

III. Sustainable Water and Watershed Management

Overview

While our population is growing rapidly, our water supplies are limited, and there is no way to make “new water” to meet increasing demand. Communities need to look to under-utilized local resources to fill future needs. They also need to develop a portfolio of water supplies, rather than relying on a single conventional source. Conservation, reclamation, and the reuse of greywater and recycled water are all potentially viable “supply” options available to local communities.

The conventional water supply systems – dams, aqueducts and pumping stations that move water around the state – are also dependent upon an aging infrastructure. As the financial costs of maintaining and updating the extensive infrastructure required by these systems, and the environmental costs they create, become increasingly apparent, damming rivers and building aqueducts to move water wherever it is needed will no longer be viable strategies.

Global warming may also play into this scenario. California depends on the Sierra snowpack as a massive natural storage system. Global warming experts warn that snow levels will rise and winters become shorter, effectively shrinking California’s largest water storage system.

Water affects many aspects of community planning and development, therefore, references to water quality, supply and management are usually dispersed throughout a city or county *General Plan*. In response to the growing influence of water on local planning and community vitality, some counties, such as Lake and Sonoma, have created a separate optional *Water Element* to include with the State-required *General Plan Elements*. Within a *Water Element*, communities can focus attention on specific water issues that may not be addressed in other *General Plan* sections, such as:

- water supply planning,
- water use efficiency,
- groundwater supplies and monitoring,
- recycling and reuse of water supplies,
- stormwater management, and
- policies and programs to support implementation.

Water management, quality and supply are also affected by local stormwater ordinances, development regulations, zoning, and land planning decisions.

Major challenges for local governments and local water agencies include securing water supplies to accommodate growth and provide reliable water service. One option is increasing surface water storage and securing additional water rights. However, these projects require heavy investment from the community and water utilities, and may take years to accomplish. Communities are finding a way around this “water supply” roadblock by identifying ways to reduce demand. This section will cover strategies local

governments and water agencies can use to stretch current water supplies by reducing demand such as:

Strategy 1: Promote water conservation and efficiency

Strategy 2: Reuse greywater

Strategy 3: Recycle wastewater

Strategy 4: Collaborate with other government agencies and water utilities

Strategy 1: Promote Water Conservation and Efficiency

A gallon of water conserved is as good as a gallon of water supplied. In fact, it can be better. Conserving that gallon not only makes it available for other uses, but it also means less wastewater is generated. The Pacific Institute's 2005 report entitled *Waste Not Want Not* highlights the potential for increasing water supplies by decreasing demand. Conservation, the report found, was the cheapest and most readily available means for increasing the reliability of water supplies in California. More than half of urban water conservation strategies can be achieved at \$200 per acre-foot or less.

Of all water uses, reduction in residential water demand provides the greatest opportunity for cost-effective water savings through conservation. The report estimated that urban water conservation could contribute 2.0 to 2.3 million-acre feet a year to our water supplies – enough to supply the current demands of more than two million households.

Water-conserving activities are key to sustainable development because they help protect water as a natural resource, minimize the use of chemicals needed to treat water and wastewater, and reduce energy use and pollution associated with pumping and transporting water. Water conservation has the potential to significantly reduce local government energy costs because it reduces the need to pump water and to treat wastewater. Approximately 33% of the energy budget of city governments in California is used for pumping water and 23% is used for treating wastewater.¹

Water conservation reduces demand, which in turn reduces the need to expand water storage projects, and allows more water to remain in local rivers and streams for recreation, fisheries and natural habitat.

General Policy Approaches

Local governments and water agencies are faced with a finite supply of water for a growing population. Conservation can help stretch the water supply, requires a broader acknowledgement that our water supply is finite, and therefore requires a change in how water is used. Local governments and water agencies can help make these changes by supporting a comprehensive water conservation program, combining outreach, appropriate incentives, and policy measures to incorporate water efficiency into landscapes, home use, and everyday life.

¹ California Energy Commission. 1993. "Energy Aware Planning Guide" Local Government Commission.

Conserving Water in the Landscape

Californians use about 977 billion gallons of water for landscape irrigation each year. On average, more than half the water consumed in residential development goes to landscape irrigation. This is particularly true in the Sierra where dry summers require significant water to keep lawns and gardens green. Landscaping affects both water quantity, in terms of the supplies needed for irrigation, and water quality, due to impacts of chemical fertilizers and pesticides that end up in runoff.

Gardens and landscapes are important to quality of life, but if not tailored to local conditions, they can have negative impacts on water quality and quantity. One of the most ubiquitous examples of a common front yard in California is a conventional “turf” lawn. Lawns may be the largest “crop” in California, a standard feature of typical suburban development. Turf lawns are not indigenous to the state or the Sierra Nevada region. To survive in this highly variable climate, lawns require an enormous amount of water as well as chemical fertilizers and pesticides.

Changing the common “lawn culture” involves not just asking residents to plan for a different kind of landscape, but helping them envision it by designing homes to accommodate alternative landscaping options. Water-wise landscaping makes use of plants, soils, planting materials, irrigation technologies and other practices to increase water efficiency while providing a beautiful landscape. According to the California Urban Water Conservation Council, water-wise landscaping can reduce outdoor demand by up to 75%. Drought tolerant and native plants that are accustomed to local conditions are lawn alternatives that tend to require fewer or no pesticides and fertilizers (significant contributors to water contamination), and require little or no irrigation or mowing.

Another water saving tip for landscaping is to group plants based on water needs, or hydrozoning. Plants with similar water needs should be placed on their own irrigation system and schedule, allowing more control over the amount and frequency of irrigation, and reducing over- or under-watering. This type of layout can also take advantage of shading and windbreaks to reduce evaporation and retain soil moisture.

