



2020

URBAN WATER MANAGEMENT PLAN

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

**JUNE 2021
PUBLIC DRAFT**





2020

URBAN WATER MANAGEMENT PLAN



San Gabriel Valley Municipal Water District

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JUNE 2021 PUBLIC DRAFT

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PENDING

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ACRONYMS

Act	Urban Water Management Planning Act
AF	acre-feet
AFY	acre-feet per year
ALW	Azusa Light & Water
AMI	Advanced Metering Infrastructure
AVWC	Azusa Valley Water Company
AWIA	America's Water Infrastructure Act of 2018
AWWA	American Water Works Association
Basin	Main San Gabriel Groundwater Basin
BMP	Best Management Practice
CalWEP	California Water Efficiency Partnership
ccf	hundred cubic feet
CEE	Consortium for Energy Efficiency
cfs	cubic feet per second
CII	Commercial Industrial Institutional
CIMIS	California Irrigation Management Information System
City	City of Azusa
COG	Local Council of Governments
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DCP	Delta Conveyance Project
DMM	Demand Management Measure
DOF	Department of Finance
DRA	Drought Risk Assessment
DSC	Discovery Science Center
DWR	Department of Water Resources
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	United States Environmental Protection Agency
ERP	Emergency Response Plan
ETo	Evapotranspiration
GHG	Greenhouse Gas
GPCD	Gallons per capita per day
gpd	gallons per day
gpf	gallons per flush
gpm	gallons per minute
hcf	hundred cubic feet
HE	High-efficiency

HECW	High Efficiency Clothes Washer
HMPC	City's Hazard Mitigation Planning Committee
HR	Hydraulic Region
ICS	Incident Command System
IRP	Integrated Resources Plan
JWPCP	Joint Water Pollution Control Plant
kWh	kilowatt hour
kWh/AF	kilowatt-hour per acre-feet
LAA	Los Angeles Aqueduct
LACDPW	Los Angeles County Department of Public Works
LADWP	City of Los Angeles Department of Water and Power
LHMP	Local Hazard Mitigation Plan
MAF	Million Acre-Feet
MG	Million Gallons
MGD	Million Gallons per Day
mg/L	milligrams per liter
MOU	Memorandum of Understanding
MSL	Mean Sea Level
MWD	Metropolitan Water District of Southern California
NDMA	N-nitrosodimethylamine
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
OSY	Operating Safe Yield
PFAS	Polyfluoroalkyl substances
PHET	Premium High-Efficiency Toilet
Plant	Joseph F. Hsu Water Filtration Plant
RHNA	Regional Housing Needs Assessment
RRA	Risk and Resilience Assessment
SBx7-7	Senate Bill x7-7: The Water Conservation Act of 2009
SCAG	Southern California Association of Governments
SDP	Seawater Desalination Program
SEMS	Standardized Emergency Management System
San Gabriel District, District, or SGVMWD	San Gabriel Valley Municipal Water District
SJCWRP	San Jose Creek Water Reclamation Plant
SMSS	Soil Moisture Sensor System
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TCE	Trichloroethylene
TDS	Total Dissolved Solid
Upper District	Upper San Gabriel Valley Municipal Water District

USGVMWD	Upper San Gabriel Valley Municipal Water District
UWMP	Urban Water Management Plan
VCWD	Valley County Water District
VOCs	Volatile Organic Compounds
WARN	Water Agencies Response Network
Watermaster	Main San Gabriel Basin Watermaster
WBIC	Weather-Based Irrigation Controller
WHO	World Health Organization
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management Plan

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EXECUTIVE SUMMARY & LAY DESCRIPTION

INTRODUCTION

The San Gabriel Valley Municipal Water District (San Gabriel District or District) 2020 Urban Water Management Plan (UWMP) has been prepared in accordance with the 1983 Urban Water Management Plan Act (Act) and its amendments. The Act requires urban water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to prepare and adopt an UWMP every five years.

This 2020 UWMP is an update of the San Gabriel District's 2015 UWMP. The intent of this plan is to provide the California Department of Water Resources (DWR) with information on the present and future water resources, demands, and provide an assessment of the District's water resource needs. Specifically, this 2020 UWMP provides water supply planning for the 25-year period from 2020 to 2045 in 5-year increments; identifies and quantifies adequate water supplies for existing and future demands during normal, dry, and multiple-dry years; evaluates demand management measures; addresses water supply contingency planning; and describes strategies to expand supply sources such as groundwater recovery and recycled water.

The San Gabriel District is a contractor to the State Water Project (SWP). The District is a wholesaler that indirectly serves four (4) retail agencies throughout Los Angeles County located in the foothills of the San Gabriel Mountains in Los Angeles County: Azusa Light and Water, and Cities of Alhambra, Monterey Park, and Sierra Madre. The San Gabriel District's service area is a built-out area with minimal projected population growth.

Section 1.4 offers a summary of each section of this 2020 UWMP.

WATER SOURCES AND SUPPLIES

Within the San Gabriel District's service area, retail water demands are met through a combination of local groundwater supplies, surface water, and imported supplies. Although the San Gabriel District is a wholesaler, the District indirectly serves its member agencies by supplemental groundwater recharge. The San Gabriel District obtains its supplies through the SWP where it has a maximum Table A amount of 28,800 acre-feet per year (AFY).

As one of 29 contractors of the SWP, each contractor submits their request for SWP supplies for the following year where DWR assesses the available water supply for the following year and sets an initial supply allocation based on: the total of all contractors' requests, current reservoir storage, forecasted hydrology through the next year, and target reservoir storage for the end of the next year. In a given year, DWR assesses the SWP supplies multiple times to ensure

reliability of its supplies.

Recently, DWR announced a decrease in 2021 SWP deliveries as the state underwent a second consecutive dry year. As a result, this reduction decreased the San Gabriel District's initial request of 28,800 AF to 1,440 AF. Although this amount is not sufficient enough to cover for its member agencies supplemental water requirements, the District anticipates that its cyclic storage account is capable of assisting in these shortfalls.

DEMAND PROJECTIONS

The 25-year demand projections provided in this UWMP reflect the San Gabriel District's projected groundwater demands for its member agencies. The San Gabriel District's groundwater demand projections are based the estimated supplemental water requirements where its member agencies pump groundwater that exceeds their production rights. These projections are based on estimated groundwater demand factoring in population growth and SBx7-7 GPCD targets for water usage.

20X2020 WATER USE REDUCTION TARGETS

SBx7-7, passed in November 2009, requires California urban water suppliers to achieve a 20 percent reduction in per capita water consumption by 2020. Under this legislation, retail water suppliers must comply with target-setting and reporting requirements. Wholesale water suppliers are not subjected to the requirements of SBx7-7; however, wholesalers are required to include in their 2020 UWMP an assessment of present and proposed future measures, programs, and policies that would help the retail water suppliers in their wholesale service area to achieve their water use targets.

PLANNED WATER SUPPLY PROJECTS

The San Gabriel District continues to explore feasible and innovative ways to assist their member agencies in securing a long-lasting and reliable water supply. The San Gabriel District indirectly serves their member agencies by utilizing SWP supplies as groundwater recharge for supplemental water requirements. The amount obtain from the SWP varies as supplies are depended on climatological conditions and DWR's assessment of its supplies. As a result, the San Gabriel District is proactive in exploring methods to increase groundwater recharge and being involved in supply agreements with MWD and other agencies. This is further discussed in Section 2. In addition, the San Gabriel District looks into the feasibility of recycled water and it is further discussed in **Section 9**.

WATER SERVICE RELIABILITY

The San Gabriel District's supply capabilities from 2025 through 2045 are dependent on SWP's deliveries. Long-term average, single dry, and multiple dry year supplies are based on DWR's 2019 State Water Project Delivery Capability Report. The SWP generally deliveries 58 percent of the contractors request amount. During single dry year, SWP delivers 5 percent of the contract amount. Furthermore, during multiple dry years, the SWP delivers 26 percent. This is further

discussed in **Section 6**.

CHALLENGES AHEAD & STRATEGIES FOR MANAGING RELIABILITY RISKS

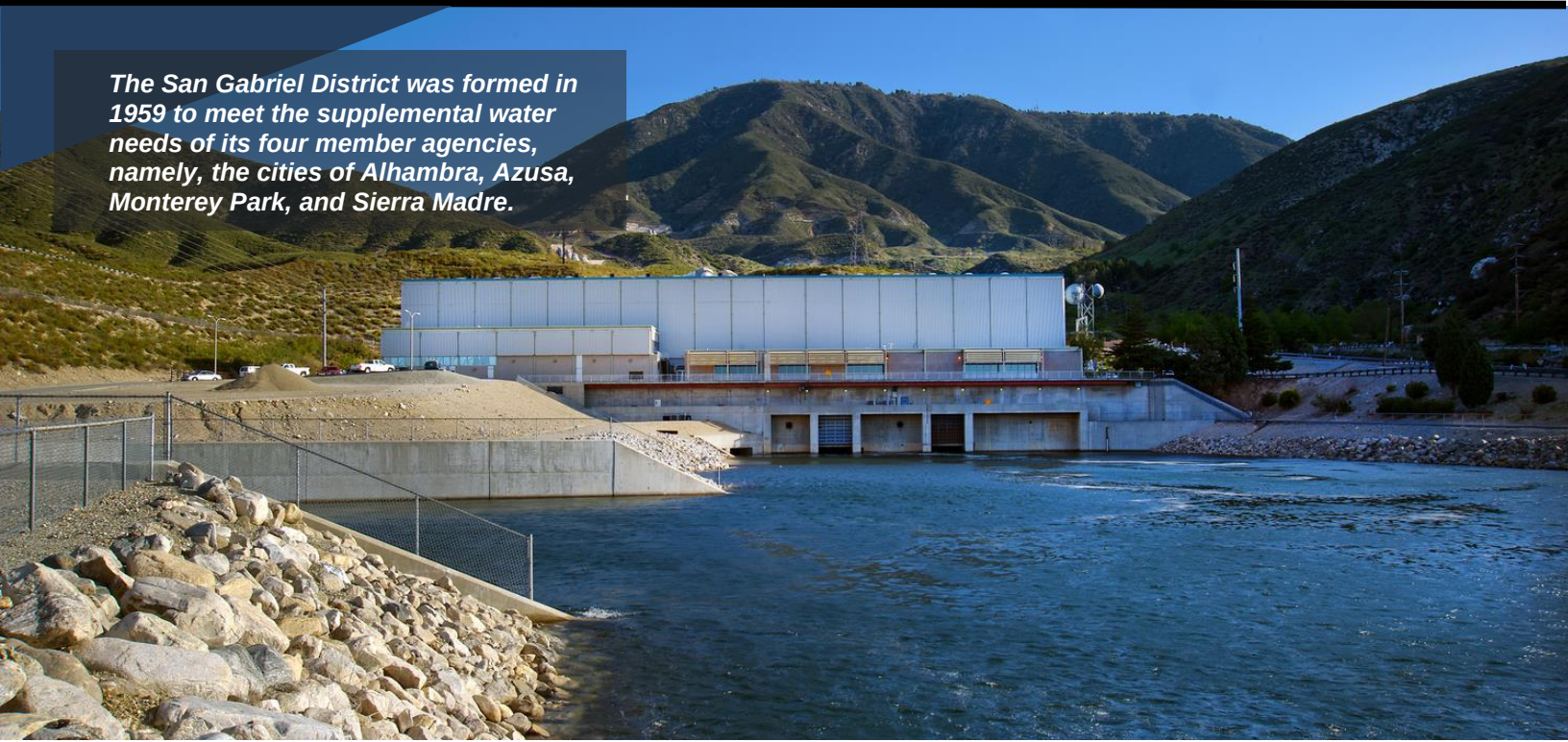
San Gabriel District and their member agencies face challenges in the near future regarding water supply including:

- Over the last decade, drastic changes in annual hydrologic conditions have negatively affected water supplies available from the State Water Project (SWP) and the Colorado River Aqueduct (CRA).
- The declining ecosystem of the Bay-Delta has resulted in a reduction in water supply deliveries for member agencies.

San Gabriel District's strategies for managing these reliability risks include:

- Continuing promotion of progressive and effective water conservation programs.
- Replacing deteriorating water infrastructure through a proactive capital improvement program, which will reduce water main leaks and conserve water and enhance efficient delivery of water supplies to its members.

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The San Gabriel District was formed in 1959 to meet the supplemental water needs of its four member agencies, namely, the cities of Alhambra, Azusa, Monterey Park, and Sierra Madre.

SECTION 1: INTRODUCTION

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 1 INTRODUCTION

1.1 PURPOSE AND SUMMARY

This is the 2020 Urban Water Management Plan (UWMP) for the San Gabriel Valley Municipal Water District (San Gabriel District). This plan has been prepared in compliance with the Urban Water Management Planning Act (Act), per Division 6 of the California Water Code, Sections 10610 to 10657 (**Appendix A**), which has been most recently amended by SB 606 in 2018.

As part of the Act, the legislature declared that waters of the state are a limited and renewable resource subject to ever increasing demands; that the conservation and efficient use of urban water supplies are of statewide concern; that successful implementation of plans is best accomplished at the local level; that conservation and efficient use of water shall be actively pursued to protect both the people of the state and their water resources; that conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions; and that urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use.

The Act requires “every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt, in accordance with prescribed requirements, an urban water management plan.” These plans must be filed with the California Department of Water Resources (DWR) every five years describing and evaluating reasonable and practical efficient water uses, reclamation, and conservation activities. (*See generally* Wat. Code § 10631).

The Act has been amended on several occasions since its initial passage in 1983. New requirements of the Act due to Water Conservation Act of 2009 (SBx7-7) state that per capita water use within an urban water supplier's service area must decrease by 20 percent by the year 2020 in order to receive grants or loans administered by DWR or other state agencies. The legislation sets an overall goal of reducing per capita urban water use by 20 percent by December 31, 2020. The state shall make incremental progress towards this goal by reducing per capita water use by at least 10 percent by December 31, 2015. Effective 2016, urban retail water suppliers who do not meet the water conservation requirements established by this bill are not eligible for state water grants or loans. As a wholesale supplier, the provisions of SBx7-7 do not apply to San Gabriel District; however, San Gabriel District keeps track of retail water use within its service area to help better understand their member agencies.

1.2 COORDINATION

In preparing this 2020 UWMP, San Gabriel District has encouraged broad community

participation. San Gabriel District provided 60-day notification letters to encourage agencies to participate in the UWMP preparation process. Copies of the draft UWMP were made available for public review at the San Gabriel District office and a notice was published in the local press that the draft UWMP was available for review.

In addition to notifications concerning the UWMP itself, San Gabriel District provide a two-week and a one-week notice of a public hearing (Board meeting) to be held at the San Gabriel District office to review and accept comments on the UWMP. The notice of the public hearing was published in the local press. Following the public hearing, San Gabriel District adopted the 2020 UWMP on June XX, 2021. Finally, as required by the Act, this 2020 UWMP is being provided by San Gabriel District to DWR, the California State Library, and the public within 30 days of Board adoption.

Table 1.1: Coordination and Public Involvement

	Participated in Plan Preparation	Contacted for Assistance	Commented on Draft	Notified of Public Hearing
San Gabriel District	✓	✓	✓	✓
City of Alhambra				✓
City of Azusa				✓
Azusa Light & Water				✓
City of Monterey Park				✓
City of Sierra Madre				✓
Metropolitan Water District				✓
Upper District				✓
LA County Dept. of Public Works				✓
LA County Sanitation District				✓
Interested General Public				✓

A copy of all things related to notification / coordination of the UWMP, and the Board resolution approving the 2020 Plan is included in **Appendix B**.

1.3 UPDATES TO THE UWMP ACT

Since the 2015 UWMPs, there are no significant changes affecting the 2020 UWMPs on the level of SBx7-7; however, there are numerous minor to major updates to the UWMP Act affecting the 2020 UWMPs as follows:

- **Water Loss:** Quantify distribution system water loss for each of the five years preceding the plan update (CWC § 10631 (d) (3) (A), SB 1414, 2019)
- **Drought Risk Assessment:** Assess water supply reliability over a 5-year period examining water supplies, water uses, and the reasonable predicted water supply reliability for five consecutive dry years (CWC § 10635 (b), SB 606, 2018)

- **Reporting of Energy Intensity:** Provide information that the water supplier can readily obtain on the energy used to process water (CWC § 10631.2 (a), SB 606, 2018)
- **Lay Description:** Include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks (CWC § 10630.5, SB 606, 2018)
- **Climate Change Impacts and Considerations:** Provide details on the impacts of climate change and consider them into projections (CWC § 10630, SB 606, 2018)
- **Water Shortage Contingency Plan (WSCP):** The water shortage contingency analysis required in previous UWMPs by former law has been replaced by a WSCP mandate with new elements, which include new six standard water shortage levels (CWC § 10632, SB 606, 2018, AB 1414, 2019)
- **Seismic Risk Assessment and Mitigation Plan:** As part of the WSCP, water suppliers are required to assess seismic risks to their water system facilities and measures to mitigate those risks (CWC § 10632.5, SB 664, 2015)

Of the above, the inclusion of the WSCP (including the seismic risk assessment and mitigation plan as part of the WSCP) as a separate document with revised elements is the most significant update affecting the 2020 UWMPs. AB 1414, SB 606, and SB 664, which amended the WSCP, mark a continued focus on water shortage preparedness and pre-planned strategies for mitigating catastrophic service disruptions.

1.4 FORMAT OF THE PLAN

The sections and information contained in this 2020 UWMP correspond to the items in the Act and other amendments to the Water Code, as follows:

Section 1 - Introduction	This section describes the Act, San Gabriel District's planning and coordination process, the history of San Gabriel District's water supply system, and a description of its water service area. This section also describes the local climate, population served, and the water system.
Section 2 – Water Sources & Supplies	This section describes San Gabriel District's water supplies, including imported water from the State Water Project (SWP), and how San Gabriel District handles those water supplies. This section also discusses potential water supplies and energy intensity.
Section 3 – Water Quality	This section discusses the quality of the San Gabriel District's water sources, including a discussion on the treatment and testing of water. This section also discusses water quality effects on management strategies and supply reliability.
Section 4 – Water Demands	This section describes past, current, and projected future water demands within San Gabriel District's service area. This chapter also discusses the requirements of the SBx7-7.
Section 5 – Climate Change	This section discusses climate change, its overall impacts on society, and its impact on the San Gabriel Districts water supplies. This section also discusses potential future impacts, current efforts to combat climate change, and climate

change considerations for water supply and demand projections.

Section 6 – Reliability Planning	This section discusses the need for reliability planning due to historic and recent droughts. This section also presents an assessment of the reliability of the San Gabriel District’s water supplies by comparing projected future water demands within San Gabriel District’s service area with expected water supplies under three different hydrologic conditions: a normal year; a single dry year; and multiple dry years.
Section 7 – Demand Management	This section addresses San Gabriel District’s compliance with the current Best Management Practices (BMPs), otherwise known as Demand Management Measures (DMMs).
Section 8 – Water Shortage Contingency Plan	This section describes San Gabriel District’s efforts that will be utilized in the event of a water supply interruption, such as a drought. San Gabriel District’s Board adopted an ordinance in 1991 (Resolution 3-91-421) which encourages conservation and recommends minimum restrictions be placed on water use. In addition, Metropolitan Water District of Southern California’s (MWD) Water Surplus and Drought Management Plan (WSDM) is also described. This section will also include a description of the seismic risk that may impact the San Gabriel District’s supply and member agencies.
Section 9 – Recycled Water	This section describes past, current and projected recycled water use, along with a description of wastewater collection and treatment facilities.
Appendices	The appendices contain references, supplemental information, and specific documents relating to San Gabriel District, used to prepare this 2015 UWMP.

1.5 UPDATES TO THE 2020 UWMP

In addition to updated information for the years 2015 - 2020, San Gabriel District’s UWMP has undergone several changes since the 2015 UWMP. The most significant change is the inclusion of the climate change section (Section 4). A summary of the changes to the 2015 UWMP is provided below:

- **Revised UWMP layout (double column to single)**
- **New Section: Climate Change (Section 5)**
- **Updated Section 8 – Water Shortage Contingency Plan**
- **Added new topics not previously discussed in the 2015 UWMP (Energy Intensity, Seismic Risk, etc.)**
- **Updated data, facts, and figures previously included in the 2015 UWMP**
- **Added new data, facts, and figures not previously included in the 2015 UWMP**

In addition to the above changes, there are multiple minor changes. The changes reflect both those that are required by the Water Code and those that San Gabriel District elected to include or modify.

