resources: use the link between the region's energy and water resources to create an integrated approach to "harvesting" both energy and water resources in conjunction with SDG&E;
- Prescriptive actions: Some water uses must be severely restricted. New water users must adopt a zero net-usage principle.
- Educate consumers: Instilling an ethic in San Diego water customers that encourages water thriftiness and discourages water waste.
- Water supply: Water efficiency, reuse and creative water transfers represent the most promising sources of new water for the region.
- Alter practices: Given that landscape irrigation as the single largest use of water in California's urban areas, special attention needs to be given to altering irrigation practices in San Diego.

4 Policy Foundations

The following facts and assumptions underlay most all of UCAN's recommendations in this report:

- California's drought is expected to get worse. State officials are already preparing for another year of drought in 2009, prompted by low storage levels, court-ordered cutbacks, increasing demand for water and forecasts of another dry winter.¹
- Some cities rely upon outdoor water use restrictions as a way of reducing water usage. Others rely upon "scarcity pricing" as the best way to encourage conservation. But the most effective approach will be a combination of both restrictions and pricing, along with greater community involvement.
- Residential users differ from commercial users in the way they respond to pricing.
- Commercial and industrial customers (C& I customers) are more interested in reliability than cheap water. They are prepared to invest significant money in water recycling if it will lower their water or sewer bill and/or increase reliability. Their water costs should be priced to reflect scarcity and assure reliability.
- In San Diego County² and the City of San Diego³, C&I customers' rates are based on "bulk" purchases (flat or decreasing block rates). This structure currently was the means by which politicians would encourage industrial expansion/relocation. Rate analysts would wrongly justify cheaper rates due to high volumes ("we lose water on every unit but we make it up on volume."), and water utilities needed to move high volumes. This paradigm must be abandoned in a scarcity market.
- Residential customers will require that water policies incorporate elements of equity and fairness. They will accept rate changes if they know that the relative inelasticity of their demand is taken into consideration. They also want to know that customers who have lots of money won't be allowed to waste water and that their own successful efforts to conserve will not result in offsetting increasing demand through new construction in the region. Scarcity pricing for this customer class will be rejected on the basis of perceived inequity.

¹ http://www.dailynews.com/news/ci_9953754

² <http://www.sdcwa.org/news/finances.phtml#current>

³ <http://www.sandiego.gov/water/rates/rates.shtml>



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- Most customers will accept some degree of change in water use if they know that the responsibility of that change is shared and that it is justified.
- Local residents value their outdoor spaces. Any water usage strategies must acknowledge and ensure residents that their outdoor experiences will be enhanced not diminished because of prescriptive water usage measures.
- Politicians generally get punished for taking bold actions. Where bold actions are required, they prefer to develop large consensus amongst all stakeholders. San Diego's water situation requires some bold and accelerated actions. The challenge for elected leaders on water issues is to build consensus for bold action quickly.

5 Policy Recommendations

5.1 UCAN's Recommendations

Addressing the challenge of regional water sustainability will not be easy, however it is necessary. To properly secure a reliable water future will require some tough decisions by the region's elected officials. This report is premised upon the assumption that the best way for San Diego to promote water efficiency is to reduce waste, not restrict use.

UCAN proposes a comprehensive set of measures available to policy makers that focus on attacking wasteful water use practices. They include:

- 1) Giving customers clearer economic signals by making water prices more consistent with true cost as well as adjusting pricing based upon consumption levels so as to economically reward those customers who are wiser in their water usage. This involves adoption of tiered rates, incentive rates and overhauling rates that inadvertently promote water waste;
- 2) Instilling an ethic in San Diego water customers that encourages water thriftiness and discourages water waste through community-based water education processes and through clearer rules about inappropriate water usage;
- 3) Seizing upon the link between the region's energy and water resources by using an integrated approach to "harvesting" both resources in conjunction with SDG&E. This could involve a door-to-door outreach campaign to install energy and water upgrades to every building in the County;
- 4) Engaging existing volunteer community resources in promoting water usage etiquette as well as assisting with water waste enforcement through the use of volunteer water rules enforcers;
- 5) Partnering with the retail sector to make low-cost, accessible water usage technologies available to San Diego consumers through the creation of Water Stores and water savings departments within Big Box retail stores.
- 6) Refocusing the districts' attention towards potable reuse of water and away from sea water desalination.



5.1.1 PRICING: Overhaul is needed for San Diego's Water/Sewer Rate Structures

UCAN proposes a comprehensive package of creative rate structures, performance incentives, and prescriptive usage measures, combined with community involvement, public education and facilitated technology compliance opportunities to address the region's water challenges. UCAN has crafted a set of low-cost measures that combine ratesetting strategies along with community-based enforcement and education efforts to create a heightened ethic of water wisdom and demonstrate the detriments of water waste throughout San Diego County.

5.1.1.1 Rate Structures

As has been established in the energy industry, rate design can go a long way towards promoting changes in consumption patterns by sending more accurate price signals to customers. Just as tiered rate structures and real-time pricing is revolutionizing energy consumption, the water/sewer utilities that serve San Diego County can use rate design to encourage wiser water consumption.

The water utilities understand the notion of tiered or “motivational” rates and have featured it in water-planning documents. Yet, they've not taken full advantage of motivational rates – current water utilities' residential rates are not particularly progressive. Moreover, most utilities in the region do not have a progressive tiered rate structure for commercial customers. Thus, these customers receive no economic signal that massive consumption of water should be discouraged. The Los Angeles Department of Water and Power has an increasing block rate structure with two tiers that applies to all customer classes. For commercial, industrial and governmental customers, Schedule C, all usage in the off-peak period is billed at the first tier rate; usage in the peak period in excess of 125 percent of the previous average winter usage for December through March is billed at the second tier rate. UCAN suggests that the methodologies developed by LADWP may serve as a model for San Diego.

Also, residential water and sewer customers are often charged the same flat rate for water and sewer service notwithstanding the size of their lots. Because so much water usage is tied to irrigation, lot sizes should matter. Yet, rates do not properly reflect irrigation use.

The San Diego County Water Authority (SDCWA) should take the lead in developing a model rate design that promotes clearer economic signals to water and sewer customers. Water districts that implement these model rates should be offered some incentive, perhaps through the form of feebates charged to those municipalities that fail to incorporate tiered rates and lot size variables into their rate structures.

Also, the utilities should accelerate GIS mapping and new software that allow them to compare a customer's actual water use with the projected water use for their specific landscaping. As noted by the SDCWA, providing this information to customers is a first step in educating the customers about how to be more efficient. And it makes water budget-based rates a viable option.



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5.1.1.2 Tiered Water Rates Based on Performance

Water agencies should implement three tiers of rates for all customer classes (residential, commercial, agriculture, industrial), as follows:

Wisest Rate – Users advance to this rate when they can show that they have implemented no less than three measures on a list of advanced water efficiency measures. This rate would be at least 20% below the standard rate and would be sharply tiered to reward those customers who use the least. Those water-conscious customers who had previously taken such actions would, upon proof of such installations, be eligible for this rate. ‘Water Wise Household’ window stickers or yard signs would be issued to consumers on the Wisest Rate schedule; This public acknowledgement would serve as a positive incentive, and a role model in their community.

Standard Rate – This is the default rate available to all customers.

Waster Rate – Users are placed on this rate if they are found to be a waster by the Water Court. Customers might also be placed on a Waster rate if their water consumption increased by a certain percentage. This rate would be appreciably more expensive – perhaps as much as 30% higher than the standard rate.

5.1.1.3 Volumetric vs. Flat/Fixed Rates

A frequently heated debate in “ratemaking” involves the extent to which rates should be designed to reflect fixed costs incurred by utilities regardless of whether or how much of the utility service that customers use. This desire to recoup fixed costs by charging customers fixed charges that do not vary based upon customer consumption clashes violently with the conservation incentives inherent in volumetric charges, i.e. rates that are based purely upon how much of the commodity a customer uses.

In electric rates, San Diego residential customers are not charged fixed charges. So a customer’s electric bill is based almost entirely upon that customer’s consumption of electricity.⁴ This kind of rate design rewards customers who use small amounts of electricity and imposes proportionately greater costs upon residential large users of electricity. As such, it sends an appropriate economic signal to customers who are electricity wise.

This conservation-oriented rate structure is NOT used by most water utilities. More than half of a typical City of San Diego water bill is comprised of fixed charges that do not vary based upon monthly consumption. So if a customer uses 1 HCF per month, they will pay approximately the same fixed monthly fee as a customer who uses multiple times more water per month. The net result is that water-wasters are rewarded with cheaper per-unit rates than water wise customers.

In order to reinforce the importance of water-wise ethics in San Diego County, water districts need to move away from fixed rate structures and orient themselves more towards volumetric rate design.

⁴ The one exception is a minimum usage charge, where an SDG&E customer is charged a nominal sum if they consume little or no energy for a month.



5.1.1.4 Irrigation Accounts Must Be Revamped

In many water districts, water customers are offered specific irrigation accounts that allow them to bypass sewer charges because the water they use is exclusively for irrigation and thus, arguably, doesn't enter the sewage system. However, given the need to rethink use of potable water for irrigation purposes, such accounts need to be subjected to an extreme makeover that rewards customers for use of xeriscaping and charges them for excessive landscape watering. Eligibility for these accounts should be subject to a xeriscape certificate issued by an authorized landscape architect or designer. And they should be tiered so as to subject large water users to higher per-unit costs. Such accounts also need to be adjusted to reflect the size of the lots being served.

5.1.1.5 Water Credits or Feebates

All new development or expansion of existing buildings/residences should be required to purchase Water Credits that represent additional consumption caused by that expansion. Water credits are similar to hook-up fees, but rather than aimed at paying for cost of adding to the water/sewer system, they are intended to encourage water conservation. A company/individual can avoid paying water credits by reducing water demand so that the expansion/addition has a net zero water impact. Proceeds from these water credits can be used to partially fund the Water Court and subsidize the Water Stores. In theory, the Water Credits could possibly be tradable (transferrable) although this would likely require a Southern California-wide effort.

In addition, the agencies should consider use of feebates. All customers whose water consumption exceeds the top 10% of water users in their rate class should be charged a water consumption surcharge that would be used to subsidize devices sold at local Water Stores.

5.1.1.6 Lawn and Garden Feebates

Water district customers with lawns that exceed a certain size should be charged with a surcharge that would be used to credit customers who buy native, drought-tolerant, low-water plants at local nurseries. Commercial customers, in particular, should be encouraged to replace lawn greenery with xeriscaping as there is little purpose served by lawns on business and commercial office properties. But even residential units that have lawns in excess of 2000 sq. feet should recognize that little constructive purpose is served by this highly water-intensive decorative landscape.

Similarly, feebates should be used for all water-intensive plants sold in San Diego County. San Diegans who purchase plants that are non-native and water intensive would be required to pay a surcharge at any retailer from which those plants are purchased. That surcharge will be a feebate that can be used by the retailers to subsidize the cost of low-water plants or can be turned over to the County Water Authority to use to subsidize Water Store merchandise.



5.1.2 COMMUNITY: Community-Based Rethinking of Water Usage

5.1.2.1 Water Usage Guidelines

Most County water districts have prescriptive conservation measures that are triggered based upon a determination of water shortage. These measures include limits or prohibitions upon watering lawns, cleaning hard surfaces, car washing and other such restrictions. However, the water districts have largely resisted triggering these restrictions. Moreover, notifying the public and enforcing these prohibitions is challenging for the districts.

As will be discussed in greater depth below, **UCAN proposes that many of these emergency prohibitions should become permanent so as to promote an ethic that actively discourages potable water waste in San Diego.** For example, use of water to wash driveways or sidewalks is entirely inappropriate and should be stopped. Use of potable water for washing cars is also highly questionable. As is the use of potable water for water-intensive landscaping, such as lawns, fountains and high-water flower gardens. Pools represent a significant evaporative waste of water. And chronic water leaks found in most older structures also need immediate attention. All of these water usages need to be subject to certain restrictions.

The focus of these prescriptive measures is not so much to encourage water conservation as much as it is to begin to address the chronic water waste that has crept into the San Diego County subconscious. There needs to be a re-examination by all San Diegans about the availability and use of potable water. This can only be accomplished through clearer water "etiquette", greater community involvement in water usage enforcement and economic incentives to deploy water-saving technologies.

5.1.2.2 Wise Water Etiquette

Like any social habit, water usage will be determined largely by common attitudes towards what are acceptable uses of water. For example, if every house on a block displays a water fountain in the front yard, the odds are high that other blocks will also begin to install such fountains. Similarly, if people feel free about using their water hose to clean off their driveways, then others on the block will similarly use their water in that fashion.

This water etiquette is largely learned from peers. The only way that San Diego can instill a wise water etiquette in the population is to focus attention upon common wasteful uses of water and highlight them as unacceptable. The economic incentives discussed above will help reinforce that point, but economic incentives alone will not be sufficient to bring about wholesale changes in a short period of time.

As will be explained below, UCAN believes that community involvement in demonstrating wise and unwise water usage will help accelerate the evolution of San Diego's water etiquette. The measures presented are aimed at getting greater community involvement in water use and helping make new water-saving technologies available to San Diegans.



5.1.2.3 Combine Energy and Water Savings Efforts In A Community Resource “Harvesting” Effort

Energy and water are essential resources in San Diego and they are inexorably linked. Less hot water usage reduces energy consumption. Energy is required to transport water to San Diego, to maintain the water and sewer distribution systems and even, particularly in the case of desalination, to produce potable water. Viewing these services independently risks overlooking some very promising synergies.

One such synergy is in harvesting these resources through a comprehensive and proactive demand response program. The water districts should explore partnering with SDG&E to create efficiency teams to visit all of the building structures in San Diego County and offer low-cost retrofitting with efficiency measures or inform building tenants of efficiency programs, investments and strategies that could reduce their costs as well as their consumption.⁵ The costs of this effort should be shared between energy and water utilities.

The districts should spend 2008 exploring the feasibility of door-to-door water/energy efficiency teams delivering and installing low-cost and free efficiency measures to every home and business in San Diego during the next four years. Such an effort, albeit significant, can be done in conjunction with SDG&E’s roll-out of its Advance Meter Initiative and its own energy efficiency programs. In addition to the benefits of deploying these measures, such an effort would serve as an unparalleled community education and outreach campaign.

In Tucson, AZ, teams of ‘Zanjeros’, or Water Managers, visit high-consuming residences to survey their practices and equipment, then install water-saving devices as appropriate.⁶ A variation of this model should be implemented in San Diego.

5.1.2.4 Water Angels

Local Boy Scout/Girl Scout troops, environmental groups, hiking groups, condominium and homeowners associations, Neighborhood Watch organizations, Retired Seniors Volunteer Patrols (RSVP), Urban Corps⁷ and other civic groups should be recruited to be volunteer or honorarium-paid Water Angels, authorized to assist with community water usage activities. These Water Angels could be used in the energy/water resource harvesting described above.

These same groups would assist with deployment of water usage devises as well as digitally documenting when they identify Water Wasters. They could also periodically check in on Wisest Rate customers, to ensure continued compliance with water efficiency measures. They’d use digital cameras to document examples of water waste or disabled water efficiency measures. Water districts and Water Courts would use this documentation in their respective enforcement activities.

⁵ These teams might also be used for enforcement purposes. See “Water Angels” above.

⁶ Tucson Water, http://www.ci.tucson.az.us/water/zanjero_program.htm

⁷ <http://www.urbancorpssd.org/>



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In addition, a Water Waster Hot Line should be established on the County's InfoLine '211' (www.211sandiego.org) system, so that concerned citizens may easily report obvious violations of water conservation ordinances that they observe.⁸ The reporting would be anonymous, at the caller's option, and then checked upon by Water Angels.

Both of these measures should be relatively low-cost endeavors that can be funded with existing customer education budgets. Similar examples of community-based involvement exist in Tucson and in East Los Angeles.⁹

5.1.2.5 Water Warrants

Water Warrant notices should be distributed by various municipal and county agents (and Water Angels) identifying violations of water usage guidelines. These notices would direct individuals to appear at one of four Water Courts. Failure by the individual to appear at the Water Court would subject that customer to being automatically placed on a Waster rate.

5.1.2.6 Water Court

The County Water Authority should establish and fund at least four "courts" at locations throughout the County.¹⁰ These courts will serve as forums where the customer's water usage transgressions will be reviewed. These forums will not only be serving an enforcement function, but also an educational one.¹¹ The Courts will be centers where customers can get information about water-saving practices and measures.

An arbitrator who will rely upon testimony and documentary evidence will determine water waste transgressions. No fines or punishment will be issued – the sole determination by the arbitrators will be whether and for how long the customer is to be placed upon a Waster Rate. Individual water districts then have the option of accepting the arbitrators' findings and shift that customer to the Waster rate.

To ensure accountability, all Water Court decisions would be part of a public record. Water Court proceedings should be a public forum televised on local cable channels and the Web.¹² Individual water districts will be able to modify or simply reject Water Court findings where warranted.

The "court" aspect of the Water Court shouldn't overshadow its importance as an education vehicle. Water Court locations – storefronts, shopping centers, or other accessible locations -- should be showcases for technologies and strategies for improved

⁸ UCAN checked to see whether there is a general water 'hotline' currently on the 211 web site. When we called, 211 told us to call the SDCWA; SDCWA referred callers to the local water district.

⁹ See: http://www.ci.tucson.az.us/water/zanjero_program.htm and Mothers of East LA, <http://clnet.ucla.edu/community/intercambios/melasi/history.html>

¹⁰ Water Courts could be largely funded by monies that currently are allocated for public education.

¹¹ Water Courts have been used in other jurisdictions, notably in Colorado, to great effect.