For a guide to plant selection and irrigation in consideration of water needs:
www.owue.water.ca.gov/landscape/faq/faq.cfm

BOX: “Turf Buy Back Program” in South Lake Tahoe

Lawns are the thirstiest option for residential landscaping. From an environmental perspective, lawns tend to be over-watered and over-fertilized. Nonfunctional lawns – lawns that are rarely used – waste water and represent an ongoing cost in time and resources for the home or business owner.

As a rule of thumb, if you only walk on your lawn when you mow it, it’s nonfunctional.

The South Tahoe Public Utility District’s “Turf Buy Back Program” offers residential customers a cash rebate for reducing the amount of lawn area in their yards. The District has been awarded two State of California water conservation grants that allow for voluntary lawn buy-backs at \$2 per square foot for customers who wish to replace their lawns with attractive, but less water-intensive, landscaping options. The incentive for lawns over 1,500 square feet is \$1.50 per square foot. Pre-conversion eligibility requires a minimum of 400 square feet of irrigated, maintained lawn to be removed. Landscape requirements for the converted area include water-efficient irrigation systems, surface treatments (mulch), a 50% living plant cover at maturity, and native/adapted plant selection.

For more information: www.stpud.us/water_conservation.html

Irrigation systems can play a significant role in how much water is used for outdoor watering needs. Irrigation can also affect water quality because runoff from over-watered lawns often carries high concentrations of fertilizers and pesticides. Several factors determine whether a sprinkler system increases or reduces the problem of over-watering:

- Schedule – Watering should only occur when needed and should take place at a time of day that minimizes evaporative loss (i.e., not in the hot afternoon).
- Quantity – To avoid over-watering, irrigation should apply only the amount of water needed to satisfy the needs of the plants.
- Plant Type – Different plants have different needs. In a well-planned garden, plants can be arranged in a manner that allows watering to reflect those differences (hydrozoning).
- Precision and Leaks – Too many sprinklers literally miss the mark. Ensuring that the system is getting water to where it is needed (instead of on the sidewalk) is essential.
- Weather – Recent weather can affect how much water is needed. Irrigation is not needed when it is raining.

Though many people are familiar with sprinkler conservation concepts, many traditional sprinkler systems make compliance with these principles a job that requires time and effort. Fortunately, new automatic irrigation technologies do much of the “thinking” for us. Unlike conventional systems that apply water arbitrarily, these systems are designed to provide water based on current conditions and the actual needs of the plants. Using sensors that can evaluate soil moisture, temperature and weather, and even “evapotranspiration” rates, the systems irrigate based on how much water plants actually need. Smart irrigation technology solves the water quantity and quality problems of overwatering, and makes landscape maintenance easier for residents.

Conserving Water Inside Buildings

California’s Water Code Section 375 allows any public entity that supplies water to adopt and enforce a water conservation program that requires installation of water-saving devices. Existing conservation technologies include low-flow toilets and showerheads,

efficient clothes washers, weather-based irrigation controllers, and more efficient commercial and industrial cooling equipment.

Converting to water-efficient toilets, showers and clothes washers results in household water savings of about 30% compared to conventional fixtures. High efficiency toilets alone reduce indoor water use in a household by an average of 16%. This translates into a savings of 15,000 to 20,000 gallons of water per year for a family of four.

More efficient plumbing products also result in lower wastewater flow and increase the available capacity of sewage treatment plants and on-site wastewater disposal systems. To encourage implementation of such water-efficient plumbing, cities and counties can work with water agencies to incorporate water-saving devices into new and existing development. Local governments can also work with water suppliers to develop incentives, rebates and outreach programs to help residents, property managers and developers incorporate more efficient technologies into their homes and projects. Some cities and water agencies offer free home water audits, evaluating the efficiency of outdoor irrigation and indoor plumbing as well as detecting leaks in these systems.

Santa Monica uses outreach, loans in its conservation program

Groundwater contamination and rapid growth created a dual threat to the City of Santa Monica's water supplies. The City was forced to increase water purchases and decided to take a multi-faceted approach. It developed a conservation program that includes education and outreach, water-use surveys, landscaping measures, toilet retrofits and a loan program. The result was a 14% reduction in water use, a 21% reduction wastewater flow and a net savings of \$9.5 million between 1990 and 1995.

For more information:

City of Santa Monica Environmental Programs Division, www.santa-monica.org/epd or (310) 458-2213

Another option is to mandate conservation through local codes that require new development to include efficient toilets, shower and faucet heads, washing machines and other technologies. For existing development, simple upgrades can be required so that homes are retrofitted with more efficient appliances and plumbing at the time of sale.

Water Rate Structuring

The rates charged for water service can have a big impact on water usage and development patterns. Water rates can be a sensitive subject – all utilities are under pressure to keep rates low and affordable for their customers. Rates that do not reflect the true costs of different consumer choices can promote inefficient water use and development practices, and penalize certain customers for less-efficient choices and practices of others.

Rate structures can be designed to account for variability in costs and consumption that

result from different development locations and consumer conservation practices. Customers typically pay for water in two ways – through hookup or connection fees, and through use charges. Uniform or “flat” connection fees and use charges do not recognize the influence that development location and density have on service costs. Users in compact, centrally-located development subsidize the costs of extending service to customers in suburban development on the community fringe. Ultimately, this creates a subsidy for more dispersed development patterns and a surcharge on more efficient development. When everyone pays the same rate, there is no incentive to locate in an area that is easier or less expensive to serve. One way to solve this is to structure connection fees to reflect variables such as the distance of the connection from the treatment station, lot size, etc., which more accurately reflect costs for providing service to different development types.

Conservation Pricing: Volume water rates can be configured to encourage less water consumption, and more accurately reflect the value of water and the costs of securing, treating and delivering it to customers. Uniform use rates charge the same amount regardless of the level of consumption, meaning that a customer using water-wise landscaping and efficient indoor appliances, and practicing conservation (e.g., turns water off while shaving) will be charged the same monthly fee as a customer who does none of those things and uses far more water.