1.6 WATER SYSTEM HISTORY

The San Gabriel District was formed in 1959 to meet the supplemental water needs of its four member agencies, namely, the cities of Alhambra, Azusa, Monterey Park, and Sierra Madre, which are located within the San Gabriel Valley and comprise an area of about 27.2 square miles in total. In anticipation of its long-term supplemental water needs, San Gabriel District entered into a contract with the DWR on November 3, 1962, for the ultimate delivery of 25,000 acre-feet (AF) of water per year from the SWP.

A subsequent amendment to the water supply contract dated September 28, 1964, increased the maximum annual entitlement to 28,800 AF. This quantity of water is not guaranteed each year and varies based on hydrologic conditions. San Gabriel District will be allocated a portion of its entitlement up to 100 percent. In 1969, voters within San Gabriel District rejected a proposal of annexation to the MWD.



Figure 1.1: San Gabriel Valley in Early (Left) & Present (Right) Day

Consequently, San Gabriel District constructed a pipeline (Devil Canyon-Azusa Pipeline) to deliver untreated SWP water to the Main San Gabriel Basin (Main Basin) as supplemental water for any production in excess of Main Basin water rights by its member agencies and to furnish San Gabriel District's portion of the Long Beach Judgment Make-up Water. The Devil Canyon-Azusa Pipeline began delivery of water in mid-1974 at the Beatty Channel with a capacity of 55 cubic feet per second (cfs). In 1981, an additional outlet was added to the Devil Canyon-Azusa Pipeline at San Dimas Wash with a 40 cfs capacity.

In 1985, San Gabriel District installed a 1.05-megawatt hydroelectric power plant (shown in **Figure 1.2**) at the San Dimas turnout to generate electricity in conjunction with its supplemental water deliveries. On April 10, 1995, San Gabriel District completed an extension of



Figure 1.2: San Gabriel District's Hydro Electric Generator at San Dimas Wash

the Devil Canyon-Azusa Pipeline from the Boyd-Kern Operations Center (in Azusa) to the County of Los Angeles Department of Public Works (LACDPW) San Gabriel Canyon Spreading Grounds, Basin No. 1 with a capacity of about 50 cfs.

The purpose of the San Dimas Outlet and the pipeline extension is to provide San Gabriel District with more flexibility in delivering SWP water to the Main Basin. In 1998, a 6 cfs outlet to Big Dalton Wash was constructed to utilize LACDPW's Citrus Spreading Grounds.

1.7 CLIMATE

San Gabriel District's service area has a Mediterranean climate with moderate to hot, dry summers with an average temperature of about 68°F and cool, wet winters with an average temperature of 58°F. The average annual rainfall for the region is 19.4 inches. **Figure 1.3** shows the historical average rainfall for San Gabriel District's service area from 1951 to 2015. Historically, the area receives slightly more rainfall than other cities in the Los Angeles area (due mainly to the foothill location of its member agencies).

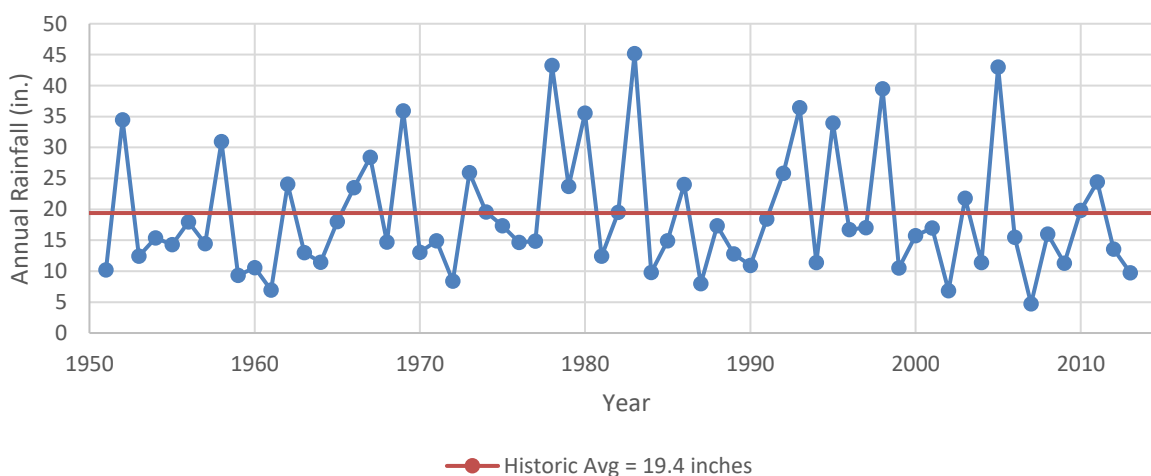


Figure 1.3: Historic Average of Annual Rainfall for San Gabriel District Member Agencies

1.8 WATER SERVICE AREA

San Gabriel District's service area consists of four member agencies cities spread out within the San Gabriel Valley. The San Gabriel Valley, which is located in southeastern Los Angeles County and is bounded on the north by the San Gabriel Mountains, on the west by the San Rafael and Merced Hills, on the south by the Puente Hills and the San Jose Hills, and on the east by a low divide between the San Gabriel River System and the Upper Santa Ana River System. **Figure 1.4** in the following page provides a map of the service area.

1.9 POPULATION

According to the most recent California Department of Finance (DOF) figures and population estimates for Azusa Light and Water, the current 2020 resident population of all four of San

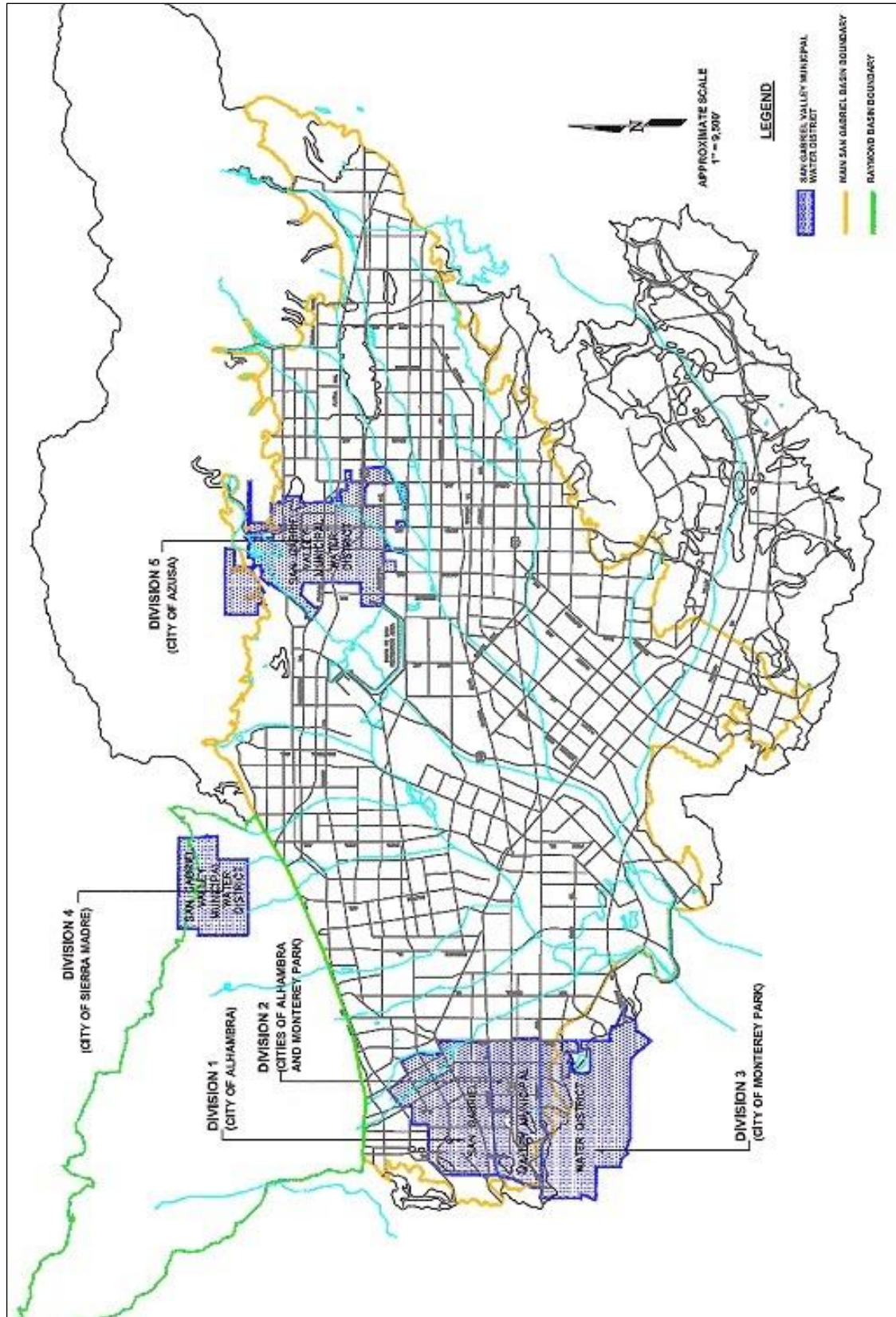


Figure 1.4: San Gabriel District's Service Area

Gabriel District's member agencies is approximately 265,342 persons. The population estimates for Azusa Light & Water (ALW) was done using DWR's WUE Population Tool. ALW service boundaries is unique as it contain primarily City of Azusa and portions of West Covina, Covina, Glendora, Irwindale, and unincorporated Los Angeles County. Population is expected to expand modestly with an annual growth rate of roughly 0.14 percent annually over the next 25 years as shown in **Table 1.2**.

Table 1.2: Population Projections (DWR Table 3-1 Wholesale)

Population Served	2020	2025	2030	2035	2040	2045
	268,386	270,684	273,012	275,369	277,757	280,175

Besides the permanent resident population living within San Gabriel District's service area, daytime populations must be considered. Although daytime population spikes are not as significant in San Gabriel District's service area compared to other areas, this still presents a challenge for water supply, especially during summer months.

1.10 IMPACTS OF CLIMATE AND POPULATION

The two main factors of concern for San Gabriel District in providing water for its member agencies are climate and population. As a region that uses groundwater as its primary source, less rainfall combined with an increased population means less natural replenishment, less SWP reliability, and a demand on groundwater. As a result, San Gabriel District works closely with its member agencies to keep up to date on population statistics, and also with DWR with regard to SWP reliability.

1.11 WATER SYSTEM

San Gabriel District is a wholesale water supplier that is governed by a five-member elected Board of Directors. As such, residents do not receive their water directly from San Gabriel District, but from one of four different retail water suppliers: the cities of Alhambra, Monterey Park, and Sierra Madre, and ALW. The location of San Gabriel District in relation to the San Gabriel Valley is shown previously in **Figure 1.4**.

San Gabriel District supplies its supplemental water to its member agencies through a 38-mile Devil Canyon-Azusa pipeline. The maximum capacity of the pipeline is 55 cfs. San Gabriel District's imported water supply consists of untreated SWP water received at the Devil Canyon Afterbay, along with five separate turnouts to distribute the water for recharge purposes as shown in **Table 1.3**.

Table 1.3: Turnout (Endpoint) Locations for Devil Canyon-Azusa Pipeline

Description	Capacity (cfs)
San Dimas Turnout	40
San Dimas Hydro	40
Big Dalton/ Citrus SG	6
San Gabriel FCS	55
Azusa FCS	50

San Gabriel District's deliveries to its turnout locations are credited either for replenishment in that given time period, or as cyclic storage. An overview of San Gabriel District's water supply process is provided below in **Figures 1.5**.

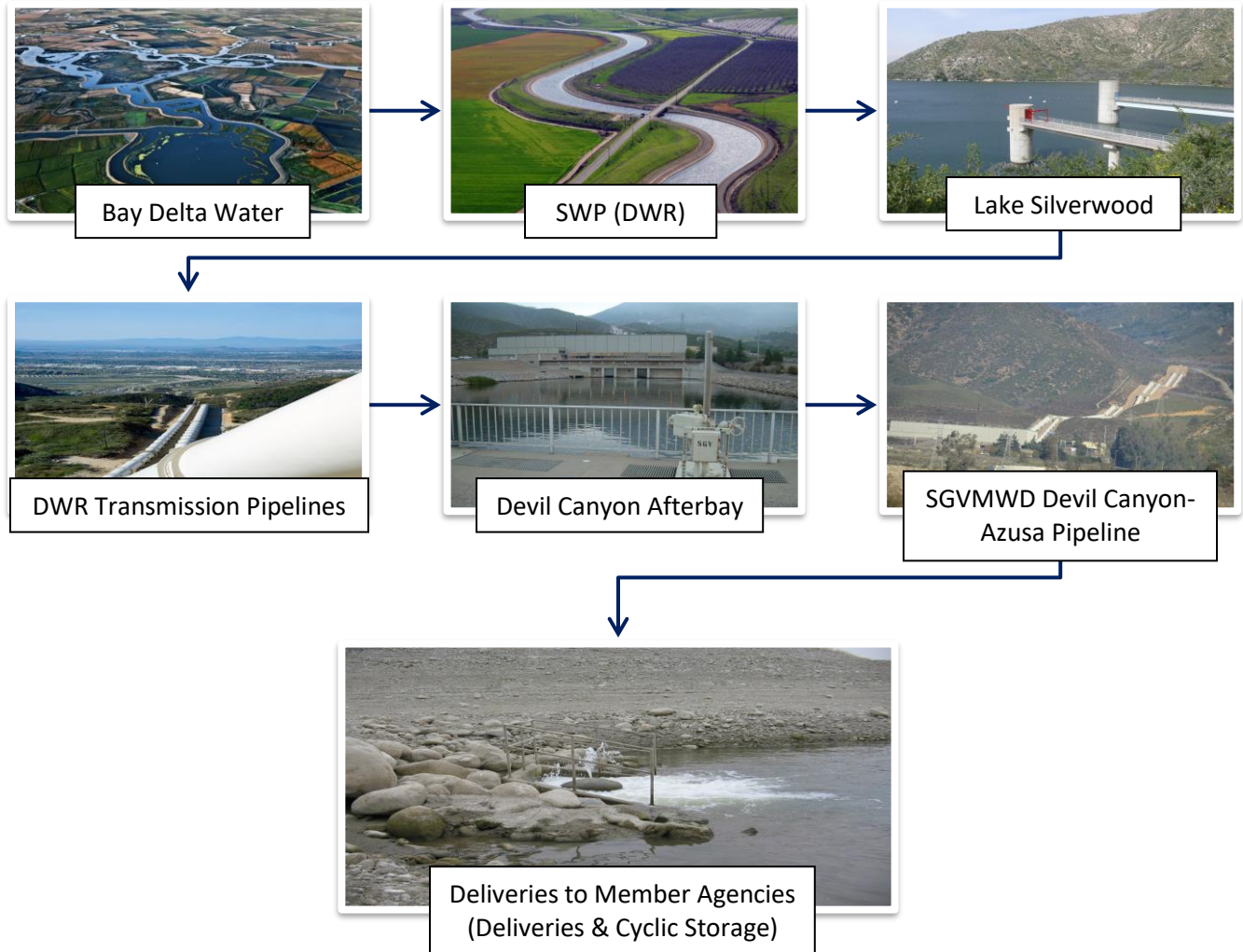


Figure 1.5: Overview of San Gabriel District - Basic Process Diagram

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San Gabriel District's sole source of water supply comes from the SWP, a water storage and delivery system of reservoirs, aqueducts, power-plants, and pumping plants.



SECTION 2: WATER SOURCES & SUPPLIES

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SECTION 2 WATER SOURCES & SUPPLIES

2.1 INTRODUCTION

San Gabriel District's sole source of water supply comes from the SWP, otherwise known as the California Aqueduct. The SWP is managed by the DWR.

2.2 WATER SUPPLY SOURCES

2.2.1 Supply to District (SWP)

The Delta is often considered the nexus of California's statewide water system. About half the total river flow in the state passes through this region, from which water is exported to the San Joaquin Valley, Southern California and portions of the Bay area to supply some 1,130,000 acres of farmland and 23 million people in central and Southern California.



Figure 2.1: Sacramento-San Joaquin Delta

The Delta provides an estimated 7 million acre-feet (MAF) of water per year, of which about 100,000 AF are exported to the San Francisco Bay Area, 1.7 MAF are used locally, and over 5 MAF are exported to the San Joaquin Valley, coastal Central and Southern California via the SWP.

The SWP is a water storage and delivery system of reservoirs, aqueducts, power-plants, and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. Of the contracted water supply, 70 percent goes to urban users and 30 percent goes to agricultural users.

In 1947, the California State Legislature funded a water resources investigation that led to the development of the SWP. This investigation resulted in the publication of the California Water Plan, which presented preliminary plans to meet the State's ultimate water needs, including those facility works required for transferring surplus water from northern California to water deficient southern California.



Figure 2.2: State Water Project (SWP)

Financing for the construction of SWP facilities was authorized in 1959, when the State Legislature enacted the California Water Resources Development Act (known as the Burns-Porter Act). The Burns-Porter Act, formally known as the California Water Resources Development Bond Act, was placed on the November 1960 ballot. Also known as Proposition One, its chances for passage were unpredictable. Heated and continuous negotiations were still ongoing, with MWD withholding its endorsement until days before the election. The San Francisco Chronicle strongly opposed the proposition. California's North-South regional rivalry was a strong factor in the election.

The initial works included Oroville Dam and Lake Oroville, B.F. Sisk San Luis Dam and San Luis Reservoir, the South Bay Aqueduct, the North Bay Aqueduct, and the California Aqueduct. Construction on the Oroville site actually began even before the passage of the Burns-Porter Act. A \$25 million emergency appropriation was passed in 1957 after a record late 1955-early 1956 flood, which devastated Northern and Central California. Statewide, 64 deaths were recorded, most in Sutter County and Yuba City, and more than \$200 million of property damage.

The first SWP water deliveries were made in 1962, two years after construction began (MWD signed the first water supply contract in 1960). Construction on the SWP continued on throughout the 1960s, utilizing a bond issue of \$1.75 billion. The main components of the SWP were completed by the mid-1970s. Throughout the 1980s and 1990s, construction activities mainly focused on power generation facilities. By the end of 2001, a total of about \$5.2 billion had been spent to construct SWP facilities. Today, the SWP includes 34 storage facilities, reservoirs and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 701 miles of open canals and pipelines. A total of 29 agencies have long-term water supply contracts with DWR. The service areas of these long-term water supply contractors vary widely in size, location, climate, and population. The contractors' uses for SWP water also differ. In the San Joaquin Valley, SWP water is used primarily for agriculture; in the Feather River area, San Francisco South Bay, the North Bay areas, and in Southern California, SWP water is used primarily for urban and industrial needs.



Figure 2.3: Map of the Aqueduct Systems in California (Left) and Sacramento-San Joaquin Delta (Top Right)



Figure 2.4: Intake for Devil Canyon Plant at Silverwood Lake (part of SWP's East Branch)

Annual payments by SWP contractors total about \$600 million per year (per DWR's website). Of that amount, operation and maintenance costs for labor and equipment account for 30 percent. The cost for power (purchases minus sales) amounts to 20 percent. Bond service payments of principal and interest and repayments for other capital financing are about 50 percent.

Southern California Branches of SWP

At the Tehachapi crossing, just north of Los Angeles, water flows into the Antelope Valley, and divides into two branches: West & East. Water in the West Branch flows through Oso Pumping Plant into Quail Lake. From Quail Lake, water flows through the Peace Valley Pipeline to Warner Power Plant and then into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel and Castaic Power Plant into Castaic Lake, the terminus of the West Branch. The East Branch carries water through Antelope Valley via Pearblossom Pumping Plant and Alamo and Mojave Siphon Power Plants into Silverwood Lake in the San Bernardino Mountains.

