WATER

REGIONAL CONTEXT

Water has arguably been the central determinant of the history of Los Angeles, and it remains a pivotal issue in the region's transition to a sustainable future. Los Angeles's Mediterranean-type climate is defined by semi-arid conditions with strong seasonal precipitation that varies widely from year to year. The region's topography creates additional variation and flooding risk. While the average annual precipitation in the coastal plain is 15.5 inches, the San Gabriel mountains average 32.9 inches per year,[36] with some of the highest rainfall intensities on record in the continental Unites States.[37] Such contrasting and uncertain conditions have long shaped Los Angeles's water management strategy, which has historically relied heavily on imports while simultaneously creating infrastructure to safely and quickly channel floodwaters to the sea. However, the realities of climate change, layered upon ecological concerns and a growing population, demand a new approach to water management in the region.

Water impacts planning in the Los Angeles region

Climate change is altering the amounts and timing of precipitation, snowpack, and runoff, both locally and in regions from which Los Angeles imports water.[38] Combined with increased temperatures and evaporation, scientists expect climate change to reduce local supplies. In particular, imports from the Bay Delta are highly at risk due to sea level rise and the potential for earthquake damage to levees.

The current statewide drought, although falling within the range of natural long-term variability, has added urgency to sustainability planning for water management. The drought has also elevated the importance of expanding water conservation measures and creating reliable local supplies. As of 2016, California is in its fifth year of drought conditions. Rain and snow amounts the previous winter improved from recent years, but not enough to draw the state out of the current drought; rain and snow levels also varied significantly by region, with parts of Northern California receiving better than average precipitation while most of Southern California received below average precipitation.[39]

Climate change responses for water resources management include adopting more water conservation measures, developing reliable local sources, developing new institutional arrangement for water management, improving groundwater quality and management, and ensuring that disadvantaged communities are not disproportionally affected by water resource constraints. Several cross-cutting approaches could help ensure that measures taken in these areas are coherent and cost effective.

In essence, Southern California is moving toward a new water regime; droughts may be part of the new normal and thus a different vocabulary must be developed and a deeply different concept of land-scaping and water use that is appropriate to a place with less reliable water supplies, warmer weather, and potential floods.

A number of regional planning efforts have established strategies and set targets around water management, with consideration of climate change impacts. These include:

- Metropolitan Water District's (MWD) 2015 Integrated Water Resources Plan (IWRP).[40] MWD serves 91% of the total population in Los Angeles County and is the regional whole-sale water agency, importing water from the Bay-Delta via the State Water Project and from the Colorado River via the Colorado River Aqueduct. The 2015 IWRP addresses conservation, development of more local supplies, and planning for a new generation of supplies in the face of decreased availability of imported water.
- Urban Water Management Plans (UWMPs) are filed every five years by urban water suppliers under Department of Water Resources (DWR) regulations.[41] The goal of UWMPs is to support the suppliers' long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Notably, these plans are unlikely to be sufficient to meet the region's long-term water conservation goals.
- The Greater Los Angeles County (GLAC) Integrated Regional Water Management Plan (IRWMP) was initiated in response to the 2002 Regional Water Management Planning Act (Senate Bill 1672) and associated bond act funding. This act incentivized the formation of regional water management groups (consisting of cities, counties, water districts, and community organizations) for the purpose of developing integrated plans. The GLAC IRWMP was issued in 2014 and includes planning targets for 2035 for water supply, water quality, habitat, open space, and flood risk reduction.[42]
- Watershed Management Plans (WMPs) are a voluntary means of complying with a number of water quality provisions of the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit. This approach allows permittees to join together to collaboratively address stormwater management on a watershed scale through customized strategies, control measures, and best management practices (BMPs), in order to meet permit requirements including receiving water limitations, total maximum daily load (TMDL) provisions, and prohibitions against non-storm water discharges. Among BMPs identified in these plans, structural approaches such as stormwater infiltration and rainfall harvesting will support water supply goals in addition to improving surface water quality. The Los Angeles Regional Water Quality Control Board (LARWQCB) has approved WMPs for most of Los Angeles County over the last year.[43]

Water management in the Los Angeles region

Over 100 public and private entities are involved in the management and distribution of potable water in the Los Angeles Region, a legacy of fragmented urban growth and a historic reliance on local control of services.[44] As a result, many small private water companies and special districts may not be adequately equipped to meet climate change challenges and associated capital investment needs.[45] Further, fragmentation may hinder new collaborations around conjunctive water management that can better meet the regional water need, rather than each entity doing it on its own.