Alternatively, “block pricing” applies variable rates depending on the amount of water used. Tiered block rates charge incrementally higher rates as consumption increases. The lowest rate or “base rate” covers an initial volume of water deemed reasonable for basic household needs. The base rate increases with surcharges on additional “blocks” (e.g., at 2,500 gallon increments) of water used. Block rates can be a highly effective way to encourage conservation while covering costs of providing service. Block rate structures can also increase revenue for water agencies as they reflect costs more accurately – those who cost more to serve pay more for service.

Box: Conservation Pricing

East Bay Municipal Utility District Reacts to Drought with New Conservation Rates

Drought conditions in 2008 prompted EBMUD to adopt new conservation rates to encourage customers to reduce water use. EBMUD increased volume charges by 10% and added a drought surcharge for high water use. The rate change is expected to reduce overall water use by 10% and generate \$21 million. The rate increase will help fund EBMUD’s drought management program and offset revenue loss from reduced water sales. Customers who use less than 100 gallons a day will be exempt from the rate increase and surcharge.

New fee structure has rewards for Irvine Ranch Water District

When rapid population growth led to dwindling supplies and increased wholesale water charges, the Irvine Ranch Water District implemented a new fee structure that rewards

water efficiency and identifies waste when it occurs. The long-term goal was to develop a water-wise conservation ethic within the community while maintaining stable utility revenues. Within a year, water use declined by 19%. Over the next six years, the district saved an estimated \$33 million in water purchases.

For more information: Irvine Water

District Conservation Office, (949) 453-5325 or www.irwd.com/Conservation

Zone Pricing: Another way to account for true costs and assess fair rates for water service is to base rates on the actual costs to provide it. While uniform rate structures spread costs evenly without regard for differences in delivery costs related to development location, zone pricing sets rates based on variables such as distance, pressure zones or lot size. A zone structure can be relatively simple; it can be based on costs and lengths of transmission lines and energy needed for delivery so that further out development pays incrementally more than development that is centrally located in existing communities. Zones can also reflect *General Plan* land use designations to account for cost variability related to density. Lower density areas cost more to serve and consume more water per capita than higher density areas. Thus, pricing can be linked to zoning districts.

Tucson “Beat the Peak”

Faced with the need to secure additional water supplies, Tucson’s Water Department instead decided to decrease demand by creating a highly visible “Beat the Peak” campaign. The campaign encourages residents to do outdoor watering at off-peak periods. The agency increased water rates across the board and created a new-tiered rate structure that increases the cost of water as consumption increases.

Started in 1977, the campaign has proven to be highly effective. According to a 2006 report by Western Resource Advocates, the average person in a single-family residence in Tucson uses 114 gallons of water per day, one of the lowest usage rates in the Southwest.² Even by the 1980s, residents had noticeably changed their “water” habits to reflect the fact that they live in a desert environment. As an added bonus, outdoor conservation has even led to indoor water conservation.

Although many conservation efforts are local in scope, their effects are regional because the supplies that communities depend on are shared at the regional, state and inter-state levels. Since the supply of housing is also a regional issue, improving regionally-based sources of water will give communities greater self-sufficiency and more control over how they develop. There is enormous potential for cities, counties, water districts, state and regional agencies, and developers to work together under the current regulatory context.

Metropolitan Water District offers free conservation workshops

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The Metropolitan Water District of Southern California – a consortium of 26 cities and water districts that provides drinking water to nearly 17 million people – works with local communities to provide free water conservation workshops to community members and landscaping firms. The workshops cover topics including how to detect wastewater, maintain sprinkler systems properly, and develop landscape designs appropriate to the climate.

For more information: www.bewaterwise.com/pda.html or Diane Harrelson, (213) 217-6167 or dharrelson@mwdh2o.com

Santa Barbara County water suppliers launch media campaign

Cities and counties can be involved in educating the community on water conservation practices. The water suppliers of Santa Barbara County joined forces to launch the Santa Barbara County Be Water Wise Media Campaign. Campaign sponsors included the Santa Barbara County Water Agency, the Cities of Buellton, Santa Barbara, Santa Maria and Solvang, the Carpinteria Valley, Goleta and Montecito water districts, and the Cuyama Los Alamos and Vandenberg Village community services districts. The campaign used materials developed and shared by the Metropolitan Water District of Southern California to run ads in local media outlets.

To view ads and materials from the campaign: sbwater.org/Programs.htm#Media. For more information: Helena Wiley, Santa Barbara County Water Agency, (805) 568-3451 or hwiley@cosbpw.net

Local Policy Approach in Amador and Calaveras Counties

Amador County

As part of the *General Plan* update, Amador County released a *General Plan Advisory Committee Workbook* which included some draft policies addressing water conservation. The County aims to encourage water conservation measures in new developments and develop BMPs for water conservation in the County. The County also suggests specific water conservation efforts, including the reuse of grey water, water-conserving plumbing fixtures, and low-water use landscapes. The County also outlines the need to coordinate with the Amador Water Agency (AWA) and other organizations to develop water-use standards and regulations to curb demand during water supply emergencies and drought.

AWA has contributed to conservation efforts through updating water infrastructure, public outreach, and regional collaboration. Recently AWA completed the 8-mile Amador Transmission Pipeline running from Lake Taboada to Tanner Reservoir. The pipeline replaced a 23-mile ditch, which used to serve as the AWA's main supply line. As a result of the pipeline, AWA is able to be more efficient with the county's water supply by reducing water loss from leakage and evaporation. As an added bonus, drinking water

coming into the Ione treatment plant is significantly cleaner and requires 50,000 gallons a day less water to backflush the system. The agency has accrued further savings based on reduced water flow into the wastewater system, which will reduce the strain and thus maintenance on filters and overall system.

