Water

THE CHALLENGE

Recent projections indicate that over 24 million people will reside in the six-County SCAG region by 2035.[1] This underscores the importance of questions about Southern California's future water supply and of reliably meeting our urban water demands in a way that is sensitive to both ecological imperatives and the evolving emphasis on sustainable development. We also face challenges in how we assure a high-quality water supply for consumption, recreational, habitat, and other needs.

Eliminating water quality impairments throughout the region's urban watersheds is a major challenge. These impairments (usually caused by "non-point" source pollution) are largely caused by urban and stormwater runoff and are required to be appropriately addressed by the Clean Water Act. As a result, water quality regulators are imposing significant and costly pollution control measures on local agencies with compliance deadlines.

Water Demand

Water demand in California can generally be divided between water used for urban and agricultural uses and water necessary for maintaining existing ecosystems. According to DWR, for the state as a whole, these three sectors accounted for 11 percent, 41 percent and 48 percent, respectively, during 2000—a year characterized by "normal" rainfall.[2] Although 48 percent of the state's water supply is allocated as environmental water, which includes instream flows, wild and scenic flows, and managed wetlands, many ecosystems are still struggling and flow regimes in riparian areas no longer resemble their natural state.

In the SCAG region, approximately three-quarters of the potable water is provided from imported sources. Annual water demand fluctuates in relation to available supplies and the rainfall in a given year.

The relationship between urban growth patterns and the demand for water poses another important challenge. Although advances in water conservation, recycling, and infrastructure improvements have made it possible to accommodate an additional 3.5 million people with the same amount of applied water today as they did in the mid-1990's, it will become increasingly difficult to provide adequate water services as new developments are built and cities in the SCAG region continue to grow.

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: An area-wide policy of minimizing impervious surfaces reinforces policies aimed at reducing development on valuable open space and the exurban fringe. Discouraging both expensive new water infrastructure and development in water-stressed areas of the region encourages concentrated growth.

Open Space and Habitat: Protecting lands for water resources conserves and restores important habitat and open space. Green infrastructure, utilized for stormwater management during rain events, can be used as local green space during the majority of the year when there is little precipitation.

Air Quality: Air quality is improved by the creation and enhancement of urban green spaces, especially urban forests—which are also solutions to stormwater management.

Our water supplies come from a blend of local and

Water Supplies

Water supplies within the SCAG region come from a blend of local and imported sources. Local sources—including groundwater, surface water runoff, and reclamation—comprise about one-quarter of the region's total supplies. The balance consists of water imported from Northern California via the State Water Project and from the Colorado River via the Colorado River Aqueduct. The following discussion provides information on local and imported water supplies in the SCAG region.

Local Supplies

Groundwater. Groundwater accounts for most of the region's local supply of fresh water. In California, groundwater typically provides 30 percent of the urban and agricultural water requirement. In Southern California, groundwater use tends to range between 23 percent in average years and 29 percent in dry years.[3] Groundwater basins contain a large volume of water resulting primarily from the percolation of natural runoff. It is also possible to artificially enhance groundwater basin recharge by using these basins as natural storage facilities to store imported water from other areas or excess surface water runoff.

The growing water demand in our region has resulted in the overdraft (over-pumping) of many groundwater basins. Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin. It is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. According to Department of Water Resources (DWR) estimates, the state has a groundwater overdraft of between 1 and 2 million acre-feet (maf)[4] during average years.[5] Many water agencies have programs designed to address this imbalance through active groundwater recharge programs such as, diverting water to surface ponds that percolate down into the basin or through the direct injection of water into the basins during periods of surplus.

Surface Storage. Surface storage involves the use of reservoirs to collect water for later release and use. It has played an important role in California where the pattern and timing of water use does not always match the natural runoff pattern.

Our growing population, the dwindling water supply available from the Sacramento-San Joaquin River Delta (Delta), and the prospect of early snow melt under some climate change scenarios all point to the need for increased local storage capacity. However, building new storage facilities can affect a number of environmental and human conditions. It can create economic impacts for the surrounding community, such as reducing property tax revenues to local governments or, conversely, increasing values by providing a more reliable water supply. New reservoirs can impact stream flow regimes, altering designated wild and scenic rivers, causing water quality issues, changing stream geomorphology, causing the loss of fish and wildlife habitat, and increasing the risk of failure during seismic and operational events. New projects need to address these and additional impacts under the application of various laws, regulatory processes and statutes.[6]

Recycling.[7] Recycling involves the collection of wastewater from treatment plants followed by secondary treatment to make the effluent suitable for non-potable uses. The recycled water is either discharged into oceans or streams, or is reused. Reuse includes irrigation, commercial and industrial processes, seawater intrusion barriers and groundwater recharge. In this way, reuse of water frees up imported water for consumptive use. One regional example is the Orange County Water District's Groundwater Replenishment system that recharges a significant quantity of highly treated recycled water to the Orange County Groundwater Basin.