Lake Silverwood & Devil Canyon

Lake Silverwood is a large reservoir in San Bernardino County, California, United States, located on the West Fork Mojave River, a tributary of the Mojave River in the San Bernardino Mountains. It was created in 1971 by the construction of the Cedar Springs Dam as a forebay on the California Aqueduct (thereby inundating the former town of Cedar Springs), and has a capacity of 73,000 AF. Silverwood Lake is located on the East Branch of the California



Figure 2.6: Supply to Devil Canyon Plant

Aqueduct. At an elevation of 3,355 feet, Silverwood Lake is the highest reservoir in the SWP.

From Silverwood, the water enters the San Bernardino Tunnel and drops 1,406 feet in elevation into Devil Canyon Power Plant, then flows to Lake Perris, the southernmost reservoir in the SWP. At Devil Canyon, the SWP also extends east into Riverside County via the East Branch Extension's Foothill Pipeline.

San Gabriel District has access to untreated imported SWP water from the Devil Canyon Plant located in San Bernardino. Water coming from the State Water Project/California Aqueduct powers turbines in the Devil Canyon Power Plant near Lake Silverwood, and then enters the pipeline through the slide-gate shown in **Figure 2.6**.



Figure 2.5: Devil Canyon Afterbay

The amount that San Gabriel District obtains from the SWP is broken down into four different delivery types: Table A delivery, an Article 21 delivery, a carryover delivery, or a turnback delivery. Table A delivery is based on a contract amount agreed upon by DWR and the Contractor (San Gabriel District). San Gabriel District currently has a contract with DWR for a SWP entitlement of 28,800 AF. Article 21 delivery is water that Contractors can request on a short-term basis in addition to their Table A contract amount. Carryover delivery is SWP water that is allocated to an SWP contractor and approved for delivery to that contractor each year, but not used by the end of the year. This water is exported from the Delta by the Banks Pumping Plant, but instead of being delivered to the contractor, it is stored in the

SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year. Lastly, turnback delivery is water that SWP contractors can offer from their Table A portion that has been allocated in the current year and exceeds their needs to a "turnback pool," where another contractor may purchase it. Contractors that sell their extra Table A water in a turnback pool receive payments from contractors that buy this water. **Table 2.1** provides the recent annual purchases from DWR. As indicated, the amount of water received by San Gabriel District varies by year, and is based on the reliability of the SWP due to climatic conditions.

Table 2.1: Six-Year Purchases from DWR SWP

Year	SWP Deliveries (AF)				
	Table A	Article 21	Carryover	Turnback Pool	Total (AF)
2020	7,728				7,728
2019	22,325				22,325
2018	10,080		6,975		17,055
2017	10,080	3,057	7		20,569
2016	17,280				17,280
2015	5,759				5,759

Contract Extension

DWR and each of the Contractors entered into substantially uniform long-term water supply contracts (Contracts) in the 1960s with 75-year terms. The first Contract terminates in 2035, and most of the remaining Contracts terminate within three years after that.

The majority of the capital costs associated with the development and maintenance of the SWP is financed using revenue bonds. These bonds have historically been sold with 30-year terms. It has become more challenging in recent years to affordably finance capital expenditures for the SWP because bonds used to finance these expenditures are limited to terms that only extend to the year 2035, less than 30 years from now. To ensure continued affordability of debt service to Contractors, it was necessary to extend the termination date of the Contracts to allow DWR to continue to sell bonds with 30-year terms.

Public negotiations to extend the Contracts took place between DWR and the Contractors during 2013 and 2014. An Agreement in Principle (AIP) was reached and was the subject of analysis under the requirements of the California Environmental Quality Act (CEQA) (Notice of Preparation dated September 12, 2014). On December 11, 2018 DWR Director approved the Water Supply Contract Extension Project. In accordance with CEQA, DWR also filed its Notice of Determination for the project with the Governor's Office of Planning and Research. In addition, DWR filed an action in Sacramento County Superior Court to validate the Contract Extension Amendments. After CEQA was completed and contract language was finalized, DWR and 18 contractors have executed the Extension Amendment. The Extension Amendment would extend the contracts through 2085 and improve the project's overall financial integrity and management. The Extension Amendment is the subject to a validation action and two CEQA lawsuits.

2.2.2 Groundwater Deliveries

Main San Gabriel Basin

San Gabriel District's member agencies obtain their groundwater primarily from the Main San Gabriel Basin. For the most part, the Main Basin coincides with the San Gabriel Valley floor, which is located in eastern Los Angeles County and overlies the majority of the San Gabriel Valley with a surface area of 167 square miles of valley terrain. The basin is

bounded by the San Gabriel Mountains to the north, San Jose Hills to the east, Puente Hills to the south, Raymond Basin to the Northwest, and by a series of hills and the Whittier Narrows to the Southwest. The Main Basin serves as a natural storage reservoir, transmission system and filtering medium for wells constructed therein.

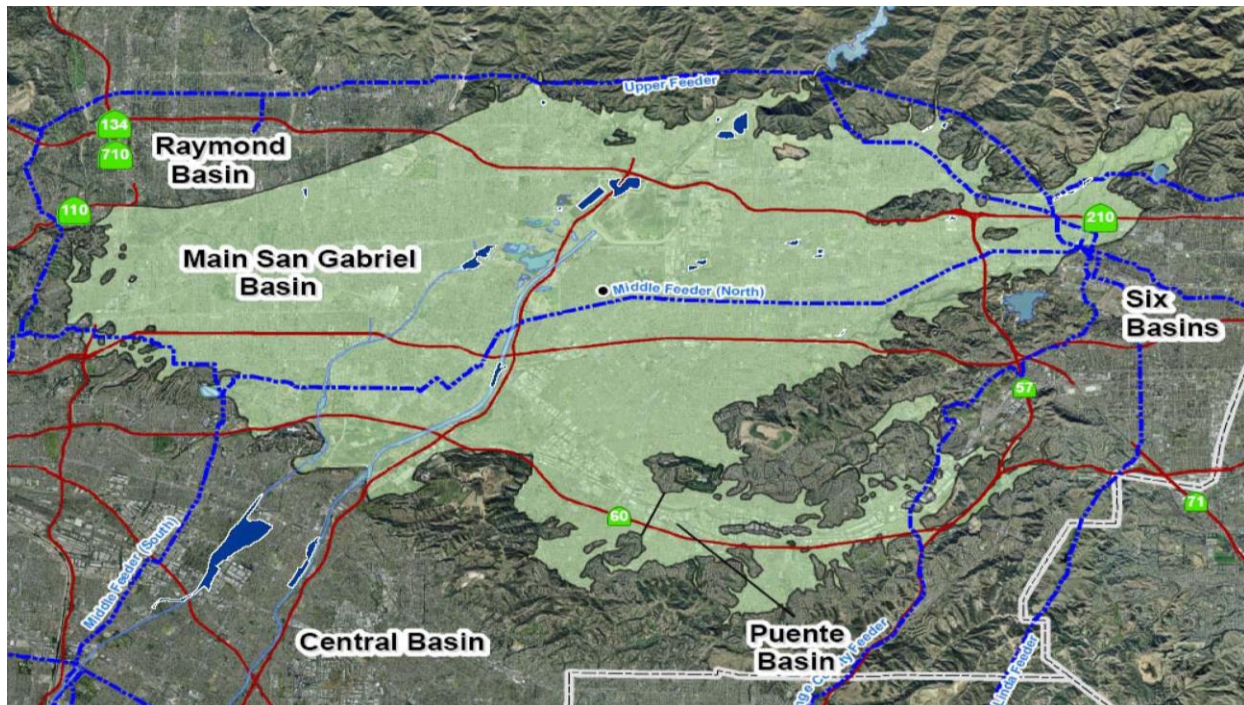


Figure 2.7: Map of Main San Gabriel Basin

Basin Geology

The Main Basin consists of a roughly bowl-shaped depression in the bedrock, filled with alluvial deposits. Materials within the Main Basin vary in size from relatively coarse gravel near the mountains to fine and medium-grained sand containing silt and clay as the distance from the mountains increases. The principal water-bearing formations are unconsolidated and semi-consolidated sediments which vary in size from coarse gravel to fine-grained sands. The interstices between these alluvial particles throughout the Main Basin fill with water and transmit water readily to wells.

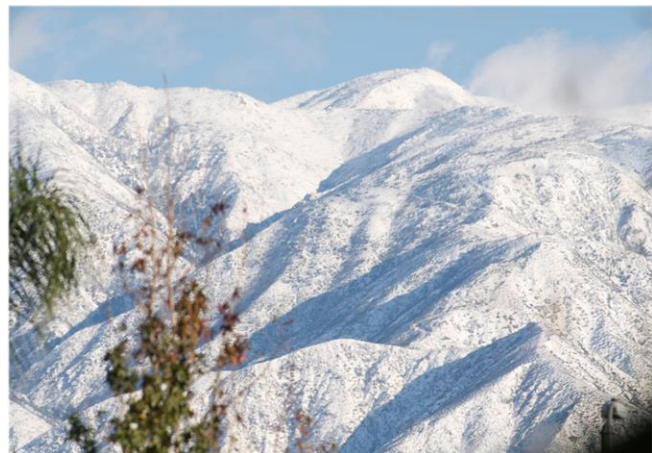


Figure 2.8: Snowfall on San Gabriel Mountains

Basin Hydrology

The major sources of replenishment to the Main Basin are direct penetration of rainfall on the valley floor, percolation of runoff from the mountains (from snowfall and rainfall), percolation of imported water and return flow from applied water. **Figure 1.3** in **Section 1** shows historic annual rainfall in the San Gabriel Valley. Rainfall occurs predominantly in the winter months and is more intense at higher elevations and closer to the San Gabriel Mountains. The magnitude of annual replenishment from direct penetration of local rainfall and return flow from applied water is not easily quantifiable. Percolation of runoff from the mountains and valley floor along with percolation of imported water have been estimated by the San Gabriel River Watermaster (River Watermaster). LACDPW maintains records on the amount of local and imported water conserved in water spreading facilities and stream channels.

The Main Basin is bisected by the San Gabriel River. The San Gabriel River originates at the confluence of its west and east forks in the San Gabriel Mountains. The San Gabriel River is joined and fed by tributary creeks and washes. In the Main Basin, these include: Big Dalton Wash, which originates in the San Gabriel Mountains; Walnut Creek, which originates at the northeast end of the San Jose Hills; and San Jose Creek, which originates in the San Gabriel Mountains, but which travels around the southerly side of the San Jose Hills through the Puente Narrows before joining the San Gabriel River just above Whittier Narrows.

The channel of the San Gabriel River bifurcates in the upper middle portion of the Main Basin, forming a channel to the west of and parallel to the San Gabriel River, known as the Rio Hondo. The Rio Hondo is fed by tributaries draining the westerly portion of the Main Basin, including Sawpit Wash, Santa Anita Wash, Eaton Canyon Wash, Rubio Wash and Alhambra Wash, all of which originate in the San Gabriel Mountains or the foothills. The Santa Anita Wash, Eaton Canyon Wash, Rubio Wash, and Alhambra Wash all cross the Raymond Basin area before entering the Main Basin.



Figure 2.9: Rio Hondo Spreading Grounds

The Rio Hondo passes through Whittier Narrows westerly of the San Gabriel River, and then flows southwesterly to join the Los Angeles River on the Coastal Plain.

To protect residents of the San Gabriel Valley from flooding that can result during periods of intensive rainfall, the LACDPW and the U.S. Army Corps of Engineers have constructed an extensive system of dams, debris basins, reservoirs, and flood control channels. The dams and reservoirs also operate as water conservation facilities.

The dams and reservoirs that control the flow of the San Gabriel River and the Rio Hondo include: Cogswell Reservoir on the west fork of the San Gabriel River, San Gabriel Reservoir at the confluence of the west and east forks of the San Gabriel River, Morris Reservoir near the mouth of the San Gabriel Canyon, Santa Fe Reservoir in the northerly portion of the Basin, and Whittier Narrows Reservoir at the southwestern end of San Gabriel Valley.



Figure 2. 10: San Gabriel River Channel

Many of the stream channels tributary to the San Gabriel River have been improved with concrete banks (walls) and concrete-lined bottoms. These stream channel improvements have significantly reduced the area of previous stream channels and reduced Main Basin replenishment. A number of off-stream groundwater replenishment facilities have been established along these stream channels to offset such reductions in replenishment. Some of these facilities are accessible to imported water supplies, while some facilities receive only local runoff.

The paths of the surface streams are mirrored in the soils and in the direction of groundwater movement in the Main Basin. The tributary creeks and washes, carrying smaller amounts of water, generally flow toward the center of the San Gabriel Valley, while the direction of flow of the major streams, the San Gabriel River and the Rio Hondo, is from the mountains in the north to Whittier Narrows in the southwest. In similar fashion, the primary direction of groundwater movement in the Main Basin is from the north to the southwest, with contributing movement generally from the east and west toward the center of the Main Basin as shown in **Figure 2.11**. Simulated 2018-19 Main Basin contours are shown in **Figure 2.12**. The greatest infiltration and transmissivity rates of soils in the Main Basin are from north to south, with the maximum rates found in the center of the valley along the stream channels. Generally, the Main Basin directs groundwater to the southwest through Whittier Narrows.

Basin Hydrogeology

The key hydrogeologic characteristics of the Main Basin are summarized in **Table 2.2**. The total fresh water storage capacity of the Main Basin is estimated to be about 9.5 MAF. Of that, about 1,100,000 AF has been used historically in Main Basin operations. The change in groundwater elevation at the Baldwin Park Key Well (Key Well) is representative of changes in groundwater

in the Main Basin. One foot of elevation change at the Key Well is roughly the equivalent of about 8,000 AF of water storage. The location of the Key Well is shown in **Figure 2.13** and hydrograph of the Key Well is shown in **Figures 2.14** and **2.15**. The historic high groundwater elevation was recorded at over 329.1 feet in April 1916. The historic low was recorded in November 2015 at 174.0 feet. The Key Well hydrograph illustrates the cyclic nature of basin replenishment and depletion. The hydrograph also illustrates the dramatic replenishment capability of the Main Basin during wet periods.

Generally, water movement in the Main Basin is from the San Gabriel Mountains on the north to Whittier Narrows to the southwest, as shown in **Figure 2.11**. Groundwater movement in the northern and northeastern regions of the Main Basin is affected by faulting.

**Table 2.2: Main San Gabriel Basin
Hydrogeologic Characteristics**

Characteristic	Amount
Max. Depth to Groundwater	800-2,000 ft.
Thickness of Groundwater Table	200-4,000 ft.
Storage Capacity (MAF)	8.6-10.5
Safe Yield (AFY)	150,000
Spreading Basins (Total)	17
Spreading Capacity (AF)	600,000
Wells (Active)	250
Well Capacity (AFY)	500,000

The Main Basin is an unconfined aquifer. Although clay deposits appear mixed with the sands in several locations in the Main Basin and there are various clay lenses throughout the Main Basin, they do not coalesce to form a single impermeable barrier to the movement of subsurface water. The Main Basin therefore operates as a single, unconfined aquifer.

Within the Main Basin there are a number of identified sub-basins. These include the Upper San Gabriel Canyon Basin, Lower San Gabriel Canyon Basin, Glendora Basin, Foothill Basin, Way Hill Basin, and San Dimas Basin. In addition, the Puente Basin is tributary to the Main Basin from the southeast, between the San Jose and Puente Hills.