AWA has encouraged conservation for its residential customers by offering educational material, planting a demonstration drought tolerant garden at its main office, and providing water conservation tips and resources on its website. Upon request, customers can receive a free water-saving kit. The kit includes free showerhead replacements and a device for reducing toilet flush water for regular toilets. The number of kits distributed annually is not recorded by the Agency.

AWA works with local governments, organizations, and other water agencies in the region to promote water conservation. Upon request from County or City Planning and Building Departments, AWA will review landscape plans for larger development projects and offer recommendations to incorporate more drought tolerant landscapes. The demonstration drought tolerant garden at the Sutter Creek office is open to the public and was constructed in partnership with Mule Creek State Prison inmates and faculty and the Amador County Cooperative Extension Master Gardeners.

GRAPHIC: AWA demo garden

AWA is also part of the Upper Mokelumne River Watershed Association (UMRWSA) and working with Calaveras County Water District and EBMUD, on a conservation plan for the Mokelumne River. The plan will be implemented in 2009.

Calaveras County

As part of the *General Plan* update, community meetings were held to receive input from residents on what should be guiding principles for the County. The community identified the need for increased water efficiency and balance of water demand across watershed boundaries. More specifically, the community believed the County should develop water conservation regulations, enforce greywater reuse for irrigation in all new development, and promote efficient patterns of development that require less water.

The inclusion of water conservation policies in the Calaveras *General Plan* would help reinforce conservation efforts of local water utilities. Stemming from growing concerns over water reliability and supply statewide, DWR had the California Urban Water Conservation Council (CUWCC) create the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), which outlines 14 BMPs to reduce consumption of California's water resources. These BMPs are considered the standard for water conservation practices. There are currently 384 water agencies and environmental groups that have signed the MOU confirming their commitment to implement the 14 BMPs, with CCWD being one of the signatories.

In its 2005 *Urban Water Management Plan Update*, CCWD emphasized water conservation as a main component of its commitment to responsible management of water resources, offering such programs as water surveys for single and multi-family homes, commercial and industrial facilities; residential plumbing retrofits; leak detection and repair; large landscape conservation programs and incentives; high-efficiency washing machine rebates; public and school outreach; and wholesale agency assistance. To reflect the true cost of water, CCWD uses commodity rates for all new connections and retrofits, and recently implemented a three-tier rate structure. CCWD also enforces the responsible use of water, and if it notices negligent or wasteful use of water, it holds the right to discontinue service if conditions are not corrected within five days of written notice to the customer. CCWD has hired a conservation coordinator to oversee and implement its many water conservation programs.

Model Policies

The following policy language is taken from city and county General Plans.

City of Truckee General Plan

“Coordinate with the Truckee Donner Public Utility District (TDPUD) to develop a list of feasible water conservation programs and incentives that might be offered to the District's customers, and develop related strategies for how the Town might support the District's efforts in implementing these programs.”

Mariposa County General Plan

“Implement standards for water conservation that are consistent with State guidelines, including requirements for the installation and use of low-flow plumbing fixtures in all new construction, and for the use of drip irrigation systems and drought-tolerant or low water using landscaping (including retention of existing native plant material) in all multi-family, commercial, resort, industrial and public developments.”

City of San Diego General Plan

“Maximize the implementation of water conservation measures as a cost-effective way to manage water demands and reduce the dependence on imported water.

- a. Implement conservation incentive programs that increase water-use efficiency and reduce urban runoff.
- b. Develop a response plan to assist citizens in reducing water use during periods of water shortages and emergencies.
- c. Encourage local water agencies to use state-mandated powers to enforce conservation measures that eliminate or penalize wasteful uses of water.
- d. Explore alternative conservation measures and technology as they become available.
- e. Develop and expand water-efficient landscaping to include urban forestry,

urban vegetation, and demonstration projects.”

Sonoma County Draft General Plan

“Require low flow fixtures, leak repair, and drought tolerant landscaping (native species if possible), plus emerging water conservation techniques, such as reclamation, as they become available.

Use water effectively and reduce water demand by:

- (1) Requiring water conserving design and equipment in new construction.
- (2) Encouraging water conserving landscaping and other conservation measures.
- (3) Encouraging retrofitting with water conserving devices.
- (4) Designing wastewater systems to minimize inflow and infiltration to the extent economically feasible.
- (5) Limiting impervious surfaces to minimize runoff.”

Ventura County General Plan

“Demonstrate low water use techniques at community gardens and city-owned facilities.”

City of Livermore General Plan

“Projects deemed appropriate for the use of recycled water shall be required to use recycled water, when available, for uses outlined in the State Water Code.

The City shall adopt a series of Best Management Practices for water conservation measures that will be mandatory in new development and strongly encouraged in existing developments.

Require compliance with the State and City’s mandatory water efficient landscape ordinance.

Develop and provide incentives for existing and future customers to reduce water consumption.

Develop and institute a City-sponsored program of mandatory water conservation measures for new development. Develop a program for existing developments that is based on a voluntary participation with incentives to achieve specific targets for water conservation. Examples include:

- (a) Ultra-low flush toilets
- (b) Plumbing retrofits
- (c) Leak detection
- (d) Efficiency standards for water-using appliances and irrigation devices, and industrial and commercial processes
- (e) Greywater use

- (f) Swimming pool and spa conservation measures such as covers to reduce evaporation
- (g) Xeriscape landscape design standards.”

City of Palm Desert General Plan

“Water management for existing landscapes—Exemptions.

If a project’s water bills indicate that the landscaped areas are using less than or equal to the maximum water allowance for those landscaped areas of one or more acres, an audit shall not be required by the water purveyor. “

City of Santa Cruz General Plan

“Efficient water use:

A. Landscaping:

- 1) Choose plants that are suitable for the climate and their intended function, with an emphasis on native and drought-tolerant plants.
- 2) Prepare soils for water penetration and retention.
- 3) Design and operate suitable and efficient irrigation systems.
- 4) The City will encourage drought-tolerant landscaping, vegetable gardens and fruit trees in lieu of large expanses of lawn or other more water-demanding plantings.