While a large potential market exists for the use of recycled water for groundwater replenishment and seawater barriers,[8] there are a number of cost, regulation, and health barriers to be overcome. Realizing this potential will require:

- Modifying existing regulations based on future studies of the health effects of recycled water;
- Identifying funding sources to aid in the promotion and use of recycled water;
- Reviewing recycled water regulations to ensure streamlined administration, public health and environmental protection;
- Planning and cooperative partnerships at the local, regional and statewide levels; and
- Conducting additional research focusing on public perceptions and acceptance, new technologies and health effects.

Potential markets for recycled water include industrial uses (e.g., cooling tower makeup water, boiler feed water), golf courses, parks, schoolyards, cemeteries and greenbelts. Because these users tend to be high demand, continuous flow customers, they allow water utilities to base load these operations rather than contend with seasonal and diurnal flow variations, thereby reducing the need for storage and other peak demand resources.

Water Conservation. Water conservation, or urban water use efficiency, involves technological or behavioral changes in indoor and outdoor residential, commercial, industrial and institutional uses that lowers the demand for water. Once invoked primarily in response to drought or emergency water shortage situations, efficiency and conservation have become viable long-term supply options, saving considerable capital and operating costs, avoiding environmental degradation, and creating multiple benefits. Water may be saved through a mechanism called groundwater banking, where one agency with groundwater capacity "holds" water conserved by a different agency for future use. During periods of drought, water demand can be reduced significantly through conservation

Global climate change could further alter our region's water

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Energy: Transporting water requires enormous amounts of energy. It takes 8,900 kilowatt-hours to bring one million gallons (kWh/MG) of water into Southern California. Increasing local water supplies and conserving water would greatly reduce the amount of energy used in the region's water supply system.

Transportation: Policies that concentrate development in areas served by existing transportation infrastructure can reduce development of prime habitat that provides water filtration.

Security and Emergency Preparedness: A robust green infrastructure system improves protection from flooding and from corresponding safety issues. More local sources of water would decrease the exposure of our Statewide transport system to natural or man-made disasters.

while demands on imported supplies tend to decline significantly during years of above average rainfall.

The California Urban Water Conservation Council's Memorandum of Understanding has a list of 14 cost-effective "best management practices" for urban conservation.[9] These efforts should target water-using devices and practices involving residential dwellings; irrigation; and commercial, industrial and institutional operations. More recently, water agency initiatives have targeted irrigation and the commercial, industrial and institutional sector. Another challenge is to reduce the common practice of over-watering yards. The resulting surface water runoff is an ongoing source of non-point source pollution that causes water impairments requiring remediation.

Seawater Desalination. Recent developments in membrane technology and plant siting strategies have increased the financial appeal of this resource option. For example, MWD estimates that its local supplies could include up to 150 thousand acre-feet of desalinated water by 2050. However, several barriers must be overcome to make it a more viable water source, including high capital and operational costs for power and membrane replacement, funding, permitting requirements (from the California Coastal Commission) and significant environmental issues.

Imported Supplies

Southern California has historically depended on imported water to supplement local supplies. In 1998, the region imported more than 6 million acre-feet (maf) of water annually, accounting for nearly two-thirds of total water used in the region.[10] Water imports are conveyed by three major facilities: The State Water Project, operated by DWR; the Colorado River Aqueduct, operated by MWD; and the Los Angeles Aqueduct, operated by the Los Angeles Department of Water and Power.[11]

State Water Project. The State Water Project (SWP), managed by DWR, is the largest state-owned multi-purpose water project in the country. It delivers water from the Sacramento-San Joaquin Delta to 29 state water contractors, providing water to more than 23 million Californians, irrigation for 750,000 acres of agricultural lands, and environmental benefits to wildlife refuges and recreational facilities.[12]

Aside from hydrology, the biggest threats to the reliability of SWP supplies are environmental conditions within the Delta. For decades, the Delta has been the focus of competing economic, ecological, urban and agricultural interests. These competing demands have combined to gradually undermine the integrity of the complex system of levees that form the backbone of the Delta water conveyance system. As levees erode, saltwater from the San Francisco Bay continues to encroach on the Delta, increasing salinity and undermining water quality. The presence and decline of endangered species in the Delta have required alterations in pumping operations. The prospect of long shutdowns presents a real threat to the supply reliability of all agencies drawing water from the Delta.[13]

A second concern involves the SWP's need to meet strict drinking water regulations. For example, following chlorination treatment, SWP water has disinfection by-products that require more advanced and costly treatment such as ozonation. Meeting these regulations and reducing treatment costs will require improving the Delta water supply by cost-effectively combining alternative sources of water, source improvement strategies, and treatment facilities.

