



Main San Gabriel Basin
WATERMASTER

2018–2019

ANNUAL REPORT

**FOCUSED ON IMPROVING WATER SUPPLY MANAGEMENT, DEVELOPING
NEW WATER SOURCES, AND PROTECTING AND IMPROVING WATER QUALITY**



Cover photo: winter storm clouds at sunset over Azusa Canyon in Angeles National Forest.

WATERMASTER IS SUCCESSFULLY ADAPTING TO A CHANGING WATER ENVIRONMENT

Despite Rain, Extended Drought Continues. Although we had above-average rainfall last year, we are still in the midst of more than two decades of overall low rainfall. In response, Watermaster has implemented numerous initiatives described in this Annual Report, including plans with regional water suppliers to replenish large volumes of imported water to help stabilize groundwater levels and improve reliability for the future.

Plan to Permanently Balance the Basin's Groundwater Supply. Watermaster's many water supply initiatives are working. Most important is a three-part plan to permanently balance the Basin's groundwater supply. The plan includes:

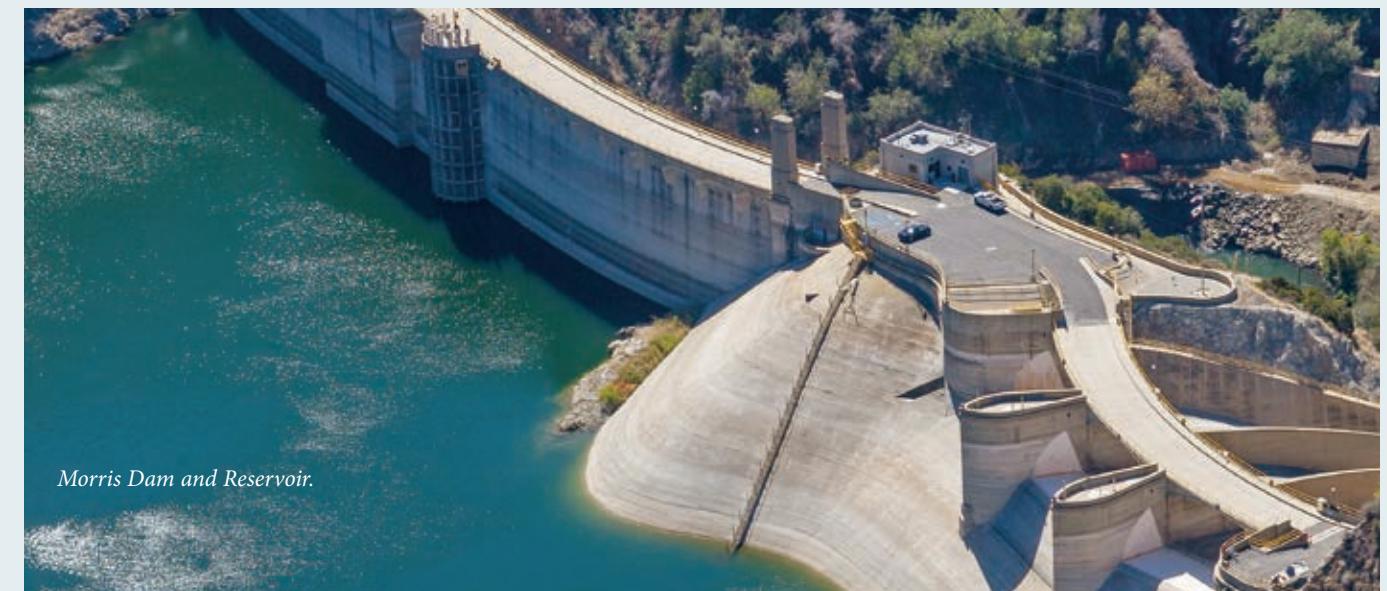
- 1) Maintaining a low Operating Safe Yield (OSY).
- 2) Collecting increasing amounts of funds through the Resource Development Assessment (RDA) to purchase and replenish the Basin with imported water whenever available to help counter the impacts of future extreme droughts.
- 3) Collaborating in the Metropolitan Water District (MWD) Regional Recycled Water Program, which can deliver large amounts of recycled water to the Basin to replace variable imported supplies and decreased local runoff in dry years.

At the Heart of Our Achievements Are the People We Work With. Virtually every action of Watermaster is undertaken in collaboration with a variety of stakeholders, including the water purveyors in the Basin, municipal water districts, MWD, Los Angeles County Flood Control District, and many others.

The list of agencies and individuals we could thank is long, but this year we want to recognize and thank one person in particular: Jim Byerrum. Jim served as chair of Watermaster from 2009 to 2019. He played a major role in developing vigorous new water management programs that are helping to ensure reliable water supplies far into the future.

We look forward to another successful year of collaborative groundwater management.

Anthony C. Zampiello
Executive Officer

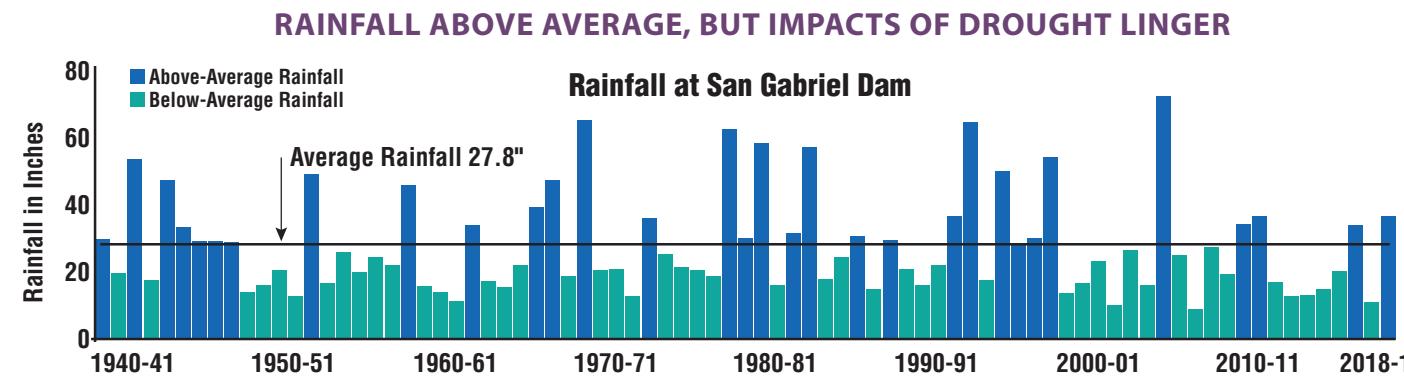


Morris Dam and Reservoir.