¹² In order to honor privacy considerations, any appearance on a televised hearing by the Water Judge would have to be agreed to in advance, by the customer making that appearance.



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water usage efficiency. Moreover, UCAN recommends that each Water Court defendant would receive a free water shower bucket after his or her appearance.

At the arbitrator's discretion, or perhaps as a matter of course, the court could send the customer to 'Water Waster Academy' in lieu of placing them on a Water Waster rate for a first violation. Subsequent violations will incur the switch to Water Waster rate for a period of time, and subject to monitoring by Water Angels or other departmental field staff.

5.1.2.7 Water Waster Academy

Patterned after the well-known DMV (California Department of Motor Vehicles) traffic school model, the Water Waster Academy will provide first-time Water Wasters the opportunity to attend a formal training program in lieu of incurring Water Waster rates. Academies should be conducted by private contractors, subject to strict guidelines imposed by the SDCWA. Water Waster Academy graduates will be provided with course materials outlining best practices for their particular sector (residential, agricultural, commercial/industrial), to include information about rebate incentives and availability of conservation technologies at local retail outlets. An intended consequence of such a program will be an increased number of 'water wise' consumers in our communities, who will in turn impart their knowledge to others. As with 'Traffic Schools', these courses would be self-funded and, presumably, offered through predominantly on-line services.

5.1.2.8 Water Stores

The County Water Authority should partner with local hardware stores, gardening stores, grocery stores, and big-box retailers to create "Water Departments" in each store stocked with subsidized water savings appliances and gadgets, such as those listed in the UCAN report. These departments should have some of the same educational materials as would be made available at the Water Courts. Many products at these stores should be partially subsidized by the water districts so as to promote purchase and deployment of them.

Peer influence over adoption of new technologies is not debatable. The early adopters who buy, for example, iPods, PDAs and PVs (solar panels) also influence their neighbors who, intrigued by the new devices, also want to have one for their own use. Intriguing or unusual water savings devices, if priced low enough, could become fixtures in every San Diego building as a result of peer influence.

Europe has begun effectively marketing water-saving technologies. Manufacturers such as Tap Magic in England (<http://www.tapmagic.co.uk/>), Real Goods in California (<http://www.realgoods.com>) and Damixa in Holland (<http://www.damixa.nl/>) offer a large array of devices that combine clever design with substantial water savings and distribute them widely throughout the US and Europe.¹³ Similarly, the Australian marketplace has numerous smart water product providers.¹⁴ Remarkably, San Diegans have no ready access to such products or retailers specializing in such products. Water districts can and

¹³ For example, British consumers have access to "The Greenshop", which is both a physical and web-based purveyor of sustainable and low-impact products. <http://www.greenshop.co.uk/>. Another such store is Ecoutlet. <http://www.ecoutlet.co.uk/>

¹⁴ <http://www.watersavingtechnology.com.au/> and <http://www.getgreen.com.au/>, are just some examples



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must play a far more important role in making these products available to San Diego consumers.

Partnerships with local retailers should result in at least one Water Store being located in each water district serving the County. Moreover, with assistance by the SDCWA and local utilities, water departments should become commonplace in big-box retailers, grocery stores and hardware stores throughout the region. These departments would consist of utility-approved water-saving devices – some of which are subsidized by the SDCWA.

The county's water districts might also investigate setting up an online store with subsidized pricing available for San Diego County residents. The cost of these subsidies can largely be covered by the large user, and lawn and garden feebates proposed above.

"In every deliberation we must consider the impact on the seventh generation... even if it requires having skin as thick as the bark of a pine."

Great Law of the Iroquois

5.1.3 PRESCRIPTIVE MEASURES: Promote ‘Net-zero’ increase in water demand to support new development

New development should result in a ‘net-zero’ increase in water demand, through the use of water conservation technologies and best management practices. Water conservation off-set programs to reduce demand in existing development should be established.¹⁵ Such a policy is steeped in common sense and may well be compulsory if the currently pending state legislation, AB 2153, becomes law. The “Water Credits” mentioned above will also send an economic signal to any new development that “net-zero” impacts are preferred.

5.1.3.1 Restricted uses of water

Water districts must begin to impose enforceable restrictions upon some sources of water use. Some of the restrictions that should be considered by districts include:

- Prohibition against using potable water to wash hard surfaces such as driveways, sidewalks, streets and building surfaces (with the exception of commercial power washing)
- Limit use of washing vehicles to recycled water only.¹⁶
- No new lawns may be installed nor existing lawns expanded. All lawns must be permitted and subject to feebates.

¹⁵ See “Can We Save Water and Still Have Growth?”, The Pacific Energy Policy Center, 10/12/2007

¹⁶ In a December 27, 2008 proposed ordinance, the San Diego City Attorney’s office proposed permitting vehicle washing only with a hand-held bucket or a hand-held hose equipped with a positive shut-off nozzle for quick rinses.



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- Hand-held hosing of lawns and gardens is limited to designated days and hours.
- All pools must be covered when not being actively used.
- A permit is required to fill new or renovated pools bigger than 2500 gallons.
- All outdoor fountains must recycle water.
- All new landscaping must be xeriscaped. Sale of non-native or high-water usage plants should be subject to a feebate.¹⁷
- All restaurants prohibited from serving water unless specifically requested.

5.1.3.2 Implement LEED Standards

Local governments should be encouraged to require that new “greenfield” homes and commercial building projects be designed to meet the U.S. Green Building Institute’s Leadership in Energy Efficient Design (LEED) Silver standard, or alternative statewide mandated green building design standards at a minimum. The SDCWA could take the lead in making project processing and approval incentives available for those projects designed to meet higher LEED gold and platinum standards. That step alone would significantly reduce the water requirements of new buildings compared to ones being built today.¹⁸

5.1.4 WATER SUPPLY: Refocus efforts toward use of Integrated Potable Re-Use (IPR)

The City of San Diego’s long-stalled Integrated Potable Re-Use (IPR) pilot project should be supported and its outcomes thoroughly analyzed. IPR technology has been proven in other locales and has been deployed most recently in Orange County. While San Diego is proposing a unique variation of IPR (direct injection into reservoirs) it needs to be studied, tested and, if feasible, then aggressively pursued. If it proves out, it offers an exceedingly cost-effective solution in part to our water reliability needs. As UCAN views it, IPR is no longer an option. It is a mandatory step that must be investigated by all water districts.

As pointed out by San Diego Coastkeeper, the Mayor of San Diego has used an unofficial ‘wallet veto,’ to override a decision by the City of San Diego to pursue IPR.¹⁹ The case for IPR is simply too strong to subject to petty politics. First, San Diego water consumers are already subject to IPR – it is called the Colorado River. This is the source from whence San Diego gets nearly half its water which currently contains 400 million gallons of sewage discharges from more than over 225 separate sewage agencies in Colorado, Utah, Wyoming, Arizona, New Mexico and Nevada and another 1.5 billion

¹⁷ This measure, as well as a probation against potable water flowing off of a customer’s property was recently implemented by the Eastern Municipal Water District located in Riverside County in Water Use Efficiency Ordinance 72.23. More info at <http://www.emwd.org/usewaterwisely/>

¹⁸ Don Wood, “Can We Save Water and Still Have Growth?”, The Pacific Energy Policy Center, 10/12/2007

¹⁹ <http://www.voiceofsandiego.org/articles/2008/07/24/cafestandiego/742reznik072108.txt>



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gallons of industrial discharges into the Colorado before water gets to San Diego. Moreover, IPR has been done successfully in cities across the country and across the globe, in some instances for more than 30 years.

IPR is also one of the more cost-effective ways to produce more water supplies. San Diego Coastkeeper has reported that the same \$200 million-\$280 million that it would take to create up to 16 million gallons per day of potable water at San Vicente would produce only 2-3 million gallons per day if water recycling through a parallel piping system were deployed. It cites a Water Re-use study that concluded that it would require 70 cents more per water bill per month for non-potable water reuse compared with IPR, and still reuse less water.

5.1.5 Suspend Development of Ocean Desalination and Explore Brackish Desalination Instead

Proposed desalination plants offer to produce potable water from sea water. However, ocean/sea water desalination technology is currently too cost-prohibitive and energy-prohibitive. It should be pursued only after all other more cost-responsible measures have been fully utilized. Mandatory conservation, water-use efficiency technology implementation, integrated potable reuse solutions and other water conservation solutions should prove to be significantly less costly, consume less energy, and contribute less climate-changing greenhouse gases than sea water desalination.

Additionally, the environmental cost of desalination in terms of marine fish and plant mortality is problematic – massive ‘once-through’ filtering of sea water could result in high mortality for fish and plankton. While the Poseidon proposal’s proponents claim that their project would be ‘carbon neutral’, their concept of carbon neutrality does not take into consideration the comparative increases in carbon production as compared to moving the same amount of water via pipeline from northern California – and MWD has no plans to reduce an equivalent amount of draw from northern California or the Colorado through their systems, hence a net increase in water use would result. Poseidon has stated publicly that should they be required by the water agencies to offset their entire carbon footprint, then the technology would be cost prohibitive.²⁰ From a ratepayer perspective, then, the likelihood of disproportionately higher rates for desalinated water is very high.

An added risk to ratepayers are the public costs associated with building a privately held water production facility, such as the one proposed by Poseidon. Demand for this very expensive water could likely drop as voluntary and mandatory conservation measures take hold. Water districts that have negotiated speculative water purchase deals with Poseidon will face challenges when demand lowers, again, potentially resulting in excessive costs being passed on to consumers.

Rather than pursuing ocean desalination at the present time, water districts should instead be exploring the potential for water storage in underground aquifers. Such aquifers exist throughout San Diego County, including South Bay, Balboa Park and San Pasqual Valley, to name just a few. Underground water storage substantially reduces the evaporative losses associated with open-air reservoirs where most of the County’s water is stored.

²⁰ The Voice of San Diego, “The ‘God of the Sea’ Looks for Greener Pastures. Retrieved on July 23, 2008 from <http://voiceofsandiego.org/articles/2008/07/19/environment/890desal040708.txt>



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The major problem with underground aquifers in San Diego County is that many of them are infiltrated with brackish water. However, desalination of this brackish water is not as energy intensive as desalination of ocean water. Moreover, it is possible that electricity from reasonably priced wind power generated by wind farms in southern San Diego County and northern Baja could be harnessed to desalinate brackish water removed from aquifers, thus reducing the cost of this resource even further.

5.1.6 Track Local Water Agency Best Practices with a 'Water Conservation Scorecard'

The SDCWA should coordinate an independent and on-going assessment, including tracking and oversight, of local water agency and jurisdictional implementation of water conservation best practice technologies and policies. Water districts should be required to provide a standardized accounting of their efficiency efforts to the SDCWA on an annual basis and the results should be published. The California Urban Water Conservation Council's Best Management Practice (BMP) Summary Report on-line tracking system can serve as a primary tool to support this effort.²¹

5.1.7 Citizen Oversight of Urban Water Management Plans (UWMP) and 'Show Me the Water' Law Compliance

The State of California has implemented several laws governing water supply planning in water districts throughout the state. Each water district is required to update its Urban Water Management Plan (UWMP) every 5 years. In addition, new construction proposals (new hookups) are required to verify their sources of water, in order to avoid the 'paper water' scenario – the so-called 'Show Me the Water' laws (S.610 & S.221)²² In both cases, local agencies must be closely monitored for compliance by citizen organizations. The SDCWA is well positioned to track public local agency compliance with state laws.

5.1.8 Districts should be encouraged to pursue water transfers

Currently, water districts within San Diego County must purchase all of their water through the San Diego County Water Authority. At times, water districts have been able to find relatively affordable water available from districts or sellers outside of the region. However, the SDCWA or the Metropolitan Water District Authority have prohibited -- or strongly discouraged -- these private water transfer deals.

In this period of water scarcity, those authorities should change their policies to be encouraging water districts to find private water transfer deals. Oftentimes, water districts are able to find out-of-region water sources that fit their specific needs. The gentle competitive pressure exerted by creative and diligent water districts to find out-of-region water should be rewarded, not stifled. Thus, water transfer policies warrant reinvestigation.

²¹ CUWCC's BMP tracking system, http://bmp.cuwcc.org/bmp/summary_reports.lasso

²² <http://www.owue.water.ca.gov/Guidebook.pdf>



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5.1.9 Local municipalities should support the Millennium Development Goals (MDG) and the Johannesburg Plan of Implementation of the ICLEI (International Council for Local Environmental Initiatives)

Following the lead of two member cities -- Chula Vista and San Diego -- the 16 remaining cities and the County of San Diego should join and actively participate in the ICLEI. Formed in 1990, ICLEI is an international association of local governments and national and regional local government organizations that have made a commitment to sustainable development. Their *Local Government Implementation Guide* is an online resource for local governments interested in pursuing the goals and targets of the Johannesburg Plan of Implementation and Millennium Development Goals. The guide focuses on key global issues of water, sanitation, and human settlements, and is an invaluable tool for jurisdictions that are serious about implementing sustainable practices including water conservation.

Launched in June 2000, ICLEI's **Water Campaign** assists local governments to quantify and qualify water resource use, develop local water action plans, set targets, act on their plans, and track and report goal-achievement.

By adhering to best-practices and model regulations provided through ICLEI, local government jurisdictions can improve water reliability and accountability, and build relations with the local water management and regulatory agencies. This process is referred to as Integrated Water Resources Management (IWRM).

Of 792 city, town, and county members internationally, only the cities of Chula Vista and San Diego are members in San Diego County. The County of San Diego is not a member.

5.1.10 If Prescriptive Measures Aren't Adopted, Then Districts Should Designate Stage 2 (Water Alert) Water Supply Shortage Stages

The County Water Authority and its 24 member water districts should implement a Stage 2 (Water Alert) Water Supply Shortage Stage, and immediately enforce the associated mandatory water conservation measures. As the largest consumer in the region, the City of San Diego should properly take the lead on this designation. The Urban Water Management Plans implemented by water districts place discretionary authority for designating water supply shortage stages squarely on the shoulders of local elected officials. Recent cutbacks in water supply from the Central California Project, and anticipated reductions in flow and increased draws by other basin users from the Colorado River, point to the need for a cautious approach to water management. The simple act of declaring a Stage 2 water alert would send a message to water consumers, and begin to effect significant policy changes in all sectors. Our water glass is no longer full – it's time to take a prudent '**cup is half empty**' approach to this vital resource.



5.2 Key Factual Support

The recommendations offered above are based upon these notable facts:

- **20% of the state's electrical energy consumption is used to move water.** The production of energy contributes to global climate change, which is an acknowledged and growing threat to the human race. In the report titled "California's Water-Energy Relationship" prepared by the State Energy Resources Conservation and Development Commission (Energy Commission) as part of its 2005 Integrated Energy Policy Report proceeding, the Energy Commission concluded that water-related energy use consumes 19 percent of the state's electricity, 30 percent of the state's natural gas, and 88 billion gallons of diesel fuel each year.²³ Since San Diego is at the end of the pipeline, we bear a disproportionate amount of the energy burden.
- **The single largest resource for new water in the region is conservation,** as shown in the 2003 report "Waste Not, Want Not" by the Pacific Policy Institute:

Our best estimate is that one-third of California's current urban water use – more than 2.3 million acre-feet (AF) – can be saved with existing technology. At least 85% of this (more than 2 million AF) can be saved at costs below what it would cost to tap into new sources of supply and without the many social, environmental, and economic consequences that any major water project will bring.²⁴
- **Availability of water is a foundation for growth and development.** Development of water infrastructure is often driven by the perception that economic viability of a region is predicated upon growth. SANDAG's Final 2030 Forecast, released in 2003, predicts that between 2000 and 2030 the San Diego region will add about one million more people, more than 300,000 new homes, and more than 400,000 additional jobs. This estimate is based upon the cities' land use plans, and the County's most recent GP2020 plan update²⁵
- **Numerous benefits are associated with water conservation,** contributing to significant cost savings:

"Saving water is a win for water agencies, a win for our environment, and a win for consumers," noted Dr. Gary H. Wolff, a senior economist with the Pacific Institute and the author of the report's economic analysis. "When you account for the other benefits that flow from saving water – like lower energy bills, reduced

²³ California Energy Commission. (November 2005). [California's Energy – Water Relationship: Final Staff Report](http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF). Retrieved on June 29, 2008 from <http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF>

²⁴ 'Waste Not, Want Not: The Potential for Urban Water Conservation in California', The Pacific Policy Institute, http://pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf

²⁵ SANDAG. (2004). [2030 Regional Growth Forecast](http://www.sandag.org/uploads/publicationid/publicationid_1077_3212.pdf). Retrieved on June 30, 2008 from http://www.sandag.org/uploads/publicationid/publicationid_1077_3212.pdf



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*landscaping costs, and a reduction in waste water – water efficiency measures become very cost-effective, and in some cases are worth doing even if water is free. Our detailed economic analyses show that myths and misunderstandings – not economics – are the biggest barriers to improving our water use efficiency.*²⁶

- **Educational campaigns, such as the County Water Authority's “20-Gallon Challenge” have not produced desired results.** The SDCWA recently announced its intent to spend \$1.6 million additional rate-payer funds to ramp up a marketing campaign to encourage voluntary conservation. Recent experience and common sense have shown that this “educational” approach has little long-term benefit. The Mayor of the City of San Diego reported that the SDCWA’s efforts resulted in only a 3% reduction in usage.²⁷ The monies spent on this advertising could be spent so much more effectively. The fact that educational campaigns have had very little impact was evidenced by this 2007 poll by Competitive Edge – an opinion research organization in San Diego – which revealed that only 14% of those polled have heard a lot about the official request for voluntary water conservation whereas 52% have heard almost nothing or nothing at all about it.²⁸
- **Significant populations of transplants from other parts of the U.S. have come to San Diego with the expectation of water availability similar to their original locations.** The result of the massive western water infrastructure that has been installed over the past 100 years is that most residents who have moved to San Diego in the past 30 years have little understanding or appreciation for where the water is coming from. News relating to water supply challenges in the western Sierra Nevada of Northern California (Feather River) or eastern Utah (Colorado River) lacks the immediacy to seriously affect the collective consciousness of water consumers in San Diego. Yet the consequences of water-related events in those distant locales have very real implications for water consumers in San Diego. It is a case of out of sight, out of mind.