Approximately 58% of the water used in Los Angeles County is sourced from outside the region (53% is met by MWD service water, and 5% is supplied by the Los Angeles Aqueduct, used only by the City of Los Angeles). Groundwater meets 38% of total countywide demand but is available only to groundwater rights holders, and local recycled water contributes about 4%.[46] Within the City of Los Angeles, approximately 89% of the water supply is imported from outside the region.[47]

Significant reductions have been made over the last few years in per capita water use, measured in gallons per capita per day (GPCD). In April 2016, the South Coast Region's residential water use was approximately 77 GPCD, representing more than a 14% reduction over the April 2015 usage of approximately 90 GPCD.[48] Data for potable consumptive demand (a broader measure than residential demand that includes municipal and industrial use) are not available at the monthly timescale, but annual MWD service area potable consumptive demand in 2015 was 131 GPCD, which is more than a 27% reduction from the 2005 baseline of 181 GPCD.[49]

The region has long struggled with water quality problems for both surface and groundwater, which could be exacerbated by climate impacts in the coming years. Approximately 85% of Los Angeles County assessed rivers and streams are impaired for one or more pollutants. Recent reports have shown that 39% of community water systems in Los Angeles County are completely dependent on groundwater for drinking water, and 40% of community water systems had a principal contaminant detected in an active untreated drinking-water well at a concentration above the maximum contaminant level on at least two occasions between 2002–2010.[50] Further studies have identified industrial chemicals prevalent throughout the county's groundwater basins in concentrations near or above comparison concentrations, including: 1,4-dioxane, perchlorate, perchloroethene (PCE), 1,1-dichloroethene, trichloroethene (TCE), atrazine, n-nitrosodimethylamine, carbon tetrachloride, and hexavalent chromium (Cr6).[51] State Water Board data for 2014 showed over 25% of supply wells exceeded comparison concentrations for 1,4-dioxane.[52] However, state regulations do not require drinking water suppliers to monitor this chemical. As of March 2016, chemical contamination above comparison concentrations for one or more chemicals existed in 439 supply wells across Los Angeles County.[53]

Despite the extent of groundwater contamination, nearly all customers have been provided with clean water based on publicly available data for systems serving >100 people in Los Angeles County.[54] Over the period from 2008–2012, the number of annual Maximum Contaminant Limits (MCLs) violations for systems serving more than 100 people in Los Angeles County ranged from a low of 6 to a high of 16, with the population impacted ranging from approximately 57,600 to over 144,000 people. In 2014, 16 systems in Los Angeles County had maximum contaminant limits violations, all of which served 1,500 or fewer people.[55]

Even when contamination is detected in time to prevent public exposure, groundwater contamination limits the siting options for infiltration BMPs, and cleanup requires tremendous resources. The 2009 California Water Plan estimates that cleanup of leaking underground tanks with MTBE can range up to $1.5 million per site, and sites where solvent contamination has reached groundwater may take decades and cost millions of dollars.[56]

The majority of the region's groundwater basins are adjudicated, meaning that a court has determined who has pumping rights to the water and in what amounts. The major adjudicated basins include the Upper Los Angeles River Area (the San Fernando Valley Basin), the West Coast Basin, most of the Central Basin, the Puente Basin, the Raymond Basin, and the main San Gabriel Basin.[57] Currently, the Santa Monica Basin, the Hollywood Basin, and the part of the Central Basin are not covered by any court-approved management agreements.