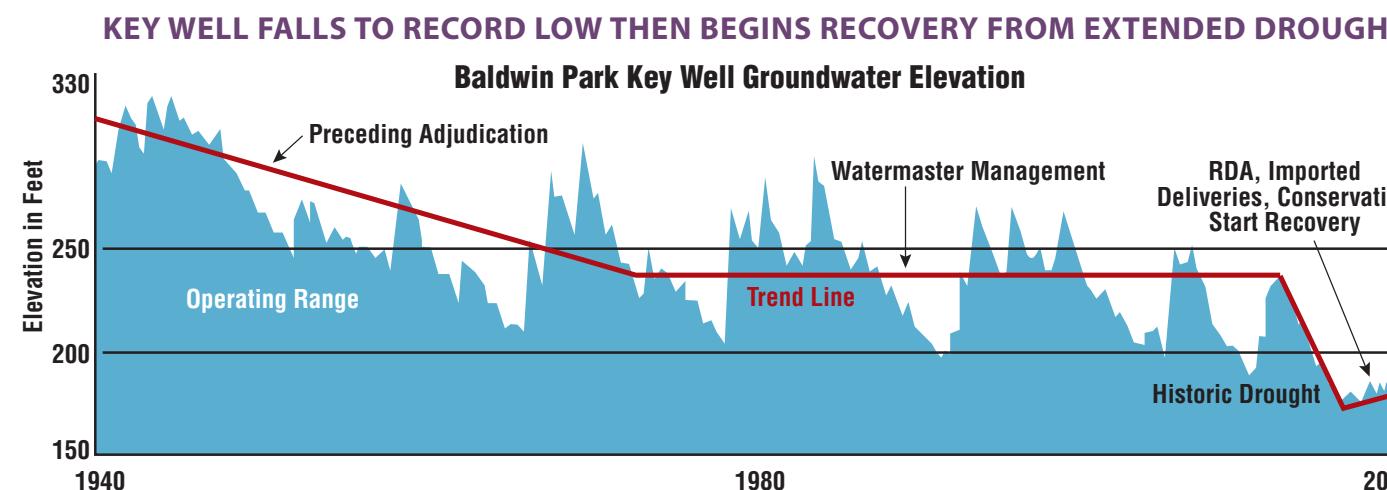
Photo credit: Los Angeles County Public Works.

Rain and Increased Water Storage Begin Basin Recovery from Long Drought

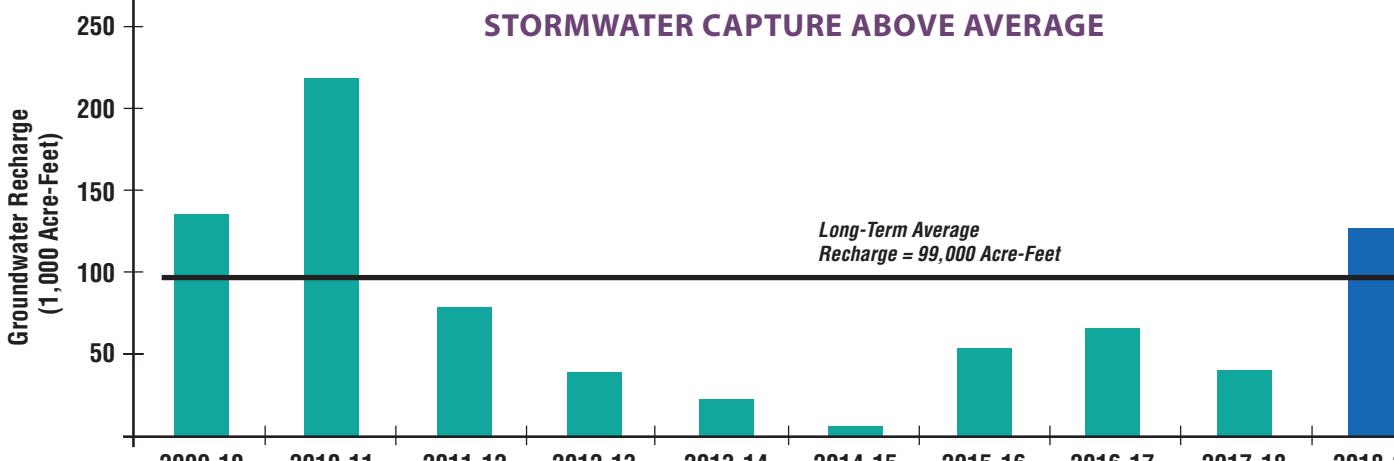
Recent wet years have helped Watermaster raise groundwater levels that had fallen to historic lows after years of drought.



Below-average rainfall occurred in 16 of the past 21 years. The impacts of the extended drought were made worse by the severe five-year drought that began in 2011, and are still evident. Two of the past three years have had above-average rainfall and are helping the Basin recover, but drought conditions may reoccur any time.