B. Landscape maintenance: Landscaped areas will be properly designed for efficient water use, and shall be properly installed and maintained, including the upkeep and replacement of low-flow irrigation fixtures and equipment.”

Strategy 2: Greywater Reuse

Any water that has been used in the home – except water from toilets – is called “grey water.” Shower, sink and laundry water comprise 50% to 80% of residential “waste” water, which may be reused for other purposes, especially landscape irrigation.³ Using greywater instead of drinking quality water for landscape irrigation can keep lawns and gardens green – even in times of drought – and alleviate water demand in areas prone to water shortages. Wastewater treatment facilities will also have less volume to treat, and can delay expansion of those facilities.

Greywater can also be better for a garden than using treated drinking water. Soap and other products in wastewater are rich in compounds that can pollute waterways, wear out septic systems, and overburden wastewater facilities. However, these same materials – phosphorous, nitrogen, potassium and proteins – are sources of nutrients for fruit trees, landscaping and gardens.⁴

³ Department of Water Resources. 1995. “Graywater Guide: Using Graywater in Your Home Landscape.”

⁴ Department of Water Resources. 1995. “Graywater Guide: Using Graywater in Your Home Landscape.”

Greywater systems can be affordable to install if done at the time of construction. A workable, code-compliant, greywater irrigation system sends water from showers, sinks and other greywater sources away from blackwater before they mix and go to a sewage system. Individual customers can save money on their metered water bills when water is used more than once.

Reusing water may allow communities to leave fresh water in rivers and streams to protect fish and wildlife. This can be critical during times of drought when river and stream flows can become low and warm, leading to fish-kills.

General Policy Approaches

Greywater use is not common practice in most areas. Implementing and promoting the use of greywater systems requires support from local government. Cities and counties can require that dual drains be installed in new construction for the purpose of reusing water. As an incentive, the water saved can be counted as a source of water to meet the requirements of new state “show me the water” laws that require developers to prove that enough water is available to serve proposed new housing.

Cities and counties can develop a greywater ordinance, which regulates permitted uses and system requirements. Permit requirements for greywater systems can be further divided based on project size and flow. For instance, a simple residential greywater system handling a flow of less than 400 gallons per day may be granted a permit without inspection or fees but a larger multi-home project may need technical and environmental review before a permit is awarded. Therefore, local governments can develop different greywater permit levels or tiers tailored for project size and greywater flow.

Local Policy Approach in Amador and Calaveras Counties

Amador County

Greywater reuse is encouraged in the Amador County *Preliminary General Plan Goals and Policies, GPAC Workbook*. A proposed policy looks to "encourage recycling and water-saving features in new development, including greywater irrigation, to limit the water flows to septic systems and leach fields."

Calaveras County

The reuse of greywater is also supported by the Calaveras community and was brought up at community workshops as a strategy for balancing water supply and demand. The community voiced support for requiring greywater reuse as irrigation for new housing developments.

Model Policy Language

The following policy language is taken from local government General Plans and municipal programs.

City of Malibu General Plan

“New development shall include a separate greywater treatment system where feasible.

Malibu also developed a “Greywater Handbook” to complement the City’s policy. The handbook provides guidelines, resources and techniques to help homeowners and developers integrate greywatersystems into their projects.”

The handbook is available at www.ci.malibu.ca.us. For more information about Malibu’s greywater law and permit process: Deputy Building Official Craig George, (310) 456-2489 x229

Sonoma County General Plan

“Encourage greywater systems, roof catchment of rainwater and other methods of reusing water and minimizing the need to use groundwater.”

City of Santa Monica

The City of Santa Monica has an incentive-based program to encourage greywater projects. The City provides discounts on sewage bills for installing greywater systems and has implemented a grant program to provide partial funding for innovative landscaping projects that incorporate greywater systems and other innovative water-saving features. The City also provides fact sheets about greywater regulations and additional resources about constructing greywater systems, requesting rebates or receiving general assistance.

For more information: Kim O’Cain or Bob Galbreath, Santa Monica Water Resources Management Office, (310) 458-5408

Los Angeles County

The Los Angeles County Recycled Water Advisory Committee has developed an extensive 48-page “Recycled Water Manual” that provides information on goals, general provisions, design and construction, operations and maintenance, marking and equipment, agency contacts and resources for users and site providers.

www.watereuse.org/ca

Los Angeles Air Force Base

The Los Angeles Air Force Base in El Segundo uses greywater in toilets and urinals in seven buildings and irrigates its five-acre landscape with grey water. The Los Angeles Air Force Base is serving as a template for bases throughout the world through its innovative use of recycled water. For more information: Office of Public Affairs, (310) 653-1132.

Strategy 3: Wastewater Recycling

Recycled water is the fastest-growing water supply in California.⁵ California has more than 300 water recycling plants in operation. Currently 500,000 acre-feet of recycled water are being used around the state. An acre-foot is roughly enough to cover a football field with one foot of water or the amount needed by one family for one year. According to the California Recycled Water Task Force, California has the potential to recycle up to 1.5 million acre-feet per year, saving potable water to satisfy the needs of 1.5 million homes annually.⁶

Water recycling is an umbrella term that encompasses the treatment, storage, distribution and reuse of municipal and/or industrial wastewater. Recycling wastewater provides communities the opportunity to develop and diversify their water portfolios with a reliable source of water to meet a range of needs.

The safety of recycled water is well established; it has been used by California communities since 1929 without any reported health problems. California's regulations governing the production, distribution and use of recycled water are some of the most stringent in the world. The California State Department of Health Services sanctions the use of recycled water for a variety of uses. These include, but are not limited to, landscape irrigation, agricultural irrigation, construction water, water for industrial purposes, fountains, and indoor toilet and urinal flushing. Recycled water may also be used in cooling systems for buildings.