Coastal groundwater basins (Central and West Coast Basins) underlie 410 square miles and provide over 400,000 acre-feet of water annually. An extensive barrier system of freshwater injection wells is in place, designed to control saltwater intrusion to these basins. Sea level rise (discussed in more detail in the Coastal Resources section) is anticipated to increase saltwater intrusion and will, therefore, require an adaptive response by agencies responsible for the coastal barrier system, including the Water Replenishment District of Southern California, and the Los Angeles County Department of Public Works, among others.[58]

Wastewater recycling offers an addition source of local water for the region. Most of the large treatment plants in the region are owned either by the County or the City of Los Angeles. The combined volume of treated wastewater discharged in 2013 from 12 of the largest plants was approximately 247 billion gallons.[59] Many of these plants also produce recycled water that is being used in place of potable water for non-consumptive uses such as industrial, landscape, and recreational purposes, as well as indirect potable reuse for groundwater recharge. Expanded application of recycled water for direct potable reuse (defined as serving purified water directly into potable water supply distribution or into the raw water supply immediately upstream of a water treatment plant) is pending the development of state regulations. Metropolitan Water District is exploring a plant that would produce up to 150 MGD of purified water and up to 60 miles of distribution lines to convey the water to spreading basins and/or injection well sites in both Los Angeles and Orange Counties.

Currently, the only desalination plant producing drinking water for the general public in Los Angeles County is located on Santa Catalina Island, and the only planned facility is the West Basin's Ocean Water Desalination Project, with a projected capacity of 20–60 MGD.[60]

THE ROLE OF REGIONAL COLLABORATION

While the groundwater adjudications in Los Angeles County were precedent setting for the state, they currently allocate water according to historical precedent. Some cities have groundwater rights, others do not, and amounts vary widely, not correlated to city populations. Further, most basins have been overdrawn, relying on imported water to ensure safe yield. As a result, the basins have more room for additional water injection, but questions abound about who that additional water belongs to and for what period of time. It is a propitious moment to bring all the groundwater masters together to discuss a greater Los Angeles groundwater basin joint powers authority (JPA) to manage the basins as water banks for the region and to create water balancing among them. As there is more interest in using them for treated wastewater storage, as well as more projects to infiltrate water into them, the adjudications will no longer be adequate to manage the new resources. The region should establish a groundwater basin JPA and explore the retirement of individual water rights to free up the water for regional benefit.

POLICY LANDSCAPE

The following is a summary of relevant state policies and recent regulations, provided as context for the discussion of goals, strategies, and actions. This summary is not an exhaustive, and further information is in the footnoted references.

Water conservation policy

Historic steps toward water conservation at the state level began in 2009, with Senate Bill X7 7 (Steinberg), a package of water reforms that included a goal of achieving a 20% reduction in per capita water use by 2020 (referred to as 20x2020), compared to baseline use from 1995–2005. This act also required local water agency planning and reductions. In January 2014, the Governor declared a drought state of emergency, which was continued in April 2014. In April 2015, the governor issued Executive Order B-29-15, which required an immediate 25% reduction in overall potable urban water use. The corresponding State Board emergency regulations prohibited certain uses of water, such as hosing down driveways and sidewalks, and also mandated monthly reporting by urban water suppliers.

In response to the continuing drought, the governor issued a new executive order in November 2015 (B-36-15), which was then further extended in May 2016 (B-37-16). Accordingly, the State Board adopted a statewide water conservation approach that replaced the prior percentage reduction-based water conservation standard with a localized “stress test” approach.[61] This new approach mandated urban water suppliers to ensure at least a three-year supply of water to their customers under drought conditions. These emergency regulations only apply to residential gallons per capita per day (R-GPCD), with data from monthly reporting to the State Water Board available for public review.[62]

In addition to setting conservation targets, the state has established code-based standards for new construction and retrofits. New stringent indoor plumbing standards have been set through recent legislative action, including Assembly Bill 715 (Laird, 2007), which applies to toilets and urinals sold in California after January 1, 2014, and Senate Bill 407 (Padilla, 2009), which requires water-conserving plumbing fixtures be installed in single-family residential real property as part of any building alterations or improvements made after January 1, 2014, and as a required replacement by the owner on or before January 1, 2017.

Assembly Bill 1881(Laird, 2006) broadly addresses outdoor water use by requiring local agencies to adopt the state’s Model Water Efficient Landscape Ordinance (MWELO) by January 2010 and requiring the Energy Commission to adopt performance standards for irrigation equipment. Assembly Bill 1881 was bolstered by Executive Order B-29-15 on April 1, 2015, which resulted in an updated MWELO issued on July 15, 2015. The ordinance revisions increased water efficiency standards for new and retrofitted landscapes through more efficient irrigation systems, graywater usage, installation of landscape water meters, on-site stormwater capture, and by limiting the portion of landscapes that can be covered with turf. It also required reporting on the implementation and enforcement of local ordinances, with adoption and required reports due by December 31, 2015. MWELO primarily applies to new construction projects equal to or greater than 500 square feet and to rehabilitated landscape projects equal to or greater than 2,500 square feet. Existing landscapes and cemeteries over one acre may be subject to irrigation water use analyses, surveys, and audits, with penalties and enforcement mechanisms to ensure compliance with conservation goals.