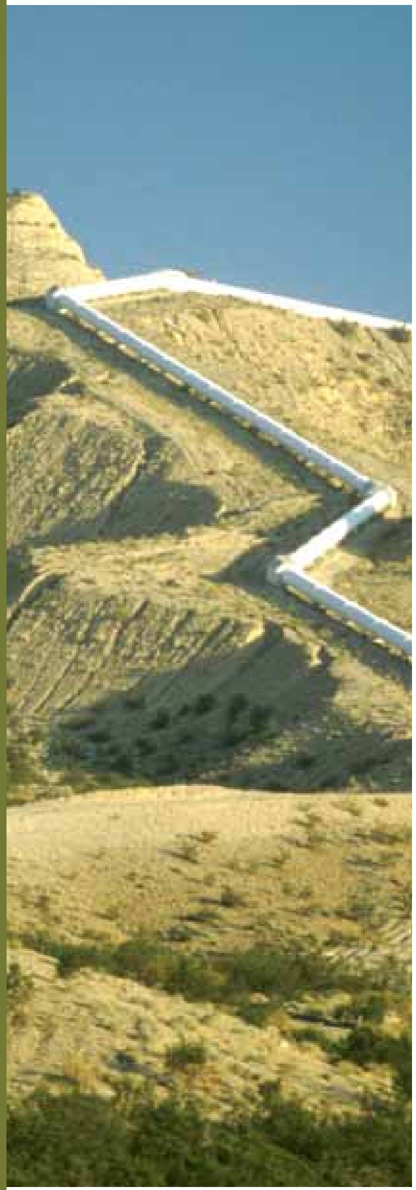
In 2000, CALFED, a collaboration of 25 state and federal agencies, released a 30-year plan for Delta restoration and long-term management. The CALFED program, currently overseen by the Bay-Delta Authority, is tasked with addressing the complex series of issues including storage, conveyance, water quality, levee system integrity, and ecosystem restoration.[14] A more recent "Delta Vision" Task Force is charged with presenting to the Governor a set of recommended actions for long-term solutions to the problem-plagued Delta ecosystem.

Colorado River. The Colorado River represents another major source of imported supply for the SCAG region. Water is conveyed from the Colorado River to urban Southern California via the Colorado River Aqueduct, owned and operated by the Metropolitan Water District.[15] Seven states share legal rights to Colorado River Water. Institutional arrangements have varied the amount of imported water available to Southern California. The need to stabilize this supply will be a key challenge for the future.

Los Angeles Aqueduct. The City of Los Angeles imports water from the eastern Sierra Nevada through the Los Angeles Aqueduct (LAA). The original aqueduct was completed in 1913 to import water from the Owens Valley. In 1940 the aqueduct was extended to the Mono Basin. Water supplies have varied based on snowpack levels in the Eastern Sierra Nevada and court decisions restricting the amount of water that can be imported via the LAA.

Wastewater

Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large publicly owned treatment works (POTWs): the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts, and the Orange County Sanitation District treatment plant. These three facilities handle more than 70 percent of all wastewater generated within the SCAG region and will be increasingly strained as the region continues to grow, unless the facilities are expanded or new facilities are constructed. In addition, medium sized POTWs (greater than 10 million gallons per day, or mgd) and small treatment plants (less than 10 mgd) service smaller communities in Ventura County.



Two-thirds of California's water bodies were threatened

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Public Health: Reducing pollution levels in streams, rivers and swimming beaches will reduce adverse heath impacts from exposure. Protecting groundwater sources from saltwater intrusion and man-made sources of pollution will help maintain aquifer water quality. A robust green infrastructure system also provides improved protection from flooding.

Environmental Justice: When communities manage local water quality through increased use of green space, they can help bring recreational opportunities into park-poor neighborhoods.

Climate Change: Policies that encourage water conservation help alleviate forecasted supply impacts of climate change whether due to shorter rainy seasons, lack of winter snow or degraded estuaries, wetlands, and groundwater aquifers.

Water Quality[16]

Non-Point Source Pollution. Whereas point source pollution refers to contaminants that enter a watershed, usually through a pipe (e.g., discharges from sewage treatment plants and industrial facilities), non-point source pollution, also known as urban runoff or agricultural runoff, comes from many diffuse sources and is most evident in dry weather conditions. Non-point pollution comes from runoff that has picked up pollutants such as chemicals, nutrients, or sediments, before entering surface water resources. Surface water resources in the SCAG region include creeks and rivers, lakes and reservoirs, and the inland Salton Sea.[17] Reservoirs serving flood control and water storage functions exist throughout the region.

Protecting the quality of water in these bodies will be an ongoing challenge. For example, lining the Los Angeles River and the Santa Ana River with concrete for flood control purposes have the unintended consequences of effectively concentrating and transferring urban pollutants and waste to the ocean. Estimates show that two-thirds of California's water bodies were threatened or impaired by non-point sources of pollution.