High quality water is more than the dream of the conservationists, more than a political slogan; high quality water, in the right quantity at the right place at the right time, is essential to health, recreation, and economic growth.

EDMUND S. MUSKIE, U.S. Senator, speech, 1 March 1966

²⁶ The Pacific Institute. (Nov 18, 2003). “Media Advisory: California Can Slake its Thirst via Efficiency, Conservation”. Retrieved on July 24, 2008 from http://www.pacinst.org/reports/urban_usage/waste_not_media_release_final.doc

²⁷ Mayor’s Report to City Council dated July 15, 2008

²⁸ Competitive Edge Research and Communication. (September 2007). Water, Water Everywhere, but Less and Less to Drink: Analysis. Retrieved on June 30, 2008 from http://cerc.net/files/barometerresults/2007-09_sep2_analysis.pdf



6 Relevant Policies from Other Cities and Countries

San Diego is not the only region in the world to tackle dwindling water supplies. This section summarizes key findings in our research of water conservation best practices around the world that could be adopted in the San Diego region. Wise water use is an international issue. Cities and countries throughout the world have taken steps to improve water use efficiencies. The Southwest United States, Australia, Israel and other dry areas are among leaders in innovative measures. But there are other first-world countries that have serious water challenges. For example, water availability in South East England is less per person than in Sudan and Syria. Thus, the British have been amongst the world's leaders in water efficiency measures.²⁹

While the following is by no means comprehensive, the range and geographic distribution of these policies is indicative of the broad acceptance of stringent water conservation ordinances throughout the world.

6.1 Water Use Monitoring and Enforcement

Alamogordo, NM: Strict mandatory water conservation measures are enforced through the use of city employees already working in the field, including: code enforcement personnel, animal control officers, police officers, and meter readers.³⁰ Nonprofit organizations in San Diego, such as Walkabout International, The Canyons Campaign, bicycle clubs, even skateboarders, could be engaged in this oversight role.

Roswell, GA: This drought-stricken municipality in the dried-out Southeast has created a 'whistle blower' anonymous hotline for citizens to call in observed wasteful practices, such as over-watering, washing cars on driveways or street, leaving hoses unattended, etc. The city's police department and code-enforcement department officers patrol communities under water restriction ordinance, and have the authority to enter property for the purpose of determining compliance.³¹

State of Colorado: Established specialized water courts in which all manners of water disputes and enforcements are exclusively handled.



Cost: 'Water Police' – meter readers, law enforcement, etc. -- would perform their policing as an adjunct to their primary work, thereby reducing costs. UCAN also proposes a voluntary enforcement component involving "Water Angels" Revenue from fines or increased rates for water wasters could offset the costs of policing.

²⁹ One of the finest practical water policy web sites that UCAN found is located at www.watertwise.org.uk/

³⁰ McCourt, Patrick, et al. (November 2006). [City of Alamogordo Water Conservation Program Overview](#). City of Alamogordo, NM. Retrieved June 6, 2008 from http://ci.alamogordo.nm.us/Water_Conversation/Water_Conversation_Overview.htm.

³¹ The City of Roswell, GA, Retrieved June 6, 2008 from <http://www.roswellgov.com/index.php/p/478>



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6.2 Graywater Reuse Systems

Amongst the most controversial and widely debated of water conservation technologies is graywater reuse. A number of jurisdictions have embraced gray water systems. But it is problematic for San Diego – at least in the near term.

State of Arizona: As one of three lower basin states in the Colorado Compact (along with California and Nevada), Arizona has embraced the challenge of limited water supply for decades. In the area of gray water reuse systems, Arizona takes a three-tiered approach:

- 1) Systems for less than 400 gallons per day that meet a list of reasonable requirements are all covered under a general permit without the builder having to apply for anything.

With this one stroke, Arizona has raised their compliance rate from near zero to perhaps 50%. And, homeowners are more likely to work towards compliance for the informal systems that still fall short. What's more, the door is now open for professionals to install simple systems.

- 2) Second tier systems process over 400 gallons a day, or don't meet the list of requirements, as well as commercial, multi-family, and institutional systems.

They require a standard permit.

- 3) Third tier systems are over 3000 gallons a day. Regulators consider each of them on an individual basis.

In Arizona, regulators apply oversight to gray water systems in rational proportion to their possible impacts.

Another wise feature of the AZ law: ... It does not proscribe design specifics.³²

Arcata, CA: An extensive graywater system is in place that serves 17,000 residents in this small, northern California coastal town, known for its progressive stance on environmental issues.

For health and safety reasons, the County of San Diego appears to be reluctant to permit, let alone mandate, graywater systems. Given San Diego's hilly topography, graywater reuse presents unique flow control issues. Ultimately, graywater will have to be considered as part of the region's water-saving strategies and should properly be a part of any new building built in the region. But currently, the potential for graywater reuse is limited.

As noted below, there are some commercial devices for sale that divert shower water for use in toilets that might be appropriate and cost-effective for some customers. However, retrofitting of all current structures to capture and reuse graywater may prove to be overly costly at the present time.

³² <http://oasisdesign.net/greywater/law/index.htm#arizona> – Oasis Design's 'Gray Water Center'



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6.3 ‘Conserve to Enhance’ Water Banking

The Arizona Water Resources Research Center (AWRCC): The AWRCC has been a leading water policy think-tank for more than 50 years. Among the many innovative studies and research projects conducted is an idea currently being developed, called “**Conserve to Enhance,” Conserving Water to Enhance the Environment**. This program would enable water users to apply conservation gains in their own usage practices, to environmental restoration use elsewhere. The concept of a ‘water conservation bank’ would be established in which funds derived from conservation would be deposited, then subsequently used to finance environmental restoration and enhancement. Key to the success of the program would be the assurances that ratepayers would have that their conservation efforts are resulting in positive gain and not merely facilitating additional growth and development.³³

The Water Conservation Bank concept, similar to the Water Credits mentioned above, is worthy of further investigation for possible application in San Diego.

6.4 ‘Green’ Building Standards

Chula Vista, CA: New green building standards being debated in Chula Vista are expected to add 3 – 5% to the cost of new construction; however, the water and energy efficiency savings can be expected to far exceed that amount.

Chula Vista officials on April 1, 2008 adopted an aggressive approach toward helping fight global warming, pledging to become the first municipality in the county with “green” building standards for all new construction and major renovations. The City Council unanimously voted to require energy-and water-efficient construction standards as part of a proposal from the city’s Climate Change Working Group, a commission led by resident Richard Chavez.

The recommendation came about as the result of the work of the City’s Climate Change Working Group:

In May 2007, Council voted to convene a temporary Climate Change Working Group and tasked the group with developing recommendations that would help the City meet or come close to meeting its target of lowering Citywide CO₂ emissions to 80% of 1990 levels by 2010. This Group was convened following the 2005 Citywide CO₂ inventory report, which indicated that Chula Vista’s community-wide emissions had increased to 35% above 1990 levels (despite decreased municipal and per capita emissions).

The group - made up of residents, businesses and community organization representatives - reviewed over 90 climate reduction measures already implemented by other cities with the goal of determining

³³ Sharon Megdal, ‘Conserve to Enhance: Conserving Water to Enhance the Environment’, *Arizona Water Resource*, Jan-Feb 2008



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which would be most applicable and effective in Chula Vista. The Group met 12 times from June 2007 through August 2008, and [presented] its final recommendations to Council on April 1, 2008.³⁴

The local working group has been addressing climate change through its involvement with ICLEI – the International Council for Local Environmental Initiatives. This initiative is likely going to take a number of years to be adopted absent a concerted effort by the region to recognize the importance of better water use. However, the work done by Chula Vista serves as a template for consideration in all water districts.

6.4.1 The ‘LEED’ Certification Program

Green building is the practice of increasing the efficiency with which buildings use resources — energy, water, and materials — while reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal — the complete building life cycle.³⁵

The LEED (Leadership in Energy & Environmental Design) Green Building Rating System™ is a voluntary, consensus-based standard to support and certify successful green building design, construction and operations. LEED is transforming the marketplace by providing a nationally recognized certification system to promote integrated, whole-building design practices in the building industry.

LEED is a third party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

The U.S. Green Building Council (USGBC) is a non-profit organization committed to expanding sustainable building practices. USGBC is composed of more than 15,000 organizations from across the building industry that are working to advance structures that are environmentally responsible, profitable, and healthy places to live and work. Members include building owners and end-users, real estate developers, facility managers, architects, designers, engineers, general contractors, subcontractors, product and building system manufacturers, government agencies, and nonprofits.³⁶

The City of Chula Vista recently adopted a Green Building Ordinance that will serve as a model for the region. Additional info at: <http://www.usgbc.org>

6.5 Landscaping Ordinances

Riverside County, CA: A new landscaping ordinance was adopted at the county level in April 2008. The ordinance is expected to reduce water consumption in new construction

³⁴ City of Chula Vista, <http://www.chulavistaca.gov/clean/conservation/Climate/ccwg1.asp>

³⁵ Wikipedia, http://en.wikipedia.org/wiki/Green_building

³⁶ U.S. Greenbuilding Council, <http://www.usgbc.org>



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projects by 20%. The City of Perris adopted 60 changes to the city's landscaping ordinance in April 2008. The ordinance requires sophisticated weather-adapting irrigation controllers among other changes.

All water districts in the State of California are required to implement stringent new landscape ordinances, patterned after the state's own, under AB 1881 – The Water Conservation in Landscaping Act of 2006. The deadline for implementation at the water district level is January 2010; there is, however, no requirement for water districts to wait until January 2010.

6.6 Integrated Water Resources Management

The 'International Council for Local Environmental Initiatives' (ICLEI) is an international organization dedicated to sustainable development, with more than 875 member cities, towns and counties worldwide. In its 'Johannesburg Plan', the ICLEI developed the Integrated Water Resources Management planning model, which promotes cross-jurisdictional and cross-departmental communication to further the goals of sustainability. This type of coordination is essential as the stresses on our water systems continue to increase.

Australia: Integrated Water Resources Management best practices have been employed to improve coordination throughout the state, as described in a case study:

The State of Queensland has used several IWRM tools to reform its water policy. The state employed an incremental approach that allowed the government to adjust its procedures and frameworks for water planning according to stakeholder concerns. The development of water resource plans was carried out across the state, in small sections, usually by valley. This process allowed for more streamlined and efficient procedures to be developed after producing the initial plans.

Environmental improvements resulting from the new policies and framework have yet to be fully assessed. However, there are indications that both the state and water industry have benefited from a clearer definition of their roles and expectations. The water industry is seen as having a well defined planning environment for the development of both irrigation and urban water supply.³⁷

6.7 Car Wash Rating Systems

The Australian Car Wash Association launched a five-star rating scheme for car washes and their water efficiency. It helps consumers identify water-efficient car wash facilities and thus make an informed choice in selecting car wash services. The rating system has been adopted by commercial car washes throughout Australia. The program estimates a potential savings of 15 million liters (appx. 4 million gallons) per year countrywide, based on typical car owner washing habits.³⁸ Given San Diego's population is about 15% of Australia's (3 million vs. 21 million), San Diego County might expect to save approximately 600,000 gallons per year through deployment of a rating scheme.

³⁷ ICLEI Implementation Guide, http://www3.iclei.org/implementationguide/water/resources_management.htm

³⁸ Australia Car Wash Association. (May 2006). "Car Wash Water Saver Rating". Retrieved on July 24, 2008 from [http://www.carwashwater.com.au/index.asp?pgid=6_ACWA Water Saver Rating Scheme Rpt \(PDF\)](http://www.carwashwater.com.au/index.asp?pgid=6_ACWA Water Saver Rating Scheme Rpt (PDF))



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6.8 Water Use Restrictions

Water agencies typically employ “stages” of water availability, which once declared set in motion certain water conservation measures. The nature of those measures, and the method by which the stages are declared, is the subject of this section.

Sydney, Australia: Highlights taken from the water agency web site reveal an aggressive conservation program:

Greater Sydney is using the same amount of water now as in 1974. Even though the population has grown by an extra one million people.

Water consumption in greater Sydney has reduced from 500 litres per capita a day in 1991 to around 340 litres per capita a day.

In April this year, less water was used than in any month over the past eight years.

450,000 households have installed water efficient taps and fittings.

43,000 households have received rainwater tank rebates.

82,000 households received washing machine rebates.

Since mandatory water restrictions were introduced in October 2003, customers have reduced their water use by more than 13 per cent. This is equal to around six months water use.

Business is also playing its part. Over 370 of the biggest water users are in Sydney Water's Every Drop Counts Business Program. Together they are saving more than 12 billion litres of water a year.

Sydney Water is spending \$100 million a year to stop water leaks. This involves:

- scanning 18,000 kilometres of water mains for hidden leaks
- replacing more than 100 kilometres of water mains a year in high priority areas
- saving more than 56 million litres every day.

Sydney Water claims to have one of the best leak management programs in the world.³⁹

Residential rainwater tanks function by capturing rainwater run-off from roofs. Rainwater tanks provide a valuable water source to flush toilets, wash clothes, water gardens and wash cars.

Water restriction levels are aggressive and clearly defined:

‘Level 1’ (mandatory) water restrictions went into effect in October 2003 when dam levels dropped below 60%.

³⁹ Sydney Water, <http://www.sydneywater.com.au/SavingWater/>



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'Level 2' (mandatory) water restrictions went into effect in June 2004 when dam levels dropped below 50%.

'Level 3' water restrictions went into effect in June 2005 when dam levels dropped below 40%. Restrictions for this level include:

Hand-held hosing of lawns and gardens and **drip irrigation** is now allowed only on **Wednesdays and Sundays** before 10 am and after 4 pm

No other watering systems or sprinklers are to be used at any time (Levels 1, 2, 3)

A permit from Sydney Water is required to fill new or renovated pools bigger than 10,000 litres (Levels 2, 3)

No hosing of hard surfaces including vehicles at any time (Levels 1, 2, 3)

No hoses or taps to be left running unattended, except when filling pools or containers

Fire hoses must only be used for fire fighting purposes – not for cleaning.

Of note is the fact that dam levels trigger water restrictions – the decision is not discretionary.

North Marin, CA: The North Marin Water District implemented 'Water Shortage Emergency Regulations' from 1973 – 1978 (they were subsequently rescinded). Current regulations include mandatory prohibitions on hosing paved surfaces, washing cars without nozzles, use of non-recirculating water in fountains, coolers, and car washes. All new construction must have restricted flow faucets and toilets, and restrictions are placed on turf landscaping. Overall, these residential regulations and incentives are very aggressive and very appropriate for consideration by San Diego County districts.

San Diego, CA: Many of the restrictions mentioned above are adopted in a proposed water conservation ordinance prepared by the San Diego City Attorney's office on December 28, 2007.⁴⁰ The City Council has not yet acted upon this draft ordinance.

UCAN doesn't currently recommend a rationing scheme. But some of the restrictions adopted in Sydney, Australia and Marin County, such as limits on pool size, use of water for washing hard surfaces, and time limits on when hand-watering can be conducted, are overdue.

The Sydney model is also useful in that it may provide a context by which restrictions might be triggered. Using reservoir levels or some other indicator as a trigger for increasingly stringent restrictions may be warranted for the region.

⁴⁰ <http://www.sandiegocityattorney.org/>



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UCAN Best Practice: Water use restriction levels are triggered objectively, by actual water supply levels in reservoirs

6.9 Water Reuse

Innovative and cost-effective approaches to water re-use are showcased around the world.

Tijuana, BC, Mexico: Long-plagued by over-population and stressed infrastructure, Tijuana came up with an innovative solution for both processing of wastewater, and providing irrigation water for a community park. The 'Ecoparque' project utilizes composting and biofilters to treat wastewater without the use of chemicals which is then used for irrigation in the park. A community of more than 1,200 homes is serviced by this system – and park.⁴¹

Water is essential for all dimensions of life. Over the past few decades, use of water has increased, and in many places water availability is falling to crisis levels. More than eighty countries, with forty percent of the world's population, are already facing water shortages, while by year 2020 the world's population will double. The costs of water infrastructure have risen dramatically. The quality of water in rivers and underground has deteriorated, due to pollution by waste and contaminants from cities, industry and agriculture. Ecosystems are being destroyed, sometimes permanently.

**World Bank Institute
WATER POLICY REFORM PROGRAM - Nov. 1999**

⁴¹ Stovall, Heather. (June 2007). Natural Alternatives to Conventional Wastewater Treatment. UC Davis. Retrieved June 5, 2008 from <http://da.ucdavis.edu/people/2007/HStovall.pdf>, P. 14



7 Wise Water Works

San Diego's water districts have relied heavily upon hoary conservation schemes to promote reduced water usage. They largely fail, as was demonstrated in its most recent 20-Gallon Challenge.⁴² UCAN has found that conservation efforts fail because they are complicated, require some lifestyle changes, and lack effective feedback mechanisms that show success – or failure.

Consumers are bombarded with information about how to save water, save energy, save money, save themselves and save the world. The word “save” has lost much of its meaning; it is probably most commonly used in the rejoinder “save it”, as in “shut up, I’m tired of hearing about it”. Save it, indeed.