Senate Bill 555 (Wolk, 2015) requires urban retail water suppliers to conduct and submit water loss audits annually starting on October 1, 2017. DWR must make these reports available to the public on its website and provide technical assistance on water loss detection programs to urban retail water suppliers. The State Water Board is required to adopt water loss performance standards by July 1, 2020.

Water recycling and desalination policy

The State Board's "Recycled Water Policy," adopted in 2009, established a target of increased use of recycled water by 200,000 ac-ft./yr. by 2020 and by an additional 300,000 ac-ft./yr. by 2030. This same policy also required "Salt and Nutrient Management Plans" to be completed by 2014 for every groundwater basin in order to ensure that groundwater quality objectives were not exceeded. The state board regulations for groundwater replenishment using recycled water became effective in 2014. The board also planned to adopt regulations for augmenting surface water with recycled water by December 31, 2016 and will submit a report to the legislature by December 31, 2016 on the feasibility of regulations for direct potable reuse of recycled water.

A May 2015 amendment by the state board to the *California Ocean Plan* established a process for permitting seawater desalination facilities statewide, to address potential marine life mortality and harm to aquatic life beneficial uses associated with source water intake and brine discharge.[63]

Groundwater management policy

The statewide Aquifer Storage and Recovery permit, adopted in 2013 by the State Water Resources Control Board, allows water purveyors to store water of drinking quality in a local aquifer (as allowed by a water rights permit). More recently, the Sustainable Groundwater Management Act (SGMA) requires local agencies to adopt groundwater management plans, in order to protect local water sources against drought and climate change.[64]

GOALS, STRATEGIES, AND ACTIONS

While there are hundreds of possible actions related to water management, this Framework focuses on those that will benefit most from collaborative planning and implementation. These highest strategies support four target areas for water management: conserving water, increasing and diversifying supplies, reducing water-related impacts on disadvantaged communities, and protecting and improving water quality.

Policy makers will need to implement these individual actions within the context of a truly integrated water management approach. Achieving our water management targets will require policy makers and others to consider carefully and holistically the interconnections between stormwater, wastewater, greywater, and recycled water. However, the complex, decentralized, and uncoordinated nature of the region's water infrastructure and governance obscures these relationships and creates barriers to the integrated management of the urban water cycle.[65] Furthermore, while numerous planning and collaboration efforts are underway throughout the region, the misalignment between municipal boundaries, surface watershed delineations, groundwater basin recharge zones, and water supply service boundaries often limits the effectiveness of these efforts and may create unintended consequences.[66] The absence of a centralized data infrastructure that cuts across these multiple physical and governance boundaries is also a barrier to optimal decision making. The work needed to achieve truly integrated planning across the county requires broad, collaborative support region-wide.

The following cross-cutting measures should be the highest priority for water management in the Los Angeles region:

1. Develop a water supply system across the county and its cities that ensures water resources are fully used and reused to minimize imports, while ensuring a basic human right to water
2. Implement a suite of policy recommendations to improve institutional capacity for data management, performance metrics, and agency collaboration, including:[67]
    - Publicly available centralized data repository for management of Southern California water to provide:
        - Standardized numerical identifiers for each utility and its service area
        - Up-to-date public geospatial data for retailer service areas
    - New guidelines to assess water utility performance capacity, including:
        - Retain and expand current emergency water use reporting requirements and require reporting by sectors
        - Standardized metrics for commercial, industrial, and institutional water consumption
        - Establish minimum performance thresholds
        - Require regular utility-scale leaking pipe audits and repairs

These measures will improve the effectiveness of all the following actions and are essential to the region's ability to respond quickly and equitably to critical climate challenges. The best practices compendium has additional information regarding case studies and steps for implementation.

GOAL 1 — Set aggressive and mandatory water conservation targets that become permanent

Reducing total usage remains a cornerstone of water management for the region, despite the significant progress made over recent years. The Framework prioritizes two areas where additional reductions can be made in non-essential water use: outdoor watering and distribution system losses.