Non-point source pollution is significantly influenced by land uses and is considered one of the major water quality problems. A major challenge from non-point sources is the urbanizing of the region. Buildings, roads, sidewalks, parking lots and other impervious surfaces alter the natural hydrology and prevent the infiltration of water into the ground. As land is urbanized, more stormwater flows faster off the land, the greater volume increases the possibility of flooding, and the high flow rates do not allow for pollutants to settle out, increasing pollutant concentrations in the runoff. Generally, the higher the percentage of impervious surfaces, the greater the degradation in stream water quality.

The general quality of surface water and groundwater in the SCAG region tends to be degraded as a result of land uses and water management practices. Fertilizers and pesticides typically used on agricultural lands infiltrate and degrade both surface water and groundwater. Septic systems and leaking underground storage tanks can also impact groundwater. Groundwater recharge in urban areas is limited by a high number of impervious surfaces. In addition, water that enters the groundwater from urban areas also carries high levels of pollutants from roads, lawns, and other sources. Water quality concerns include:

Salinity. Over-pumping can result in saltwater intrusion from the ocean, further degrading groundwater quality. Wastewater discharges can result in salt buildup from fertilizer and dairy waste. Water agencies need to work with other stakeholders on researching and developing salinity management goals and action plans, which include blending low and high salinity water and the desalination of brackish water.

Perchlorate. Ammonium perchlorate is a primary ingredient of solid rocket propellant and is used in the manufacture of munitions and fireworks. It is readily soluble in water, highly mobile in groundwater, and has significant health effects on thyroid function.[18] Small amounts have been found in the Colorado River with higher concentrations in local groundwater basins. The challenge is to find cost-effective ways to remove perchlorates using conventional water treatment, nanofiltration and reverse osmosis.

Total Organic Carbon and Bromide. When source water containing high levels of total organic carbon (TOC) and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts are created. Studies show links between exposure to disinfection byproducts and certain cancers, as well as reproductive and developmental effects. TOCs and bromide in Delta water present challenges to monitor and maintain safe drinking water supplies. The challenge is to better protect SWP water supplies in a cost-effective manner.

Methyl Tertiary Butyl Ether and Tertiary Butanol. Until recently, MTBE was the primary oxygenate in virtually all gasoline used in California to address air pollution issues. However, MTBE has caused a serious problem, as it is very soluble in water and moves quickly into the groundwater. One gallon of MTBE alone (11 percent MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 micrograms per Liter. We must find ways to reduce the cost of treating groundwater wells, or risk the temptation to seek increased imports at lower cost. A combination of advanced oxidation processes followed by granular activated carbon can reduce MTBE levels by up to 90 percent.

Arsenic. Arsenic, a naturally occurring substance often found in drinking water, has been identified as a risk factor for lung and urinary bladder cancer. Several local water sources contain arsenic concentrations exceeding the federal standard. It appears likely that current treatment standards will increase cost but not necessarily decrease local water supplies. However, if treatment cost increases are sufficient, some water agencies in Southern California may choose to increase their use of imported water to avoid this additional cost.

Uranium. Colorado River water has been compromised by a 10.5-million-ton pile of uranium mine tailings at Moab, Utah. Rainwater has seeped through the pile and contaminated the local groundwater, causing a flow of contaminants into the river. While the Department of Energy has agreed to move the tailings, remediating the site will require Congressional appropriations, and maintaining support for a cleanup will require close coordination and cooperation with other Colorado River users.

Climate Change[19]

Current scientific research suggests that increasing concentrations of atmospheric greenhouse gases are producing global-scale temperature and precipitation changes. Models have predicted that by the end of the century, average winter temperatures could increase by more than 7 degrees, and summer temperatures could increase by as much as 18 degrees. The results of precipitation studies have been less definitive,

We must improve comprehensive and collaborative water-

ENERGY COSTS, GREENHOUSE GASES, AND WATER

In a Los Angeles Department of Water and Power analysis, the energy costs in kilowatt hours per acre foot of water (kWh/af) and CO_2 emission in pounds per acre foot of water (lbs/af) ranged as follows:

- Tertiary Treated Recycled Water: 428 kWh/af and 558 lbs/af
- Pumped Groundwater: 519 kWh/af and 677 lbs/af
- State Project Water Imports: 2580 kWh/af and 2154 lbs/af
- Seawater Desalination: 4100 kWh/af and 5345 lbs/af

ranging broadly between models and scenarios. Predictions from these models range from slight increases in precipitation to decreases of up to 30 percent. Nevertheless, it is an issue that water agencies are increasingly accounting for as part of the standard water planning processes.

While uncertainties exist about the exact timing, magnitude and regional impacts of these temperature and precipitation changes, researchers have identified several issues of particular importance to water resource planners. These include:

- A reduction in the Sierra Nevada snowpack
- Increased intensity and frequency of extreme weather events
- Rising sea levels resulting in:
    - An increased risk of damage from storms, high-tide events and the erosion of levees.
    - Saltwater intrusion into coastal groundwater.
    - Potential pumping cutbacks on the State Water Project and the Central Valley Project.