If San Diego consumers are going to become more effective water users, it won’t be as a result of another pamphlet touting water conservation measures. It will be a result of strategies described above combined with the deployment of new technologies that lock in water savings without consumers having to change their behaviors.

The technologies and devices detailed in this section reflect best-practices in use in municipalities and water-stressed regions around the world. While many of these technologies can be found in isolated use within the San Diego region, and many water districts are advancing these technologies, there is clearly room for improvement. UCAN calls upon local political leaders and agency officials to embrace these technologies in the course of their rule making.

A plethora of technologies exist worldwide to address the issue of water efficiency.⁴³ Even more are in the works. Europe has taken the lead in developing innovative devices that combine style, functionality and efficiency; the United States should and will become a more active player in these technologies as the real cost of water emerges. Many innovative technologies are profiled in this report; further information can be found at other web sites.⁴⁴

San Diego is benefitted from its numerous world-class universities and its non-profit resources, including the Water Conservation Garden at Cuyamaca College, the San Diego Zoological Society, Quail Botanical Gardens, Balboa Park’s many gardening societies and numerous other smaller garden non-profits. These are invaluable resources that, if tapped, can serve as proving and demonstration grounds for emerging applications in water wise works.

⁴² According to the City of San Diego, the results of the SDCWA’s 20-Gallon challenge were very short-lived. Early in the process, customers saved 4,396 acre feet but within a few months, that savings level had dropped to only 106 acre feet. (Mayor’s report to San Diego City Council, July 15, 2008)

⁴³ Disclaimer: Many of the technologies described here make reference to specific vendors and products. These references are meant to serve as examples only, and do not imply product endorsement.)

⁴⁴ The California Urban Water Conservation Council (www.cuwcc.com) – [Product News](#) – *Absolutely the most comprehensive compilation of water conservation products and technologies on the web.*

The Pacific Institute (www.pacinst.org) - [Waste Not, Want Not: The Potential for Urban Water Conservation in California](#)

[Appendix A: Indoor Residential Water Use and the Potential for Conservation](#)

[Appendix B: Outdoor Residential Water Use and the Potential for Conservation](#)

[Hidden Oasis: Water Conservation and Efficiency in Las Vegas](#)

[Appendix D Calculation of Potential Water Savings in Single-Family Homes](#)



7.1.1 Residential and Commercial Outdoor Technologies

In light of the fact that outdoor irrigation is the single largest use of potable water in California's urban areas, UCAN strongly urges water districts to focus their attentions on changing outdoor watering practices.

7.1.1.1 Swimming Pool Covers

Swimming pool covers offer numerous benefits to the homeowner, in addition to conservation. A recent survey conducted by the Metropolitan Water District (MWD) in cooperation with member agencies revealed the motivations for purchasing pool covers were:

- 1) To keep pool warm (43%)
- 2) To keep pool clean (25%)
- 3) To replace old cover (21%)

In the survey, customers were not motivated to conserve water, even though 8,000 to 10,000 gallons of water per pool per year are saved, based on the average pool size in that water district. A \$50 rebate program was offered, applicable to a 12mil thickness cover purchased through a retailer.⁴⁵

Expanding San Diego water districts' current pool cover programs could also yield large savings. Since 2005, the Southern Nevada Water Authority has distributed 8,450 rebates for pool covers, which it estimates save 30 gallons of water per square foot per year. We conservatively estimate that there are at least 80,000 pools installed in single-family homes alone in the SNWA service area.²⁶ Given an average pool area of 500 square feet in the Las Vegas Valley (Sovocool 2007), providing rebates to an additional 40,000 pool owners in the Las Vegas Valley would reduce outdoor water use by 1.8 KAFY at a cost of far less than building new supply.⁴⁶



SolarCovers.com is representative: <http://www.solarcovers.com/solar-reels.asp>

⁴⁵ Inland Empire Utilities Agency, Metropolitan Water District, Regional Water Conservation Partnership. (May 2004). Residential Swimming Pool Covers: A Survey of Rebate Program Participants. Retrieved on June 30, 2008 from http://www.cuwcc.org/Uploads/committee/Plenary/IEUA_Res_Swimming_Pool_Covers_March-2005.ppt#393,2. IEUA's Pilot Swimming Pool Cover Rebate Program

⁴⁶ http://www.pacinst.org/reports/las_vegas/hidden_oasis.pdf



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Cost: Based on a typical 500 sq ft pool, a 12 mil cover would start at \$150, and a reel system would also start at \$150

Conservation: $20 \text{ HCF} * \$2.35/\text{HCF} = \$47/\text{year}$ lost in typical City of San Diego pool with no cover

Assumptions:

20 HCF/year, Evaporative loss from swimming pool with no cover (based on 30 gallons/sq ft/year x 500 sq ft average pool size)⁴⁷

Average use of cover: 5.7 days/week

7.1.1.2 Smart Sprinkler controllers

Smart controllers (commonly referred to as ET controllers, weather-based irrigation controllers, smart sprinkler controllers, and water smart irrigation controllers) are a new generation of irrigation controllers that utilize prevailing weather conditions, current and historic evapotranspiration, soil moisture levels, and other relevant factors to adapt water applications to meet the actual needs of plants.

According to the Irrigation Association's Smart Water Application Technology (SWAT) information, "*Smart controllers estimate or measure depletion of available plant moisture to operate an irrigation system that replenishes water as needed while minimizing excess. A properly programmed smart controller makes irrigation adjustments throughout the season with minimal human intervention.*" Water savings in the range of 15 – 25% can be expected versus non-'Smart' controllers⁴⁸

A controlled study of the technology, its deployment systems, and actual results, is underway in Southern California. The program is entitled, "Smart Water Application Technology (Swat) Initiative." Final report findings are expected in the fall of 2008. Among the available features of smart controllers is the ability to control them remotely via computer, or via touch-tone telephone, making them particularly useful for remote locations and large enterprise operations.

The California Urban Water Conservation Council has collected detailed analysis of the technology: http://www.cuwcc.org/irrigation_controllers/controller_research.lasso

A representative device is the Agua ET Controller, manufactured by Agua Conserve.



⁴⁷ The Pacific Institute. (November 2007). [Hidden Oasis](http://www.pacinst.org/reports/las_vegas/hidden_oasis.pdf). Retrieved on June 29, 2008 from http://www.pacinst.org/reports/las_vegas/hidden_oasis.pdf, p. 30

⁴⁸ Ibid, http://www.cuwcc.org/uploads/committee/DWR_Interim_Progress_Report_Final_06-08-10.pdf



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Aqua Conserve information: www.aquaconserve.com



Cost: starting at \$264 for a 6-station model



Conservation Savings: 20 – 30%, or approximately 1/10 acre-foot per customer per year⁴⁹

7.1.1.3 Conversion to Native and Low-Water Plants

Approximately 50% of residential water consumption is used for outside irrigation of plants and lawns.⁵⁰ For various reasons including aesthetics, homeowners and businesses prefer to have living landscapes, as opposed to non-living landscapes such as stone, paving, or artificial plants and turf. San Diego is an arid climate, whose native vegetation is drought-adapted. It makes sense, then, to incorporate native plants into residential and commercial landscaping. Key benefits of native landscaping include:

Water Conservation: Once established, many native plants need minimal irrigation beyond normal rainfall.

Low Maintenance: Natives require less water, little to no fertilizer, little to no pesticides, less pruning, and less of your time.

Pesticide Freedom: Native plants have developed their own defenses against many pests and diseases; hence the use of toxic pesticides is not required.

Fire Safety: Properly selected native plants can provide significant protection against wild fire, which has become a significant issue in recent years as our burgeoning communities have expanded their 'wild land-urban' interface into fire-adapted wild lands, which in years past were the realm of plants and animals, but not homes.

Wildlife Benefits: By planting natives, natural habitats can be expanded, thereby benefitting adjoining wildlands.⁵¹

By selecting a broad 'palette' of native plants, shrubs, trees and prostrate ground-covers, the landscaping possibilities are limitless. While irrigation via drip system is sometimes recommended, in most cases natives can be planted without irrigation systems, since once established they adapt naturally to the local weather cycle. Information resources abound on the web, perhaps the most highly respected being the California Native Plant Society (CNPS), which offers relevant resources on-line, and expertise through their local chapter membership. The San Diego CNPS Chapter holds native plant sales twice each year during planting seasons. In addition, local demonstration gardens abound throughout the county, offering first-hand observation of landscaping best practices.

San Diego also boasts a rather remarkable resource called The Water Conservation Garden at Cuyamaca College.⁵² It describes itself as a learning laboratory for the

⁴⁹ The California Urban Water Conservation Council. (Oct 8, 2006). Retrieved on June 29, 2008 from, http://www.cuwcc.org/uploads/committee/DWR_Interim_Progress_Report_Final_06-08-10.pdf

⁵⁰ San Diego County Water Authority. (Oct 12, 2007). Water Conservation Summit: Post-Event White Paper, p. 2, Retrieved on July 1, 2008 from <http://www.waterconservationsummit.com/WaterConSummit07WhitePaper.pdf>

⁵¹ California Native Plant Society, Retrieved on July 1, 2008 from <http://cnps.org/cnps/nativeplants/>

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dedicated gardener and a place to gather lots of information about water-wise, or California-Friendly gardening. It is partially funded by water districts and, if anything, needs to be replicated countywide.

Founded in 1992 and officially opened in 1999, it offers good information for consumers and serves as a planting laboratory for the region. Yet, it offers a wonderful case history about how such educational resources, alone, have only limited impacts. During the 15 years of its existence, the water-intensive, non-native landscapes in San Diego have inexplicably continued to spread. Without incentives to use water-appropriate plants, admirable resources such as the Water Conservation Garden will have only limited impacts.



Nativescapes Garden at the San Diego Wild Animal Park



Cost The cost to install a 100% native plant landscape is roughly equivalent to the cost of installing a conventional irrigated lawn landscape, including irrigation systems. That's where the similarity ends, however. The Federal EPA estimates the cost of maintaining an average lawn to be \$350/year for a half-acre lawn, in addition to water charges, irrigation system costs and non-native plantings.⁵³ The maintenance cost of a nativescape is essentially zero, with occasional costs associated with seasonal overgrowth trimming and removal (understanding that 'puttering in the garden' is a known stress reducer.)



Conservation Savings: A fully-established native plant landscape can save up to 50% of a typical residential home's water consumption.⁵⁴

7.1.1.4 Effective Gardening

To its credit, the local water agencies have attempted to promote xeriscaping, with some degree of success. But the amount of water used for landscaping purposes compels a

⁵² Web information about this resource found at www.thegarden.org

⁵³ The US Environmental Protection Agency. [Sustainable Landscaping Presentation](http://www.epa.gov/req3esd1/garden/presentation.htm). Retrieved on July 1, 2008 from <http://www.epa.gov/req3esd1/garden/presentation.htm>

⁵⁴ Water Conservation Summit: Post-Event White Paper, San Diego County Water Authority, (Oct 12, 2007), p. 2, <http://www.waterconservationsummit.com/WaterConSummit07WhitePaper.pdf>

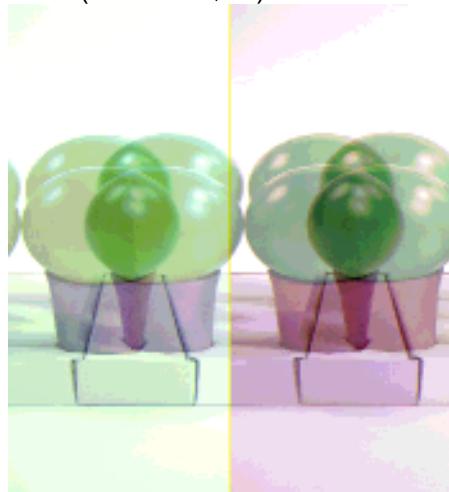
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greater effort to promote wiser water usage in gardens and landscaping. Numerous technologies exist that help reduce landscaping waste. For example, something as simple as a water storing gel or crystals which for approximately \$7 boasts up to 90% water savings. It allows the consumer to water a potted plant once a week by releasing a constant water supply and lasts a full year. Many of these gels store up to 400 times their weight in water and dissolved nutrients. The plants then extract these as needed from the granules.



Conservation Savings: 90%

Similarly, low-cost plant feeders, such as a "Plant Minder" marketed in Europe, releases water into a porous terra cotta pot, which then slowly releases the water into the pot. The plants roots naturally grow towards this source of water and end up enveloping it. The plant then only takes the required amounts of water. It avoids spills, and under and over watering. These items are relatively low cost (less than \$20).



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7.1.1.5 Conversion to Artificial Turf

An increasingly popular alternative to landscape irrigation is turf replacement. Artificial turf provides a turf alternative that retains the look, feel and functionality of a natural lawn. And, it looks green every day of the year, through all seasons – even when it isn't supposed to! The material is porous, and percolates rain water into the soil. Many water agencies provide incentives for removal of turf; the Helix Water District is currently offering an incentive for residential turf removal of \$1.00 per square foot, up to 1,000 square feet. Municipalities such as Las Vegas and Phoenix have also seized upon artificial turf as a desirable alternative to lawns. For consumers who require a lawn area for aesthetic reasons, or for entertaining, this would be an appropriate solution. Cost savings for regular mowing, de-thatching, sprinkler maintenance, etc. are an additional benefit. However, the use of this turf for physical and recreational activities is complicated by recent reports of high lead content in the turf.⁵⁵ In July, a Consumer Product Safety Commission evaluation indicated that newer fields either had no lead or generally had the lowest lead levels, so the SDCWA has restored its turf conversion incentive program. However, this potential health issue combined with the relatively high cost of the material makes artificial turf conversion a somewhat limited option, currently.



Vendor info: <http://www.easyturf.com/>



Cost: less than \$12,000 for an average residence. Variable for commercial customers.



Conservation Savings: 6,800 gallons/year

Assumptions:

50%: Average San Diego household water consumption used for outdoor irrigation⁵⁶

100% of landscape is lawn area

½ acre-foot/year (13,600 gallons or 21,780 cubic feet): Average household water consumption in San Diego

⁵⁵ <http://www.asqi.us/xwp/2008/05/15/artificial-turf-lead-sbr-crumb-rubber-issues-playing-catch-up-on-synthetic-fields/>. It is expected that more will be known about health issues related to artificial turf by 2010. The California legislature is in the process of mandating further study in SB 1277. <http://www.legisweb.com/calm/model/Retrieve.asp?ref=um:calm:2007:sb1277:doc>

⁵⁶ [Water Conservation Summit: Post-Event White Paper](#), San Diego County Water Authority, (Oct 12, 2007), p. 2

7.1.2 Residential Indoor Technologies

7.1.2.1 Hot Water Recirculation Pumps for Showers

This device is mounted in the bathroom between the hot and cold plumbing. The user pushes a button prior to showering or face washing, which causes the pump to circulate cold water in the hot-water pipe back into the cold-water supply to the heater, until the temperature reaches 96 degrees, or 3 minutes have elapsed, whichever occurs first.



Chili Pepper info: <http://www.chilipepperapp.com/Default.htm>



Cost: \$180



Conservation Savings: 2.5 gallons/minute * 1 minute = 6.25 gallons/person/day

Assumptions:

2.5 gallons/minute for low flow shower head

1 minute of cold water in a larger house

Avg. household of 2.5 persons

7.1.2.2 High Efficiency Toilets (HET)

Both 'Ultra-Low Flow Toilet' (ULFT), 1.6 gallons per flush, and the newer 'High Efficiency Toilet' (HET), 1.26 gallons per flush, are continuously improving in efficiency and reliability.

An emerging standard for evaluating toilet efficiency has been developed, with funding in part by The San Diego County Water Authority. This standard, called the 'Uniform North American Requirements for Toilet Fixtures (UNAR)', provides water agencies with reliable criteria on which to base their minimum requirements in support of water conservation programs.⁵⁷

⁵⁷ 'Uniform North American Requirements for Toilet Fixtures (UNAR), Guidelines and Specifications', 1/30/2006, http://www.cuwcc.org/toilet_fixtures/UNAR_SPEC_v1.1_06-03-09.pdf



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Retrofit ordinances are common place in virtually every water district in the region, which require that existing conventional toilets be replaced with ULFT or HET toilets at the time of sale of existing homes. All new construction is required to use ULFT or HET toilets.

A progressive organization in Los Angeles, called 'Mothers of East LA' (MELA), leverages the local water district's toilet retrofit program, by delivering and installing toilets in under-served communities. MELA-SI gives free Ultra Low Flush Toilets to customers – and installs them – in order to save money and water. The old, water guzzling toilets are brought back to MELA-SI for recycling, and the money generated from the recycled toilets are then used to fund other programs.⁵⁸ This innovative program would be a natural extension of the work of the Water Angels, proposed in this report.

(See section on 'Dual-Flush Toilets' section for even more savings.)

If a home built prior to 1980 (not for sale) were to be retrofitted to HET toilet:



Conservation Savings: $6.25 - 1.26 \text{ gallons/flush} * 6 \text{ flush/day} = 29.94 \text{ gallons/person/day}$

If a home built or sold after 1994 (not for sale) thus containing ULFT toilets were to be retrofitted to HET toilet:



Conservation Savings: $.34 \text{ gallons/flush} * 6 \text{ flush/day} = 2.04 \text{ gallons/day}$

Assumptions:

1.26 gal/flush for HET toilets

1.6 gal/flush for toilets made after 1994 (ULFT toilets)

3.5 gal/flush for toilets made between 1980 and 1994

6.25 gal/flush for toilets made before 1980

6 average toilet flushes per household per day

2.5 persons per household

7.1.2.3 Dual-Flush Toilets

In wide-spread use through the world, dual-flush toilets have been developed to respond to the natural fact that toilet users typically do "#1" 6 or more times daily, whereas the average user performs a "#2" only one or two times. Since the flush requirements are different for liquid urine versus solid matter, these toilets offer two flush modes: One button or lever produces a 0.8 gallon flush, whereas the other produces a full 1.28 gallon flush.