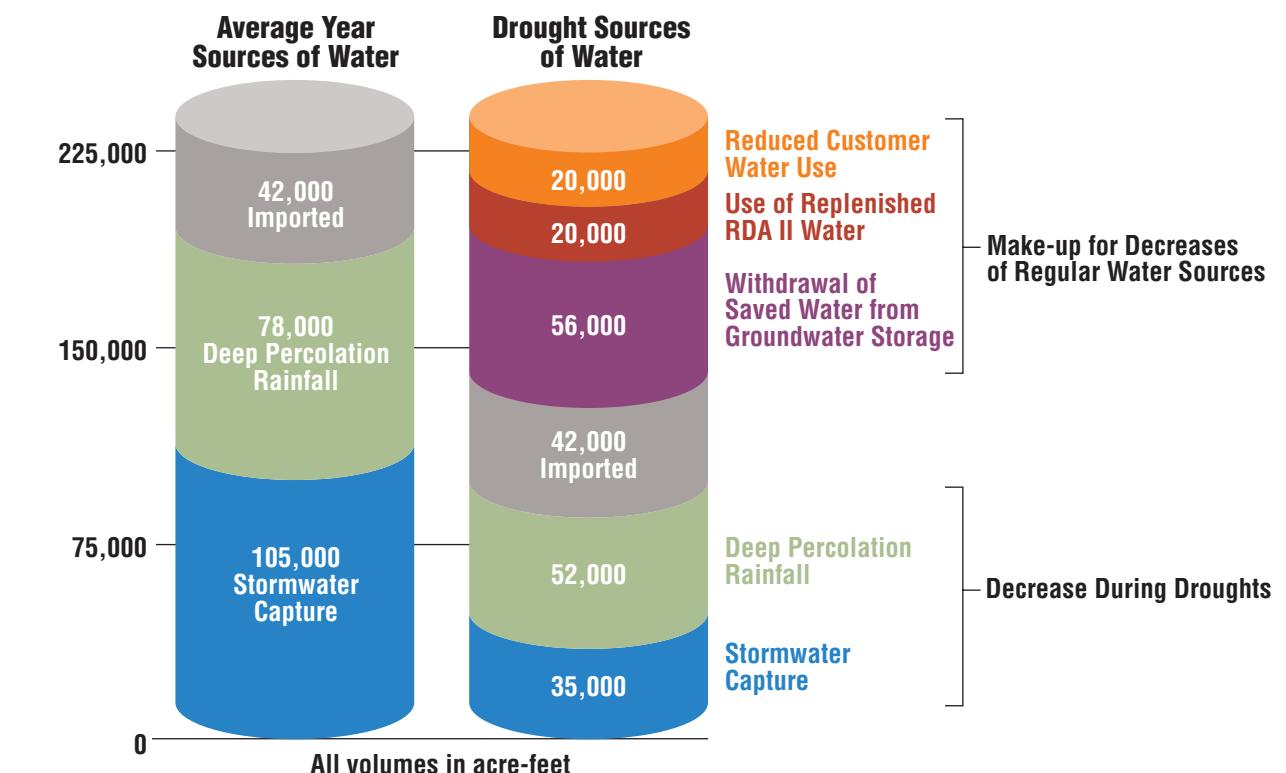


From its historic low of about 169 feet in November 2018, the Key Well had recovered over 27 feet as of June 2019 thanks to increased rainfall, recharge, and imported water purchases. The rise in the Key Well is equivalent to more than a year's supply for the Basin.



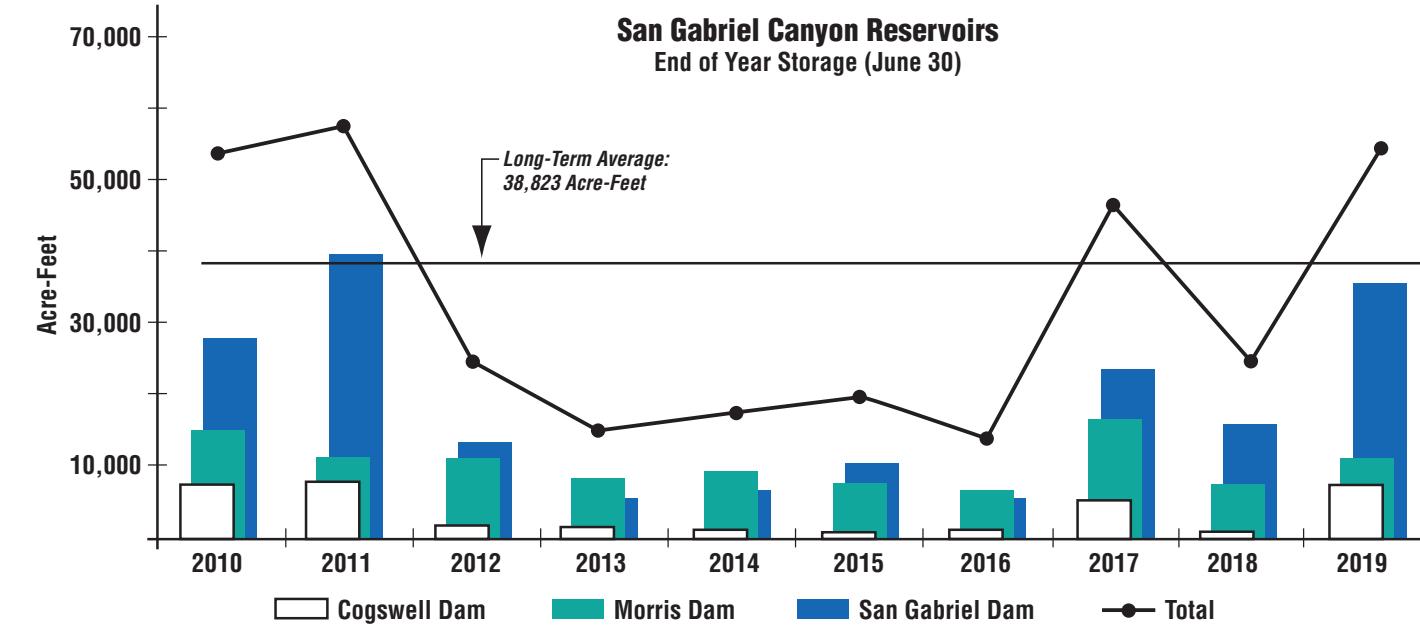
Stormwater capture was above the long-term average thanks to a wet year and efficient recharge by the Los Angeles County Flood Control District.