Other important issues associated with climate change include:

- Effects on local supplies such as groundwater.
- Changes in urban and agricultural demand levels and patterns.
- Impacts to human health from water-borne pathogens and water quality degradation.
- Declines in ecosystem health and function.
- Alterations in power generation and pumping operations.

Water also contributes to the generation of greenhouse gases because of the energy requirements of transporting it (water) throughout California. The energy component in developing and managing water resources is a growing challenge for the region. Energy is involved in each stage of water's use cycle: source and conveyance, treatment, distribution, consumption and wastewater treatment. In these ways, the management of energy and water supply and water quality are closely inter-related and must be considered together when regional growth and water resource strategies are developed.

These issues present challenges to future water planning efforts. Ongoing research concerning the likelihood and potential impacts of climate change needs to be carefully monitored and explicitly addressed by agency planning documents.

THE PLAN

The RCP focuses on three strategies for addressing water supply and quality issues. First, the region needs to develop sufficient water supplies to meet the water demands created by continuing regional growth. Second, we can improve our water quality by implementing land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste. Finally, the region needs to improve comprehensive and collaborative watershed planning that yields waterwise programs and projects.

Improve Water Supply and Manage Demand

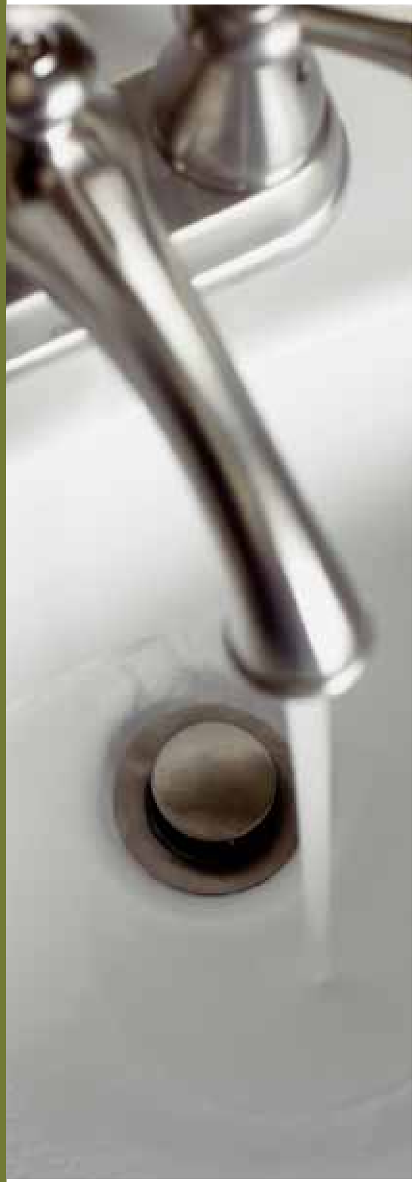
The region needs to improve its stewardship of water supplies and manage demand in order to address the anticipated substantial growth in population and economic activities. The RCP promotes strategies that encourage environmentally-sustainable water imports, local conservation and conjunctive management approaches, reclamation and reuse, and water transfers and banking.

Conjunctive Management. Conjunctive management is an integrated approach to managing existing groundwater and surface water resources. Conjunctive management efforts are planned to optimize productivity, equity, and environmental sustainability. This strategy requires coordination among water institutions and, though it can add a level of complexity, it can be important in water-scarce regions to prevent groundwater exploitation. [20]

Transfers and Water Banking. Following the basic principles of *Integrated Resource Planning*, urban water agencies within Southern California may continue to diversify their sources and reduce dependence on imported water by entering into contractual arrangements with agricultural irrigation districts. For example, irrigation agencies agree to adopt water conservation measures or to engage in land fallowing (letting agricultural lands idle) to save water.[21] Water that would otherwise be used to irrigate crops is then purchased, or transferred, to urban water agencies. Frequently, this water is stored, or *banked*, in aquifers for use during times of shortage, thus increasing the urban agencies' supply reliability. Water banking also occurs during wet years as rainwater is directed to groundwater recharge facilities and spreading basins for use during times of shortage.

Land Use and Transportation Policies

The RCP encourages development strategies that promote compact growth patterns. Concentrated or clustered development will help to reduce impervious surfaces, conserve energy used for water conveyance, and provide a greater level of overall water quality protection. Concentrated development protects the watershed by leaving a larger percentage of the watershed in its natural condition. It reduces urban and agricultural runoff that can contain significant volumes of pollutants from entering surface waters, reducing future impacts on surface and groundwater quality and supply. Compact growth also



POLLUTANTS IN URBAN RUNOFF

The California State Water Quality Control Board identified the following pollutants in urban runoff.[22]

Sediment. Excessive loads in streams interfere with photosynthesis, aquatic life respiration, growth and reproduction.