⁵⁸ Mothers of East LA, <http://clnet.ucla.edu/community/intercambios/melasi/history.html>

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A popular manufacturer is Caroma, of Australia.

Caroma Info: <http://www.caromausa.com>



Cost: \$350 for Caravelle 270 model, pictured

A Korea firm has developed a dual-flush conversion device for conventional or ULFT toilets. Push the lever down, the flush is 1.0 gallon for liquid on a ULFT toilet; pull the lever up, more water is used for solids. The firm is called Watos Corea.



Watos Corea info: <http://www.watos.com> (Korean), <http://www.usag.com> (English)



Cost: \$12.99

A home-grown solution that can be applied to many conventional ULFT toilets that rely on flapper valve floats to close the valve, and a large tank of water (approx. 4 gallons to provide head), is to adjust the float upward on the chain to achieve minimum low-flush for urine waste, and adjust the fill valve float in combination with bricks or bottles to lessen the volume, to accommodate solid waste. In this scenario, a touch to the lever can produce a short flush of under 1-gallon, while holding down the lever will produce a longer, less efficient flush as needed.



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Conventional ULFT toilet, home-modified to function as dual-flush (www.kohler.com)

If a ULFT single flush toilet were replaced with a dual-flush HET toilet:



Conservation Savings: $1.6 - 0.95 \text{ gallons/flush} * 6 \text{ flush/day} = 3.9 \text{ gallons/day}$

Assumptions:

4 of 5 flushes are 0.80 gal/flush, hence 0.95 gal/flush average

1.6 gallons/flush for ULFT toilet

6 flushes per day - 2.5 persons per household

7.1.2.4 Leak Detection

A recent survey of 47 California water utilities found an average leakage loss of 10 percent and a range of 30 percent to less than 5 percent of the total water supplied by the utilities. Rates as high as 45% have been reported.⁵⁹ Leakage loss represents a significant conservation opportunity!

An innovative system called 'Leak Defense' is offered by the firm Sentinel Hydro Solutions of Escondido, CA. The system monitors ambient flow in the plumbing system, and shuts off supply when an abnormal flow is detected. Designed for emergency notification and shut off in the event of a supply line break while the building is unattended, the system can also detect small leaks down to 8 oz per hour while the building is occupied.

The world-wide American Leak Detection, Co. offers professional leak detection services, at <http://www.americanleakdetection.com/tips-water-conservation.php>

⁵⁹ State of California, Department of Water Resources, Office of Water Use Efficiency and Transfers, Last accessed on June 26, 2008 from <http://www.owue.water.ca.gov/leak/faq/faq.cfm>

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Sentinel Hydro Solutions info: www.sentinelhydrosolutions.com



Cost: \$1,099



Conservation Savings: An average of 10% potential

Assumptions:

10% average leak rate base on a survey of California water agencies

7.1.2.5 Bath and Shower Water Recycling

A form of gray water re-use has been employed in the UK, in which bath and shower water is recycled into toilets through a system of settling tanks and valves. Such technology has the advantage of reusing some gray water without the associated risk of irrigating landscapes as described below.⁶¹ The 'Ecoplay' micro greywater recycling system is manufactured by CME Sanitary Systems in England. The system storage capacity is 100 litres (26.4 gallons) – enough for approximately 26 flushes with a dual-flush toilet.



Ecoplay Info: <http://www.ecoplay-system.com>

⁶⁰ Global Towne, Last accessed on June 14, 2008 from <http://globaltowne.com/images/LDS.jpg>
⁶¹ <http://www.greenworks-energy.co.uk/water-conservation.php>

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Cost: EcoPlay estimates a 6-year payback in a typical household (actual cost TBD)



Conservation Savings: 6 flushes/person/day * 1.26 = 7.56 gallons/ day

Assumptions:

2.5 persons per household

6 flushes a day

1.26 HET toilet

7.1.2.6 Efficiency bathtubs

Anatomically shaped bathtubs reduce the volume of water required for a bath. The British firm, Green Works provides water conserving low capacity baths which reduce the amount of water needed for the 'perfect' English bath down to 140 litres (36.98 gal) rating capacity from the UK government's target of 230 litres (60.76 gal) rating capacity. These low volume baths are the same size as traditional standard baths, but are cleverly shaped inside to reduce the amount of water needed. While not commercially available yet, the concept is easy to reproduce.



Info: <http://www.greenworks-energy.co.uk/water-conserving-bath.php>



Cost: TBD



Conservation Savings: 70 – 36.98 gallons/bath = 33 gallons/bath

Assumption:

Typical bath tub size = 70 gallons⁶²

⁶² EPA, <http://www.epa.gov/watersense/water/simple.htm>

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7.1.2.7 Smart Faucets and Showerhead flow Restrictors and Valves

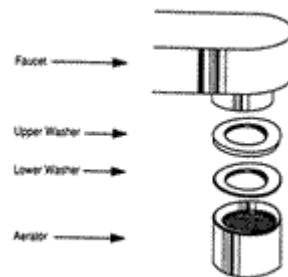
Faucets have not been a primary focus of water efficiency advocates, given that the Energy Policy Act (EPAct) of 1992 and subsequent EPAct legislation have limited faucet flows to 2.2-gpm (at 60 psi) [or 2.5-gpm at 80 psi]. (**NOTE: In public restrooms, the flow rate on faucets is limited by standards and codes to 0.5-gpm.**) It is only now that serious attention (by the U.S. EPA's WaterSense product labeling program) is again being given to residential faucets and the possible new opportunities for further efficiencies.⁶³

The conservation use of faucets and showers, over and above their technology attributes, is to a great deal a function of the operator. Technologies that facilitate lower flow rates can only go so far; ultimately it is up to the user to *turn off the valve!*

Low-flow faucets and showerheads have been required in new construction and resales since the mid-1990's. Significant water savings in the region could be achieved by retrofitting older home and businesses. It is notable that in many jurisdictions, the water agencies have the legal authority to enter property to verify compliance with mandated water conservation measures such as flow restrictors. European countries have begun developing smart faucets that contain flow restrictors and sensors that maximize flow.⁶⁴ One simple item, called "Tap Magic" is a \$8 tap insert that saves up to 70% of water used in a kitchen or bathroom wash basin.



The Jordan Valley Authority (Kingdom of Jordan) promotes faucet and shower flow restrictors in their arid service area. Low flow Faucets and Faucet Aerators, 6 liters (1.6 gallons) per minute maximum:



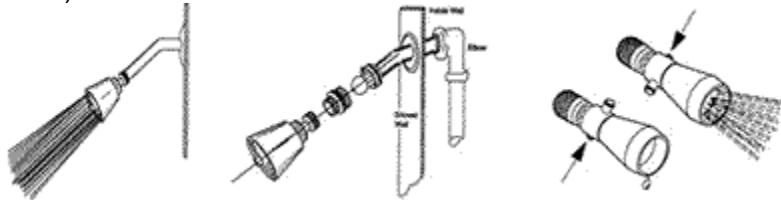
⁶³ California Urban Water Conservation Council, http://www.cuwcc.com/faucets_showerheads.lasso

⁶⁴ http://www.waterwise.org.uk/images/site/Devices/kitchen_final.pdf



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Low flow Shower heads, 9 liters (2.4 gallons) per minute Maximum (note the shut-off button):



Jordan Valley Authority info:

http://www.mwi.gov.jo/mwi/main_topics/WDM/Technologies%20and%20Library%20Water.aspx

We've all seen them before, at the public campground: push-button self-closing valves for the shower and sink. Application of these water – and money -- -saving technologies in the residential market makes sense! The featured shower valve requires a pre-mix valve, if cold washing is not an option. Kings Supply Company offers these products:



Kings Supply Co. info: http://www.kingssupply.com/cat15_1.htm

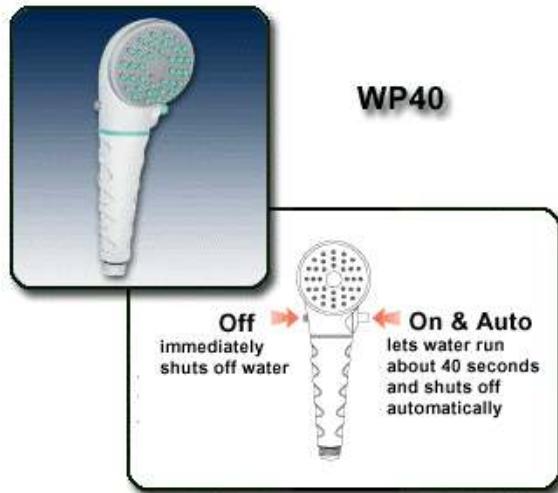


Cost: Shower valve, \$120; Hot/cold mixer, \$110; Sink faucet with mixer, \$160

US Agua Guard offers an innovative hose showerhead that incorporates an auto-shutoff valve. One push-button provides a 40-second flow, while the other button shuts off the flow if 40 seconds is too long! Active duty and retired sailors will love this 'Navy Shower':



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Aqua Guard info: <http://www.usag.com/wp40.html>



Cost: \$19.99



Conservation Savings: $(5 \text{ minutes} * 2.5 \text{ gallons}) - (1.33 \text{ minutes} * 2.5 \text{ gallons}) = 9.175 \text{ gallons}$ per shower saved using the Aqua Guard timed valve, or similar use-management disciplines by the shower-taker

Assumptions:

5 minute average shower

2.5 gallon/minute shower head

Two 40-second squirts: one for wetting, one for rinse



Farrah Faucet or Water Angel???

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7.1.2.8 Leak-proof Toilets

One of the most serious sources of water loss in a home is the leaky toilet. Especially true in San Diego due to the harshness of our water, the rubber seal flapper valves quickly degrade, and they do so over a long period time. Early leaks are nearly undetectable, and only when the toilet begins to fill itself periodically does the homeowner begin to recognize the problem. Adding insult to this injury, replacement flapper valves often defeat the design purpose of the ULFT or HET toilet, resulting in a massive waste of water exceeding 3 gallons per flush.

One useful device to address this problem is a flapper-less HET toilet such as the Ecologic produced by Niagara Conservation, a New Jersey company. This toilet incorporates a trough-like bucket in the tank that holds the water. The flushing action results in the tipping of the bucket resulting in a waterfall of water – ala Niagara Falls. Leakage is impossible – *there is no drain valve!* The city of Austin, TX, has chosen this toilet to offer consumers in their free toilet replacement program.⁶⁵



Niagara Conservation info: <http://www.niagaraconservation.com/Ecologic.html>



Cost: \$305



Conservation Savings: Up to 7,000 gallons/month in the case of a 'silent leak'⁶⁶

7.1.2.9 Toilet Lid Sinks

This ingenious system incorporates a small water tap, sink basin, and even a soap dish into the removable porcelain tank lid on a toilet. The tap itself is auto-shutoff. This system provides additional efficiencies, as the user can combine tooth brushing, shaving, and face

⁶⁵ The City of Austin, TX. (February 2005). Water Wise Newsletter. Last accessed on June 25, 2008 from http://www.enewsbuilder.net/watercon/e_article000355543.cfm?x=b11.0.w

⁶⁶ East Bay Municipal Water District, Last accessed on June 25, 2008 from http://www.ebmud.com/conserving_&_recycling/water_smart_tips/default.htm



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& hand washing with nature's call. Use of the commode in reverse orientation would yield certain benefits...



Source: Real Goods, <http://www.realgoods.com/product/id/1013600.do>



Cost: \$89



Conservation Savings: 10 gallons/day

Assumptions:

1 minute average runtime

2 brushings/day

2 gallons/minute average sink faucet flow rate

7.1.2.10 Shower Buckets

One of the simplest and most effect ways to save a many gallons of water per day in the typical household is to employ the use of a bucket to capture the first 30 seconds – 1 minute of cold water exiting the shower in the morning. Water thus captured can then be used to irrigate indoor or outdoor plants.⁶⁷

⁶⁷ Toy duck watering pail, <http://www.toyboxligonier.com/plwacandu.html>

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The above bucket example was obtained on the internet for \$0.84 (UCAN logo added). One might consider using a watering can to facilitate use in the garden. The plastic ducky water can with beak spout will set you back \$5.25 – but it's a LOT more fun!



Cost: 84 cents



Conservation Savings: 2.5 gallons/minute * 1 minute = 6.25 gallons/ day

Assumptions:

2.5 gallons/minute for low flow shower head

1 minute of cold water in a larger house

Avg. household of 2.5 persons

7.1.3 Commercial Indoor Technologies

7.1.3.1 Waterless Urinals

While urinals are the realm of commercial applications, this waterless technology certainly makes the case for approximately 50% of the users who use toilets while standing up. The urinal technology employs the use of a patented 'vertical trap' process involving the use of a proprietary blue liquid that floats on top of urine, and seals odors. The urinal uses no water. The operating cost of the urinal is advertised to be \$1.00 per 1,000 uses, including materials and labor, versus the cost of fresh water for flushing at a minimum of 1,000 gallons (1.33 HCF) for 1,000 uses -- \$3.12 based on typical \$2.35/HCF residential rate in San Diego. Additional savings are realized from: reduction in down stream costs of treating the effluent (reflected in the sewer service charges and base fees on residential



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bills); reduction in plumbing and valve infrastructure in new construction; reduction in maintenance costs versus convention units.



Waterless Company info: <http://www.waterless.com>



Cost: \$350 - \$480, based on model



Conservation Savings: 6 – 18 gallons/person/day

Assumptions:

1.0 gallon/flush: conventional low-flow urinal (ranging to 3.0 gallons/flush)

6 urinations per day, average

2.5 persons per household

7.1.4 Dual-flush Flushometer Toilet Valves

A dual-flush flushometer valve, similar to one offered by Sloan Valve Company offers a simple retro-fit solution for existing flushometer installations. Lifting the lever upward produces a shorter flush of 1.1 gallons – cutting $\frac{1}{2}$ gallon off the normal flush of 1.6 gallons.



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UPPERCUT™



Sloan Valve Company Information:

http://www.sloanvalve.com/index_3036_ENU_HTML.htm



Cost: \$170



Conservation Savings: 2/5 gallon per flush on average

Assumptions:

4 of 5 flushes are 1.1 gal/flush, hence 1.2 gal/flush average



8 Why Not San Diego?

Other regions have successfully tackled chronic water shortages. What is so different about San Diego? The answer is: **nothing**.

Years of relative abundance of water throughout the Southwestern United States has led water users to view potable water as an inexhaustible resource rather than the gift that it truly is. It will likely take a generation (or two) to alter that perception. Major urban centers such as Las Vegas, Phoenix, Tucson, Los Angeles and San Diego all share the same dilemma – how to evolve from water-waste to a water-wise urban areas.

San Diego is well positioned to make the shift more quickly than other urban areas. Its energy utility is shifting into smart meters earlier than the other urban centers and this transition into a new paradigm of energy usage will help consumer awareness shift its perception on water usage. San Diego is amongst the most high-tech regions in the world and its customer base will be more open to technological solutions to water usage. And its customers are probably the most educated and savvy in the world.

Finally, the SDCWA has begun a dialogue with stakeholders about changes in water usage over two years ago. In so doing, it has laid a foundation for more rapid changes that could be embraced by stakeholders. This affords San Diego a degree of flexibility about which many other regions couldn't boast.

San Diego is positioned to become the most water-wise and energy-wise major urban center in the United States. The only obstacle that remains is the requisite political will.

9 Public Opinion Considerations

A recent Competitive Edge poll reveals the underlying sensibility of the broader electorate:

67% of San Diegans support mandated conservation. 52% of San Diegans had heard 'nothing' or 'almost nothing' about City's voluntary water conservation measures⁶⁸

The public understands that we have a water problem, even if our region's political leadership is uneasy about pursuing aggressive strategies to address this problem. San Diegans are a smart bunch, as elections over the years have shown. The 1985 'Managed Growth Initiative' showed that San Diegans want to manage their growth through deliberate, well-researched development decisions.

In spite of their sensibilities regarding sustainability, however, San Diegans are handicapped by a 'source myopia' phenomenon – they aren't appreciate of our sources for produce (largely: Imperial County via semi-truck), source of fuel (Los Angeles via the

⁶⁸ Competitive Edge Poll & San Diego Coastkeeper



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an underground pipeline), and sources of water (The 1st and 2nd San Diego Aqueducts). Nor do they fully appreciate where our waste/sewage goes (The Pacific Ocean via a 5-mile ocean outfall pipe)? In "Little House on the Prairie", Laura Ingalls Wilder's classic tale of life on the mid-western prairie in the late 1800's, the Wilder family appreciated the answers to these questions because they had to in order to survive. Today's San Diego households do not and do not have to. It is what it is and vague education efforts to inform the consuming public of these sources is a poor use of money.

There is also a temptation by some interests to warn that any aggressive action relating to water will result in detrimental economic impacts. Naysayers will 'warn' decision-makers about how any curbing of water use growth, raising water rates, and cutting back on supply will drive business from the region: 'Our economy will be adversely affected', 'Our region must continue to grow at all costs.' UCAN disagrees. In fact, industry can lead the way through intelligent use of water for landscaping that makes sense on the bottom line:

Developers of some projects plan to use drought-tolerant landscaping or recycled water outdoors, since 75 percent of the water needed by a warehouse goes to landscaping. That way, Brown said, "You don't have vast amounts of lawn area that are flying in the face of local conditions."⁶⁹

10 Grant Funding Sources

As discussed above, most all of the initiatives suggested by UCAN would be self-funding. However, the water districts should explore grant funding as well. A variety of funding sources exist within and outside of the San Diego region, which could be tapped for education and advocacy programs undertaken by water agencies. Some of them are summarized here:

CWA education and marketing expenditures – An amount of \$1.8M was funded on 3/28/08 to further influence users to voluntarily comply with conservation measures. This increased funding was the result of less-than-desired outcomes from the '20-Gallon Challenge' campaign. These funds could be re-directed to support putting conservation technology into the hands of consumers.