Recycled water, although highly treated, is considered non-potable. A dual-plumbing system is used, with the recycled water carried in purple-colored pipes to prevent the unintentional misuse of recycled water or cross-connection with the potable water system. Recycled water systems also require regular preventative maintenance, including inspections, making certain that pipe markings remain level, monitoring of spray patterns and runoff from irrigation, and accurate recordkeeping of maintenance.

While the economics of recycled water depend upon place and use, it can be less expensive than purchasing new supplies. Matching water quality to end-use saves money for both the buyer and water agency. For example, the quality needed for landscaping is not as high as that needed for drinking water. Already large quantities of recycled water are used in California for agricultural purposes. The required quality of that water varies based on the degree to which the water may come in contact with food crops or dairy

⁵ California Recycled Water Task Force. 2003. "Water Recycling 2030 Recommendations of California's Recycled Water Task Force."

⁶ Ibid.

COWS.

Recycled water supplies can also be used as a part of groundwater storage projects, where treated wastewater is stored in aquifers. Recycled water can be used to enhance or restore wetlands that provide wildlife habitat, flood protection, improved water quality and recreational amenities. It can also reduce the volume of potable water that must be withdrawn from rivers, lakes and groundwater to maintain the natural ecology of those bodies of water.

General Policy Approaches

State law indirectly requires the use of recycled water. California Water Code Section 13550-13556 states that if recycled water is available, then the use of potable domestic water for non-potable uses, including cemeteries, golf courses, parks, industrial and residential irrigation uses, and toilet flushing, is an unreasonable use of water.

California regulates the use of recycled water under Title 22 in the California Code of Regulations. Each use of recycled water must have a permit from the local authority administering the recycled water program, which has the responsibility of enforcing the rules and regulations. The local authority is usually the retailer of recycled water to the site. Permit requirements typically include construction, inspection, cross-connection certification, site-supervisor training, and a schedule of the hours that recycled water can be used. These local authorities can specify what sites and/or uses of recycled water are to be used in their service area, as long as they comply with state requirements.

The Regional Water Quality Control Boards require that recycled water customers conduct an inspection at least once a year while the recycled water system is in use. The results of this inspection must be documented and submitted in a written report. According to Department of Health Services regulations, at dual-plumbed use sites the customer is responsible for conducting a periodic cross-connection test every four years, unless visual inspections reveal a requirement for more frequent testing. The agency operating the recycled water program also promulgates rules and regulations determining the way recycled water systems are implemented and operated, and how records are to be kept.

Local governments and water agencies are the key players in the recycled water arena, water agencies provide the commodity, and local governments provide the political will and regulatory framework. Both entities depend on each other's support to implement a successful program. They need to work closely to ensure the inclusion of recycled water in each of their planning documents, and consider sharing resources for a joint public-private venture, which may include the development of necessary reclamation and treatment facilities. On the local government end, building codes can be amended to require the installation of dual-purpose pipes (purple pipes) in new construction and remodels. Where recycled water is available, this step will implement state law. Where it is not, communities will be building the infrastructure for the future when recycled water is available.

Cities and counties can also adopt a water recycling ordinance. The California section of the WaterReuse Association web site provides a model water recycling ordinance (www.watereuse.org/ca/modelwrord.htm). The ordinance's intent is to maximize resource conservation and streamline implementation of water recycling projects in conformance with state law. The ordinance can also be tailored to conform with local rules and regulations.

Local governments can also work with developers to create incentives or otherwise streamline the deployment of dual-plumbing systems and initiate public discussion through outreach and education. Creating forums to share the benefits of using recycled water and address public concerns and questions will help build public understanding and support a recycled water program.

Local Policy Approach in Amador and Calaveras Counties

Amador County

The stage is set for Amador County to begin using and distributing recycled wastewater. Both Amador County and the Amador Water Agency (AWA) have shown commitment to create a regional facility, and have outlined specific goals for the development of a recycled wastewater program in their planning documents. The *General Plan Advisory Committee Workbook* for the Amador County *General Plan* update includes draft policies in direct support of recycled wastewater, such as:

- Increase wastewater treatment capacity to serve the county's population.
- Work with Amador Water Agency to identify a desired location for a regional wastewater treatment plant, and restrict the development of incompatible uses in the vicinity of the site.
- Encourage the use of reclaimed water for irrigation wherever possible in order to reduce the loading of the wastewater system.

AWA announced its Purple Pipe Plan in September 2008. The plan outlines how the agency will move forward in creating a water system that will convey recycled water. By including recycled wastewater in its water portfolio, AWA can potentially claim additional water rights if it is able to prove that recycled water is replacing significant quantities of treated water. The goal for the program is to produce approximately 3 million gallons per day of recycled water, which in turn will conserve 3,000 acre-feet of untreated water. AWA's goal for the county is to have recycled water be 20% of its water supply by 2020.

Although there is support from both the County and AWA, there is still much to do before recycle water is a reality in Amador County. Deciding on a central location for a regional facility and generating buy-in from elected officials, the general public, and other water agencies for the \$20-\$40 million dollar facility are current challenges. Coupled with the hefty price tag are underlying misconceptions and questions

surrounding the quality of treated wastewater. In order to surmount community doubt, education and outreach will be integral in implementing a recycled wastewater program in Amador County.

Calaveras County

Localized problems with water quality and supply are a current challenge identified in the *Issues and Opportunities Report* for the Calaveras County *General Plan* update. The report lists several guiding principles to ensure protection of water quality, recycling water is one of them. Developing wastewater recycling will help areas within the county balance water portfolios. Groundwater overdraft has been a recurring problem in some areas and the State has encouraged water purveyors who rely solely on groundwater sources to explore additional options.