Nutrients. Nitrogen and phosphorus can result in eutrophication of receiving waters, reducing oxygen levels available for other species.

Bacteria and viruses. Pathogens introduced to receiving waters can restrict water contact activities.

Oxygen demanding substances. Lawn clippings, animal excrement and litter reduces dissolved oxygen levels as they decompose.

Oil and grease. Hydrocarbons from autos are toxic to some aquatic life.

Metals. Metals can enter waterways through storm drains along with sediment, or as atmospheric deposition.

Toxic pollutants. Pesticides, phenols and polynuclear aromatic hydrocarbons are toxic chemicals found in stormwater.

Floatables. Trash in waterways increases metals and toxic pollutant loads.

requires less water and less energy for water transport and water treatement than a diffuse, sprawling pattern.

Accommodating growth challenges us to find ways to promote compact, mixed-use development, which can reduce water demand and creates a smaller urban footprint. By reducing impervious surfaces, development generates less surface runoff, and minimizes dispersion into watersheds and groundwater recharge areas receiving this runoff.[23]

Watershed Planning

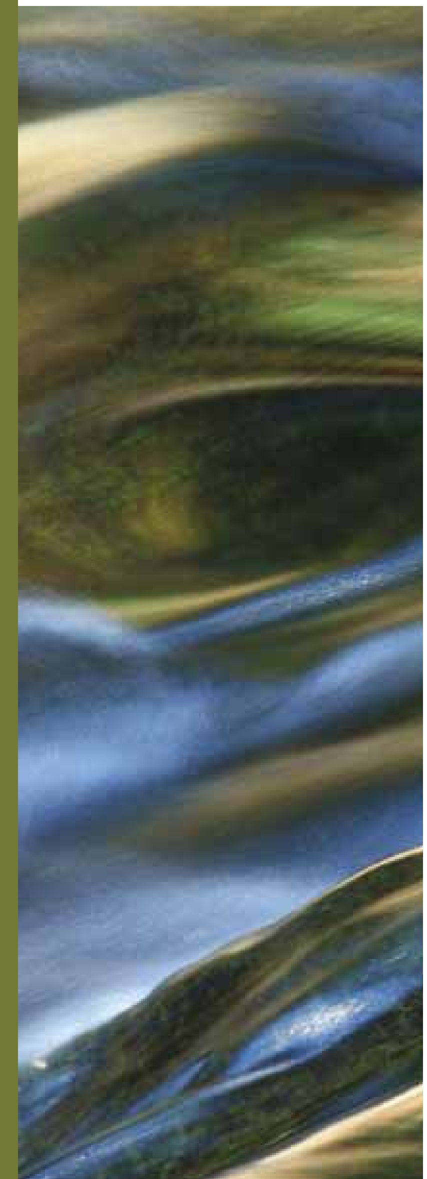
The way in which land is used—the type of use and level of intensity—has a direct effect on water supply and quality. Watershed management is the process of evaluating, planning, managing, restoring and organizing land and other resource use within an area of land that has a single common drainage point. Watershed management tries to provide for sustainable development while maintaining a sustainable ecosystem.

Our region needs to better implement collaborative watershed planning that produces waterwise programs. By promoting better designed communities and projects, we can produce multiple benefits and ecosystem protections. This can be done by integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders. Efforts such as the State Water Plan, are a step in the right direction towards compiling resources and informing planners and water agencies.

State Water Plan. 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 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.

WATER GOALS

- Develop sufficient water supplies through environmentally sustainable imports, local conservation and conjunctive use, reclamation and reuse to meet the water demands created by continuing regional growth.
- Achieve water quality improvements through implementation of land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste in the region.



- Foster comprehensive and collaborative watershed planning within the region that produces waterwise programs and projects with multiple benefits and ecosystem protections, integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders.

WATER OUTCOMES

- Regional per capita water demand reduced by 25 percent by 2030 with waterwise land use and local management policies (voluntary local land use policies and water practices are established to maximize efficient use of local water resources and reduce water demand in the SCAG region).
- Regional water impairments eliminated by 2030 with the use of stormwater, urban and agricultural runoff controls and improved retention and infiltration systems (voluntary land use and transportation policies are established to minimize pollution entering water bodies and increase on-site water management).
- All member agencies included as active participants in regional watershed planning and implementation efforts, including concurrent updating of basin plans within the region (coordination and collaboration of local agencies, water districts and other watershed stakeholders to maximize all investments in water management for public benefit).