The San Diego Foundation – A number of funds at the Foundation could be applied to water conservation education and/or advocacy. Additional funds could be developed by that Foundation and other local foundations.⁷⁰ The Environmental Working Group oversees a fund that promotes different themes each year, with a consistent goal being to increase the capacity of the nonprofit organizations it services. The San Diego Social Venture Partners fund takes a very hands-on participatory approach to working with deserving nonprofits. A new fund, named the 'Protecting our Communities Fund', was recently established in support of the campaign to stop the proposed 'Sunrise Power Link', and is worthy of exploration.

Integrated Regional Water Management (IRWM) Program – This state-directed Grant Program, under the Department of Water Resources, encourages development of integrated regional strategies for management of water resources by providing funding,

⁶⁹ Ibid

⁷⁰ Recently, a newly formed San Diego-based 501(c)(3) nonprofit called The Equinox Center has indicated that water efficiency will be one of its focus points. www.equinoxcenter.org.



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through competitive grants. A San Diego Regional Advisory Committee (RAC) coordinates the efforts of multiple watershed stakeholders, as well as the three primary partners: The County of San Diego, The City of San Diego, & The San Diego County Water Authority. The IRWMP for San Diego serves to review proposals for water project funding in the region, subject to Proposition 50 and Proposition 84 funding sources.

The Governor's 2008 – 09 budget calls for \$3.1 billion to augment Prop 84 funding for IRWMP in support of water conservation.⁷¹

"Air is water with holes in it "

- **Anonymous**

⁷¹ State of California. (2008). The California Strategic Growth Plan. Retrieved June 5, 2008 from <http://www.dof.ca.gov/budget/historical/2008-09/governors/summary/documents/SCSG.pdf>, p. 59



11 Appendix A - Online Resources of Significance

Selected on-line resources related to water conservation policy are compiled here. Many of these organizations have developed significant policy positions, or have researched model technologies and ordinances for application in water-stressed regions of the world.

Water Resources Research Center (AWRRC) at The University of Arizona, College of Agriculture and Life Sciences

<http://www.ag.arizona.edu/azwater/about.html>

A research and extension unit of the College of Agriculture and Life Sciences, the WRRC is the designated state water resources research center established under the 1964 Federal Water Resources Research Act. The WRRC conducts water policy research and analysis, and its information transfer activities include publications, conferences, lectures, and seminars. Water news and information are provided to the academic community, water professionals, elected and appointed officials, students and the public. The WRRC is one of four University of Arizona water centers responsible for implementing the Water Sustainability Program, which receives funding from The University of Arizona's Technology and Research Initiative Fund (TRIF).⁷²

The WRRC publishes two journals, 'AWR Newsletter' and 'Arroyo'. The WRRC is particularly qualified to comment on water policy, given the limited water resources in the Arizona desert region.

The California Urban Water Conservation Council

www.cuwcc.org

The California Urban Water Conservation Council was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities. The Council's goal is to integrate urban water conservation Best Management Practices into the planning and management of California's water resources. A historic Memorandum of Understanding was signed by nearly 100 urban water agencies and environmental groups in December, 1991. Since then the Council has grown to 384 members. Those signing the MOU pledge to develop and implement fourteen comprehensive conservation Best Management Practices (BMPs). A comprehensive set of water conservation technologies is posted at http://www.cuwcc.com/products_tech.lasso

The Planning and Conservation League (PCL)

www.pcl.org

PCL partners with hundreds of California environmental organizations, to provide an effective voice in Sacramento for sound planning and responsible environmental policy at the state level. These partner organizations rely on PCL's presence at the Capitol to not only shape environmental policy, but also keep them informed about issues of concern. PCL oversees key legislation affecting water policy in California, and often plays a key role in developing legislation as a sponsor. Their comprehensive legislative tracking resource is here: <http://www.pcl.org/legislation/index.html>

State of California, Department of Water Resources, Office of Water User Efficiency and Transfers

⁷² The University of Arizona web site, <http://www.ag.arizona.edu/azwater/about.html>



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www.owue.water.ca.gov/docs/UrbanDroughtGuide.pdf

To help local agencies and communities prepare for the possibility of another dry year and possible water supply interruptions, the Department of Water Resources has published this updated version of the Urban Drought Guidebook, entitled 'Urban Drought Guidebook, 2008 Updated Edition.' Drought, climate change, natural disasters, and environmental protections can all affect water supplies. Good planning and preparation can help agencies maintain reliable supplies and reduce the impacts of supply interruptions. The State of California, the U. S. Bureau of Reclamation, and the California Urban Water Conservation Council worked together on the guidebook to provide technical assistance to local water suppliers.

The Pacific Institute

www.pacinst.org/publications

For over twenty years, the Pacific Institute has been providing science-based and peer-reviewed policy direction issues affecting California environment. A number of key policy papers have been influential in shaping public policy as it relates to water conservation in the west. Several are listed here:

'Climate Change and California Water Resources: A Survey and Summary of the Literature' (2003)

'Waste Not, Want Not: The Potential for Urban Water Conservation in California' (2003)

'Hidden Oasis: Water Conservation and Efficiency in Las Vegas' (2007)

California Water Impact Network

<http://www.c-win.org/uploads>

Mission: C-WIN is a non-profit, tax exempt California Corporation that advocates for the equitable and environmentally sensitive use of California's water, including in stream uses, through research, planning, public education, and litigation.

The Board of Directors reads like a Who's Who in water advocacy, including Dorothy Green, Founding President of Heal the Bay, Malinda & Yvon Chouinard, founders and owners of Patagonia, and Jim Edmondson, the Executive Director of Cal Trout. Among their publications is the exceptionally informative *A Community Guide to California's "Show Me the Water Laws"* (Spring 2008), <http://www.c-win.org/uploads/Guidebook.pdf>.



12 Appendix B – Current Water Policies in the Region

The task of conserving water is not without its political challenges. Simple conservation actions that at first blush would appear to be common-sense, upon further analysis reveal significant ‘unintended’ or unforeseen consequences. Jurisdictional authorities must balance the need to conserve with these other pressures, as this Tucson, Arizona City Council member opined:

I know the positive impact of educating communities about water management. But why conserve more when less water use means higher water rates and when our city leadership continues to allow for growth?

The majority of our water department expenses can be described as fixed. This means that the costs will be incurred no matter how much water is supplied. Arizona has a "use it or lose it" policy on Colorado River water rights, so our city must buy its total allocation each year or risk losing it in the future.

Additionally, maintaining existing infrastructure and providing services to existing customers must be done no matter how much water is used. As with any business, the city must divide its fixed costs by the amount of product it sells. The less water sold, the higher the price must be to cover the fixed costs.

As for growth, in a community where 30 percent of our jobs come from the construction industry, it is unrealistic to simply say, "We need to stop growth to save water."⁷³

The author highlights two critical disincentives for water conservation: 1) Federal ‘appropriative rights’ laws that guarantee water to those who use it (as opposed to ‘riparian rights’ that guarantee water to those who have it by virtue of their geographic location); and 2) perceived growth inducements resulting from successful implementation of water conservation measures (“I’m going to waste water now to prevent growth in my community.”)

A further challenge facing those in decision-making positions (formal authorities), is that use of a ‘big stick’ approach to governance is directly contrary to the maintenance of popular support – a fact with which those in elected office are so keenly familiar. The following review of local and regional conditions relating to water conservation is reflective of this fact.

⁷³ “City’s water-conservation plans will be focus of town halls”, editorial by Rodney Glassman, *Arizona Daily Star*



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12.1 City of San Diego

12.1.1 City of San Diego, Mayor/Council

12.1.1.1 Existing City Ordinances and/or Policies

As the largest member agency in the County Water Authority, The City of San Diego under Mayor Sanders has been to date unwilling to establish mandatory conservation measures for City ratepayers, stating that the water situation is far from critical. Hence, the City of San Diego is promoting the CWA's 20-Gallon Challenge voluntary compliance educational program, but no more. This sort of 'inaction' on the part of local elected officials is fairly typical in the region, for some obvious reasons, as this observer notes:

"Right now, it's all moral exhortation," said Steve Erie, political science professor at University of California, San Diego. "There's no real penalty or pain. But that would cost him votes. These are all feel-good measures. And I don't think they really amount to much."⁷⁴

To paraphrase a common expression, "A moral exhortation and \$1.95 will buy you a bottle of water." Placing the responsibility for conservation entirely at the whim of consumers is a wreck less non-solution to a critical water challenge, as this 'Voice of San Diego' reporter noted:

... the call for conservation was slow to catch on. While demand has been lower this winter than it was a year earlier, water authority officials attribute it to the rainy weather -- not their messages about saving water.⁷⁵

The following table shows how the water rates in the City of San Diego are structured:

User Type	Block	\$ per HCF
Single family residences	1-7HCF	2.262
Commercial and Industrial		2.357
Single family & Multi-Family (non-tier)	7-14HCF	2.461
Irrigation		2.524
Single-family	14+HCF	2.775 ⁷⁶

The lack of proportional tiered rates for commercial, industrial, agricultural and multi-family residences is a significant shortcoming which gives an inequitable benefit to large users by placing an unfair burden on single family rate-payers. This issue of water billing for other than single family residential customers is complex, and worthy of further objective review.

The City's 2005 Urban Water Management Plan (UWMP) was adopted by the San Diego City Council on September 11, 2006, and was filed with the Department of Water Resources (DWR). It stands as the City's foundational water planning document and

⁷⁴ Rob Davis, *Voice of San Diego*, "Sanders Turns into Mr. Water", 3/11/2008

⁷⁵ Ibid

⁷⁶ Grand Jury Report, 'Sober Up San Diego: The Water Party is Over'



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portends to be fully consistent with the California UWMPA, SB610 & SB221, the State of California Urban Water Management Planning Act.

A 'smart controller' incentive program was announced in January 2008, in which the City is offering a \$350 rebate to residential customers with over 2,000 sq ft of irrigable landscape. Incentives are also offered to commercial and multi-family customers.

The City provides a variety of educational and incentive programs at their website, <http://www.sandiego.gov/water/conervation>. Programs include: residential and commercial landscape surveys; ULFT and HET Toilet vouchers; smart irrigation controllers; and numerous educational opportunities.

San Diego Municipal Code 147.04 requires that all buildings, prior to a change in property ownership, be certified as having water-conserving plumbing fixtures in place, including toilets, faucets, and auto-shutoff valves for reverse osmosis systems. The requirement to convert to conserving devices is triggered by sale of the property; existing homes are not required to retrofit. A significant water conservation benefit would be incurred were mandatory fixture retrofitting programs be applied to all existing structures.

12.1.1.2 Integrated Potable Reuse (IPR)



Sensationalized by the media and certain public personalities as 'Toilet to Tap', the City of San Diego's bumpy start on the road to re-use of treated water reached a milestone in early 2008 with the approval of a demonstration pilot project by the City Council – over Mayor Sander's veto. Tertiary treated water from the North City Water Treatment Facility will be piped to San Vicente Reservoir, where it will mix with imported and local runoff water, becoming available for consumption following a 12-month assimilation time, after which standard potable water treatment processes are applied.⁷⁷

In the City's 2005 Water Reuse Study, two 'American Assembly' workshops were conducted, resulting in support:

"The Assembly strongly supports indirect potable reuse projects." – American Assembly Statement II, July 2005

Numerous examples of successful and safe IPR projects exist:

Fairfax County, Virginia has been "augmenting" Occoquan Reservoir for 30 years with re-purified water. Las Vegas discharges 100 percent of the city's reclaimed sewage water into Lake Meade. Orange County is discharging their re-purified sewage water into both surface lakes and underground aquifers. The Orange Co. system was largely paid for with federal grant money.

Locally, Santee Lakes, former gravel pits, have been filled with purified sewage water since the late 1950s. Fishing in the Santee Lakes was approved in 1962, with consumption of fish caught in the Lakes approved in 1964, and in 1965, the first public use for swimming was approved.⁷⁸

⁷⁷ Photo: Celsias, http://www.celsias.com/blog/images/toilet_water.jpg



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The cost of mixing potable and non-potable reuse strategies is cost-effective. In fact, the City of San Diego's own 2005/2006 Water Reuse Study, which examined six options for enhancing local water supplies through water recycling and reuse, concluded that a mixed potable and non-potable strategy is the only way to achieve 100% reuse at the North City Water Reclamation Plant at an estimated monthly water bill average increase of \$1.63 per household. A strictly non-potable strategy, which the Mayor has supported, would only achieve 73% of plant capacity at a significantly higher cost of \$2.34 per customer.⁷⁹

Despite the displeasure of some over potable reuse, the fact remains that San Diegans have been consuming treated wastewater for years. More than 300 municipalities and farmers discharge treated sewage into the Sacramento and San Joaquin Rivers. The number of municipalities who discharge treated sewage into the Colorado River exceeds 250.⁸⁰

12.1.1.3 ‘Purple Pipe’ Infrastructure

Two water treatment plants in the City of San Diego currently produce treated water suitable for industrial and irrigation use, yet the distribution infrastructure – ‘purple pipes’ – is inadequate. In a recent press release, Mayor Sanders cited the reason for the slow expansion of purple pipe infrastructure was the low cost of recycled water, which is 30% of the fee charged for potable water (\$350/af recycled versus \$1024/af potable.)

Applications for recycled non-potable water include industrial and landscaping uses; however, indoor use is a potential growth area as the following 2006 case study reveals:

The City of San Diego has many well-known and innovative recycled water customers. However, there is currently only one customer that uses recycled water indoors - BD Biosciences, a segment of BD (Becton, Dickinson and Company). The bio-technology research and development business uses recycled water for toilet and urinal flushing in the eight employee and visitor restrooms in one of its two buildings. The water used in the restroom sinks in this building is potable.

BD Biosciences is located in the Torrey Mesa business park, north of the University of California, San Diego (UCSD). A second company building, in the nearby vicinity, uses recycled water to irrigate outdoor landscaping and in the cooling tower. This older building was retrofitted to accommodate the recycled water use.⁸¹

12.1.1.4 Urban Water Management Plan

In compliance with The Urban Water Planning Act of 1984 (AB 797), the City of San Diego has prepared its Urban Water Management Plan every fifth year beginning in 1985. The most recent plan update was prepared in 2005, and can be found online at <http://www.sandiego.gov/water/pdf/uwmpfinal.pdf>. This comprehensive plan (276 pages) describes in detail the City's plan for managing its water resources, including demand management, regulation, sources, reliability, recycling and drought response. A key

⁷⁸ ‘Toilet Facts’, Judy Swink, www.VoiceofSanDiego.org

⁷⁹ San Diego Coastkeeper

⁸⁰ ‘Editorial: Toilet Water Politics, Recycling Can't Conquer 'Yuk' Factor’, 7/29/2006, The Sacramento Bee and ‘Chemicals at Issue in Toilet-to-Tap Revival’, Kathryn Balint, 1/4/2004, The San Diego Union-Tribune

⁸¹ City of San Diego, Water Reuse Study Update, August 2006,

<http://www.sandiego.gov/water/waterreusestudy/news/eupdate.shtml>



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section relevant to this water conservation report deals with ‘consumption reduction methods’ to include ‘mandatory prohibitions against water use practices during water shortages’:

4.4.2 Consumption Reduction Methods

Prohibitions enacted to bring significant reductions in water consumption during times of extreme water shortage are included in Stages 3 and 4 of Table 4-4. These measures apply only when using potable water (not recycled water), and include prohibiting the issuance of construction meters and building permits; watering golf courses (except greens); filling and refilling of swimming pools, spas, fountains and ponds; and washing vehicles. The current Emergency Water Regulations do not assign percentage values that correlate with anticipated demand reductions resulting from activation of each stage. Rather, as specific conservation stages are sanctioned during emergencies or drought, the Water Department and City Manager will closely monitor projected supply availability and demand. Depending on those projections, the proportionate demand management efforts presented in Table 4-4 will be enacted and enforced.⁸²

The Plan identifies four water conservation stages that govern demand management, regulation and enforcement by the Water Department during water shortages:

Stage 1 (Water Watch) – Voluntary compliance. Applies during periods when the **possibility** exists that the Water Department will not be able to meet all of the water demands of its customers. Estimated percentage reduction in water supply: **5%**

Stage 2 (Water Alert) – Mandatory compliance. Applies during periods when the **probability** exists that the Water Department will not be able to meet all of the water demands of its customers. Estimated percentage reduction in water supply: **10%**

Stage 3 (Water Warning) – Mandatory compliance. Applies during periods when the Water Department **will not** be able to meet all water demands of its customers. Estimated percentage reduction in water supply: **30%**

Stage 4 (Water Emergency) – Mandatory compliance. Applies when a **major failure** of any supply or distribution facility, whether temporary or permanent, occurs in Metropolitan, Water Authority, or City water distribution system and facilities. Estimated percentage reduction in water supply: **50%**

The City’s Municipal Code includes Water Emergency Regulations which authorizes the Mayor (acting as ‘City Manager’) and City Council to determine and declare water shortage emergencies in any and/or all parts of the city. In other words, there is no objective trigger to initiate Stage 2 or higher level alert status – the decision is discretionary on the part of the elected Mayor and Council.

On September 21, 2007, the City Attorney requested that the City begin the process of declaring a water shortage emergency, and implement Stage 2 conservation measures. He cited increasing drought conditions, and the reduced water supply from the bay delta due to the judicial decree to protect the delta smelt.