Strategy 1.1 — Reduce outdoor water usage by transitioning landscapes to all California native or California-friendly plants

Large landscape and residential exterior water use are estimated to constitute approximately 26% of urban water use within California's South Coast Region.[68] A recent study using data from the City of Los Angeles determined that landscaping irrigation represents 54% of single-family water use.[69] The study also concluded that residents are overwatering when there are no restrictions in place, because landscape greenness did not change significantly when watering restrictions were in effect. A related study showed that voluntary restrictions were not effective in reducing water use and that mandatory restrictions resulted in an average of 19 to 23% decrease in water use.[70] Recommendations to address these findings included dual metering for indoor and out-of-door watering, water pricing adjustments specifically targeting customers with higher landscaping irrigation, and mandatory restrictions on outdoor water use. Dual-metering data to partition indoor and outdoor use is critical to more accurately assessing landscape irrigation needs and to calculate potential savings (for both money and water) from reducing over-watering. However, due to the additional expense to implement dual-metering systems, decision makers will need further analysis of the costs and benefits. New landscaping norms for the region must be developed and implemented widely that are suited to their specific water-scarce region. Integrating native vegetation that is adapted to aridity should be part of urban landscapes, bringing local ecosystems into the city.

Water pricing strategies such as steeply tiered block rate structures can influence water use behavior by allocating a greater share of service costs to those with greater demand. However, care must be taken to ensure low-income households are not adversely impacted.[71] Furthermore, informational, behavioral, and cognitive barriers can reduce the effectiveness of such an approach and should be addressed as part of a water pricing strategy.[72] Furthermore, a 2015 court ruling determined that, under Proposition 218 (1996), cities must demonstrate that proposed tiers correspond to the actual cost of providing service at a given level of usage,[73] although there are widespread calls to reform Proposition 218 to remove such unintended barriers to sustainable water management.[74]

Passive, or code-based, water conservation relies on the use of plumbing codes that will be adopted over time for new construction or remodeling and which do not require financial incentives from water agencies. However, oversight and enforcement are key to ensuring that builders and remodelers incorporate such codes, especially for remodeling. This enforcement will be particularly important for the recently adopted MWELO requirements for new construction and redevelopment. MWD has identified MWELO enforcement as a critical action to achieve demand reduction.[75]

Active water conservation strategies include the use of grants, loans or rebate programs to persuade water users to improve efficiency in existing systems. MWD has fostered active conservation since

1990, and in 2008 launched SoCal Water$mart, which consolidated the residential and commercial rebate programs into a singular regional program.[76] In addition to rebates for many indoor water-using appliances, rebates are available to residential and commercial customers for turf removal, landscape equipment such as sprinkler nozzles and smart irrigation controllers, and water audits.

Programs such as turf removal rebates aim to transition high-water-use landscapes to more California native and California-friendly plant choices. Additional approaches to facilitating this transition involve working directly with other key participants including the nursery trade (to encourage stocking more natives and providing education to consumers) and gardeners (to train them on care and maintenance of native plants and low-water landscapes). Composting is also an important element of climate-appropriate landscaping by reducing water evaporation and erosion losses from areas of bare soil.

Reductions in urban water use are not without downsides, however, including potentially contributing to tree mortality and exacerbating the urban heat island effect, which results in increased energy use for cooling and further contributes to global warming. As discussed under Goals 2 and 3 below, expanded use of recycled water to maintain urban green spaces equitably throughout the region can address these impacts and maintain health benefits.[77]

Action 1.1.1 — Adopt Model Water Efficient Landscape Ordinance (MWELO) provisions for a dual water metering (indoor-outdoor) for all new construction, and assess costs and benefits associated with retrofitting existing buildings.

Action 1.1.2 — Adopt and implement conservation pricing approaches for water rates using tiered block rate structures (or implement budget-based water pricing), while avoiding impacts to low-income households and addressing informational, behavioral, and cognitive barriers to effectiveness.

Action 1.1.3 — Adopt the Model Water Efficient Landscape Ordinance (MWELO) for new construction and require retrofits upon sale, lease, or remodel of existing buildings.

Action 1.1.4 — Achieve a retrofit rate of at least 1% of existing building stock per year by incentivizing MWELO retrofits and by implementing requirements for retrofit, upon sale for properties meeting MWELO threshold landscape areas.