WATER ACTION PLAN

				Potential for Direct/Indirect Benefits								Other Benefits	
Best Practices	Legislation	Coordination	Constrained Policies	Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
X			WA-1 SCAG should create a compendium of best management practices, case studies, and model ordinances that will give 'waterwise' guidance for development entitlements and growth management policymaking.										
		X	WA-2 SCAG should promote water conservation awareness throughout the region, featuring the connections between water and other resources, including energy and timing of water use.			X	X						X
	X		WA-3 SCAG should encourage water reclamation where it is cost-effective, feasible, and appropriate to reduce reliance on imported water.				X			X			X
		X	WA-4 SCAG should encourage coordinated watershed management planning at the sub-regional level by (1) providing consistent regional data; (2) serving as a forum for discussions between affected local, State, and federal watershed management agencies; and (3) ensuring that watershed planning is consistent with comprehensive regional planning objectives and challenges.				X						
		X	WA-5 SCAG should facilitate information sharing between local water agencies and local jurisdictions, in order to evaluate future water demands, prepare realistic Urban Water Management Plans, and support sustainable water and growth management policies.	X									
		X	WA-6 SCAG should encourage integration of water stewardship practices and unify investment incentives among all stakeholders, prioritizing resources for investments that optimize returns and outcomes and best meet fiscal limitations, growth realities and sustainability objectives.										
	X		WA-7 SCAG should provide, as appropriate, legislative support and advocacy for regional water conservation, supply, and water quality projects.										
	X		WA-8 SCAG should develop a policy framework for integrating water resources planning and Compass Blueprint planning strategies in order to coordinate positive interactions between local land use policies and regional water supply and water quality actions over time.	X									
Voluntary Local Government Best Practices													
X			WA-9 Developers and local governments should consider potential climate change hydrology and resultant impacts on available water supplies and reliability in the process of creating or modifying systems to manage water resources for both year-round use and ecosystem health.					X		X			X
X			WA-10 Developers and local governments should include conjunctive use as a water management strategy when feasible.										
X			WA-11 Developers and local governments should encourage urban development and land uses to make greater use of existing and upgraded facilities prior to incurring new infrastructure costs.	X					X				
X			WA-12 Developers and local governments should reduce exterior uses of water in public areas, and should promote reduced use in private homes and businesses, by shifting to drought-tolerant native landscape plants (xeriscaping), using weather-based irrigation systems, educating other public agencies about water use, and installing related water pricing incentives.				X						X

				Potential for Direct/Indirect Benefits								Other Benefits	
Best Practices	Legislation	Coordination	Constrained Policies	Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			WA-13 Developers and local governments should protect and preserve vital land resources—wetlands, groundwater recharge areas, woodlands, riparian corridors, and production lands. The federal government's 'no net loss' wetlands policy should be applied to all of these land resources.					X					X
	X		WA-14 Local governments should amend building codes to require dual plumbing in new construction, and provide incentives for plumbing retrofits in existing development, to enable the safe and easy use of recycled water in toilets and for landscaping.	X									
X			WA-15 Local governments should amend ordinances as necessary to allow municipal and private outdoor use of recycled water for all parks, golf courses, and outdoor construction needs.										
	X		WA-16 Water agencies should incentivize the use of recycled water through pricing structures that make it an attractive alternative to fresh water in non-potable situations.							X			
		X	WA-17 Water agencies should reduce salinity and remove contamination in major groundwater basins to increase conjunctive use of water resources and extend groundwater storage unless specific beneficial uses for contaminated groundwater are identified.							X		X	
		X	WA-18 Local governments should create stable sources of funding for water and environmental stewardship and related infrastructure sustainability, including purchase and implementation of green infrastructure.					X					
		X	WA-19 Water purveyors should develop and implement tiered water pricing structures to discourage water waste and minimize polluting runoff.									X	
X			WA-20 Local governments should use both market and regulatory incentive mechanisms to encourage 'water wise' planning and development, including streamlining and prioritizing projects that minimize water demand and improve water use efficiencies.				X						X
		X	WA-21 Local governments should develop comprehensive partnership approaches to remove and prevent water impairments, replacing the existing regulatory command and control approach that has created delays and distrust.										
		X	WA-22 Local governments should create opportunities for pollution reduction marketing and other market-incentive water quality programs.									X	
X			WA-23 Local governments should encourage Low Impact Development and natural spaces that reduce, treat, infiltrate and manage runoff flows caused by storms and impervious surfaces.	X				X					
X			WA-24 Local governments should prevent development in flood hazard areas lacking appropriate protections, especially in alluvial fan areas.	X				X				X	
X			WA-25 Local governments should implement green infrastructure and water-related green building practices through incentives and ordinances.	X		X	X	X		X	X	X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
		X	WA-26 Local governments should integrate water resources planning with existing greening and revitalization initiatives, such as street greening, tree planting, and conversion of impervious surfaces, to maximize benefits and share costs.	X		X		X				X	X
		X	WA- 27: Developers and local governments should maximize pervious surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. New impervious surfaces should be minimized to the greatest extent possible, including the use of in-lieu fees and off-site mitigation.										
X			WA-28 Local governments should maintain and update Best Management Practices for water resource planning and implementation.										
		X	WA-29 Local governments should coordinate with neighboring communities and watershed stakeholders to identify potential collaborative mitigation strategies at the watershed level to properly manage cumulative impacts within the watershed.										
		X	WA-30 Local governments should adopt MOUs and JPAs among local entities to establish participation in the leadership and governance of integrated watershed planning and implementation.										
		X	WA-31 Local governments should increase participation in the implementation of integrated watershed management plans, including planning effort initiated in neighboring communities that cross jurisdictional lines.										
X			WA-32 Developers and local governments should pursue water management practices that avoid energy waste and create energy savings/supplies.			X	X						X
State and Regional Agency Best Practices													
	X		WA-33 State and regional agencies should develop fair and consistent safety guidelines for use of reclaimed and recycled wastewater for non-potable uses, in order to facilitate more widespread acceptance and use.									X	
X			WA-34 State and regional agencies should design and operate regional transportation facilities so that stormwater runoff does not contaminate surrounding watershed ecosystems.		X								