HOW STORED WATER AND CONSERVATION MEET DROUGHT NEEDS



During extreme droughts, when less rainfall leads to decreased stormwater capture and deep percolation of rainfall, the water losses will be made up by reduced customer water use (conservation), use of replenishment RDA II water, and withdrawal of saved water from groundwater storage.

ABOVE-AVERAGE STORAGE IN SAN GABRIEL CANYON RESERVOIRS



Total water stored in San Gabriel Canyon Reservoirs on June 30, 2019, was 55,000 acre-feet, about 140% of the long-term average.

Progress Towards Attaining Permanent, Long-Term Water Supply Reliability

Over the four decades between its formation in 1972 and the historic drought that began in 2011, Watermaster succeeded in balancing Basin supplies. Over the past decade, however, imported supplies became more variable and winters generally drier. In response, Watermaster is implementing a three-part plan to permanently balance Basin water supplies using new funding, strategy, and management techniques.

WATERMASTER'S THREE-PART PLAN TO ENSURE PERMANENT, RELIABLE WATER SUPPLIES

#1 ONGOING: ESTABLISH A CONSERVATIVE OPERATING SAFE YIELD

The Operating Safe Yield (OSY) is the amount of water that can be pumped from the Basin without purchasing expensive imported water. A low OSY triggers the purchase of additional imported water when local supplies are insufficient to meet demand to the Basin. This helps to maintain Basin levels and generates income through replenishment payments for purchasing imported water. The OSY has been limited to 150,000 acre-feet per year for the past five years. Due to the current reality of potential extended droughts, low Basin water levels, and variability of imported supplies, Watermaster plans to keep the OSY low.

#2 ONGOING: IMPLEMENT THE RESOURCE DEVELOPMENT ASSESSMENT

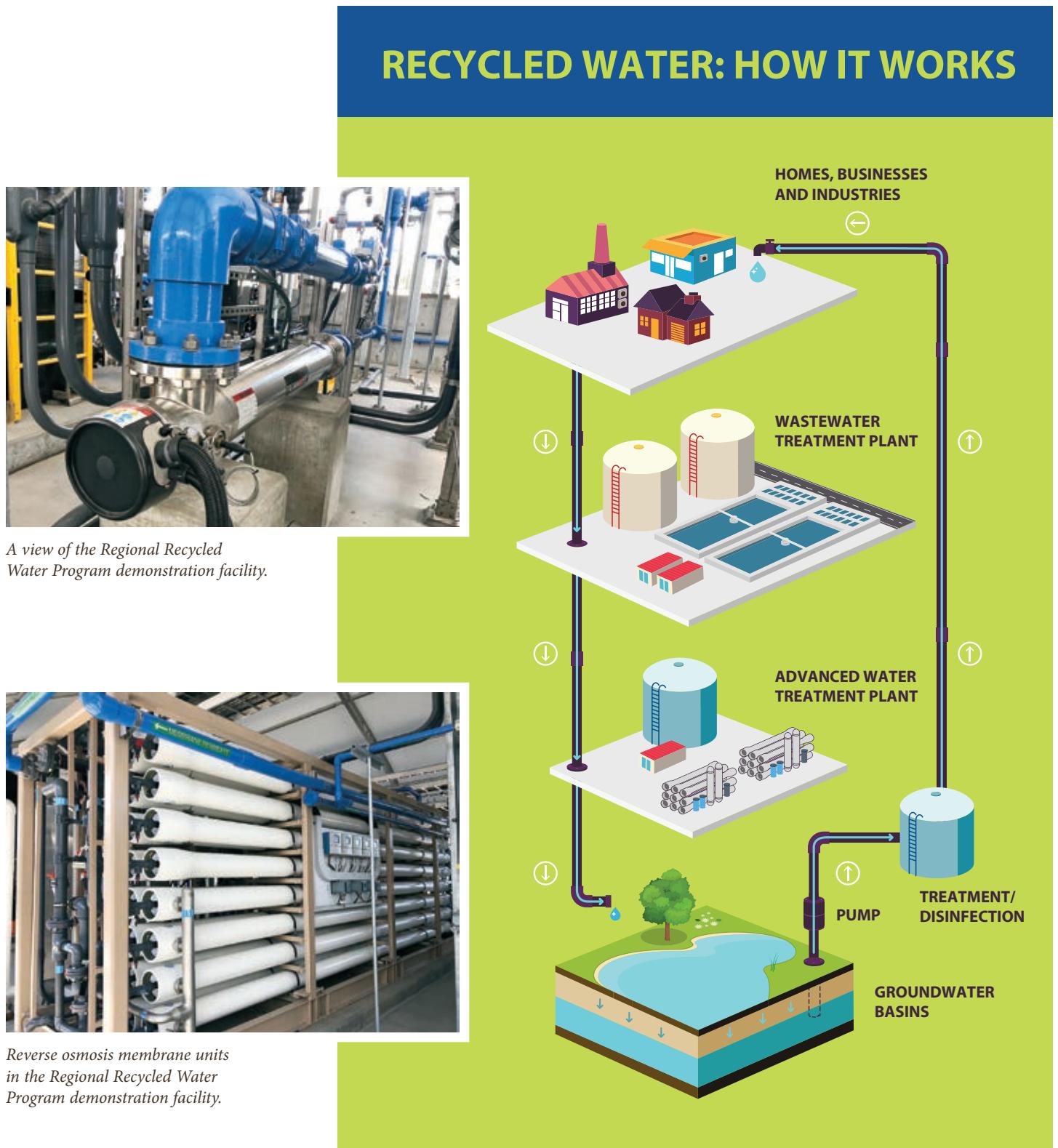
STORMWATER AUGMENTATION PROGRAM AS A BRIDGE UNTIL A PERMANENT RECYCLED WATER SUPPLY IS AVAILABLE

The Resource Development Assessment (RDA II) "Stormwater Augmentation Program" is designed to provide supplemental water supplies during a "worst case" drought, which is assumed to be three consecutive five-year droughts with the same hydrologic conditions as the historic five-year drought from 2011 through 2016. The RDA II is an assessment that started at \$40 per acre-foot of water pumped in the Basin in 2016 and increases to \$175 per acre-foot of water pumped by 2020. RDA II funds are used to purchase untreated imported water to supplement the shortage of local stormwater resulting from recent dry periods.