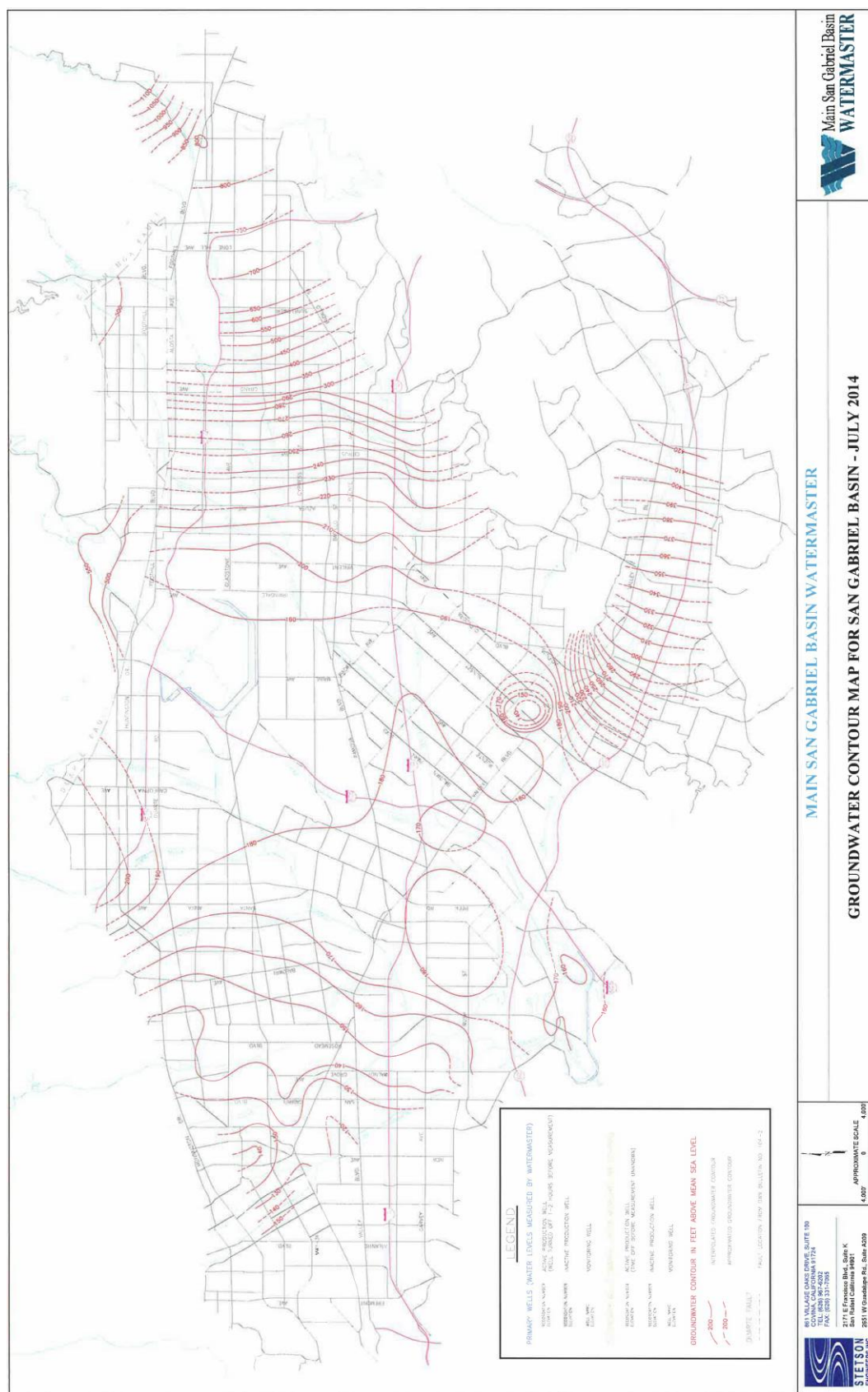


Figure 2.11. Groundwater Contour Map for San Gabriel Basin – July 2014

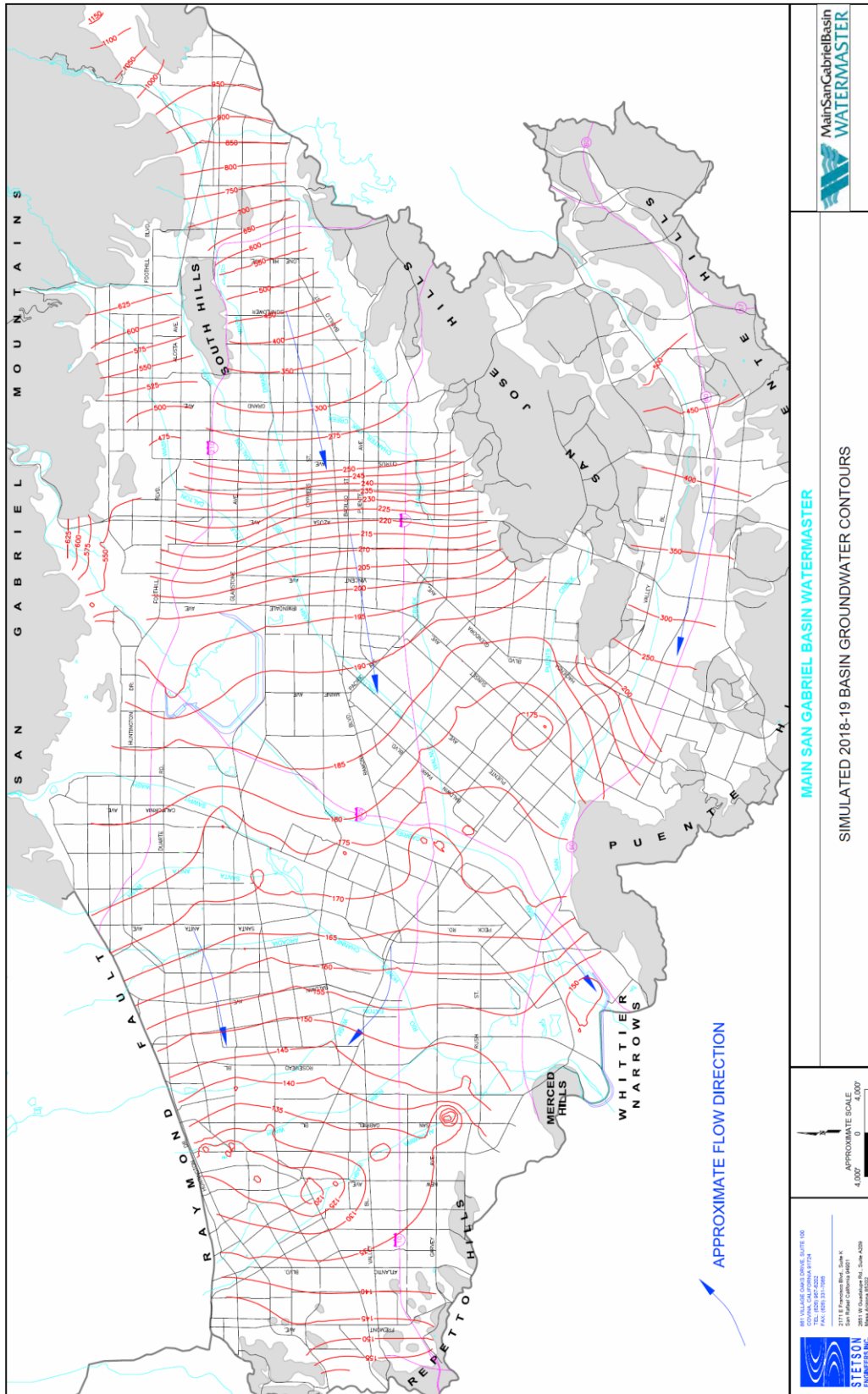


Figure 2.12: Simulated 2018-19 Groundwater Contour Map for San Gabriel Basin

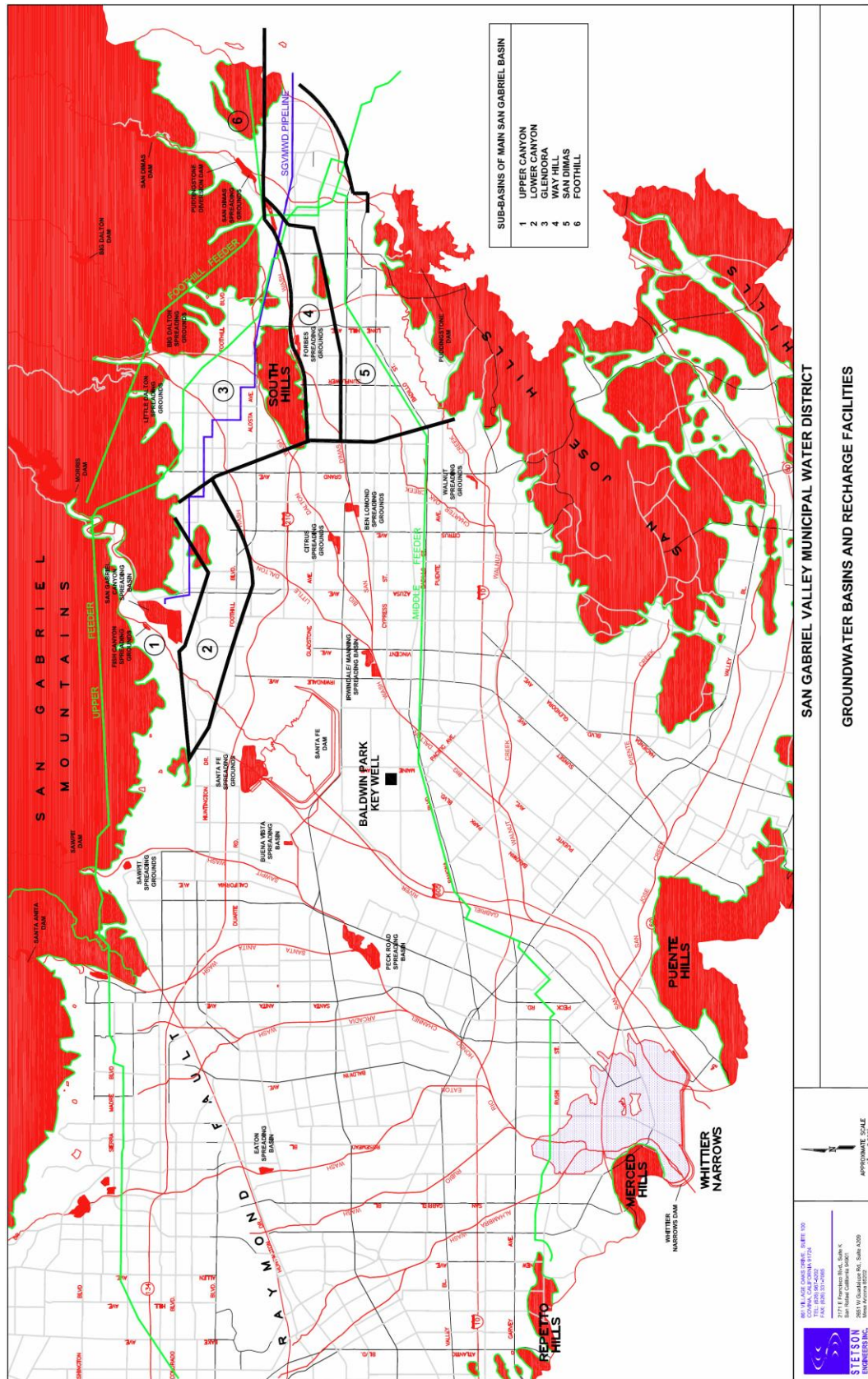


Figure 2.13: San Gabriel District's Groundwater Basins & Recharge Facilities

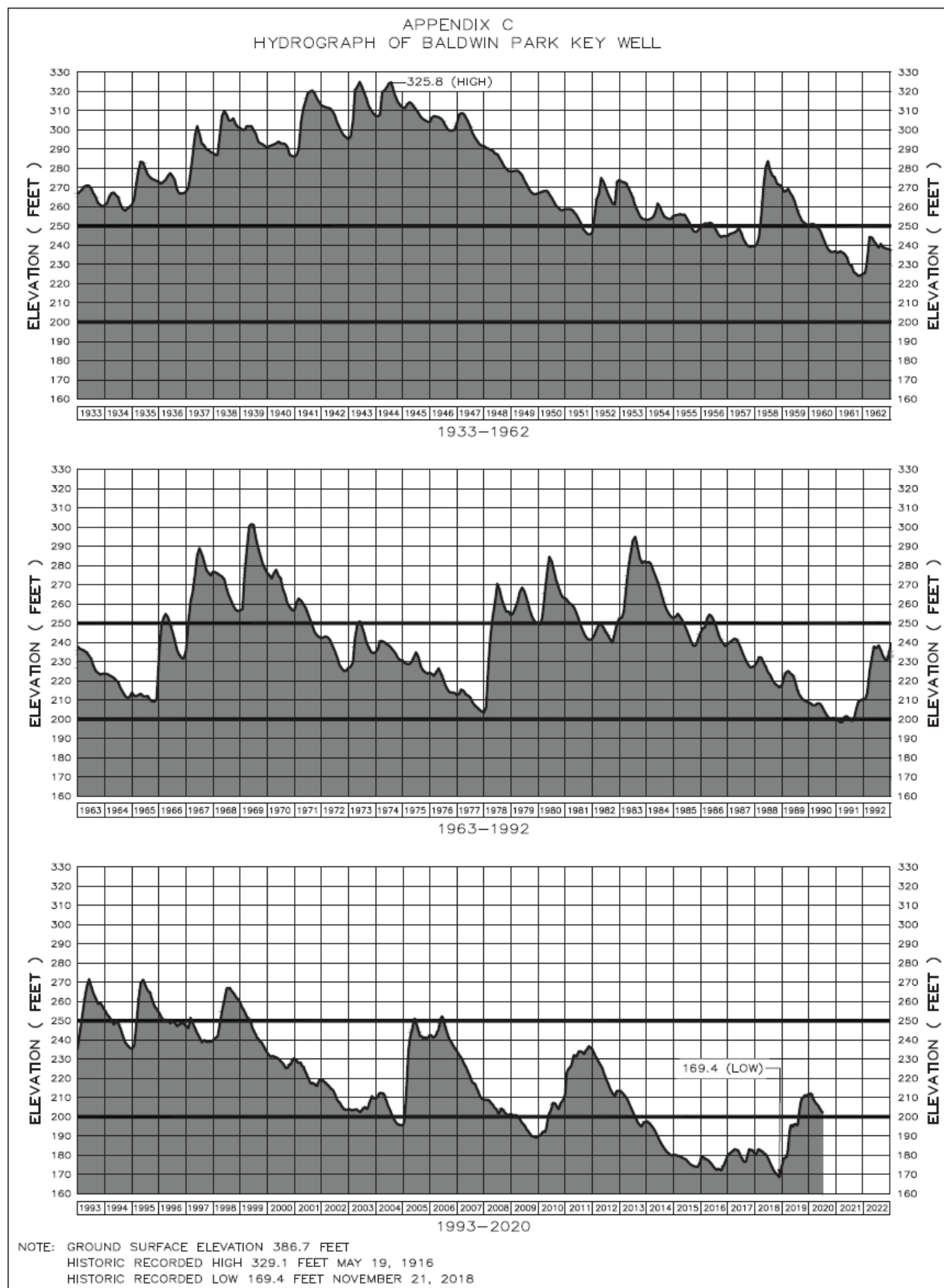


Figure 2.14: Historic Water Elevation at Baldwin Park Key Well – 1933 to 2020

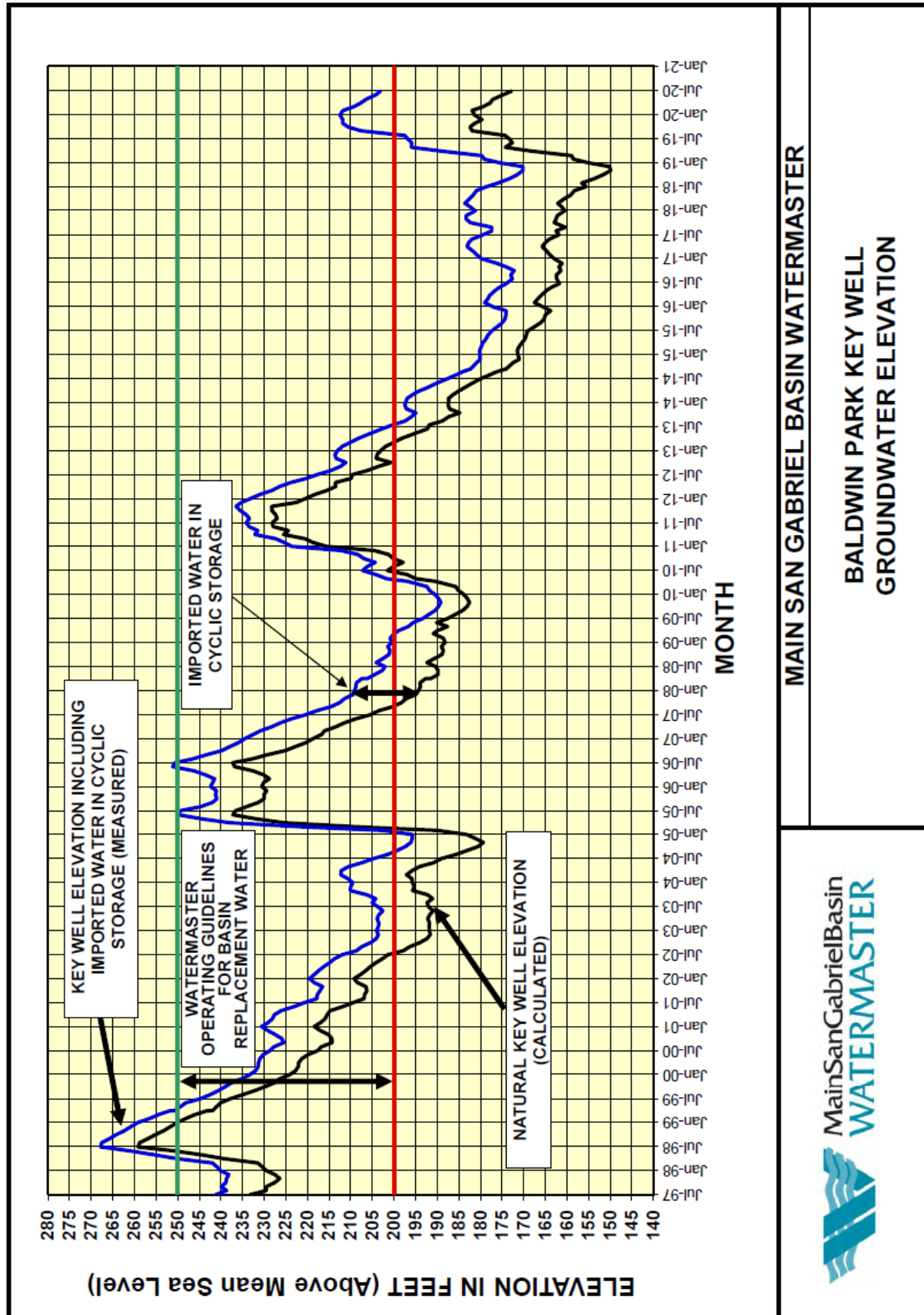


Figure 2.15: 1997 - 2015 Water Elevations at Baldwin Park Key Well

The management of water resources in the Main San Gabriel Basin is provided by Watermaster services under two separate court judgments: The Long Beach Judgment and The Main Basin Judgment. The Long Beach Judgment established the River Watermaster, and the Main Basin Judgment established the Basin Watermaster. Through the Long Beach Judgment and the Main Basin Judgment, operations of the Main Basin are optimized to conserve local water to meet the needs of the parties of the Main Basin Judgment.

Long Beach Judgment

On May 12, 1959, the Board of Water Commissioners of the City of Long Beach, the Central Basin Municipal Water District (Central Basin), and the City of Compton, as plaintiffs, filed an action against the San Gabriel Valley Water Company and 24 other producers of groundwater from the San Gabriel Valley as defendants. This action sought a determination of the rights of the defendants in and to the waters of the San Gabriel River system and to restrain the defendants from an alleged interference with the rights of plaintiffs and persons represented by the Central Basin in such waters. After six years of study and negotiation a Stipulation for Judgment was filed on February 10, 1965, and Judgment (Long Beach Judgment) was entered on September 24, 1965. Under the terms of the Long Beach Judgment, the water supply of the San Gabriel River system was divided at Whittier Narrows, the boundary between San Gabriel Valley upstream and the coastal plain of Los Angeles County downstream.

Under the terms of the Long Beach Judgment, the area downstream from Whittier Narrows (Lower Area), the plaintiffs and those they represent, are to receive a quantity of usable water annually from the San Gabriel River system comprised of usable surface flow, subsurface flow at Whittier Narrows and water exported to the Lower Area. This annual entitlement is guaranteed by the area upstream of Whittier Narrows (Upper Area), the defendants, and provision is made for the supply of Make-up Water by the Upper Area for years in which the guaranteed entitlement is not received by the Lower Area.



Figure 2.16: San Gabriel River Upper Regions

Make-up water is imported water purchased by the Main Basin Watermaster and delivered to agencies in Central Basin to satisfy obligations under the Long Beach Judgment. The entitlement of the Lower Area varies annually, dependent upon the 10-year average annual rainfall in San Gabriel Valley for the 10 years ending with the year for which entitlement is calculated.

The detailed operations described in the Long Beach Judgment are complex and require continuous compilation of data so that annual determinations can be made to assure compliance with the Long Beach Judgment. In order to do this, a three-member Watermaster was appointed by the Court, one representing the Upper Area parties nominated by and through Upper San Gabriel Valley Municipal Water District (Upper District), one representing the Lower Area parties nominated by and through the Central Basin, and one jointly nominated by Upper District and Central Basin. This three-member board is known as the San Gabriel River Watermaster.

The River Watermaster meets periodically during the year to adopt a budget, to review activities affecting water supply in the San Gabriel River system area, to compile and review data, to make its determinations of usable water received by the Lower Area, and to prepare its annual report to the Court and to the parties. The River Watermaster has rendered annual reports for the water years 1963-64 through 2013-14 and operations of the river system under that Court Judgment and through the administration by the River Watermaster have been satisfactory since its inception.



Figure 2.17: San Gabriel River Lower Regions

One major result of the Long Beach Judgment was to leave the Main San Gabriel Basin free to manage its water resources so long as it meets its downstream obligation to the Lower Area under the terms of the Long Beach Judgment. Reference to the Long Beach Judgment is included in **Appendix C**.

Main Basin Judgment

The Upper Area then turned to the task of developing a water resources management plan to optimize the conservation of the natural water supplies of the area. Studies were made of various methods of management of the Main Basin as an adjudicated area and a report thereon was prepared for the Upper San Gabriel Valley Water Association, an association of water producers in the Main Basin. After due consideration by the Association membership, Upper District was requested to file as plaintiff, and did file, an action on January 2, 1968, seeking an adjudication of the water rights of the Main San Gabriel Basin and its Relevant Watershed. After several years of study (including verification of annual water production) and negotiations, a stipulation for entry of Judgment was approved by a majority of the parties, by both the number of parties and the quantity of rights to be adjudicated. Trial was held in late 1972, and Judgment (Main Basin Judgment) was entered on January 4, 1973. Reference to the Main Basin Judgment is included in **Appendix D**. Reference to the Main Basin Watermaster Rules and Regulations is included in **Appendix E**.

There are three municipal water districts overlying and partially overlying the Main Basin. The three districts are Upper District, San Gabriel District, and Three Valleys Municipal Water District (TVMWD). The boundaries of these water districts are shown on **Figure 2.18** on the following page.

Under the terms of the Main Basin Judgment all rights to the diversion of surface water and production of groundwater within the Main Basin and its Relevant Watershed were adjudicated. The Main Basin Judgment provides for the administration of the provisions of the Main Basin Judgment by a nine-member Watermaster. Six of those members are nominated by water producers (producer members) and three members (public members) are nominated by Upper District and San Gabriel Districts which overlie most of the Main Basin. The nine-member board employs a staff, an attorney, and a consulting engineer. The Main Basin Watermaster holds public meetings on a regular monthly basis throughout the year.