Interest in developing a system for recycling water has been expressed by local water agencies. A portion of the Calaveras County Water District's (CCWD) updated Urban Water Management Plan explores recycled wastewater capacities and future projections. CCWD is working closely with Calaveras County, Calaveras County Farm Bureau Federation, UC Cooperative Extension, and Calaveras Grown to coordinate efforts, identify potential demand, and conduct public outreach. Currently, golf course irrigation is the main user of recycled water in the county, but CCWD is looking to expanding service to agriculture customers and for other landscape purposes.

A challenge to expanding recycled wastewater service in the area stems from the size of current wastewater treatment facilities. Many of the District's facilities are too small to reasonably and economically develop recycled water systems. CCWD will continue to evaluate the potential for recycled wastewater, and believes there is an opportunity to work with the County to incorporate recycled water use in parks and public landscaping. Currently, CCWD uses recycled water for landscape irrigation at its largest facility.

Model Policies and Programs

The following policy language is taken from city and county General Plans.

City of Chino General Plan

“It is the policy of the City that recycled water be used for any purposes approved for recycled water use, when it is economically, technically and institutionally feasible. Recycled water shall be the primary source of supply for commercial and industrial uses, whenever available and/or feasible. Use of potable water for commercial and industrial uses shall be contrary to city policy; shall not be considered the most beneficial use of a natural resource; and shall be avoided to the maximum extent possible.”

City of Santa Clara General Plan

“Maximize the use of reclaimed water for construction, maintenance and irrigation, and encourage its use elsewhere, as appropriate.”

City of Livermore General Plan

“Require all new industrial, commercial and office development within pressure Zone 1 to use reclaimed water for landscape irrigation, where available.”

City of Palm Desert General Plan

“Coordinate with the Coachella Valley Water District on the continued use and future expansion of tertiary-treated wastewater treatment and distribution facilities to serve existing and new development projects in the city.”

County of Los Angeles General Plan

“Encourage the production and use of reclaimed water and stormwater runoff to provide water for irrigation, groundwater recharge, saltwater intrusion barriers or other beneficial uses.”

City of San Luis Obispo General Plan

“Facilitate use of tertiary-treated water and seek to legalize use of greywater for non-potable household purposes.”

IV. Collaborative Water Resource Planning

Background

Successful integration of water resource planning into land use planning is achieved through a watershed-wide perspective. A single community within a watershed can enact measures to protect water quality or prevent flooding but they won't be as effective as when neighboring communities enact similar measures. Coordination is needed because watersheds do not tend to follow jurisdictional boundaries. Mayors, city council members and county supervisors are in an excellent position to bring together key players within a watershed to focus on its preservation.

General Approaches

More and more state funding will be attached to water projects and programs that demonstrate regional collaboration. There are numerous venues for city and county elected officials to affect planning on a watershed level.

LAFCOs – A 1995 law added section 10910 to the California Water Code that permits LAFCOs to require cities, when applying to expand their sphere of influence, to provide information for determining whether existing and planned water supplies are sufficient to meet current and new demands. LAFCOs cannot demand conditions for their approval of a project, however, LAFCO boardmembers can base their decisions on the impact of the proposed expansion on the watershed.

COGs – A Council of Government (COG) has responsibility for producing transportation plans within its region. COGs representing 80% of California residents have adopted a growth strategy that includes preservation of existing open space and a vision for compact, walkable, mixed-use communities. Water is not currently included in the visioning process, but these processes offer an ideal opportunity to apply a regional approach to managing water resources.

Metropolitan Planning Organizations – Metropolitan Planning Organizations (MPOs) are the entities that administer federal transportation dollars. COGs often serve as the regional MPO. The Sacramento Area Council of Governments (which serves as the region's MPO) provides financial incentives to cities and counties in its region for concentrating growth around transit and for planning and building compact, mixed-use development. These same strategies are found in the first Ahwahnee Water Principle.

Resource Conservation Districts – Resource conservation districts are formed as independent local liaisons between local, state and federal government and landowners. Resource conservation districts can facilitate cooperation between local government and farmers, ranchers and other landowners. They have an expanding role in linking land use planning and water management. Several are extending their focus on agricultural issues in primarily rural areas to address a growing slate of concerns related to urban areas. Many watershed coordinators are housed in local resource conservation districts, which

make them a valuable resource for getting stakeholders to the table in planning and management processes.

Watershed Partnerships – Watershed partnerships are formed when local watershed stakeholders come together to protect their watershed. These groups are engaged in a wide range of efforts to protect and restore the state’s water resources and the watersheds that sustain them. These include local restoration efforts, data collection and monitoring, local education and outreach efforts, and providing a conduit between local government, landowners and residents interested in protecting the watershed. Many are also involved in long-range planning and assessment projects to provide information that can affect policy and management decisions.

Intregrated Regional Water Management Plan (IRWMP)- An IRWMP is a comprehensive planning document that provides the venue for multiple agencies and stakeholder groups to work together to identify and prioritize regional water resource projects and programs. The IRWMP tackles issues such as water supply, flood management, water quality, environmental restoration, envrionmental justice, stakeholder involmment, and community and stateside water issues. The California Department of Water Resources has initiated funding incentives for “Integrated Regional Water Management” (IRWM) planning and projects. This program is funded though voter-approved bonds (Propositions 50 and 84) to provide grants for local projects if they are part of a collaborative regional planning effort.

Coordination of planning efforts between water utilities and city and county planning departments are key to effective decision making. A common challenge in regional planning is creating consistency between multiple planning documents, and ensuring that overlapping regulatory agencies (i.e., water agencies, city planning departments, county planning departments) are kept informed of each others' actions, planning efforts, and relevant data. Planners can align land use and water use by incorporating water supply and demand analysis into general plans and specific plans. Water supply and quality data can be found in Urban Water Management Plans, Water Master Plans or other water planning documents created by local water agencies. Integrating water planning data into land use planning documents can streamline procedures for complying with the state’s “show me the water” laws.