⁸² City of San Diego, ‘Urban Water Management Plan’ (2005), p. 4.15, <http://www.sandiego.gov/water/pdf/uwmpfinal.pdf>



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As of this writing, the Mayor and Council have not even designated Stage 1 Water Supply Shortage Stage.

12.2 County

12.2.1 County Grand Jury recommendation/report

In its comprehensive report entitled, “Water Conservation: Sober Up San Diego, the Water Party is Over”, filed February 2008, the County Grand Jury issued strong recommendations for action to the City of San Diego.⁸³ The 10-page report included the following specific recommendations variously to the City Council, the Mayor, and City Water Department:

- 08-05:** Put the water rates for multiple-family residences, and for commercial, industrial, and agricultural users into tiered block structures to make charges proportionate to use.
- 08-06:** Consider more carefully their growth policy as it relates to San Diego’s long-term water prospects and begin more rigorously enforcing the requirement that any large project proposal be able to ensure a 20-year supply of water.
- 08-07:** Publish the current water restriction stages and conditions in order to induce greater participation in conservation efforts.
- 08-08:** Base the cost of new water meters on the current and projected water conditions.
- 08-09:** Formalize concrete triggers for water alerts to make them automatic and less arbitrary.
- 08-10:** Make some or all of the voluntary usage restrictions in Stage 1 water watch permanently mandatory in San Diego.
- 08-11:** Periodically distribute to all residents information on water conservation and pursue other methods such as media coverage to get the public’s awareness of the need for a maximum effort at conservation.
- 08-12:** Raise the cost of recycled water to at least 80% of that of potable water, and use this income to finance expansion of the recycled water distribution system.
- 08-13:** Approve the use of recycled water for reservoir augmentation.
- 08-14:** Implement the use of recycled water in all appropriate City facilities.
- 08-15:** Support the pilot study in using reclaimed water as a source of potable water approved by the City Council.

⁸³ San Diego County Grand Jury, “Water Conservation: Sober Up San Diego, the Water Party is Over” (February 2008).



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These recommendations send a strong message to the City of San Diego, which dutifully responded as it is required to by law. The responder was the City's own Independent Budget Analyst (IBA), in a memo dated April 25, 2008. A sampling of the response text reveals the frequent use of the following English language expressions: "...this action *may* be implemented in the future...", "This requires *further analysis...*", "...prior to approval of any discretionary permit for a future project, DSD *requests* the Water Department prepare a water supply assessment (WSA) to be included in the environmental documentation of certain large proposed projects.", "The recommendation *has not yet been implemented*, but *could be* implemented if appropriate and allowable in the future...", "Mayor Sanders has been *following the Code* and has been actively working to *encourage far greater* water conservation throughout the city...", "There is no doubt that the City of San Diego's water supply reliability is challenged but *it is far from bleak...*", "*Additional study and demonstration* of treatment technologies is required to secure the necessary state permits for reservoir augmentation...", "...recycled water *may be used* for reservoir augmentation at *some point in the future...*". [Italics added for emphasis]

While some agreement with the Grand Jury's recommendations was forthcoming, significant room for improvement remains. Weasel words such as these are best left to the weasels. Action verbs are what are needed here (e.g. "shall", "will", "direct", "order", "require".)

12.2.2 County Water Authority

The County Water Authority (SDCWA) is San Diego County's regional water wholesaler. It was formed in 1944 for the purpose of importing water to the region. At the time of its formation, the Water Authority supplemented local supplies with imported water. The mission of the San Diego County Water Authority is to provide a safe and reliable supply of water to its 24 member agencies serving the San Diego region's \$150 billion economy and nearly 3 million residents.

At one time, the Authority imported 95% of its water, but has since made efforts to reduce. The water import rate reached a low of 83.5% in 2000, and has been going up since then. The Authority has a goal of 60% imported water by 2020⁸⁴

This following sections review recent SDCWA actions.

12.2.2.1 Water Conservation Summit

In 2006 and 2007, the County Water Authority conducted 'Water Conservation Summits' which brought together stakeholders from throughout the region to explore tactics and strategies for achieving increased water-use efficiency. A white paper was produced and issued to the press in March 2008 which highlighted the following findings and recommendations produced by several working groups:⁸⁵

- A 'Vision 2012' Panel reviewed methods of influencing public behavior, reminiscent of the 'BDI' intervention model (Identify desired behavioral changes, Identify the determinants of those desired behaviors, and develop

⁸⁴ San Diego Coastkeeper, Powerpoint, November 2007

⁸⁵ San Diego County Water Authority, 'Post-event White Paper: Water Conservation Summit', <http://www.waterconservationsummit.com/WaterConSummit07WhitePaper.pdf>



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interventions to influence those determinants.) These findings relate exclusively to volunteer compliance with conservation measures.

- A draft **landscape ordinance** was further developed in 2007, based on initial studies conducted at the 2006 Summit. Development of this ordinance is a requirement of AB 1881. Legal review of enforcement authority, technical, and outreach objectives pursuant to finalization of the ordinance and associated Technical Manual were discussed. By January 2009, DWR will develop a state-wide model ordinance for water-efficient landscaping. By January 2010, every California County and City must adopt a water-efficient landscape ordinance that is at least as effective as the state's model; a draft county ordinance is posted on-line. Key points of the ordinance:
 - Landscaping <3,000 sf when not installed by the developer are exempt. This is problematic, as the bulk of residential landscaping in the region falls into this category.
 - Re-landscaping <3,000 sf are exempt. Again, a significant loophole afforded to those who are updating their landscapes.
 - Cemeteries, historical sites, public recreation sites are exempt
 - A Landscape Design Manual will include detailed design criteria
 - CC&Rs for Planned Residential Developments (PRDs) must include requirement to meet the ordinance
 - Cities and County will coordinate with the local water districts to ensure consistent application of criteria
 - Water budget-based approach, maximum water allowance is based on 0.7 EvapoTranspiration Adjustment Factor (ETAF)
- An '**Industry Cluster Working Group**' was formed, which developed recommendations for collaboration and marketing, as follows (note that all of these recommendations are educational-only -- no policy mandates are recommended):
 - 'Accelerated Public Sector Water Efficiency Partnership Demonstration Program' and other incentive programs (voluntary)
 - Make available examples of water-efficient landscaping on Web and CD data distribution to contractors and consumers (voluntary)
 - Gather testimonials (voluntary)
 - Marketing to HOA and related professional associations (voluntary)
 - Explore collaborating marketing opportunities with other agencies, utilities (voluntary)
 - Link incentives to drought response plan (voluntary)

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- Apply for grants to reinforce conservation efforts (voluntary)
- Continue development of a regional web-based 'water budget program' (voluntary)
- Conduct feasibility study on implementation of water budgets for mixed meter sites (voluntary)
- **Public Outreach and Education** – This focus group produced no action items, but rather developed themes for incorporation into an 'Outdoor Water Conservation Public Outreach Plan', which, no doubt, will occupy shelves at water districts and corporate offices throughout the region when it is completed. Key among the educational resources highlighted is The Water Conservation Garden in El Cajon.
- **Recycled Water** – This focus group emphasized the need to develop a consistent message regarding non-potable uses of recycled water across water agencies. The support of industry was encouraged to increase odds of obtaining funding for expansion of purple pipe infrastructure. Participants 'generally supported' IPR (integrated potable reuse) through reservoir augmentation and/or aquifer recharge. The group advocated:
 - development of a regional marketing plan,
 - solicitation of grant funding to promote education,
 - coordinate with the Regional Water Quality Control Board and stakeholders to produce 'salt management plans' to improve recycled water quality
 - Forming an ad hoc IPR committee within the 'WateReuse' organization to serve as advocates for reuse
- **Water and Energy Partnership** – This focus group recommended marketing and incentive programs to promote both water and energy savings. The use of water and energy audits was suggested. No teeth. (It is notable that legislation, AB 2404, was introduced by Assemblymember Salas in March 2008 that would require energy companies to consider water conservation measures that lead to energy savings.)

12.2.2.2 Education

In March 2008, the CWA board took action to initiate a \$1.6 million marketing campaign to further educate the region's water users as to the need to conserve. The concern expressed was that public perception has been influenced by recent rains and snow packs, creating the impression of adequate water availability. The previous year's '20-Gallon Challenge' earned media campaign has not produced the desired results, according to the agency.

The effectiveness of a more aggressive education campaign at the expense of more stringent regulatory or cost-based reforms has to be questioned.



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12.2.2.3 Member Water Agencies

24 member water district agencies control the distribution, rates, hook-ups, and consumer education at the point-of-use. It is useful to note significant progress/setbacks at the jurisdictional level, even as state and regional mandates begin to require reforms. Lead agencies demonstrating progressive practices can, and perhaps have, drive the process at the regional level through the implementation of available technology, adoption of progressive rate and hookup structures, and adoption of 'green' or 'low impact development' (LID) policies.

Significant conservation practices among members agencies are highlighted in the 'Model Policies & Ordinances Summary' section of this report. A comprehensive tracking of water district best practices is a recommendation of this report.

12.2.2.4 "20 gallon challenge"

The '20 gallon challenge' model education program has been put forth by the Water Authority, as a guide for implementation by member agencies. Recent analysis of the effectiveness of the educational program has inspired the Water Authority to implement a \$1.8 million marketing campaign to further educate the majority of water users who either a) have not heard of the '20-Gallon Challenge', or b) see no point in modifying their behavior.

12.2.2.5 Quantification Settlement Agreement (QSA), 2003

The QSA agreement involved key governmental stakeholders, whose purpose was to agree to water apportionments for California from the Colorado River, subject to the Colorado River Compact and subsequent agreements, previously agreed to by the seven member water basin states. That 1922 original agreement limited California to a diversion amount of 4.4M acre-feet per year. The October 10, 2003 agreement was signed by representatives from the San Diego County Water Authority, the Metropolitan Water District, Coachella Valley Water District, Imperial Irrigation District, the State of California, and the U.S. Department of the Interior. The other basin states were not involved in the QSA, as no change to their agreed-to diversion amounts was anticipated or possible.

Included in the provisions of the agreement: Fallowing of agricultural fields in Imperial and Palo Verde Valleys in order to transfer water from there to San Diego and Los Angeles; Lining of the All-American and Coachella Canals to reduce loss from percolation (and consequently lowering of the water table in Mexico, thereby inflicting hardship on subsistence farmers there – a significant environmental and social justice issue that has yet to be resolved); and the 'restoration' of the Salton Sea, whose health is dependent primarily on agricultural runoff.

It is interesting to note that the original Colorado River Compact, and subsequent agreements including the QSA, were based on an estimated annual flow rate for the Colorado River that is not only based on incorrect historical data – it is also most certainly bound to change downward as the result of global climate change.

It is significant, therefore, that key among the features of the QSA is this agreement:



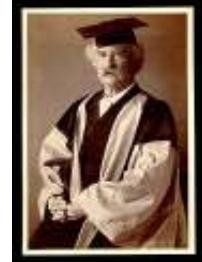
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A peace treaty between the four water agencies and the promise for lasting peace among the seven states that share the Colorado River⁸⁶

(One might ask, were these agencies and states at war previously?)

One would hope that this ‘peace treaty’ of sorts holds going forward, as our water demands and stresses increase. More than one author has postulated that the next civil war in the United States will be fought over water, and this noted 19th century philosopher summed up the western water situation prophetically:

“Whiskey’s for drinking, water’s for fighting about.” — Mark Twain



12.3 Resource Conservation District (RCD) of Greater San Diego County

The RCD is a significant resource for education and funding in the region, although it has no regulatory authority. RCD services are wide and varied to meet the diverse needs of the county’s residents, agencies and businesses. The RCD provides soil and water conservation assistance to landowners, homeowners, growers, ranchers, schools, environmental organizations, government agencies, and consultants.⁸⁷

As mandatory and incentive-based conservation programs come into being, the RCD will have an increasing role to play.

12.4 Regional

12.4.1 Metropolitan Water District (MWD)

The Metropolitan Water District of Southern California is a consortium of 26 cities and water districts that provides drinking water to nearly 18 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura Counties. The mission of the MWD is to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way. Metropolitan currently delivers an average of 1.7 billion gallons of water per day to a 5,200-square-mile service area. The two primary external sources of MWD’s water are the Colorado River via the Colorado River Aqueduct, and Northern California via the Central Valley Project⁸⁸

The San Diego County Water Authority is the largest purchaser of water from MWD, from which it imports 90% of San Diego County’s potable water.

⁸⁶ San Diego County Water Authority, ‘Quantification Settlement Agreement Fact Sheet’, <http://www.sdcwa.org/manage/pdf/QSAfactsheet.pdf>

⁸⁷ RCD of Greater San Diego County, <http://www.rcdsandiego.org/>

⁸⁸ MWD, <http://www.mwdh2o.com/mwdh2o/pages/about/about01.html>



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On 3/12/2008, MWD approved a 14.3% rate increase going into effect 1/1/2009. The amount passed on to member agency rate-payers will depend on the amount of imported MWD water they purchase. Recognizing the increasing demands on water infrastructure, some board members highlighted the need for increased conservation:

Board Chairman Timothy F. Brick said in a statement ... that the MWD must work with its 26 member cities and agencies to manage rising costs, including through "more aggressive water conservation." Some critics have said the MWD has not championed conservation to reduce imported water use and keep rates down.⁸⁹

Some members argued that the increase should be 20% to avoid using cash reserves to keep the rate down. Further, the cost of purchasing imported water is expensive, and often wasteful. As a case in point, in 2002 MWD staff arranged to pay 11 Sacramento Valley irrigation districts \$10/acre-foot options for the right to purchase 146,000 af of water should the need arise. The result was right out of Murphy's law book:

"The winter was dry, and that spring, MWD called the options. Almost immediately afterward, the heavens opened, and it rained like hell... [as a result] \$8.3 million worth of water floated down the Sacramento River and out to sea... because we had to call it too early."⁹⁰

With the increasingly unpredictable nature of climactic systems related to global climate change, the lengthening odds of gambling for water rights calls into question the ethics of managing rate-payer funds in this hap-hazard way.

At this writing, MWD is nearing the end of a \$6.3 million education campaign, and is preparing to match that spending to continue the campaign through 2009.

12.5 State of California

12.5.1 Significant Legislation

Numerous pieces of legislation have been enacted or introduced, which have significant bearing on local conservation practices. These bills are briefly discussed in the following sections.

12.5.1.1 Previously Adopted Legislation

12.5.1.1.1 AB 797 -- The Urban Water Management Planning act of 1983

The Act states that every urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The Act describes the contents of the Urban Water Management Plans as well as how urban water suppliers should adopt and implement the plans. It is the intention of the

⁸⁹ Deborah Schoch, Los Angeles Times Staff Writer, "MWD approves 14% hike in rates on imported water", March 12, 2008

⁹⁰ Matt Jenkins, "L.A. Bets on the Farm", *High Country News*, 11/12/2007



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Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.⁹¹

The City of San Diego has produced Urban Water Management Plan updates roughly every 5 years since 1985, with the most recent update being 2005.

The UWMP is the primary vehicle for use by the City in implementing strategies for water conservation, and should be a focus of UCAN's oversight.

12.5.1.1.2 SB 610 & SB 221 – Changes to the Urban Water Management Planning Act, 2001

The so-called 'show me the water' bills, they modify the original legislation from 1983. The City of San Diego and other local agencies are required to demonstrate 'proof' of 20-year water supplies for major projects. Ellen Hanak of the Public Policy Institute of California had the following observations:

"However, the survey showed that over half of all cities and most counties—housing over half of the state's residents—have some form of local oversight policy to guard against this possibility [of local government – utility disconnect]. In addition, the passage in 2001 of Senate Bills 610 and 221—the "show me the water" bills—requires the demonstration of adequate long-term water supply before approval of large development projects. These new laws have already made their mark. Developers are being sent back to the drawing board to come up with more secure supply options, and many projects are being designed to incorporate recycling and conservation."⁹²

She further noted a need for regulatory oversight,

"To date, the state's main role has been to facilitate better local water and land-use planning through certain pieces of legislation, financial incentives, and technical support. However, water management laws have relied on citizen enforcement rather than direct state oversight. Billions of dollars in state water bond funds have enabled the state to reward local entities for taking positive actions. Yet ... there is more room for regulatory actions—in particular, withholding new water-rights permits, as a way to encourage local entities to manage water resources responsibly."⁹³

She went on to cite a specific example of agency non-compliance,

"The Urban Water Management Planning Act introduced in 1983 requires that all large municipal utilities prepare a comprehensive water supply and demand planning document every five years. Yet in 2000, one sixth of required municipal agencies submitted no water plans whatsoever, and a significant portion of submitted plans lacked detailed projections of supply and demand."⁹⁴

⁹¹ California Department of Water Resources, <http://www.owue.water.ca.gov/urbanplan/index.cfm>

⁹² Ellen Hanak, Public Policy Institute of California, "Does California Have the Water to Support Population Growth?", Research Brief, July 2005, page 2, http://www.ppic.org/content/pubs/rb_RB_705EHRB.pdf

⁹³ ibid

⁹⁴ ibid



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12.5.1.1.3 AB 1881 – The Water Conservation in Landscaping Act of 2006

AB 1881 requires local jurisdictions to adopt landscape ordinances promoting significant improvements in outdoor landscape efficiency. The San Diego County Water Authority and member agencies are working towards implementation of model landscape ordinances, some in advance of the January 1, 2010 legally-imposed deadline. The Act also requires adoption of performance standards and new product labeling, in cooperation with the California Energy Commission, for the purpose of reducing energy and water use in landscaping applications.