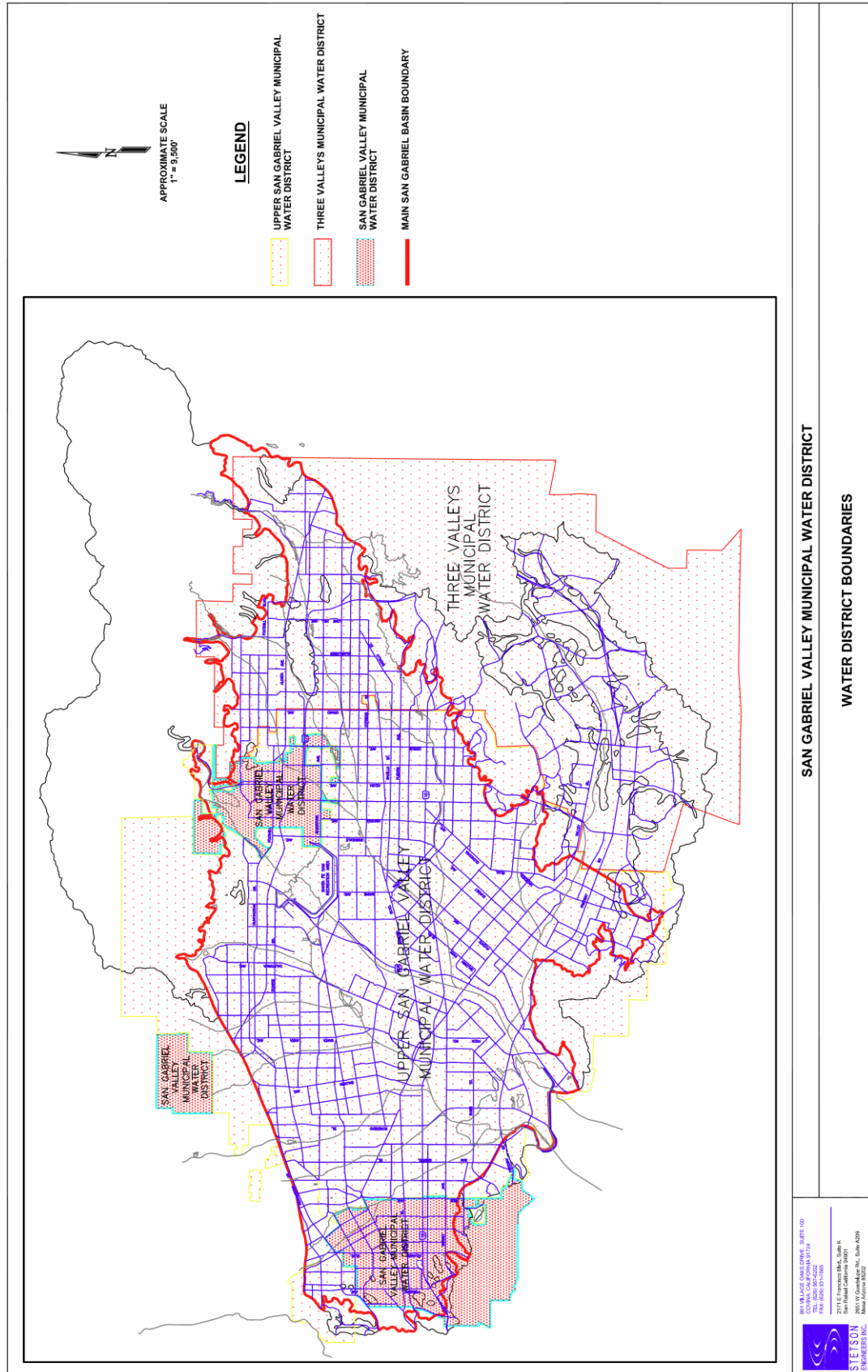


Figure 2.18: Water District Boundaries within Main Basin

The Main Basin Judgment does not restrict the quantity of water which Parties may extract from the Basin. Rather, it provides a means for replacing all annual extractions in excess of a Party's annual right to extract water with Supplemental Water. The Main Basin Watermaster annually establishes an Operating Safe Yield for the Main Basin, which is then used to allocate to each Party its portion of the Operating Safe Yield which can be produced free of a Replacement Water Assessment. If a producer extracts water in excess of its right under the annual Operating Safe Yield, it must pay an assessment for Replacement Water which is sufficient to the purchase of 1 acre-foot of Supplemental Water to be spread in the Main Basin for each acre-foot of excess production. All water production is metered and is reported quarterly to the Main Basin Watermaster.



Figure 2.19: Well Production in Main Basin

In addition to Replacement Water Assessments, the Main Basin Watermaster levies an Administration Assessment to fund the administration of the Main Basin management program under the Court Judgment and a Make-up Obligation Assessment in order to fulfill the requirements for any make-up Obligation under the Long Beach Judgment and to supply 50 percent of the administration costs of the River Watermaster service. The Main Basin Watermaster levies an In-lieu Assessment and may levy special Administration Assessments.

Water rights under the Main Basin Judgment are transferable by lease or purchase so long as such transfers meet the requirements of the Judgment. There is also provision for Cyclic Storage Agreements by which Parties and non-parties may store imported Supplemental Water in the Main Basin under such agreements with the Main Basin Watermaster pursuant to uniform rules and conditions and Court approval.

The Main Basin Judgment provides that the Main Basin Watermaster will not allow imported water to be spread in the central part of the Main Basin when the groundwater elevation at the Baldwin Park Key Well (Key Well) exceeds 250 feet; and that the Main Basin Watermaster will, insofar as practicable, spread imported water in the Main Basin to maintain the groundwater elevation at the Key Well above 200 feet. One of the principal reasons for the limitation on spreading imported water when the Key Well elevation exceeds 250 feet is to reserve ample storage space in the Basin to capture native surface water runoff when it occurs and to optimize the conservation of such local water. Under the terms of the Long Beach Judgment, any excess surface flows that pass through the Main Basin at Whittier Narrows to the Lower Area (which is then conserved in the Lower Area through percolation to groundwater storage) is credited to the Upper Area as Usable Surface Flow.

Through the Long Beach Judgment and the Main Basin Judgment, operations of the Main Basin are optimized to conserve local water to meet the needs of the parties of the Main Basin Judgment.

San Gabriel District is one of the Responsible Agencies from which Main Basin Watermaster purchases supplemental water. The supplemental water purchased from San Gabriel District is for groundwater replenishment purposes (Replacement Water for excess production by a Producer) or Make-up Water for delivery to the Lower Area under the terms of the Long Beach Judgment. San Gabriel District sells imported water to the Main Basin Watermaster.



Figure 2.20: Turnout Facility at Irwindale

Imported water for groundwater replenishment is delivered to the flood control channels and diverted and spread at spreading grounds through Main Basin Watermaster's agreement with the LACDPW. Groundwater replenishment utilizes imported water and is considered Replacement Water under the terms of the Main Basin Judgment. It can be stored in the Main Basin through Cyclic Storage agreements, authorized by terms of the Main Basin Judgment, but such stored water may be used only to supply Supplemental Water to the Main Basin Watermaster.

The Main Basin Watermaster has entered into a Cyclic Storage Agreement with each of the three municipal water districts. One is with the MWD and Upper District, which permits MWD to deliver and store imported water in the Main Basin in an amount not to exceed 100,000 AF for future Replacement Water use. The second Cyclic Storage Agreement is with TVMWD and permits MWD to deliver and store 40,000 AF for future Replacement Water use.

The third is with San Gabriel District and contains generally the same conditions as the agreement with MWD except that the stored quantity is not to exceed 50,000 AF. As of February 2016, San Gabriel District had about 2,164 AF in its Cyclic Storage account.



Figure 2.21: Turnout Facility at Azusa

Imported Make-up Water is often delivered to lined stream channels and conveyed to the Lower Area. Make-up Water is required to be delivered to the Lower Area by the Upper Area when the Lower Area entitlement under the Long Beach Judgment exceeds the usable water received by the Lower Area.

Imported water is used to fulfill the Make-up Water Obligation when the amount of Make-up Water cannot be fulfilled by reimbursing the Lower Area interests for their purchase of recycled water. The amount of recycled water for which reimbursement may be made as a delivery of Make-up Water is limited by the terms of the Long Beach Judgment to the annual deficiency in Lower Area Entitlement water or to 14,735 AF, whichever is the lesser quantity.

Current Management of Basin

San Gabriel District has not adopted a specific groundwater management plan. As mentioned previously, management is based upon Watermaster Services through the Long Beach and Main

Basin Judgments. San Gabriel District is a party to the Main Basin Watermaster Judgment.

The Main Basin Watermaster was created in 1973 to resolve water issues that had arisen among water users in the San Gabriel Valley. The Main Basin Watermaster's mission is to manage the water supply of the Main San Gabriel Groundwater Basin. During the late 1970s and early 1980s, significant groundwater contamination was discovered in the Main Basin. The contamination was caused in part by past practices of local industries that had carelessly disposed of industrial solvents referred to as volatile organic compounds, (VOCs), as well as by agricultural operations that infiltrated nitrates into the groundwater. Cleanup efforts have been undertaken at the local, state, and federal level.

Local water agencies adopted a joint resolution in 1989 regarding water quality issues that stated Main Basin Watermaster should coordinate local activities aimed at preserving and restoring the quality of groundwater in the Basin. The joint resolution also called for a cleanup plan. In 1991, the Court granted Main Basin Watermaster the authority to control pumping for water quality purposes. Accordingly, Main Basin Watermaster added Section 28 to its Rules and Regulations regarding water quality management.

The new responsibilities included development of a Five-Year Water Quality and Supply Plan, updating it annually, submitting it to the California Regional Water Quality Control Board, Los Angeles Region, and making it available for public review by November 1 of each year.

Main Basin Watermaster prepares and annually updates the Five-Year Water Quality and Supply Plan in accordance with the requirements of Section 28 of its Rules and Regulations. The objective is to coordinate groundwater-related activities so both water supply and water quality in the Main Basin are protected and improved. Many important issues are detailed in the Five-Year Plan, including how Main Basin Watermaster plans to:

1. Monitor groundwater supply and quality;
2. Develop projections of future groundwater supply and quality;
3. Review and cooperate on cleanup projects, and provide technical assistance to other agencies
4. Assure that pumping does not lead to further degradation of water quality in the Basin;
5. Address perchlorate, N-nitrosodimethylamine (NDMA), and other emerging contaminants in the Basin;
6. Develop a cleanup and water supply program consistent with the U.S. Environmental Protection Agency (EPA) plans for its San Gabriel Basin Superfund sites; and
7. Coordinate and manage the design, permitting, construction, and performance evaluation of the Baldwin Park Operating Unit (BPOU) cleanup and water supply plan.

The Main Basin Watermaster, in coordination with San Gabriel District, has worked with state and federal regulators, along with local water companies to clean up water supplies. Section 28 of Main Basin Watermaster's Rules and Regulations require all producers (including San Gabriel District sub-agencies) to submit an application to 1) construct a new well, 2) modify an existing well, 3) destroy a well, or 4) construct a treatment facility. Main Basin Watermaster prepares a report on the implications of the proposed activity.

Groundwater Replenishment

Since its formation in 1974, San Gabriel District has been providing deliveries of groundwater replenishment to the Main Basin on behalf of its member agencies. **Table 2.3** provides a recent of total replenishment deliveries by year. Deliveries vary by year, and, depending on the needs of the basin, are credited as deliveries or into San Gabriel's Cyclic Storage Account.

Table 2.3: Six-Year Deliveries

Year	Deliveries (AF)
2020	7,728
2019	22,325
2018	17,055
2017	20,569
2016	17,280
2015	5,759

2.2.3 Projected Water Supplies

As noted previously, the Main Basin is managed by the Main Basin Watermaster. With regard to the supply obligations for San Gabriel District, Section 42, Basin Operating Criteria, of the Main Basin Judgment states, "...Watermaster shall not spread Replacement Water when the water level at the Key Well exceeds elevation two hundred fifty (250), and Watermaster shall spread Replacement Water, insofar as practicable, to maintain the water level at the Key Well above Elevation two hundred (200)."

Figures 2.14 and **2.15**, shown previously, show the historic fluctuation of the Key Well since the Main Basin was adjudicated in 1973 and demonstrates the Main Basin was generally operated between elevation 250 feet and 200 feet above mean sea level (AMSL). Furthermore, at elevation 200 feet AMSL at the Key Well, the Main Basin has about 7,600,000 AF of available storage. During the period of management under the Judgment, significant drought events have occurred from 1969 to 1977, 1983 to 1991, 1998 to 2004, 2006-2007, and 2011-2015. In each drought cycle, the Main Basin was managed to maintain water levels.

Vulnerability of Supplies

Since 1973, the Main Basin has gone through four distinct multiple dry water cycles. The multiple dry year sequence did not compromise San Gabriel District's member agencies' ability to reliably supply water to their customers. This will be discussed in greater detail in each of San Gabriel District's member agencies' 2020 UWMPs.

For San Gabriel District's deliveries, there is no requirement to provide water for a specific time frame, only that the Main Basin ultimately be replenished. San Gabriel District maintains a Cyclic Storage account in the Main Basin that may be used to satisfy groundwater replenishment requirements in the event of reduced availability from the SWP due to single or multiple dry years.

Reliability of Supplies

The information noted in the **Table 2.4** is based on the District's SWP entitlement of 28,800 AF and the percentage yield from DWR's SWP Delivery Capability Report (DCR). The SWP DCR identifies projected availability of supplies for an average water year, single dry water year and multiple dry water years on Table 5-6 based on historic trends.

Table 2.4: SWP Reliability

Year	Percent of Maximum SWP Contract Amount ^[1]	Deliveries (AF)
Long – Term Average	58%	16,704
Single Dry Year (1977)	7%	2,016
2-Year Drought (1976 – 1977)	32%	9,216
4-Year Drought (1931 – 1934)	30%	8,640
6-Year Drought (1987 – 1992)	26%	7,488

[1] Percentages based on Table 5-6, DWR's SWP Delivery Capability Reliability Report 2019

The SWP's 2019 DCR indicates that the modeled single dry year SWP water supply allocation is 7 percent under the existing conditions. However, historically the lowest SWP allocations were at 5 percent in 2014. Due to extraordinarily dry conditions in 2013 and 2014, the initial 2014 SWP allocation was a historically low 5 percent of Table A amounts, was later reduced to 0 percent in January 2014, and was later raised back to 5 percent, the lowest ever final total SWP water supply allocation. The circumstances that led to the low 2014 SWP water supply allocation were unusual, and although possible, likely have a low probability of occurrence.

Each year by October 1, SWP contractors submit their requests for SWP supplies for the following calendar year. By December 1, DWR estimates the available water supply for the following year and sets an initial supply allocation based on: the total of all contractors' requests, current reservoir storage, forecasted hydrology through the next year, and target reservoir storage for the end of the next year. The most uncertain of these factors is the forecasted hydrology. In setting water supply allocations, DWR uses a conservative 90 percent hydrologic forecast, where nine out of ten years will be wetter and one out of ten years drier than assumed. DWR re-evaluates its estimate of available supplies throughout the runoff season of winter and early spring, using updated reservoir storage and hydrologic forecasts, and revises SWP supply allocations as warranted. Since most of California's annual precipitation falls in the winter and early spring, by the end of spring the supply available for the year is much more certain, and in most years DWR issues its final SWP allocation by this time. While most of the water supply is certain by this time, runoff in the late fall remains somewhat variable as the next year's runoff season begins. A drier than forecasted fall can result in not meeting end-of-year reservoir storage targets, which means less water available in storage for the following year.

Water year 2013 was a year with two hydrologic extremes. October through December 2012 was one of the wettest fall periods on record, but was followed by the driest consecutive 12 months on record. The supply allocation for 2013 was a low 35 percent allocation. However, the 2013 hydrology ended up being even drier than DWR's conservative hydrologic forecast, so the SWP began 2014 with reservoir storage lower than targeted levels and less stored water available for 2014 supplies. Compounding this low storage situation, 2014 also was a critically dry year, with runoff for water year 2014 the fourth driest on record.

The exceedingly dry sequence from the beginning of January 2013 through the end of 2014 was one of the driest two-year periods in the historical record. As noted above, the circumstances that led to the low 2014 SWP water supply allocation were unusual, and likely have a low probability

of occurrence in the future. Thus, the assumption for SWP contractors such that a 5 percent allocation represents the “worst-case” scenario.

With the state undergoing a second consecutive dry year, DWR has already taken the steps to prolong the SWP supplies. On March 2021, DWR decreased the allocation of 2021 SWP deliveries for the contractors from 422,848 AF to 210,266 AF. Based on the recent low amount of precipitation and runoff, and an assessment of overall water supply conditions, SWP supplies are projected to be 5 percent of most SWP contractor’s 2021 requested Table A amounts. This reduction decreased San Gabriel District’s initial request of 28,800 AF to 1,440 AF. This will be reflected on the Drought Risk Assessment shown in **Section 8** when analyzing supplies for the next five years.

2.3 ALTERNATE WATER SOURCES

The only alternate source of water feasible to San Gabriel District is recycled water. Reclamation of wastewater in the Main Basin has been extensively reviewed in both local and regional studies. In 1976, San Gabriel District and Upper District completed a study entitled “Potential Use of Reclaimed Water for Ground-Water Replenishment in the Main San Gabriel Basin.” This study was updated at the request of the Main Basin Watermaster in 1980 and again in 1987. This study along with others concluded water reuse in the Main Basin could be feasible.

Recycled Water is discussed in further detail in **Section 9** of this UWMP.

2.4 TRANSFERS OR EXCHANGES

Short Term

San Gabriel District has no arrangements in place with other agencies for short term exchanges of supplies.

Long Term

San Gabriel District, along with the City of Alhambra, Upper District, MWD, and the Main Basin Watermaster, participate in a Cooperative Water Exchange Agreement (CWEA). CWEA reduces a localized condition that exists in the westerly portion of the Main San Gabriel Basin called the “Alhambra Pumping Hole.” The Pumping Hole is located in an area of the Basin that typically received insufficient replenishment due to its hydrogeologic characteristics. Seven producers extract water from the Alhambra Pumping Hole, which had resulted in decreasing water level elevation. To mitigate that condition, it is agreed that the City of Alhambra, one of the producers, would receive direct delivery of water from MWD service connection USG-5 and, in exchange, would reduce its extractions from the pumping hole about 3,000 AF. All demand in excess of the 3,000 AF will be satisfied by production from the Main Basin. A provision of the CWEA also provides a mechanism for MWD to utilize unused capacity in San Gabriel District’s Devil Canyon-Azusa Pipeline. CWEA is cooperatively financed by the City of Alhambra, San Gabriel District, Upper District, and Main Basin Watermaster.

San Gabriel District is also active in the Cyclic Storage of water in the Main Basin. San Gabriel District is able to deliver water for groundwater replenishment purposes in advance of a specific requirement for such water. Water delivered to the Main Basin, in advance of its requirement, is credited to the Cyclic Storage account with Main Basin Watermaster. This is in-lieu of actual delivery of imported water for that purpose, at the water discretion of San Gabriel District. Because water is often stored in Cyclic Storage for many years before being required as replacement water, the Cyclic Storage program may be considered an exchange program in that it takes advantage of surplus water and stores it in the Main Basin for future use.

Additionally, a water exchange agreement was developed with the City of Arcadia, Main Basin Watermaster, and San Gabriel District to reduce the City of Sierra Madre's accumulated over extraction. This agreement consists of a water exchange whereby the City of Arcadia produces water from the Main Basin and sells that water to Sierra Madre. The metered sale is reported by Sierra Madre to the Main Basin Watermaster and also pays appropriate assessments to the Main Basin Watermaster.

In March 1995, the San Gabriel District entered into a water banking agreement with Dudley Ridge Water District. This agreement enables Dudley Ridge Water District to deliver and store up to 20,000 AF in the Main Basin as part of the San Gabriel District's Cyclic Storage Account. In 2002, this agreement was amended to limit the amount of water stored by Dudley Ridge Water District to 12,500 AF. In future years Dudley Ridge Water District will have the ability to exchange water it had previously stored in the Main Basin for a portion of the San Gabriel District's annual water allocation from the SWP.

2.5 SUPPLY OPPORTUNITIES

2.5.1 SWP Opportunities

Potential SWP water supply projects are identified by DWR in its latest SWP Delivery Capability Report.

2.5.2 Local Supply Opportunities

Basin Management Programs

Management practices in the Main Basin result in the conservation of water supplies. The Main Basin Judgment established the individual rights of water producers and requires the Operating Safe Yield of the Main Basin to be reviewed and established each year and Replacement Water to be provided for overproduction. The Main Basin Judgment also permits Cyclic Storage agreements to be entered with the Main Basin Watermaster.

The Operating Safe Yield is established by Watermaster each year after reviewing a number of factors. Among the most important factors considered are the current groundwater and natural water supply conditions. Replacement Water is required to be delivered to the Main Basin in an amount equal to the overproduction from the Main Basin. Overproduction is that quantity of

water which producers extract from the Main Basin in excess of their net production rights for a particular year.