Action 1.1.5 — Research and support water-neutral development through "zero net water" technologies in new developments.

Action 1.1.6 — Expand programs and funding to support the creation and health of appropriate landscapes, including: assisting the nursery trade to shift to low water-using plants, with an emphasis on natives; educating gardeners about low-water landscape maintenance; and increasing the number of composting facilities and compost distribution.

Strategy 1.2 — Reduce distribution system losses through strong leak detection and enforcement programs

The California Department of Water Resources (DWR) estimated in the 1980s that leaks in water district distribution systems amounted to over 700,000 acre-feet of water a year in the state, enough to supply 1.4 million homes for a year, and likely higher now. Meanwhile, audits of water utilities have found an average loss through leaks of at least 10% of their total supply.[78] Furthermore, a recent study in Los Angeles County found that most small water retailers do not report prioritizing adoption and implementation of best management practices to minimize water loss.[79]

Action 1.2.1 — Require leak detection and repair through the development of sustainable funding mechanisms.

Action 1.2.2 — Allocate funding to assist small retailers (not covered by Urban Water Management Plan requirements) to install leak detection systems, conduct water audits, and implement other related BMPs.

GOAL 2 — Invest in infrastructure to increase and diversify supplies by better managing local water on a regional basis

Expanding reliance on local supplies will require increasing stormwater capture and infiltration, improved management and protection of groundwater, and increasing water recycling, in addition to the water conservation measures described above.

Strategy 2.1 — Increase stormwater capture

Over the past two decades, policy makers and water experts have increasingly recognized the value of stormwater as a resource and become more educated on the deleterious impacts of impervious surfaces on stream ecology, stream channel stability, water quality, and the urban hydrologic cycle as a whole.[80] Widespread efforts have occurred across the state to move toward increased stormwater capture and infiltration, including the implementation of Low Impact Development (LID) techniques, green infrastructure, and related approaches to stormwater management for new development and redevelopment. In 2014, Proposition 1 was passed, which authorized a $7.5 billion water bond to provide funding for multi-benefit projects that include stormwater capture, improved water quality, decreased downstream erosive flows, and increased groundwater supplies. However, due to the complexity of subsurface geology and the lack of a coupled surface-groundwater model for the region, researchers have insufficient information to quantify the extent to which distributed infiltration BMPs will contribute new volumes to drinking water aquifers and where they should be implemented.[81]

Action 2.1.1 — Develop high resolution spatial estimates of recharge potential for stormwater capture to prioritize installation of regional and distributed BMPs.

Action 2.1.2 — Use the IRWMP process or other regional forums to systematize region-wide sharing of information on conceptual projects (in addition to shovel-ready projects), to facilitate potential cost sharing and efficiencies.

Action 2.1.3 — Enforce the Low Impact Development (LID) provisions of the MS4 permit for new construction to achieve a 100% compliance rate.

Action 2.1.4 — Require LID retrofit upon sale for properties exceeding some threshold acreage.

Strategy 2.2 — Improve collaborative groundwater basin management through adjudications that allow for conjunctive use, ensuring the basins serve as regional water banks

Existing groundwater basin adjudications prevent non-rights holders from accessing infiltrated stormwater resulting from structural BMPs financed by the non-rights holder. As a result, this dynamic creates financial barriers to implementation of stormwater infiltration projects required under the MS4 Permit.[82]

Action 2.2.1 — Develop approaches to encourage aquifer storage and recovery, including possible modification of groundwater basin adjudications via state law, in order to allow conjunctive use.

Action 2.2.2 — For basins not currently adjudicated, address the issue of storage and recovery as part of collaborative efforts to comply with the Sustainable Groundwater Management Act and form groundwater joint powers authorities to manage the basins.

Strategy 2.3 — Develop regional collaborations to increase the use of recycled water

Public perception and health concerns have created some of the greatest challenges to implementing potable reuse systems.[83] Public perceptions are slowly changing, although further education is needed, and work on statewide standards has progressed (see policy section above). More work is needed, however, on ecological, technical, and infrastructure barriers. Regulations are needed to require water recycling where available. Policy makers should undertake careful study before making any significant expenditures, in order to assess tradeoffs between distributed wastewater treatment and centralized treatment/reinjection into aquifers. This study should take into account cost, effectiveness, water availability, and equity impacts, as part of an integrated approach to sustainable water management.