#3 ADVANCING STEADILY: DEVELOP A PERMANENT RECYCLED WATER SUPPLY TO REPLACE IMPORTED WATER DEPENDENCY

Over time, Watermaster's traditional supplemental imported water supplies have grown increasingly expensive and variable. In response, Watermaster, the Responsible Agencies, Producers, and other stakeholders are working with MWD, Sanitation Districts of Los Angeles County, and others to participate in the Regional Recycled Water Program. The Main San Gabriel Basin plans to be a primary storage location for between 40,000 and 70,000 acre-feet of recycled water per year that will be used to replenish the San Gabriel Basin. Recycled water is not subject to drought or other restrictions and can be counted on as a long-term reliable supply.

Because 16 of the past 21 years have been dry, even after a year of good rain, Basin levels begin to decline rapidly. To ensure a reliable water supply, Watermaster must keep the OSY low, maintain the RDA II, continue to pre-purchase imported water, develop the Regional Recycled Program, and promote efficient water use.



Recycled water images and graphic courtesy of Metropolitan Water District of Southern California.

Key Elements of Watermaster's Comprehensive Water Management Program

The three-part plan to permanently balance the Basin is just one element of Watermaster's broader set of plans and programs to enhance groundwater management.

VIGOROUS ACTION TO IMPROVE LONG-TERM WATER SUPPLY SECURITY



Despite periodic wet years like this one, the recent 20-plus years of drier-than-normal conditions reinforce the need to continue Watermaster's long-range plans to balance the Basin.

FUNDING AND BUYING WATER

Initiating RDA II in 2016 to raise millions of dollars each year to buy water to augment the loss of stormwater replenishment resulting from droughts.

PROVIDING INCENTIVES TO STORE WATER

Incentivizing Producers to pre-purchase water for Cyclic Storage to offset Replacement Water obligations and anticipate imported water needs.

DEVELOPING NEW WATER SOURCES

Participating in the planning and feasibility study of MWD's Regional Recycled Water Program.

PROMOTING CONSERVATION

Conducting public outreach and promoting responsible water use with San Gabriel Valley Water Association and others.

COLLABORATING

Conducted basin-wide Groundwater Level Vulnerability Assessment to help purveyors.

Amended the Judgment to allow management flexibility for developing new supplies and collaborating outside the Basin.

USING TECHNOLOGY AND PLANNING

Established a committee that set strategic OSY guidelines.

Coordinated with other agencies to identify potential stormwater capture projects and enhance existing projects.

Developed a Three-Year Purchased Water Plan to coordinate supplemental water purchases with purveyors and municipal water districts.

PROTECTING WATER RIGHTS

Worked to protect water rights associated with legislation and expansion of the National Recreation Area along the San Gabriel River.

Water impounded behind Morris Dam being released for replenishment into the groundwater Basin.

SUMMARY OF WATER SUPPLY ACTIONS

KEY WELL HITS RECORD LOW IN NOVEMBER 2018 AND TRIGGERS DROUGHT PREPARATIONS

By summer 2018, the Key Well was heading towards what would be a historic low. Watermaster began preparing for intensive drought conditions and reconvened its Drought Ad Hoc Committee. The committee implemented a broad range of drought interventions, including ways to bring more water to the Basin and coordinate conservation outreach.

CYCLIC STORAGE AGREEMENTS EXTENDED AND AMOUNTS INCREASED

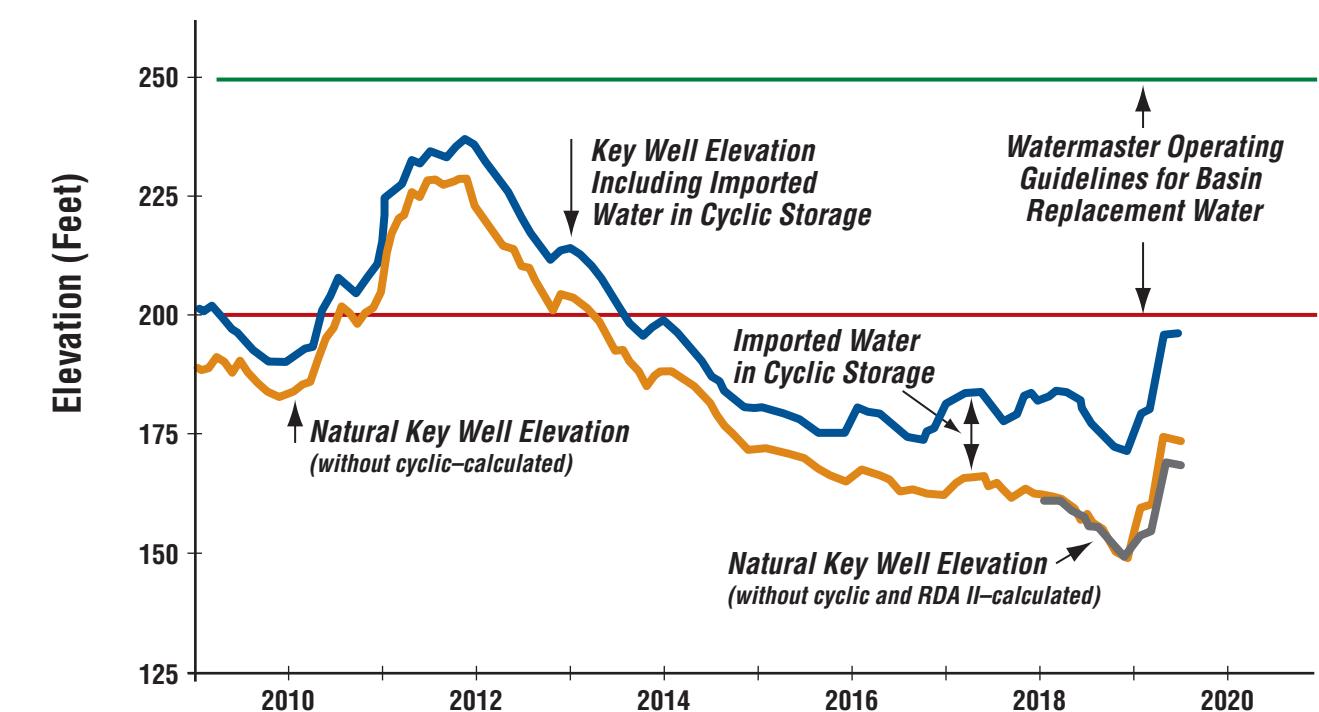
The Cyclic Storage program provides incentives for Producers and MWD to pre-purchase and store available untreated imported water and use that water later instead of purchasing Replacement Water at potentially higher future rates. For example, during 2019, MWD plans to store about 105,000 acre-feet of Cyclic Storage water in addition to the nearly 58,000 acre-feet delivered in 2017. Cyclic Storage also helps to maintain higher water levels, thus saving money and energy through reduced pumping costs.