The concept of the Operating Safe Yield and replacement of overproduction conserves water supplies. Water producers within the Main Basin are cognizant of their production rights and generally try to minimize Replacement Water assessments which otherwise result in higher costs to the producer. It creates a consciousness that water conservation measures should be aggressively pursued at the retail water delivery level.

San Gabriel District has a Cyclic Storage agreement to store up to 50,000 AF with the Main Basin Watermaster whereby ownership of the water remains in an account until San Gabriel District incurs a Replacement Water obligation. Water delivered into Cyclic Storage may be used only for Replacement Water purposes in accordance with the terms of the Main Basin Judgment. The cyclic storage of water in the Main Basin conserves water supplies because water is delivered into cyclic storage at times when surplus SWP water or surplus delivery capacity is available. The storage of such surplus SWP water for later use provides efficient utilization of available water supplies. Utilization of water from the Cyclic Storage account during water shortage years reduces the demand for delivery of water from the SWP.

Improvements and Modifications to Conservation Facilities

Currently, San Gabriel District does not own or operate any groundwater replenishment facilities. However, San Gabriel District has completed two projects to its Devil Canyon-Azusa Pipeline. In 1995, San Gabriel District completed an extension to its existing pipeline and construction of a 55 cfs turnout to the LACDPW San Gabriel Canyon Spreading Grounds. In 1998, San Gabriel District modified the Big Dalton Pressure Reducing Station to enable it to discharge 6 cfs to LACDPW Citrus Spreading Grounds. In 1998, San Gabriel District explored the possibility of purchasing an



Figure 2.22: Live Oak Spreading Grounds

abandoned gravel mining pit for use as a groundwater replenishment facility. However, due to side slope stability concerns, the project was found to be infeasible.

In 2005, TVMWD added a 20 cfs turnout to the Live Oak Spreading Grounds, operated by San Gabriel District. San Gabriel District also contributed to a project with LACDPW for an interconnection between Ben Lomond Spreading Grounds and Citrus Spreading Grounds. This interconnection allows for greater flexibility for deliveries and replenishment of imported water for groundwater replenishment. San Gabriel District will continue to explore opportunities to expand groundwater replenishment capabilities or to modify its own delivery system, which will better utilize existing facilities.

Cooperative Committees

San Gabriel District participates in an informal committee organized to coordinate groundwater replenishment activities, called the Groundwater Replenishment Coordinating Group. Participants in the group include: San Gabriel District, Main Basin Watermaster, River Watermaster, MWD, Upper District, TVMWD, Water Replenishment District of Southern California, LACDPW, Los Angeles County Sanitation District (LACSD), and others. The purpose of the group is to ensure all parties are informed of current and future water supply and water conservation activities. San Gabriel District's participation in the group serves to effectively manage the water supplies.

Potential Effective Replenishment Capabilities Study

In a report entitled "Potential Effective Replenishment Capabilities (PERC)," dated June 17, 1992, the Upper District identified the replenishment capabilities of existing facilities within the Main Basin and the potential for enhancement of replenishment. The report identified sand and gravel pits as viable locations of future replenishment facilities; however, no new facilities have been developed.

Subsequently, several water agencies, including San Gabriel District, sponsored a second study to coordinate future demand for supplemental water with available replenishment and to identify actions that could be taken to ensure adequate replenishment capability. The "PERC II Study," dated March 1995, identified replenishment capabilities of existing spreading facilities and examined the availability of those facilities for supplemental water after local water had been replenished. The study also considered the impacts of the Main Basin Judgment, particularly supplemental water replenishment limitations as a result of the groundwater level at the Baldwin Park Key Well exceeding 250 feet. San Gabriel District will continue to work with other water agencies to coordinate supplemental water replenishment schedules and development of new replenishment facilities.

Alternative Supply to City of Sierra Madre

The City of Sierra Madre is one of San Gabriel District's member agencies and produces water from the Santa Anita subarea of the Raymond Basin. This portion of Raymond Basin historically has experienced significant changes in water levels. As a result, Sierra Madre is experiencing water supply issues specifically with their groundwater quality. To help mitigate this, City of Arcadia (an MWD supplied water purveyor), in cooperation with San Gabriel District, is supplying potable water on an interim basis to Sierra Madre via an interconnection between the cities; however, the City of Arcadia has indicated its emergency connection may not be able to reliably provide water to the City of Sierra Madre during extreme weather conditions.

Due to potential unreliable groundwater supplies from the Raymond Basin and the unreliability of the emergency connection with the City of Arcadia, San Gabriel District has coordinated with MWD to construct an interconnection to the MWD Foothill Feeder that will allow the City of Sierra Madre access to treated imported water from MWD. Currently, the City relies on this source to meet the City's water demands.

The agreement between the San Gabriel District and MWD allows for the exchange of up to 5,000 AF each year. For each acre-foot MWD delivers to the City of Sierra Madre, the San Gabriel District provides two acre-feet from its cyclic storage to MWD in the Main San Gabriel Basin, up to 5,000 AF. The program provides increased reliability to MWD by allowing additional water to be delivered to MWD's member agencies TVMWD and Upper San Gabriel Valley MWD.

Alternative Supply to Alhambra

The City of Alhambra is a member of San Gabriel District and produces water from the southwesterly portion of the Main Basin commonly referred to as the "Alhambra Pumping Hole". The City of Alhambra, along with six other producers, historically pumped water from this area in excess of natural replenishment abilities creating a pumping depression. Although this pumping depression does not adversely impact water supplies, it does result in greater pumping costs. San Gabriel District is working with other agencies in the San Gabriel Valley to investigate alternatives to shift pumping from the Alhambra Pumping Hole to other portions of the Main Basin. These alternatives will involve decreasing reliance on treated imported water.

2.5.3 Regional Desalinated Water

San Gabriel District's member agencies produce groundwater primarily from the Main Basin. Production in excess of water rights requires San Gabriel District to provide untreated imported water to replenish the groundwater basin. The Main Basin Watermaster prepares an annual "Area Agency Water Quality Monitoring Report." The 2008-09 annual report indicates the total dissolved solids (TDS) or salt concentration in groundwater wells within San Gabriel District's member agency's wells range from 190 milligrams per liter (mg/L) to 570 mg/L. The State Water Resources Division of Drinking Water (DDW) recommended level is 500 mg/L and water can be provided for long-term domestic use with TDS concentrations of up to 1,000 mg/L. Due to the high quality (low TDS concentration) of the groundwater, San Gabriel District and its member agencies do not need to investigate the use of desalination to develop or reestablish a new long-term supply.



Figure 2.23: Desalination Plant

2.6 ENERGY INTENSITY

2.6.1 Overview

New to the 2020 UWMP, it is required that every urban water supplier assess the energy required to distribute their water supply to their consumers or member agencies. The water supplier's energy intensity is required for the preparation of an UWMP, as defined in CWC Section 10631.2(a). Energy intensity varies with climate, topography, source characteristics, proximity, and other factors. Therefore, urban water suppliers face issues related to the economic costs of the

energy required for their operations, as well as issues related to the sustainable supply of energy and water. Knowing how much energy is needed to deliver water to customers is important because of its significance for the State's total energy demands, and for its implications regarding greenhouse gas (GHG) emissions and climate goals for the region and state.

This section includes an assessment of the energy intensity of the water supply operation for San Gabriel District. Energy is required for the pumping, conveyance, treatment and distribution of water, and for collection, treatment, and discharge of wastewater, and/or conveyance and distribution of recycled water.

Energy intensity in respect to water supplies is a measure of unit energy consumption an urban water supplier expends per AF to convey water from the point where the supplier acquires the water to the point of delivery. Energy for public water and wastewater services are measured in kilowatt-hours of electricity, which is then normalized by water volume to express energy intensity in kilowatt-hour per acre-feet (kWh/AF).

Some of the main differences between energy use associated with various water supply sources are the distances the water must be transported from its origins (the amount of pumping necessary to harvest and distribute the water) and the location of treatment facilities in relation to the end users, among others.

2.6.2 Water Use and Energy Relationship

Energy production can emit a number of different types of Greenhouses Gas (GHGs). California's Air Resources Board recognizes that energy production accounts for between 30 and 40 percent of total GHG production in California, and include the following inventory of GHGs: Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF₃). These GHGs vary in magnitude in terms of their GHG strength, and therefore are converted to be equivalent to CO₂ for the purposes of measuring GHG emission across the state. CO₂ emissions (or the equivalent for other GHGs) are the common measurement for GHG emissions. Currently, statewide water uses accounts for nearly 20 percent of electricity use, and 30 percent of non-power plant related natural gas consumption. Water use and energy are linked in at least three critical ways:

- Water pumping and purification: The amount of energy used to pump water will depend upon the source (e.g., surface versus groundwater), the distance and height the water must be moved, and treatment requirements.
- Wastewater treatment: The amount of energy used in wastewater treatment plant typically ranges from 1,100 to 4,600 kWh per million gallons of wastewater treated.
- Water heating: In an average California home, 41 percent of the water is used for dishwashing, faucets, laundry, and bathing water that is often heated.

These amounts, in total, are so significant that one must also count the amount of GHGs from the fossil fuels that are burned to produce the oil, gas, coal and other combustibles which are then burned to produce the electricity. San Gabriel District understands the water-energy nexus and

aims to conserving water saves the energy that would have been used to convey and distribute the water. Reducing the energy consumption in water operations leads to the decreases production of GHGs.

2.6.3 Energy Usage and Intensity

In order to determine energy use related to water supply processes under San Gabriel District's operational control, SGVMWD collected billing and energy quantity data provided by Southern California Edison (SCE) for 2020 (January 1, 2020 to December 31, 2020) representing the comprehensive one-year reporting period. The billing amounts for each facility were converted to an energy use quantity measured in kilowatt hours (kWh) for electricity. **Table 2.5** summarizes the energy intensity for San Gabriel District. As shown, over 82,500 kWh of energy was used to deliver over 7,728 AF of potable water. This equates to an energy intensity of 10.7 kWh/AF. DWR requires the reporting of energy intensity as kWh per million gallons (kWh/MG). Therefore, San Gabriel District's energy intensity is 32.9 kWh/MG.

Table 2.5: SGVMWD Total Energy Intensity (DWR Table O1-B)

Enter Start Date for Reporting Period	1/1/2020	Urban Water Supplier Operational Control		
End Date	12/31/2020			
☐ Is upstream embedded in the values reported?		Sum of All Water Management Processes	Non-Consequential Hydropower	
<i>Water Volume Units Used</i>	AF	Total Utility	Hydropower	Net Utility
<i>Volume of Water Entering Process (volume unit)</i>		7728		7728
<i>Energy Consumed (kWh)</i>		82723		82723
<i>Energy Intensity (kWh/vol. converted to MG)</i>		32.9	#DIV/0!	32.9

Contaminants detected in the SWP can also fluctuate on a seasonal basis due primarily to natural weather inflows into the SWP, but are not normally a concern.



SECTION 3: WATER QUALITY

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 3 WATER QUALITY

3.1 WATER QUALITY SUMMARY

In 1974, Congress passed the Safe Drinking Water Act in order to protect public health by regulating the nation's drinking water supply.

The quality of water used for groundwater recharge by San Gabriel District is directly related to the quality of the supply sources (i.e., SWP). This section explores water quality, its effects on water supply, and San Gabriel District's efforts to ensure a safe water supply for its member agencies.

3.1.1 Transfer of Authority

The California Department of Public Health (CDPH) previously oversaw the water quality of the State's drinking water program and the environmental laboratory accreditation program. As of July 2014, those programs were transferred to the State Water Resources Control Board (SWRCB). Under the SWRCB, the Division of Drinking Water (DDW) regulates public drinking water systems, including setting the maximum contaminant levels (MCLs) and regulating the operation of water systems.

3.2 QUALITY OF SOURCES

3.2.1 Imported Water (SWP)

San Gabriel District is dependent on DWR to continue to provide untreated imported water for groundwater recharge. Imported water obtained from the SWP contains specific contaminants which are characteristic of the Bay-Delta region as well as regions south of the Bay-Delta which provide inflows into one or more of the major aqueducts comprising the SWP. Some of the contaminants of concern include: salinity, biological loads, disinfection by-products, perchlorate, uranium, and arsenic.



Figure 3.1: SWP Cutting through Farmland

Contaminants detected in the SWP can also fluctuate on a seasonal basis due primarily to natural weather inflows into the SWP, but are not normally a concern. However, occasional flooding in areas of farmland can pose a concern for the SWP water quality, especially if biological contaminants or inorganic chemicals flow-in at elevated concentrations. For the most part, the contaminant levels detected in the SWP are below

federal EPA and DDW standards.

Southern Reservoirs (Lake Silverwood)

The quality of water received by San Gabriel District is also affected by the quality of water in Lake Silverwood and the Devil Canyon Afterbay. Typically, Lake Silverwood receives the majority of its natural inflows during the winter months, and the majority of its SWP inflows during the rest of the year.

Ensuring the Safety of the SWP

Ensuring water quality of the SWP is a top priority for DWR. DWR continually monitors SWP water quality at multiple locations along the path of the SWP and publishes monthly reports on SWP water quality. DWR anticipates the quality of SWP water delivered to San Gabriel District to meet water quality standards for groundwater recharge.

3.2.2 Groundwater

The San Gabriel Basin contains contaminants which are naturally occurring from the geological characteristics of the basin as well as those which have been caused by man-made operations that have affected the aquifers below. That is, mostly man-made operations prior to or during World War II, before waste handling standards were in place.

Groundwater extracted by San Gabriel District's member agencies contains various contaminants of concern which include nitrate, TDS, VOCs, perchlorate, and NDMA. Most of these contaminants are native to the Main Basin and are not increased by the concentrations of contaminants supplied by San Gabriel District.

3.3 WATER QUALITY ASSURANCE

In February 1989, San Gabriel District, Upper District, and Main Basin Watermaster adopted a Joint Resolution regarding groundwater quality in the San Gabriel Valley. Under this resolution, the adopting entities affirmed their commitment to participate in a coordinated federal, state, and local response to contamination of groundwater supplies within the Main Basin for both the purpose of preventing additional contamination and the purpose of cleaning up and limiting the spread of existing contamination. Each of the adopting entities proclaimed its agreement and intent to diligently pursue the principles set forth in the Joint Resolution to control groundwater contamination within the Main Basin.



Figure 3.2: Health Standards Protect Drinking Water

Subsequently, San Gabriel District, Water Quality Association, and Main Basin Watermaster, among others, have coordinated with San Gabriel District's member agencies with development groundwater treatment facilities. This participation has been important because San Gabriel District member agencies rely on groundwater supplies and do not have direct access to treated imported water. A more detailed explanation of member agency efforts to address water quality issues specific to their water system is included in their 2020 UWMPs

Water Quality Control Plan & Voluntary Agreement

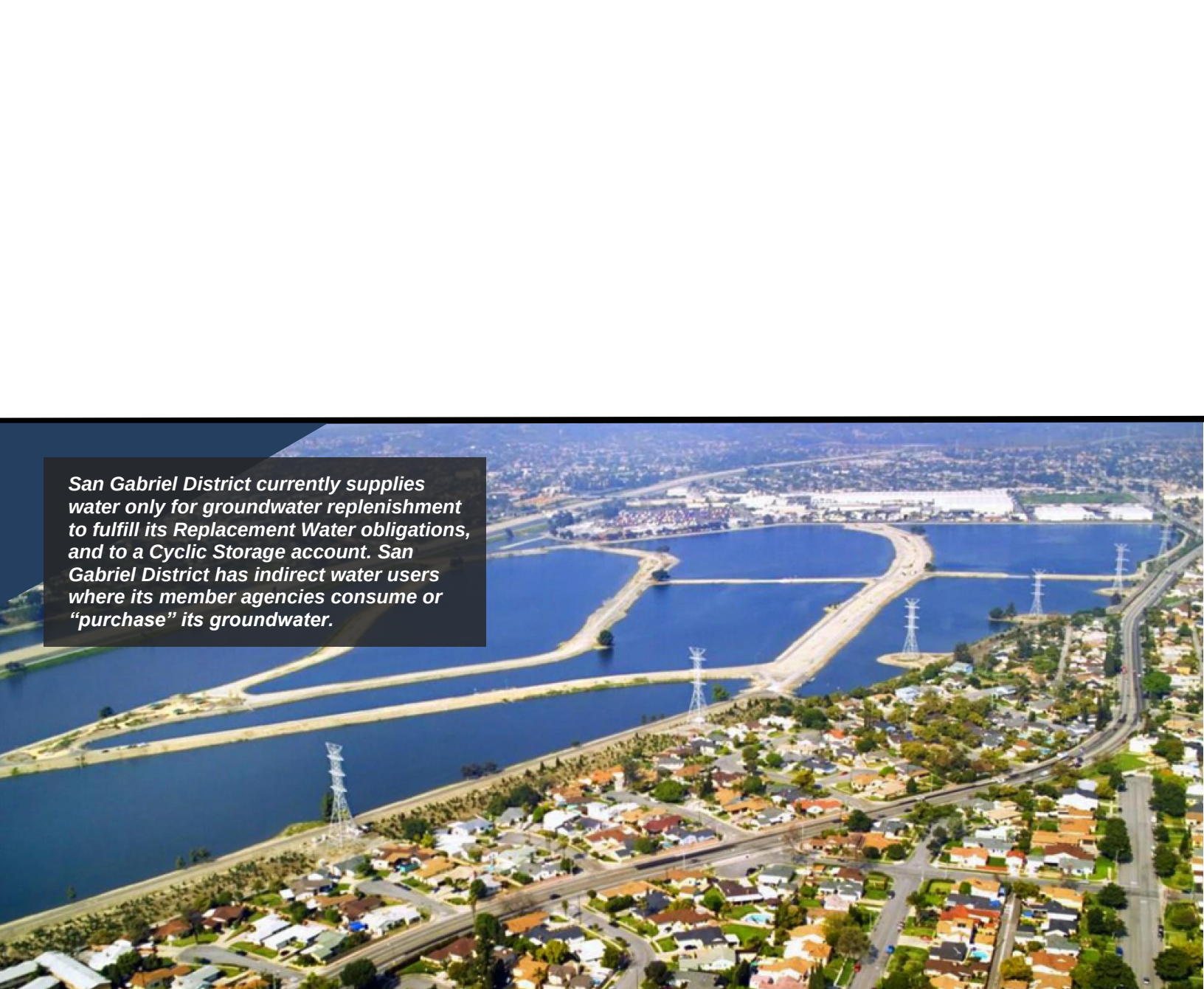
The SWRCB is responsible for adopting and updating the Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary (Bay-Delta Plan), which establishes water quality control objectives and flow requirements needed to provide reasonable protection of beneficial uses in the watershed. The SWRCB has been engaged for many years in updating the Bay-Delta Plan.

The Bay-Delta Plan is being updated through phases. Phase 1 is updating the Bay-Delta Plan objectives for the San Joaquin River and its major tributaries and the southern Delta salinity objectives. Phase 2 is updating the objectives for the Sacramento River and Delta and their major tributaries. On December 12, 2018, through SWRCB Resolution No. 2018-0059, the SWRCB adopted the Phase 1 Plan amendments and Final SED establishing the Lower San Joaquin River flow objectives and revised southern Delta salinity objectives. On February 25, 2019, the Office of Administrative Law approved the Plan amendments. This plan requires an adaptive range of 30-50 percent of the unimpaired flow to be maintained from February through June in the Stanislaus, Tuolumne, and Merced Rivers, with a starting point of 40 percent of the unimpaired flow. During this same time period, the flows at Vernalis on the San Joaquin River, as provided by the unimpaired flow objective, are required to be no lower than a base flow of 1,000 cubic feet per second (cfs), with an adaptive range between 800 and 1,200 cfs, inclusive.

The SWRCB is also considering Phase 2 Plan amendments focused on the Sacramento River and its tributaries, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne rivers), Delta outflows, and interior Delta flows. Staff is recommending an adaptive range of 45-65 percent Unimpaired Flow (UIF) objective with a starting point of 55 percent. Once the SWRCB adopts Phase 2 Plan amendments, the Board will need to conduct hearings to determine, consistent with water rights, water users' responsibilities for meeting the objectives in both Phase 1 and 2. At this time, the potential impacts to the SWP are unknown but this objective would have a large impact on water users in the Phase 2 planning area.