Action 2.3.1 — Assess requirements for new developments to hook up to recycled water distribution pipes if they are within reasonable distance (e.g. 200 yards) for potable uses.

Action 2.3.2 — Assess and quantify the tradeoffs between distributed and centralized wastewater treatment using an integrated water management approach.

Action 2.3.3 — Create acceptable, effective solutions to increase demand for recycled water.

Action 2.3.4 — Provide input to the feasibility assessment of direct potable reuse, currently ongoing by the State Board, Division of Drinking Water.

Action 2.3.5 — Increase reinjection of treated waste water in groundwater basins where adjacency exists.

Strategy 2.4 — Improve water recycling technologies

Advancements in water recycling technologies, including salt and nutrient management, will facilitate the expansion of recycled water use by driving down costs, as well as help to address ecological concerns related to desalination of seawater and brackish groundwater.

Action 2.4.1 — Support the demonstration and scale-up of new technologies for seawater and brackish groundwater desalination that reduce associated cost, energy demand, greenhouse gas emissions, and impacts to marine wildlife and coastal ecosystems.

Action 2.4.2 — Support the demonstration of improved technologies for the treatment and reuse of greywater for potable uses.

GOAL 3 — Reduce water-related impacts on disadvantaged communities

Policy makers should enact water conservation programs equitably, focusing on areas with the greatest need and being aware of the relative financial capacity of the affected communities. If not explicitly considered, these policies may inadvertently cause costs to be borne disproportionately by those who can least afford to pay. This risk is particularly significant given that wealthier areas use much more water than disadvantaged communities per capita.

Strategy 3.1 — Preserve lifeline water rates for low-income customers

The recent successful legal challenge to tiered rate structures highlighted the need for reforms to Proposition 218 and related laws.[84]

Action 3.1.1 — Implement any local actions available to preserve lifeline rates, including the option of state legislation to allow and require municipal water providers to offer these rates.

Action 3.1.2 — Support state constitutional reforms for sustainable water management.

Strategy 3.2 — Assist communities with high rates of water usage to conserve more

In Los Angeles County, 10 to 20% of single-family households have water bills that exceed 2% of annual incomes.[85] The California Department of Public Health uses 1.5% as the threshold for water affordability.[86]

Action 3.2.1 — Continue low-flow toilet distribution.

Action 3.2.2 — Provide assistance to replace high-water-using appliances.

Action 3.2.3 — Provide assistance to transition to low-water-using landscaping.

Action 3.2.4 — Provide incentives for owners of multi-unit dwellings to conserve water through shared savings with tenants and deployment of water conversation technologies and practices.

Strategy 3.3 — Maintain public recreation and invest in and protect parks and open spaces that create multiple benefits

Intensive reductions or limits on landscape irrigation can reduce the cooling and shading benefits of urban greenspaces, which serve great value in disadvantaged communities.[87]

Action 3.3.1 — Transition urban greenspaces to California native and California-friendly landscapes, in part in order to maintain public health benefits.

Action 3.3.2 — Consider advancing stormwater projects that create new parks and open space.

GOAL 4 — Protect and improve water quality

Strategy 4.1 — Address failing drinking water systems

Small water systems, particularly those that serve disadvantaged communities, have the highest rate of non-compliance with drinking water standards, which may only worsen with climate change.[88] The technologies needed to meet primary standards may be too costly and technical for small systems to operate and maintain, however, consolidation with larger systems can be an effective solution.[89] The State Board provides incentives to large systems for such consolidation.

Action 4.1.1 — Consolidate failing drinking water systems with larger public systems.

Strategy 4.2 — Protect and improve groundwater quality

Groundwater quality varies throughout the region, and ensuring no further degradation should be a top priority.

Action 4.2.1 — Groundwater contamination plumes are complex in their movement. Careful monitoring needs to occur to make sure that no activities accelerate the dispersion of contaminated groundwater.

Strategy 4.3 — Adopt water-neutral new development ordinances

Action 4.3.1 — For any new development in the region, measures must be developed such that the development does not require additional new water. This may occur through a menu of options that each locality develops from investment into a fund that assists existing building owners to retrofit their appliances, to new irrigation technologies for public open spaces or water recycling facilities.

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