3D MODEL ASSISTS SAN JOSE CREEK WATER RECLAMATION PLANT PROJECT

Watermaster is using its 3D groundwater model to help Sanitation Districts of Los Angeles County depict and understand groundwater flow, allowing them to set goals and objectives related to water recycling and conveyance.

COLLABORATIVE STUDY ON DEVELOPING NEW WATER SUPPLY FROM STORMWATER

A multiyear study led by the Las Virgenes Municipal Water District is investigating the potential for collecting urban runoff and stormwater and recycling it into a usable new water supply by utilizing existing capacity in wastewater treatment plants. Treating stormwater also improves the quality of runoff and stormwater that currently flows untreated into waterways and eventually the ocean. Watermaster is participating in the study, along with a large group of regional stakeholders, and is helping to fund this project.



The Key Well is about 27 feet higher due to the addition of RDA II water and Cyclic Storage. This is equivalent to about 216,000 acre-feet of water—over a year's supply for the region.

Monitoring & Improving Water Quality

In addition to carrying out extensive monitoring and testing, Watermaster supports cleanup programs throughout the Basin to help fulfill its responsibility to protect and improve water quality.

TESTING AND MONITORING BASIN-WIDE WATER QUALITY



DRINKING WATER QUALITY TESTING

Watermaster conducts State-required Title 22 drinking water quality sampling throughout the Basin for Producers. This enables Watermaster to identify water quality trends on a regional scale that might otherwise go unnoticed at a specific well, and is also more cost effective for producers.

ADDITION TO BASIN-WIDE GROUNDWATER QUALITY MONITORING

To identify and evaluate the location and magnitude of contaminants and the effectiveness of cleanup projects, Watermaster conducts extensive testing at about 200 wells. Watermaster provided parties with an overview of the Per- and Polyfluoroalkyl Substances (PFAS) sampling regulations and added targeted testing for PFAS during 2019. PFAS are found in Teflon, hair products, and other personal and household products.

GROUNDWATER FLOW AND CONTAMINANT MIGRATION PROGRAMS

Watermaster enters groundwater level and quality data into its 3D groundwater computer model to simulate contamination flows, project contaminant concentrations, and develop proactive remedial actions.

PROTECTING AND CLEANING THE GROUNDWATER BASIN

MANAGING THE BALDWIN PARK OPERABLE UNIT (BPOU) AGREEMENT

Watermaster manages the implementation of the BPOU Agreement, the largest cleanup area in the Basin. Watermaster's role includes third-party review and evaluation of the cleanup, accounting services, and technical and administrative coordination on subprojects and committee meetings.

TREATING CONTAMINATED WATER FROM PUENTE VALLEY OPERABLE UNIT (PVOU) FOR BENEFICIAL USE

Following decades of collaborative work, numerous stakeholders agreed on a plan to treat and utilize the water in the PVOU. Watermaster approved the \$40 million project (funded by the parties responsible for the contamination), which includes an agreement to treat the water to drinking water standards for distribution by the end user.

FACILITATING OTHER CLEANUPS AROUND THE BASIN

Watermaster engages with stakeholders and regulatory agencies and oversees Basin cleanup projects at operable units and other cleanup sites to ensure they meet State regulatory standards.



THE BASIN OPERABLE UNITS

These are either United States Environmental Protection Agency (USEPA) or Department of Toxic Substances Control (DTSC) cleanup sites. There are additional non-USEPA/DTSC cleanup sites.

- Baldwin Park Operable Unit (BPOU)
- El Monte Operable Unit (EMOU)
- South El Monte Operable Unit (SEMOU)
- Whittier Narrows Operable Unit (WNOU)
- Puente Valley Operable Unit (PVOU)

OTHER ACTIONS TO PROTECT AND IMPROVE GROUNDWATER QUALITY

ENSURING WELLS MEET QUALITY AND SUPPLY REQUIREMENTS

Watermaster reviews each application to drill, destroy, or modify a well to ensure it conforms to both water quality and water supply plans and strategies.

ENSURING LANDFILLS DO NOT THREATEN GROUNDWATER QUALITY

Watermaster regularly inspects landfills within the Basin to ensure their operation is consistent with regulatory permits that protect groundwater quality.

COMPLETING THE FIVE-YEAR WATER QUALITY AND SUPPLY PLAN

Every year, Watermaster produces a revised Five-Year Water Quality and Supply Plan. This detailed document includes reports on current water supply and water quality conditions, supporting data, and projected changes over the plan period.