The State and several water users began working on an alternative to the Bay-Delta Plan update in 2018, known as the Voluntary Agreement process. The Voluntary Agreement process offers an alternative to the SWRCB staff's flow only approach. A Voluntary Agreement, if agreed to by the SWRCB, would be a substitute for the UIF approach and would become the Program of Implementation for the Plan amendments. Implementing the Voluntary Agreement would not require a water rights hearing because the parties are agreeing to take the actions. The Voluntary Agreement approach provides flow, and funding for flows, habitat actions, and a robust science program. The Voluntary Agreement approach provides an opportunity to combine flow and habitat actions to protect public trust resources, while providing certainty for water users. It

offers a chance to avoid years of hearings and litigation and to instead begin early implementation of Voluntary Agreement actions.

An aerial photograph showing a large, blue water reservoir in the background, separated from a residential neighborhood by a long, straight concrete dam. The neighborhood in the foreground is densely packed with houses, many with swimming pools, and is intersected by a major road. Several high-voltage power lines with towers are visible, running parallel to the dam and through the residential area. The sky is clear and blue.

San Gabriel District currently supplies water only for groundwater replenishment to fulfill its Replacement Water obligations, and to a Cyclic Storage account. San Gabriel District has indirect water users where its member agencies consume or “purchase” its groundwater.

SECTION 4: WATER DEMANDS

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 4 WATER DEMANDS

4.1 FACTORS AFFECTING DEMAND

Water use within the San Gabriel District's service area is variable and consists of a number of factors that range from landscape use/irrigation, commercial and industrial use, residential use, and water losses. This section explores the water usage trends within San Gabriel's service area and quantifies total usage per customer type.

Urbanization's Effect on Water Use

At one time predominantly agricultural, the San Gabriel Valley is today almost entirely urbanized and is an integral part of the Greater Los Angeles area. It is one of the most ethnically diverse regions in the country.

The early decades of the San Gabriel Valley were characterized by massive landholdings, an agricultural economy, and development of large-scale infrastructure such as railroads. Agriculture became the economic base for the region, especially citrus and walnuts, as refrigerated railcars made possible the shipment of perishable goods to the rest of the country. The San Gabriel Valley from Pasadena to Pomona became part of the Citrus Belt, sending oranges to points east with packing labels featuring bucolic names and scenes from the San Gabriel Valley.



Figure 4.1: Citrus Groves

After World War II, there was a shift from agriculture to manufacturing and technology as the region began to be built out by suburbanization and responded to Cold War industry demands. In addition to the industrial needs, there was also a shift to do socio-economic factors. In the decades that followed, large waves of Asian and Hispanic immigrants settled in the San Gabriel Valley. The late 20th and early 21st centuries saw a shift in the regional economy from manufacturing and technology to logistics as well as banking, real estate, insurance, and legal firms. Today, the San Gabriel Valley is home to over 2 million people, of which over 260,000 people reside within San Gabriel District's service area.

The urbanization within San Gabriel District's service area has created water needs which cannot be fully met by any one source alone. The appropriate solution for the area is a combination of sources, which include groundwater as a primary source.



Figure 4.2: San Gabriel Valley (San Gabriel Canyon Spreading Grounds in Distance)

Groundwater Pumping Demands

San Gabriel District's member agencies have provided estimates of their projected water use, which were compared to future annual production rights based upon each member agency's share of the Operating Safe Yield and water rights held in other groundwater basins (Raymond Basin).

Where projected production exceeds production rights then supplemental water was made using an Operating Safe Yield of 200,000 acre-feet (historic average).

4.2 WATER DEMANDS

San Gabriel District currently supplies water only for groundwater replenishment to fulfill its Replacement Water obligations, and to a Cyclic Storage account. As a wholesale agency with no direct water sales, segregation of water sales into customer use type, such as residential, industrial, commercial, and governmental uses, cannot be made. However, records of water deliveries from San Gabriel District member agencies are discussed in each of the member agencies' UWMPs. Essentially, San Gabriel District has indirect water users. Its member agencies consume or "purchase" its groundwater.

Past Water Use

San Gabriel District's water sales are segregated into Replacement Water Deliveries under the Main Basin Judgment and Cyclic Storage Deliveries. It is expected the current types of water sales by San Gabriel District will continue into the foreseeable future.

Imported Supplemental Water is delivered by San Gabriel District for only groundwater replenishment through San Gabriel District's transmission pipeline and turnouts. All water delivered is purchased solely from the SWP, as the SWP is the only physical source of water available to the San Gabriel District which meets groundwater replenishment standards. **Table 4.1** presents the recent quantities of water delivered to (on behalf of) San Gabriel District's member agencies.

Table 4.1: Six-Year Water Deliveries to Turnout Facilities

Year	Deliveries (AF)
2020	7,728
2019	22,325
2018	17,055
2017	20,569
2016	17,280
2015	5,759

San Gabriel District normally utilizes its Cyclic Storage account to pre-deliver its Replacement Water Requirements to the Main Basin. Water delivered to the Main Basin and credited to San Gabriel District's Cyclic Storage account is then available to meet San Gabriel District's member agencies' future Replacement Water obligation. When Replacement Water deliveries are required, that requirement may be made by transfer of water from San Gabriel District's Cyclic Storage account or by direct delivery of imported supplemental water to the Main Basin.

Detailed information about San Gabriel District's water deliveries, including a summary of annual accounting in San Gabriel District's Cyclic Storage Account (credits and debits), are shown along with the accumulated balance from 1974-75 through 2015, which can be found in **Appendix F**.

Projected Water Use

San Gabriel District develops estimates of its member agencies' projected water use, which are compared to future annual production rights based upon each member agency's share of the Operating Safe Yield and water rights held in other groundwater basins (Raymond Basin). The projected supplemental water requirement for San Gabriel District is shown on **Table 4.2**. The San Gabriel District typically. Where projected production exceeds production rights then a supplemental water requirement is incurred as shown on **Table 4.3**.

Table 4.2: Projected Supplemental Water Requirements

Year	Supplemental Water Requirements (AF)
2025	14,482
2030	14,766
2035	15,054
2040	15,345
2045	15,641

Water use projections to be made for "lower income households" will be determined by San Gabriel District's member agencies based on their retail customers.

Table 4.3: Estimated Supplemental Water Requirements of San Gabriel District's Member Cities for Average Conditions (AF)

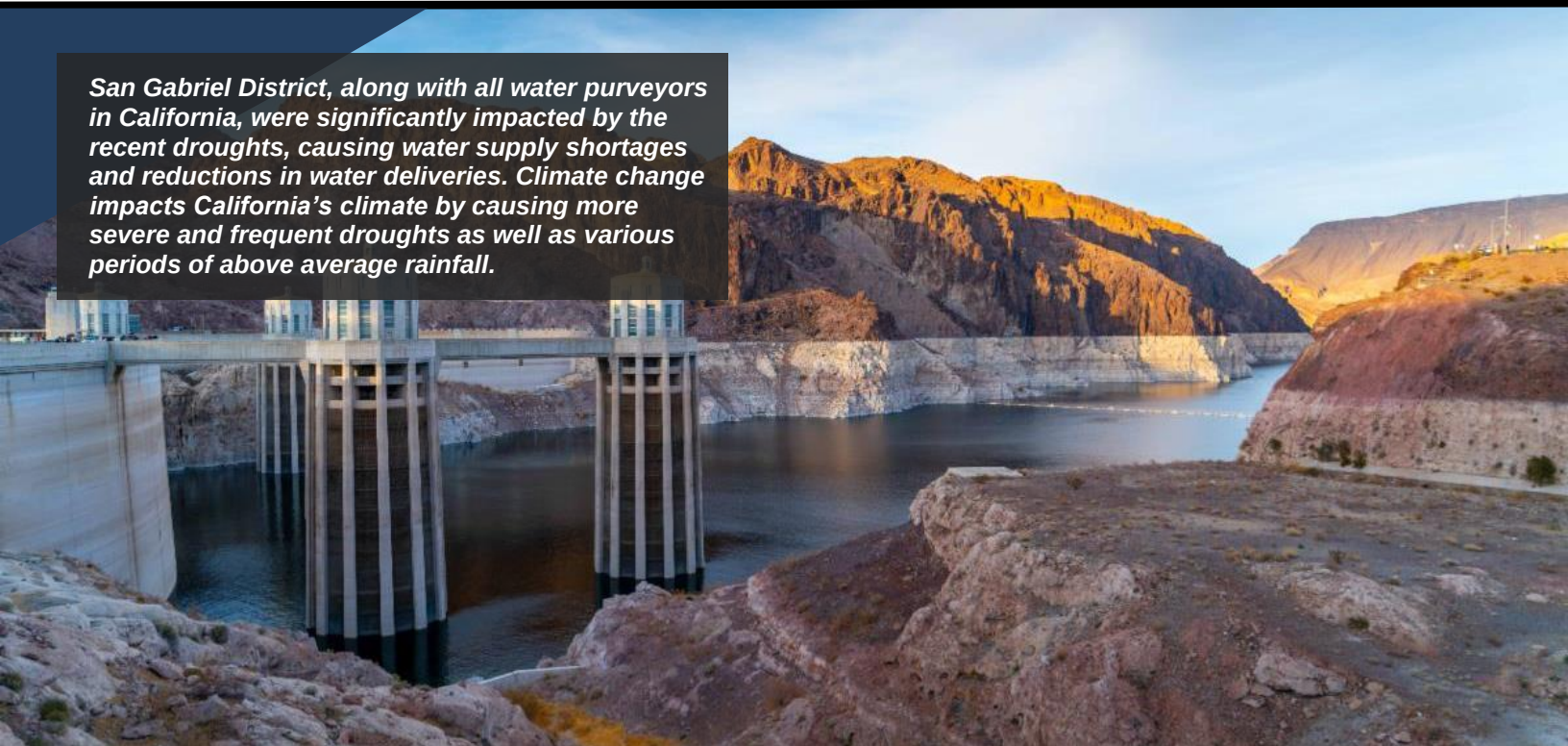
Producer	Main Basin Pumping Rights (AFY) ¹	Raymond Basin Pumping Rights (AFY) ²	Average Groundwater Usage ³	Supplemental Water Requirements
Alhambra	6,688	-	7,211	523
Azusa	10,369	-	12,694	2,325
Monterey Park	5,088	-	8,029	2,941
Sierra Madre	N/A	1,764	-	5,000 ⁴
Total Estimated Supplement Water Requirements Amount:				10,789

¹Main Basin pumping rights from 2019-20 Main San Gabriel Basin Watermaster Annual Report

²Raymond Basin pumping rights from 2019-20 Raymond Basin Management Report

³Values obtained from average groundwater usage in the past 10 years.

⁴Amount of 5,000 AF is based on the San Gabriel District's agreement with MWD to provide 2 AF from its cyclic storage for every 1 AF MWD provides to Sierra Madre, up to 5,000 AF.



San Gabriel District, along with all water purveyors in California, were significantly impacted by the recent droughts, causing water supply shortages and reductions in water deliveries. Climate change impacts California's climate by causing more severe and frequent droughts as well as various periods of above average rainfall.

SECTION 5: CLIMATE CHANGE

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 5 CLIMATE CHANGE

5.1 INTRODUCTION

Climate change is not only a weather issue, but also a water supply issue. Changes in weather can have adverse effects on local and regional water supplies. Climate change has become an increasingly important topic of interest in recent years as it has the potential to bring about drought, which hinders a water agency's ability to effectively deliver water. The ability to manage water supplies in times of drought is an important part of water resources management for a community. The San Gabriel District is concerned with combating the causes of climate change and preparing for the impacts brought about by climate change.

5.2 CLIMATE CHANGE IMPACTS

The rise of anthropogenic activities producing carbon dioxide in the world has changed the earth's climate by emitting greenhouse gasses responsible for global warming. This has resulted in extreme weather events occurring more frequently. The severity and frequency of climate change impacts on temperature and precipitation patterns can be difficult to forecast due to dramatic shifts in weather patterns as a result of increased concentrations of carbon dioxide in the atmosphere. While the precise timing, severity, and regional impacts of these temperature and precipitation changes are uncertain, climate researchers have identified several important issues of concern for water planners in California. The climate change impacts of concern are as follows:



Figure 5.1: Climate Effects on California

Temperature Increases

- More winter precipitation falling as rain rather than snow, leading to reduced snowpack water storage, reduced long term soil humidity, reduced groundwater and downstream flows, and reduced imported water deliveries
- Higher irrigation demands as temperatures alter evapotranspiration rates, and growing seasons become longer
- Exacerbated water quality issues associated with dissolved oxygen levels, increased algal blooms, and increased concentrations of salinity and other constituents
- Impacted habitats for temperature-sensitive fish and other life forms, and increased susceptibility of aquatic habitats to eutrophication

**Precipitation
Pattern
Changes**

- Increased flooding (both coastal and inland) caused by more intense storms
- Changes to growth and life cycle patterns caused by shifting weather patterns
- Threats to soil permeability, adding to increased flood threat and decreased water availability
- Reduced water supply caused by the inability to capture precipitation from more intense storms, and a projected progressive reduction in average annual runoff (though some models suggest that there may be some offset from tropical moisture patterns increasingly moving northward)
- Increased turbidity caused by more extreme storm events, leading to increased water treatment needs and impacts to habitat
- Increased wildfires with less frequent, but more intense rainfall, and possibly differently timed rainfall through the year, potentially resulting in vegetation cover changes
- Reduction in hydropower generation potential

Sea Level Rise

- Inundation and erosion of coastal areas (coastal bluffs in particular), including coastal infrastructure
- Saline intrusion of coastal aquifers
- Increased risk of storm surges and coastal flooding and erosion during and after storms
- Changes in near-shore protective biogeography such as loss of sand, tide pools, wetlands, and kelp beds

Although the extent of these changes is uncertain, the San Gabriel District is already planning ahead to ensure long lasting reliability of its source for its retailers.

5.3 CLIMATE IMPACTS ON THE DISTRICT'S WATER SUPPLY

5.3.1 Impact to the Main San Gabriel Basin

The Main San Gabriel Watermaster observed significantly low groundwater elevations due to the recent drought periods as shown in **Figure 5.2** on the following page. The 2011-2015 drought brought groundwater levels to sub 200 feet and the Watermaster still identifies this period as the drought recovery stage. The Basin heavily relies on the natural hydrologic cycle for groundwater replenishment. The 5-year average for stormwater runoff replenishment would total to approximately 510,000 AF. However, the 2011-2015 drought only produced approximately 130,000 AF, only 25 percent of the normal average. The Watermaster anticipates more droughts to come and is proactively planning for potentially upcoming droughts by reducing the Operating Safe Yield for its member agencies to ensure reliability of the Main Basin's groundwater supplies.

5.3.2 Impact to the State Water Project

The report called *Mean and Extreme Climate Change Impacts on the State Water Project* was published that assesses how climate change has impacted the SWP and potential future outcomes of this water supply. The impacts were assessed for 20 different climate change scenarios which

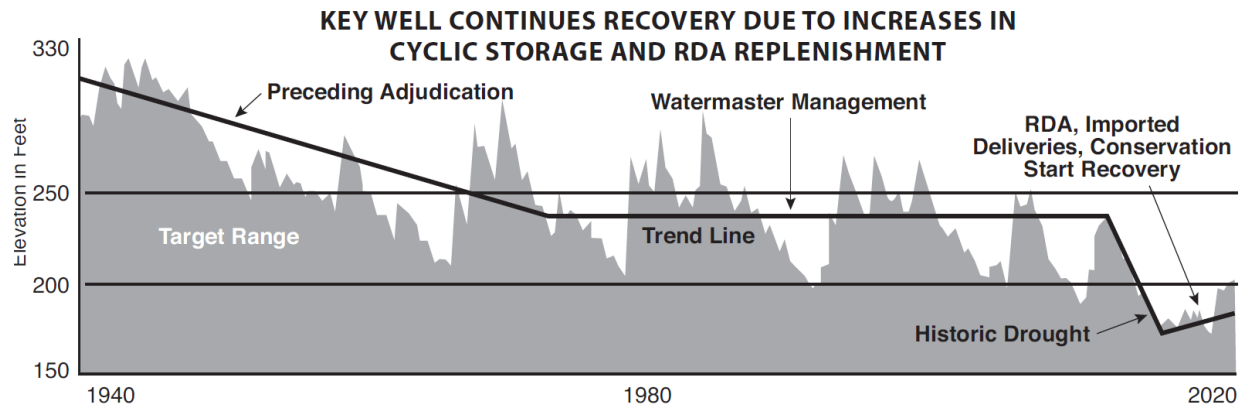


Figure 5.2: Historic Groundwater Elevations from Watermaster's Key Well

includes, but not limited to, a variety of global climate models, reservoir dead storage situations, and significant seasonal pattern shifts. The results show that flow season pattern shift in rim inflows from the Sierra Nevada and sea level rise in the San Francisco Bay would exert overwhelmingly negative effects on South of Delta export, leading to a half million acre-feet export reduction in the middle of this century.

From 2009 to 2018, the San Gabriel District has received water from the SWP well below its maximum allowable amount of 28,800 AF, as shown in **Figure 5.3**. Furthermore, a similar trend is shown on the total SWP deliveries to all of its Contractors where the 10-year delivery average of 1,871 thousand AF (maximum possible SWP delivery of 4,173 thousand AF) (see **Figure 5.4**). As one of the 29 State Water Contractors with the Department of Water Resources, the San Gabriel District is committed to working with the state and other stakeholders to finalize a long-term Delta solution. While this is a complex issue, putting off any decisions only delays this vital project to secure the water supply for millions of people across California.