				Potential for Direct/Indirect Benefits								Other Benefits	
Best Practices	Legislation	Coordination	Strategic Initiatives	Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	WA-1S SCAG should support researching the feasibility and environmental impacts of increasing water supply through saltwater desalination.				X			X			X
		X	WA-2S SCAG should encourage streamlined water quality regulatory implementation, including identification and elimination of overlapping regulatory programs to reduce economic impacts on local businesses and governments.						X				
X			WA-3S SCAG should encourage restoring the region's watersheds to 90 percent effective pervious surface equivalent to pre-development conditions. Increases in pervious surfaces should be accomplished through new development models and materials, such as green roofs, porous pavement, natural stormwater management, increased park space, and expansion of urban forest.	X									
		X	WA-4S SCAG should support improving water quality in the region's imported water supplies.									X	
		X	WA-5S SCAG should encourage preventing non-native/invasive species from adversely affecting regional water supplies and quality.					X					
		X	WA-6S SCAG should encourage the use of stormwater permits on a watershed-wide basis.									X	
		X	WA-7S SCAG should support the development and implementation of public education and outreach efforts at the local level regarding watershed management for community leaders and educators. In addition, SCAG will encourage consideration of these policies at schools (K-12).					X				X	

Footnotes

[1] Southern California Association of Governments, *2008 Final Regional Transportation Plan*. May 2008.

[2] Department of Water Resources, *2005 Water Plan Update*, Vol. 1, Table 3-1, p. 3-9.

[3] Department of Water Resources, *California's Groundwater-Bulletin 118*. Update 2003. Located at http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm

[4] The acre-foot is a common measure of volume in discussions of water supply. An acre-foot (af) is the amount of water required to fill an acre-size area with one foot of water.

[5] California Department of Water Resources, *Draft Bulletin 118*. Updated 2003.

[6] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, November 2005. http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP_2005.pdf

[7] One concern is that the use of recycled water for groundwater recharge could adversely impact groundwater quality due to the introduction of organic contaminants, metals and salts.

[8] Excerpted from the Department of Water Resources Water Plan, Vol2, Ch. 18. 2005.

[9] See www.cuwcc.org for more information about CUWCC and the MOU.

[10] California Department of Water Resources, *Water Plan*. 1998. This estimate includes water used for agriculture.

[11] According to the California Department of Water Resources *Management of the California State Water Project*, Bulletin 132-02, p.3, January 2004: "Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be build as needed."

[12] California Department of Water Resources, *Management of the California State Water Project*, Bulletin 132-2, p. xxix. January 2004.

[13] In addition to saltwater intrusion from the San Francisco Bay, the Delta is also vulnerable to the collapse of aging levees. In June 2004, for example, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operation.

[14] For additional information about the CALFED Program, see http://www.calwater.ca.gov/.

[15] The CRA has an annual capacity of 1.3 maf. The Colorado River has experienced drought conditions for eight of the last nine years. This is the longest dry period on the river in recorded history.

[16] *Ibid*., Chapter IV. 2005.

[16] The following sections are excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, Chapter IV. November 2005.

[17] The Salton Sea, the largest inland body of water in California, was formed around 1906 when the Colorado River was accidentally diverted from its natural course. Presently, the Sea is fed by agricultural runoff from the Imperial Valley and Mexico and by the New River and the Alamo River. Without agricultural runoff the Salton Sea would dry up entirely.

[18] Perchlorate interferes with the thyroid gland's ability to produce hormones required for normal growth and development.

[19] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, pp II-21-23. November 2005.

[20] World Bank. *Agricultural and Rural Development Notes - Conjunctive Use of Groundwater and Surface Water*. Issue 6, February 2006. Based on Investment Note 4.3 in the larger volume *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management*. www.worldbank.org/rural.

[21] Some urban agencies also have the ability to enter "spot" water markets and to purchase water on an "as needed" basis.

[22] Excerpted from the California Department of Water Resources, California Water Plan Update 2005. 2005.

[23] State Water Resources Control Board. California Water Quality Assessment. 1992.