COMPLETING PUBLIC HEALTH GOAL REVIEWS

Watermaster coordinates with water systems that have more than 10,000 customer connections to prepare their Public Health Goal reports, which are required every three years. This includes identifying contaminants associated with health risks, appropriate water treatment technologies to treat them, and estimates of costs to bring contaminant levels down to Public Health Goal levels.

Outreach, Communication, and Collaboration

Working cooperatively with the many Basin stakeholders to implement the terms of the Judgment is key to protecting and improving our water supply and water quality.

EXPANDED OUTREACH AND EDUCATION

MAJOR NEW REGIONAL OUTREACH PROGRAM

Following a careful review of communication and education needs by staff, the Watermaster Board and an Ad Hoc Committee selected a consultant and initiated a Basin Outreach Program focusing on Basin-wide and San Gabriel River Watershed supply sources. The goal is to help the public understand critical regional water issues, including how the watershed and Basin work conjunctively, what makes the Basin unique, and why a wet year in Northern California does not necessarily translate into robust water supplies in the Basin.

Support from the Judge Overseeing the Judgment. The Honorable Maureen Duffy-Lewis, who is responsible for overseeing the Judgment, was strongly supportive of bringing greater awareness to Basin management challenges through outreach, and offered constructive input.

COLLABORATIVE OUTREACH TO THE ASIAN COMMUNITY

The executive officers of Watermaster and the Water Quality Authority engage in quarterly interviews with Chinese language television host, Mr. Jack Zhou. The Watermaster Executive Officer also participates in San Gabriel Valley Municipal Water District's annual Asian media event to inform them on regional groundwater conditions.

PROVIDING ADMINISTRATION AND SHARED SERVICES FOR SEVEN ADDITIONAL AGENCIES

By administering and managing several organizations under one roof, Watermaster helps lower costs and provides enhanced opportunities for all. The seven organizations Watermaster administers are:

- San Gabriel Valley Water Association (SGVWA)
- Raymond Basin Management Board (RBMB)
- San Gabriel Valley Protective Association (SGVPA)
- Central Basin Water Association (CBWA)
- California Groundwater Coalition (CGC)
- Association of Groundwater Agencies (AGWA)
- Foothill Water Coalition (FWC)

COLLABORATION TO IMPROVE OUTCOMES AND LOWER COSTS

PARTNERSHIP WITH WATER PRODUCERS FOR CONSERVATION

Watermaster continues working successfully with Producers and regional agencies to promote water conservation and responsible water use. The recent five-year average water demand is about 9% below the ten-year average.

SUPPORT FOR COUNTY AND CITY IMPLEMENTATION OF MS4 REQUIREMENTS

Municipal Separate Storm Sewer System (MS4) refers to development requirements designed to intercept non-storm runoff before it can be discharged into local streams and rivers, and retain it onsite. Watermaster successfully negotiated language in the legislation which now requires project proponents to obtain review and consent from Watermaster for these proposed projects. Watermaster continues to provide review and guidance on MS4 issues to cities, the County, and others to ensure that water rights concerns are addressed and MS4 augments the water supply without adversely impacting existing adjudications, water rights, and Basin safe yield.

LEADERSHIP IN INTEGRATED REGIONAL WATER MANAGEMENT PLAN (IRWMP)

IRWMP is a super-regional planning effort led by Los Angeles County Department of Public Works in conjunction with county-wide representatives and stakeholders. Watermaster's Assistant Executive Officer is the Chair of the Upper San Gabriel and Rio Hondo River Steering Committee, and the Executive Officer is also on the IRWMP Leadership Committee as Groundwater Representative. This collaborative effort develops mutually beneficial water solutions and obtains State bond funding on a regional basis. Watermaster's participation brings groundwater management to the forefront.

ENGAGEMENT WITH SAN GABRIEL VALLEY PROTECTIVE ASSOCIATION

Watermaster engaged with the San Gabriel Valley Protective Association to improve management of the tracking and accounting between Upper and Lower Areas of the San Gabriel River system.

COLLABORATIVE INVASIVE MUSSELS STUDY

Watermaster is participating in and helping fund a study on protection of local recharge facilities from the effects of invasive mussels. The results will be used by Watermaster and its partners (Orange County Water District, MWD, Los Angeles County Public Works, and others) to develop a Quagga mussel contingency and control plan. Invasive mussels are prolific breeders that can infest water infrastructure, damage equipment, and choke off water transmission.

In 2017, a concern over the potential presence of invasive mussels prevented the delivery of over 20,000 acre-feet of water to the Basin. The mussels are detrimental to native and endangered species, including native fisheries.



Watermaster is participating in efforts to control invasive Quagga mussels that can clog and corrode water facilities, and impact imported water deliveries.

Effective Administration & Financial Management Support the Water Programs



Watermaster continually improves its operations, administration, and financial management to ensure that the water community is served efficiently.

EFFECTIVE ADMINISTRATION, OPERATIONS, AND FINANCE

ADMINISTRATIVE ASSESSMENT REMAINS THE SAME

The Administrative Assessment was held unchanged at \$15 per acre-foot on all production. The Assessment remained unchanged for the sixth year in a row due to contained expenses and additional revenue and interest from higher-than-expected water sales.

IN-LIEU ASSESSMENT REMAINS THE SAME

The In-Lieu Assessment was also held unchanged at \$10 per acre-foot on all production to manage the cooperative water exchange agreement accounting.

RESOURCE DEVELOPMENT ASSESSMENT (RDA) INCREASED AS SCHEDULED

As planned, the RDA increased from \$70 per acre-foot last year to \$105 per acre-foot on fiscal year 2018–19 production, and \$140 per acre-foot on fiscal year 2019–20 production. Last year, the RDA raised almost \$14.5 million to purchase over 18,000 acre-feet of reliability storage water.

3D GROUNDWATER MODEL SUPPORTS WATER SUPPLY AND QUALITY PROJECTS

The 3D groundwater computer model allows Watermaster to more fully understand and more effectively manage many aspects of the groundwater Basin, including recharge of recycled water and stormwater, impact of stormwater capture from MS4 programs, and development of MWD's Regional Recycled Water Program.