12.5.1.2 Current Pending Legislation

12.5.1.2.1 AB 2175 (Laird, D-Santa Cruz) –

AB 2175 would require cities to cut per capita water use by 20 percent by 2020 and farmers to slash water demand by 500,000 acre-feet by the same year. The bill also ties future state water management grants to local agencies to their compliance with conservation goals – this is in reference to the IRWMP (Prop 50 & Prop 84) funding cycle as discussed elsewhere in this report. The bill initially leaves it up to cities and agricultural agencies to develop their own water reduction strategies, and will follow-up with forceful mandates should the cities and agencies waiver. For cities, the bill may set low and high per-capita targets for communities that already have successful conservation programs and those that don't, respectively.

AB 2175 is **supported** by the Planning and Conservation League

12.5.1.2.2 AB 2153 (Krekorian) – The Water Efficiency Security Act (WESA)

This bill would ensure water reliability and security by establishing water efficiency targets for new development and developing a funding stream to increase efficiencies in existing housing through an 'offset program'. It would affect new construction beginning January 2014.

The California Water Efficiency and Security Act will:

1. Have the California Energy Commission develop guidelines requiring all new development in California be water demand neutral by first incorporating water efficiency measures.
2. Require any water use in the new development to be offset through water efficiency measures in existing communities or by developing climate resilient water supplies.
3. Water efficiency programs will be directed to disadvantaged communities that otherwise would not be able to afford efficiency and adaptation.⁹⁵

AB 2153 is **sponsored** by the Planning and Conservation League.

⁹⁵ The Planning and Conservation League, *AB 2153 (Krekorian) California Water Efficiency & Security Act of 2008*, informational flyer, <http://www.pcl.org/files/WESA%20AB%202153%20Fact%20sheet%203%202014%202008.pdf>



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12.5.1.2.2.1 (*Salas, D-National City/Coronado/Chula Vista/Imperial Beach*) –

An existing decision of the commission approved pilot programs for the state's largest electrical and gas corporations through which they will develop partnerships with water agencies to undertake specific water conservation programs and will measure the results and fund studies necessary to understand more accurately the relationship between water savings and the reduction of energy use and the extent to which those reductions would vary for different water agencies. This bill would require the commission, by December 31, 2009, to report to the Legislature on the results of the pilot programs, provide conclusions drawn from the pilot programs, and make recommendations as to whether the electrical and gas corporations would or could achieve cost-effective energy efficiency improvements through water conservation programs.

This bill is significant in that it would solidify the connection between water use and energy efficiency, ultimately relating to global climate change impacts.

AB 2404 is in '**watch**' status by the Planning and Conservation League

12.5.1.2.3 AB 2882 (Wolk) -- Allocation based conservation water pricing

This bill would help California promotes water use efficiency in the state by permitting the use of allocation based water rates. Allocation based water rates provide equitable incentives for water users to use water efficiently. When properly tiered, allocation based water rates ensure that those that are very efficient water users are rewarded with lower water rates and those that are more wasteful bear the burden of paying for additional water. The relevant section of the proposed legislation follows:

372. (a) A public entity may employ allocation-based conservation water pricing that meets all of the following criteria:

(1) Billing is based on metered water use.

(2) A basic use allocation is established for each customer account that provides a reasonable amount of water for the customer's needs and property characteristics. Factors used to determine the basic use allocation may include, but are not limited to, the number of occupants, the type or classification of use, the size of lot or irrigated area, and the local climate data for the billing period.

(3) A basic charge per volumetric unit is imposed for all water used within the customer's basic use allocation, except that at the option of the public entity, a lower rate may be applied to any portion of the basic use allocation that the public entity has determined to represent superior or more than reasonable conservation efforts.

(4) A conservation charge is imposed for increments of water use in excess of the basic use allocation. The conservation charge for the increments shall, in the aggregate, provide revenue not to exceed conservation measure costs and overuse costs. The increments may be fixed or may be determined on a percentage or other basis, provided that the conservation charge for the highest-price increment is at least three times the basic charge.

(b) (1) Except as specified in subdivision (b), the design of an allocation-based conservation pricing rate structure shall be determined in the discretion of the public entity.

(2) The public entity may impose meter charges or other fixed charges to recover fixed costs of water service in addition to the allocation-based conservation pricing rate structure.⁹⁶

⁹⁶ LegInfo, http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=ab_2882&sess=CUR&house=A&author=wolk



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The bill does not require all water agencies to adopt conservation rates, but for those who do it establishes standards that protect consumers by ensuring a lower base rate for those who conserve water and requiring that higher rates for use in excess of the base rate do not exceed the reasonable cost of providing the water service. Wolk's legislation provides agencies with the clarity necessary for legal implementation of these rate structures, in the context of Proposition 218.⁹⁷

AB 2882 is **supported** by the Planning and Conservation League.

12.5.2 CalFed

Arising from years of wrangling over Bay Delta management issues (San Francisco Bay and the river deltas generally formed by the Sacramento and San Joaquin Rivers) during the drought of the 1980's and early 1990's, the formal 'CalFed' was established officially in 1994. In 2000, a Record of Decision (ROD) was agreed to by the then 13 state and federal agencies (later expanded to 25 agencies), which established four main CalFed goals:

Water Supply Reliability:	Expand water supplies to ensure efficient use of the resource through an array of projects and approaches.
Water Quality:	Improve water quality from source to tap for 25 million Californians who receive at least some of their drinking water from the Delta.
Ecosystem Restoration:	Improve the health of the Bay-Delta system through restoring and protecting habitats and native species.
Levee System Integrity:	Improve Bay-Delta levees to provide flood protection, ecosystem benefits and protection of water supplies needed for the environment, agriculture and urban uses.

The California Bay-Delta Authority was established in 2004, with federal participation beginning in 2006. The **California Bay-Delta Authority** is comprised of 24 members, six each representing state and federal agencies, seven public members, one member from the Bay-Delta Public Advisory Committee and four non-voting ex-officio members.

A summary of the past and pending actions of CalFed, and the very serious issues associated with managing the Bay-Delta region, are beyond the scope of this paper. However, consumer watchdog vigilance is the order of the day as decisions affecting the Bay-Delta will have profound environmental and sustainability implications for the State of California, and Southern California in particular.

⁹⁷ Lois Wolk News, April 2008, <http://democrats.assembly.ca.gov/members/a08/press/20080414AD08PR01.htm>



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12.5.3 Governor Schwarzenegger

12.5.3.1 “Delta Vision”

Building on the work of CalFed, Governor’s ‘Delta Vision’ program further develops a regional strategy for protecting and managing the bay-delta. Delta Vision has produced the following set of 12 recommendations to drive the process going forward:

Delta Vision’s 12 Integrated and Linked Recommendations

1. Delta ecosystem and a reliable water supply for California are the primary, co-equal goals for sustainable management of the Delta.
2. The California Delta is a unique and valued area, warranting recognition and special legal status from the State of California.
3. The Delta ecosystem must function as an integral part of a healthy estuary.
4. California’s water supply is limited and must be managed with significantly more efficiency to be adequate for its future population, growing economy and vital environment.
5. The foundation for policy making about California water resources must be the longstanding constitutional principles of “reasonable use” and “public trust;” these principles are particularly important and applicable to the Delta.
6. The goals of conservation, efficiency and sustainable use must drive California water policies.
7. A revitalized Delta ecosystem will require reduced diversions, or changes in patterns and timing of those diversions, upstream, within the Delta and exported from the Delta at critical times.
8. New facilities for conveyance and storage, and better linkage between the two, are needed to better manage California’s water resources, the estuary and exports.
9. Major investments in the California Delta and the statewide water management system must be consistent with, and integrate specific policies in this vision. In particular, these strategic investments must strengthen selected levees, improve floodplain management and improve water circulation and quality.
10. The current boundaries and governance system of the Delta must be changed. It is essential to have an independent body with authority to achieve the co-equal goals of ecosystem revitalization and adequate water supply for California while also recognizing the importance of the Delta as a unique and valued area. This body must have secure funding and the ability to approve spending, planning and water export levels.
11. Discouraging inappropriate urbanization of the Delta is critical both to preserve the Delta’s unique character and to ensure adequate public safety.



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12. Institutions and policies for the Delta should be designed for resiliency and adaptation.⁹⁸

A strategic plan is being developed now, for presentation to the Governor and the legislature in December 2008.

12.5.3.2 Water Conservation Challenge

The Governor announced his call for '20 percent reduction in per capita water use statewide by 2020', in a press release on February 28, 2008. He called for policies and legislation to be enacted throughout the state to achieve this goal.⁹⁹

Many of the state and regional initiatives discussed in this report are reflective of the Governor's plan.

12.5.4 California Public Utilities Commission (CPUC)

The Mission of the CPUC: "The California Public Utilities Commission serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy. We regulate utility services, stimulate innovation, and promote competitive markets, where possible, in the communications, energy, transportation, and water industries."

In 1911, the PUC was established by Constitutional Amendment as the Railroad Commission. In 1912, the Legislature passed the Public Utilities Act, expanding the Commission's regulatory authority to include natural gas, electric, telephone, and water companies as well as railroads and marine transportation companies. In 1946, the Commission was renamed the California Public Utilities Commission. The Water Division supports the Commission by investigating water and sewer system service quality issues and analyzing and processing utility rate change requests.¹⁰⁰

California Public Utilities Commission has proposed that all new construction approved in the future must not increase existing demand on our energy grid¹⁰¹

In fulfillment of its mission to 'protect consumers', and in particular the water rate-payers in some districts, the CPUC plays a significant role in water conservation from the consumer rights perspective.

⁹⁸ Delta Vision, Blue Ribbon Task Force, 'Our Vision for the California Delta', http://deltavision.ca.gov/BlueRibbonTaskForce/FinalVision/Vision_2_Page_Summary.pdf

⁹⁹ 'Governor Schwarzenegger Outlines Comprehensive Actions Needed to Fix Ailing Delta', Press Release, February 28, 2008, <http://gov.ca.gov/press-release/8911/>

¹⁰⁰ State of California, Public Utilities Commission, <http://www.cpuc.ca.gov/PUC/aboutus/puhistory.htm>

¹⁰¹ Competitive Edge Poll & San Diego Coastkeeper



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12.5.5 **Judicial Decree**

U.S. District Court Judge Oliver Wanger on August 31, 2007 ordered state and federal water project managers to reduce the amount of water pumped from the Sacramento-San Joaquin River Delta to protect the threatened delta smelt from extinction, under the federal Endangered Species Act. The resulting 30% reduction in flow of water to MWD has resulted in a flurry of memos, ordinances, and rate increases among Southern California water agencies.

Of note is the fact that the longfin smelt is also being considered for listing under the Endangered Species Act (ESA).

12.5.6 **Proposition 218 – The Consumer's Protection**

Proposition 218 was a proposition in the state of California on the November 5, 1996 ballot. Prop 218 significantly changed local government finance. Prop 218 amended the [California Constitution](#) (Articles XIIIC and XIIID) which, as it relates to assessments, requires the local government to have a vote of the affected property owners for any proposed new or increased assessment before it could be levied. The Proposition was passed by California voters on November 5, 1996, and the assessments portion placed in effect on July 1, 1997. In the past, the local government agencies were not required to obtain ballot approval from the property owners before levying street lighting assessments; only council approval was required, even if there were significant protests. Government agencies affected by Proposition 218 are counties, cities, and special districts.¹⁰²

12.5.7 **California Water Plan Update**

The *California Water Plan* provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs. The goal for the current *California Water Plan Update* is to meet Water Code requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.¹⁰³

According to the plan, significant savings can be realized through conservation:

"According to Chapter 22 of the current [2005] California Water Plan Update, an extra 3 million acre-feet of water – one-third of the current urban usage – could be saved yearly with existing technologies. These include installing more efficient sprinklers and landscaping at city parks and highway medians;

¹⁰² Wikipedia, [http://en.wikipedia.org/wiki/California_Proposition_218_\(1996\)](http://en.wikipedia.org/wiki/California_Proposition_218_(1996))

¹⁰³ State of California, Department of Water Resources, Planning and Local Assistance, California Water Plan, <http://www.waterplan.water.ca.gov/index.cfm>



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expanding metering of water and replacing an estimated 10 million antiquated toilets that were installed in homes and offices prior to 1992.¹⁰⁴

The California Water Plan Steering Committee is made up of State of California agency employees. A public draft of the pending update will be available in December 2008, with the final California Water Plan Update completion date set for December 2009.

The current Plan, adopted in 2005, makes the following recommendations (It should be noted that these recommendations are just that: recommendations. They do not hold the rule of law, and they have no regulatory significance as such – that is the role of the state legislature, local jurisdictions, and water agencies.):

A Framework for Action

Recommendations

California Water Plan Update 2005 provides recommendations for the next 25 years. These recommendations are directed at decision-makers throughout the state (referred to as California), the executive and legislative branches of state government, and DWR and other state agencies.

1. California must invest in reliable, high quality, sustainable, and affordable water conservation, efficient water management, and development of water supplies to protect public health, and improve California's economy, environment, and standard of living.
2. State government must provide incentives and assist regional and local agencies and governments and private utilities to prepare integrated resource and drought contingency plans on a watershed basis; to diversify their regional resource management strategies; and to empower them to implement their plans.
3. State government must lead an effort with local agencies and governments to remediate the causes and effects of contaminants on surface water and groundwater quality.
4. California must maintain, rehabilitate, and improve its aging water infrastructure, especially drinking water and sewage treatment facilities, operated by state, federal, and local entities.
5. State government must continue to provide leadership for the CALFED Bay-Delta Program to ensure continued and balanced progress on greater water supply reliability, water quality, ecosystem restoration, and levee system integrity.
6. State government must lead in water planning and management activities that: (a) regions cannot accomplish on their own, (b) the state can do more efficiently, (c) involve inter-regional, inter-state, or international issues, or (d) have broad public benefits.
7. California must define and articulate the respective roles, authorities, and responsibilities of state, federal, and local agencies and governments responsible for water.
8. California must develop broad, realistic, and stable funding strategies that define the role of public investments for water and other water-related resource needs over the next quarter century.

¹⁰⁴ Editorial, 'Governor's Water Plan a Boost for Conservation', The Sacramento Bee, April 3, 2008,
<http://www.sacbee.com/110/story/832558.html>



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9. State government must invest in research and development to help local agencies and governments implement promising water technologies more cost effectively.
10. State government must help predict and prepare for the effects of global climate change on our water resources and water management systems.
11. DWR and other state agencies must improve data, analytical tools, and information management and exchange needed to prepare, evaluate, and implement regional integrated resource plans and programs in cooperation with other federal, tribal, local, and research entities.
12. DWR and other state agencies must explicitly consider public trust values in the planning and allocation of water resources and protect public trust uses whenever feasible.
13. DWR and other state agencies must invite, encourage, and assist tribal government representatives to participate in statewide, regional, and local water planning processes and to access state funding for water projects.
14. DWR and other state agencies must encourage and assist representatives from disadvantaged communities and vulnerable populations, and the local agencies and private utilities serving them, to participate in statewide, regional, and local water planning processes and to get equal access to state funding for water projects¹⁰⁵

12.6 Federal

12.6.1 Colorado River Compact

The Colorado River Compact was negotiated and signed by 7 so-called ‘basin states’, in 1922. The member states, with their water allocations, were¹⁰⁶:

Upper Basin, 7.5 million acre-ft/year (293 m³/s) total		
Colorado	51.75%	3.88 million acre-ft/year (152 m³/s)
Utah	23.00%	1.73 million acre-ft/year (68 m³/s)
Wyoming	14.00%	1.05 million acre-ft/year (41 m³/s)
New Mexico	11.25%	0.84 million acre-ft/year (33 m³/s)
Arizona	0.70%	0.05 million acre-ft/year (2.0 m³/s)

Lower Basin, 7.5 million acre-ft/year (293 m³/s) total		
California	58.70%	4.40 million acre-ft/year (172 m³/s)
Arizona	37.30%	2.80 million acre-ft/year (109 m³/s)
Nevada	4.00%	0.30 million acre-ft/year (12 m³/s)

Arizona joined the compact in 1944, and a US Supreme Court decision in 1963 led the way for Arizona’s Central Valley Project.

¹⁰⁵ The California Water Plan, 2005, <http://www.waterplan.water.ca.gov/docs/cwpu2005/cwphighlights/highlights.pdf>

¹⁰⁶ Wikipedia, http://en.wikipedia.org/wiki/Colorado_River_Compact



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A 2007 agreement updated the Compact, in which basin states agreed to participate in allocation cut-backs equally and further agreed to cooperate on water projects across state lines.

The Compact is inherently flawed insofar as the annual river flow used as the basis for the allocations by the US Bureau of Reclamation in 1922 – 16.4 million acre-feet/year – in actuality is only 13.5 million acre-feet/year based on current scientific data. Due to global climate change, the number is likely to fall.

The over-allocation of the Colorado River is a problem of immense proportions, the magnitude of which is only now becoming a matter of public concern, as noted in this recent Scripps Institution of Oceanography study:

A new study warns that the 2,080-megawatt Hoover Dam could have too little water to produce power within the next decade. The study by researchers at the Scripps Institution of Oceanography concludes that the growing demand for water in the West, combined with reduced runoff due to climate change, are causing a net deficit of nearly 1 million acre-feet of water per year in the Colorado River system, which includes Lake Powell and Lake Mead.

Lake Mead feeds the Hoover Dam, and the researchers estimate a 50% chance that Lake Mead could drop too low for power production by 2017.

According to the U.S. Bureau of Reclamation, the Hoover Dam is one of the largest hydropower facilities in the nation, producing enough power to serve 1.3 million people in Arizona, California, and Nevada.¹⁰⁷

¹⁰⁷ EERE Network News, "Report Places Even Odds on Hoover Dam Running Dry by 2017", citing a Scripps Institution of Oceanography peer-reviewed study



13 Appendix C - Interesting Water Factoids