On the same note, water agencies can incorporate land use data into their water planning documents. The implication for water demand varies by land use and development type. One of the best methods of forecasting future water demand is to a use land use-based analysis, which is more accurate and defensible than simply relying on population-based projections or socioeconomic modeling because it recognizes the association between water usage and various patterns and forms of development. Moreover, using a land use-based method for projecting future water demands enables simpler integration with land use planning documents.

Institutional Issues

Small, segregated agencies - No economies of scale

Local Policy Approach in Amador and Calaveras Counties

Both Amador and Calaveras County have worked together with other water agencies and stakeholder groups in regional water planning efforts. Examples include:

- M/A/C IRWMP- (include a brief description here)
- Mokelumne River Forum – The Mokelumne River Forum was established to create a partnership among water agencies and stakeholders who rely on the Mokelumne River and are concerned about regional water supply issues. Planning decisions concerning water supply volume, infrastructure needs, consumptive uses, environmental issues, and recreational needs are made through a collaborative process that strives to develop mutually beneficial and regionally focused solutions. The Mokelumne River Forum provides a venue to discuss and develop solutions that resolve conflicts and balance the needs of all users.
- Mokelumne Inter-Regional Conjunctive Use Project - IRCUP is a conceptual project linking the counties of Amador, Calaveras and San Joaquin with EBMUD in an expandable water storage and exchange program that could provide water supply sustainability and reliability benefits to all participants
- Upper Mokelumne River Watershed Authority - (discussed more in depth in Chapter 2, page ____)

Amador County

The need for coordination is brought up in the *General Plan* Advisory Committee workbook. Draft policies included in the workbook encourage coordination between AWA and other organizations to plan for future water supply needs in emergencies and droughts as well as promote regional and interagency coordination.

Calaveras County

The Calaveras County Water District (CCWD) has been an active participant in many regional water planning efforts, such as the M/A/C IRWMP, the Upper Mokelumne River Watershed Authority, and the Mokelumne River Form. The District was part of other regional watershed based planning efforts, as well. In 1999 and 2002, the District worked with Stockton East Water District (SEWD), a technical advisory committee, and a group of public stakeholders to begin the process of developing a Calaveras River Watershed Management Plan (CRWMP). Phase I of the project was accepted by the SWRCB and included a field assessment, stakeholder/technical advisory group formation and completion of the plan. Phase II of the plan, reported on Baseline Water Quality Monitoring on the upper and lower Calaveras River and was completed in June 2005. Throughout the process, CCWD engaged the public and participated with other agencies and non-government organizations at informational meetings over the last six years. CCWD hopes to secure additional funds for continued water quality monitoring.

In its 2003 Strategic Plan, the CCWD recognized the need for water and land use

planning to align. Specific objectives include becoming more cognizant of population growth and land use trends by educating staff and board members on current land use and population growth trends, as well as inviting County Planning Director to present current planning information at CCWD meetings. With current land use planning data, CCWD aims to incorporate this understanding more fully into CCWD planning and decision making.

CCWD emphasizes the need to build a relationship with the County Planning Department and with other local water agencies. One particular objective is initiating a Project Evaluation and Review Committee to bring together County staff and “coordinate CCWD planning with County initiatives.

Currently, there is county-wide interest among water agencies and local governments to create a *Water Element* to be included in the *General Plan* update. CCWD is spearheading the process and is coordinating meetings for stakeholders to discuss content for the document. A *Water Element* is not required but can provide the framework and vision for future water needs and management goals. Benefits of having a *Water Element* include providing the necessary linkage between land use planning, water supply and wastewater treatment planning, which will help align growth and development with the planning, financing and construction of water and wastewater infrastructure. A separate *Water Element* also makes water resource information accessible to the general public, policy makers, and interested parties through a single high-level document. Data and information on local hydrologic cycles and processes as well as descriptions of wet and dry conditions can also be included in a *Water Element*.

Model Policies

The following policy language is taken from city and county General Plans.

City of Woodland General Plan

“The City shall cooperate with other jurisdictions in jointly studying the potential for using surface water sources to balance the groundwater supply so as to protect against aquifer overdrafts and water quality degradation.”

Inyo County General Plan

“To ensure planning decisions are done in a collaborative environment and to provide opportunities of early and consistent input by Inyo County and its citizens into the planning processes of other agencies, districts, and utilities.”

City of Livermore General Plan

“Require coordination between land use planning and water facilities and service to ensure that adequate water supplies are available for proposed development.”

City of Truckee General Plan

“Initiate a process with Nevada County and Placer County, either in conjunction with development of the Open Space Plan or as separate effort, to develop a coordinated open space protection strategy for the entire Planning Area.

Work with the Truckee River Watershed Council, TDRPD and other agencies to develop comprehensive, long term management plans for the Truckee River corridor [..]. The plans should treat the Truckee River and Donner Lake and their associated riparian, wetland and meadow habitats as holistic systems, and should address the complete range of issues associated with the Truckee River and Donner Lake, including scenic and habitat values, opportunities for riparian restoration and enhancement, flood protection, water quality, and access and recreation opportunities.

Form a citizens advisory committee that will serve as an advisory body during the preparation of the stormwater and/or water quality management plan. Upon adoption of the plan, consider other roles the committee may assume.

Work with the Truckee Donner PUD to study ways in which the development review process can be strengthened to define more stringent requirements for documentation of a project’s projected water needs and the availability of local water supplies to serve it.”

City of Sonora General Plan

“Work in coordination with the Tuolumne County Resource Conservation District to assist in preparing, implementing and funding voluntary, stewardship-based, resource management programs, especially those which maintain and enhance water quality and quantity.

Consider facilitating an annual city/county staff meeting, luncheon or similar activity to facilitate coordinated land use planning between city and county staff members. Senior staff from the various city and county staffs should, at a minimum, be present at the coordination event.”