THREE-YEAR PURCHASED WATER PLAN

The Three-Year Purchased Water Plan was developed to help anticipate the imported water needs of the Producers. Many aspects of Watermaster's operations are reviewed to prepare the Three-Year Plan, including Replacement Water obligations, the RDA II, the in-lieu program, and the OSY.

LEGISLATIVE ENGAGEMENT

HELPED AMEND FEDERAL LEGISLATION FOR WATER SUPPLY AND QUALITY PROTECTIONS

At the request of the San Gabriel Valley Water Association (SGVWA), Watermaster provided suggested language to HR 2215 (San Gabriel Mountains Foothills and Rivers Protection Act) to ensure that it protects water rights and water supply operations in the Basin. The legislation would expand the boundaries of the San Gabriel Mountains National Monument to include the western areas of the Angeles National Forest and urban reaches of the San Gabriel River, and would establish a new National Recreation Area to allow resources to flow into the region and increase recreational opportunities for the surrounding communities. It also designates portions of the San Gabriel Mountains area as components of the National Wilderness Preservation System and the Wild and Scenic Rivers System.

RECLASSIFICATION OF BASIN AS LOW PRIORITY

California Department of Water Resources (DWR) classified the Basin as a "Low-Priority" basin under the State's Sustainable Groundwater Management Act (SGMA) due to Watermaster's history of long-term responsible management.

The Main San Gabriel Basin is exempt from most of the requirements of SGMA except basic reporting requirements. Nonetheless, Watermaster continues to align its management of the Basin with the SGMA requirements as part of its mission to efficiently manage the quantity and quality of the Basin's groundwater.

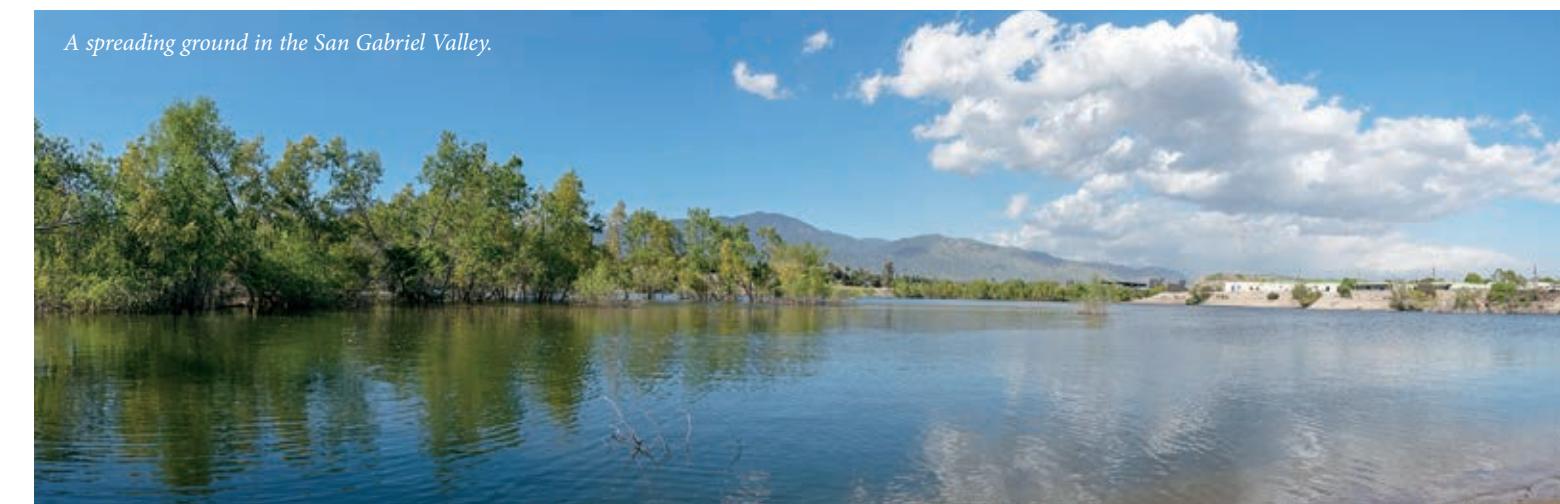


Photo credit: Los Angeles County Public Works.

OUR PEOPLE MAKE A DIFFERENCE

THANK YOU, JIM BYERRUM

The staff and Board of Directors of Watermaster express our appreciation to Jim Byerrum, who served for ten years as Board Chair and as Producer representative for California Domestic Water Company. Jim retired from the Board in 2019. During Jim's tenure, Watermaster and communities across the Basin adapted to the historic five-year drought that began in 2011. In response to the drought and decreased reliability

of imported water supplies, Jim led Watermaster's Board to assertively facilitate many new advances in management to balance the Basin in the short run and over the long term.

THANK YOU, THOMAS WONG

Though he was only seated for a short time, the staff and Board also wish to thank Thomas Wong for his service to Watermaster as a board member representing San Gabriel Valley Municipal Water District.



MainSanGabrielBasin
WATERMASTER



Rio Hondo Spreading Ground.

Photo credit: Los Angeles County Public Works.

WATERMASTER BOARD

Lynda Noriega, Chair – California Domestic Water Company

David Michalko, Vice Chair – Valencia Heights Water Company

Dan Arrighi, Secretary – San Gabriel Valley Water Company

Ron Bow, Treasurer – City of Monterey Park

David DeJesus, Covina Irrigating Company

Anthony R. Fellow, Upper San Gabriel Valley Municipal Water District

Benjamin Lewis, Jr., Golden State Water Company

Steven Placido, San Gabriel Valley Municipal Water District

Charles Trevino, Upper San Gabriel Valley Municipal Water District

EXECUTIVE OFFICER

Anthony C. Zampiello

725 North Azusa Avenue • Azusa, California 91702

Telephone (626) 815-1300 • Fax (626) 815-1303

www.watermaster.org