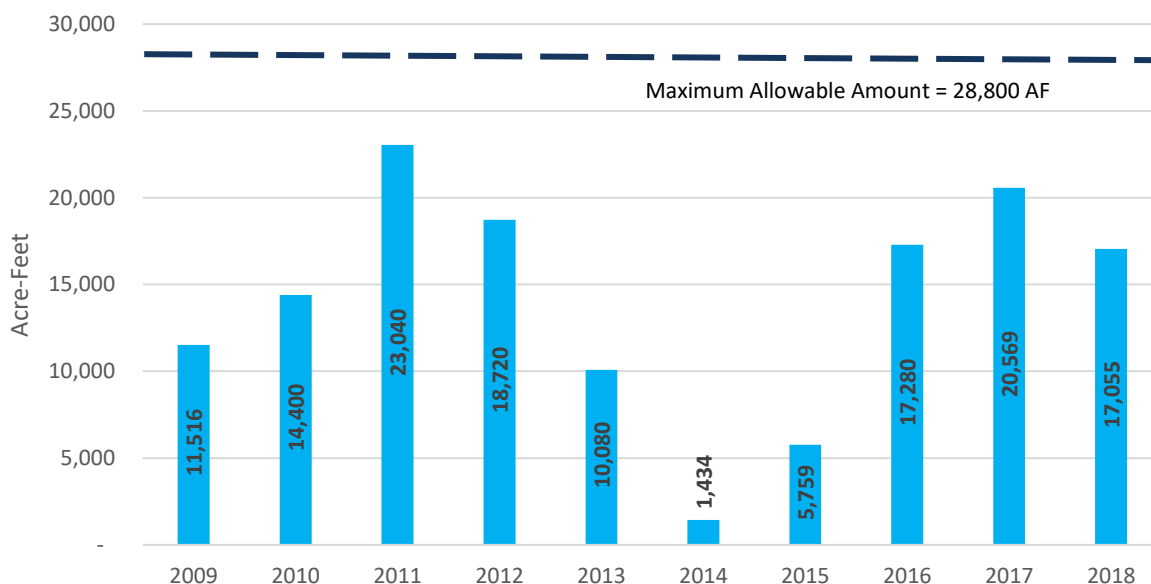


Figure 5.3: 2009-2018 SWP Delivery to San Gabriel District

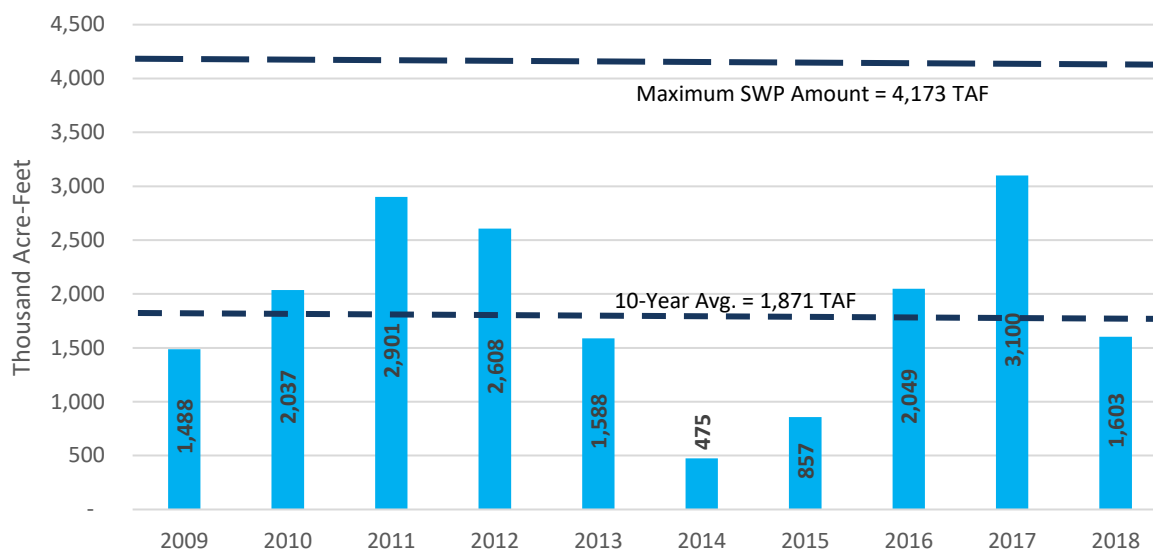


Figure 5.4: 2009-2018 SWP Delivery to all Contractors

5.3.3 Projected Climate Change Impacts

Extensive research has been done on the future impacts due to climate change on the state of California. The state released its latest research on climate called the *California's Fourth Climate Change Assessment* detailing the potential impacts of climate change that affects California such as temperature, sea level rise, droughts, and wildfires. The assessment utilizes historic data and the latest computer models to analyze these potential impacts. Furthermore, the State provided public access to downscaled data, along with mapping and other visualization tools, found at Cal-Adapt. In respect to water resources, research shows that California has a highly variable climate and is susceptible to dry spells. Additionally, extended drought periods could become more pervasive in future decades. Utilizing the extended drought scenario tool on Cal-Adapt provided projections on impacts on the San Gabriel District's member agencies caused by an early 21st century drought (2023 – 2042). These impacts include increased temperatures and decreases in precipitation which are key components to take into consideration for water resources planning.

Temperature

Under an extended drought period scenario from 2023 – 2042, temperatures are anticipated to increase as shown in **Figures 5.5** and **5.6**. All four of the San Gabriel District's member agencies show similar trends in temperature increases in both minimum and maximum daily averages. As a result, average temperature increases range from 4.5°F to 4.9°F for maximum and 3.8°F to 4.5°F for minimum, as shown in **Tables 5.1** and **5.2**, respectively.

Table 5.1: Extended Drought Scenario – Historic & Projected Maximum Daily Average Temperatures

Member Agency	Temperatures (°F)			
	Azusa	Alhambra	Monterey Park	Sierra Madre
Historic (1961-1990)	78.8	78.1	78.2	78.7
Projected (2023-2042)	83.7	82.6	82.7	83.5
Difference	+4.9	+4.5	+4.5	+4.8

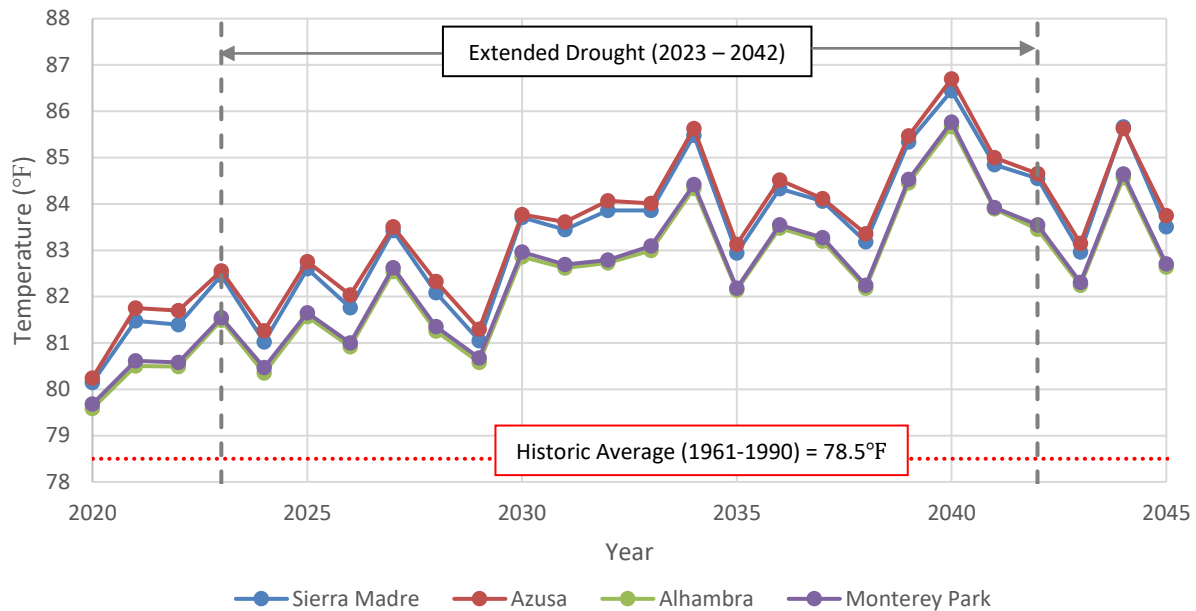


Figure 5.5: Extended Drought Scenario - Maximum Daily Average Temperatures

Table 5.2: Historic & Projected Minimum Daily Average Temperatures

Member Agency	Temperatures (°F)			
	Azusa	Alhambra	Monterey Park	Sierra Madre
Historic (1961-1990)	54.4	53.2	53.5	55.1
Projected (2023-2042)	58.8	57.0	57.3	59.6
Difference	+4.4	+3.8	+3.8	+4.5

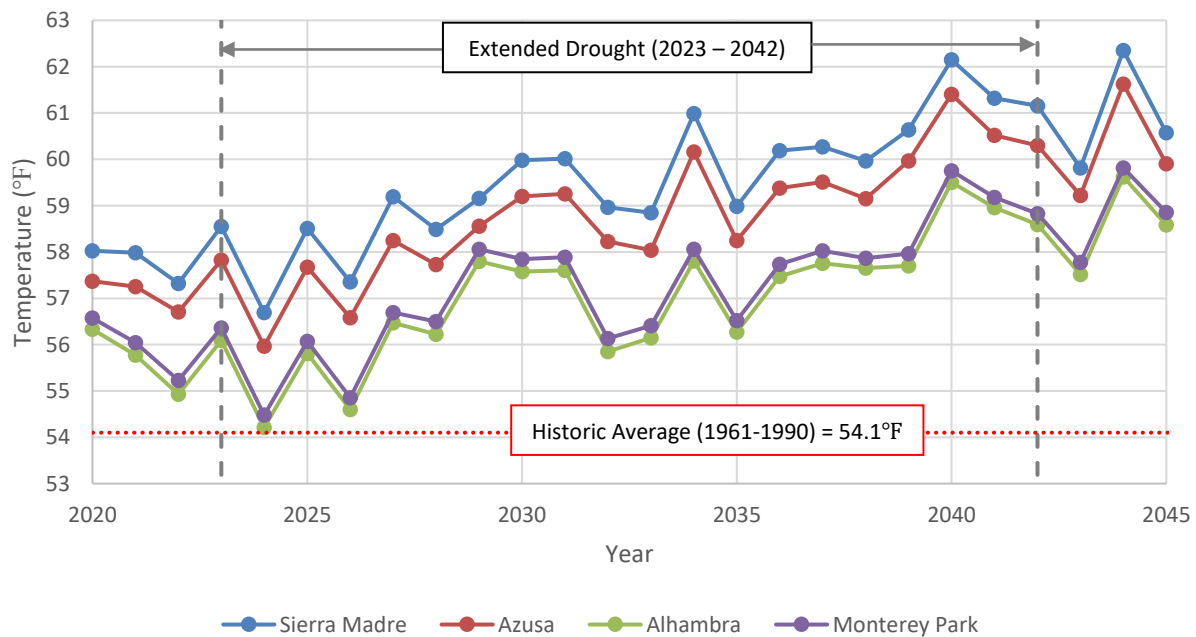


Figure 5.6: Extended Drought Scenario - Minimum Daily Average Temperatures

Precipitation & Stormwater Runoff

Under an extended drought period scenario from 2023 – 2042, predicted precipitation shows multiple periods of below average annual precipitation as shown in **Figure 5.7**. As a result, this translates to reduced precipitation averages ranging from 4.5 inches to 7.2 inches as shown in **Table 5.3**. This is also relating to reduced stormwater runoffs in a similar trend to precipitation as shown in **Figure 5.8**. Reduction of stormwater runoff averages are shown in **Table 5.4**. Furthermore, there are potential years which includes

Table 5.3: Historic & Projected Average Precipitation

Member Agency	Average Annual Precipitation (in.)			
	Azusa	Alhambra	Monterey Park	Sierra Madre
Historic (1961-1990)	20.0	17.3	17.0	23.3
Projected (2023-2042)	14.4	12.8	12.5	16.1
Difference	-5.6	-4.5	-4.5	-7.2

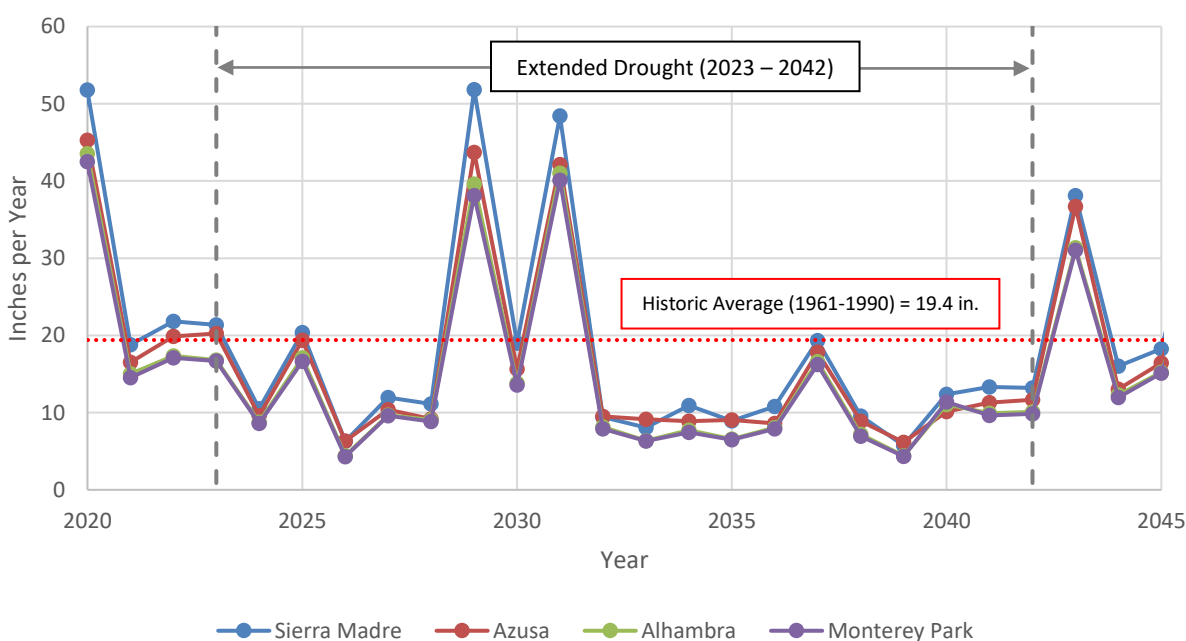


Figure 5.7: Extended Drought Scenario - Annual Precipitation

Table 5.4: Historic & Projected Average Runoff

Member Agency	Average Annual Runoff (in.)			
	Azusa	Alhambra	Monterey Park	Sierra Madre
Historic (1961-1990)	2.6	1.9	1.7	4.1
Projected (2023-2042)	2.0	1.7	1.5	2.9
Difference	-0.6	-0.2	-0.2	-1.2

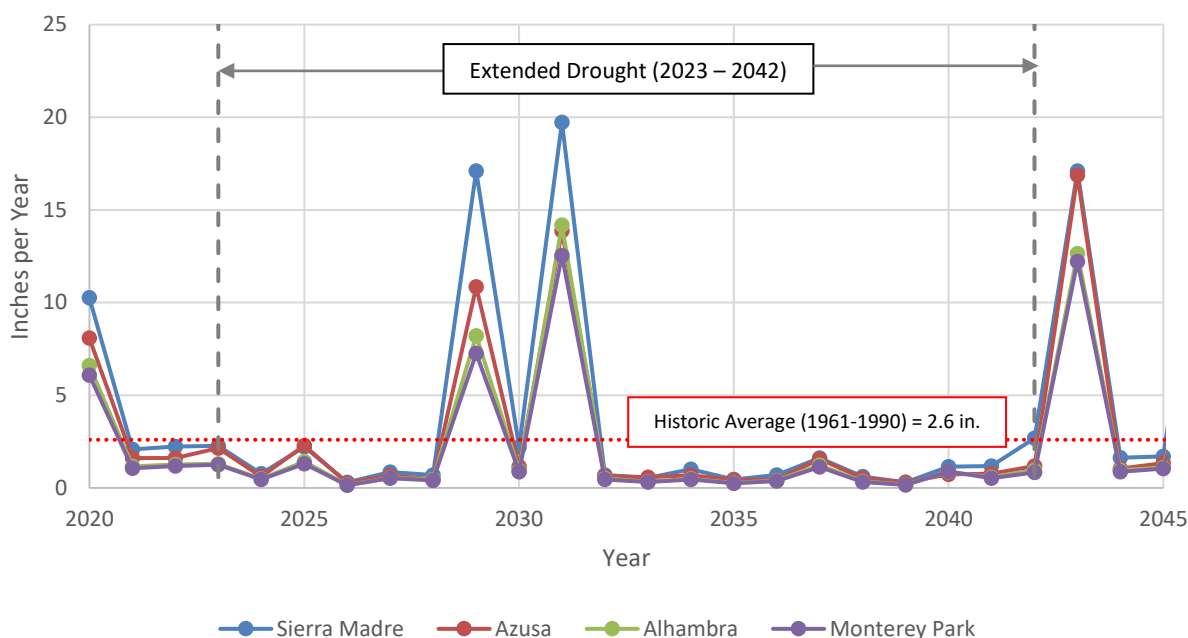


Figure 5.8: Extended Drought Scenario - Annual Runoff

5.4 CONSERVATION & INNOVATIVE EFFORTS TO COMBAT CLIMATE CHANGE

The San Gabriel District benefits from a wide array of conservation efforts and legislative movements that is geared towards water conservation. The recent droughts opened the dialogue amongst local and state government on future planning for water resources. As a result, alongside with the fight against climate change, placed various initiatives for increased water conservation and reliance on localized water sources.

Global Warming Solutions Act

California Assembly Bill 32 (AB 32), formally known as Global Warming Solutions Act of 2006, is a California State Law enacted in 2006. The purpose of the law is to slow down climate change by establishing a comprehensive, state-wide program to reduce greenhouse emissions from all sources within the state. In particular, AB32 requires the California Air Resources Board (CARB) to develop regulations to limit California greenhouse emissions to 1990 levels by 2020. The goal would equate to roughly 25 percent reduction in greenhouse gases by 2020. Accordingly, CARB has developed AB32 compliance regulations for California business and commercial sectors, including instate electricity generators as well as importers of electricity into California. A key part of AB32 regulations is a market-based mechanism whereby GHG compliance instruments (allowances and offsets) can be traded among the regulated entities to help them minimize the costs of compliance.

Safe Clean Water Program (Measure W) and Stormwater Management

Measure W, formally known as the Safe Clean Water Program, passed in 2018 with the goals to create a comprehensive, regional plan to address how Los Angeles County captures water and

reduce the reliance on imported water. In the past, stormwater was seen as an element to manage and to vacate off streets to prevent floods. The millions of miles of streets formed an impermeable layer that diverts stormwater into local drains and channels, ultimately expelling into the ocean. Today, stormwater is seen as a potential water source to be harvested. The measure raises about \$300 million per year to fund projects that capture, treat, and recycle rainwater. The Main San Gabriel Watermaster sits on committees for two of the nine watersheds covered by Measure W and offers its engineering and water management expertise to help support projects that improve water supply and quality, while working to ensure that water rights and water supply concerns are addressed.

Utilization of Recycled Water for Groundwater Recharge

Recycled water is another reliable source that is gaining headway in southern California. The usage of recycled water for groundwater recharge has been extensively analyzed on its feasibility. Further discussion for San Gabriel District's endeavors for utilizing recycled water can be found in **Section 9**.

Efforts from Member Agencies

Monterey Park – In 2012, partnered with AECOM to developed the Climate Action Plan. The City of Monterey Park, in partnership with the San Gabriel District, will continue to develop pilot or demonstration projects related to water conservation. The objective of these projects is two-fold: to save water at each location, and to provide teaching examples of technology, materials, and procedures that save water. The San Gabriel District recently granted the City's water district \$50,000 to re-irrigate planters in front of City Hall with water-efficient equipment such as low-flow sprinkler heads and nozzles, and weather-based "smart" water controllers. The planters were re-vegetated to include more water-efficient plant species. In addition, the City installed water-efficient equipment that has weather-based "smart" water controllers at Garvey Park. The City will continue to work with the San Gabriel District to complete re-irrigation and re-vegetation of medians throughout the City with water-efficient irrigation equipment and native vegetation, and to expand the California native plant palette concept to other City facilities and large, private employers.

Due to its natural climate, California has throughout its history experienced periodic droughts lasting up to several years. As a result, many agencies began to assess their need for water reliability planning.



SECTION 6: RELIABILITY PLANNING

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 6 RELIABILITY PLANNING

6.1 INTRODUCTION

Drought conditions continue to be an issue for Southern California's water supply. As the population of Southern California continues to increase and as environmental regulations restrict imported and local water supplies, it is important that each agency manage its water supplies in the face of drought. This can be accomplished through conservation and alternative water supplies, and additionally through prohibitions under penalty of law during times of seasonal or catastrophic shortage in accordance with local ordinances.

This section discusses local and regional efforts to ensure a reliable supply of water and compares projected supply to projected demand up to the year 2045. Demand and supply projections are provided in the tables on the following pages.

6.2 HISTORIC DROUGHTS

Due to its natural climate, California has throughout its history experienced periodic droughts lasting up to several years. In particular, California experienced a statewide drought during 1976-77, which is still the driest on record. As a result, many agencies began to assess their need for water reliability planning. Many agencies enacted drought ordinances as a direct response to the drought conditions. The ordinances declared that the agencies were suffering from a drought emergency



Figure 6.1: Lake Oroville during 2011-2016 Drought

and structured water use reduction in several phases, culminating in overall goal of a certain percent reduction target. The ordinances had the power to declare one of several stages or phases was in effect. The ordinance mainly targeted residential customers within the agencies' service area, since the ordinances sought more immediate, rather than long term, results. Since the 1976-1977 drought, however, the local region experienced several other droughts, including the recent drought of 2011-2016 (discussed in the following section). Focus since the 1976-1977 drought has shifted to long-term results.

Although the recent drought of 2011-2016 has more significantly impacted surface waters and other non-urban agencies that use water for agriculture, San Gabriel District's member agencies

are still affected by the drought. The Main Basin has recently lacked natural groundwater replenishment which has increased pressure on imported water to make up the difference.

In 1991, San Gabriel District's Board passed a Resolution (Resolution 3-91-421) for the purpose of "Encouraging Additional Water Conservation Measures". The resolution does not have direct power of individual customers, but does encourage its member agencies to maintain restrictions on certain types of water use during times of drought. The resolution is discussed in further detail in **Section 8** of this UWMP.

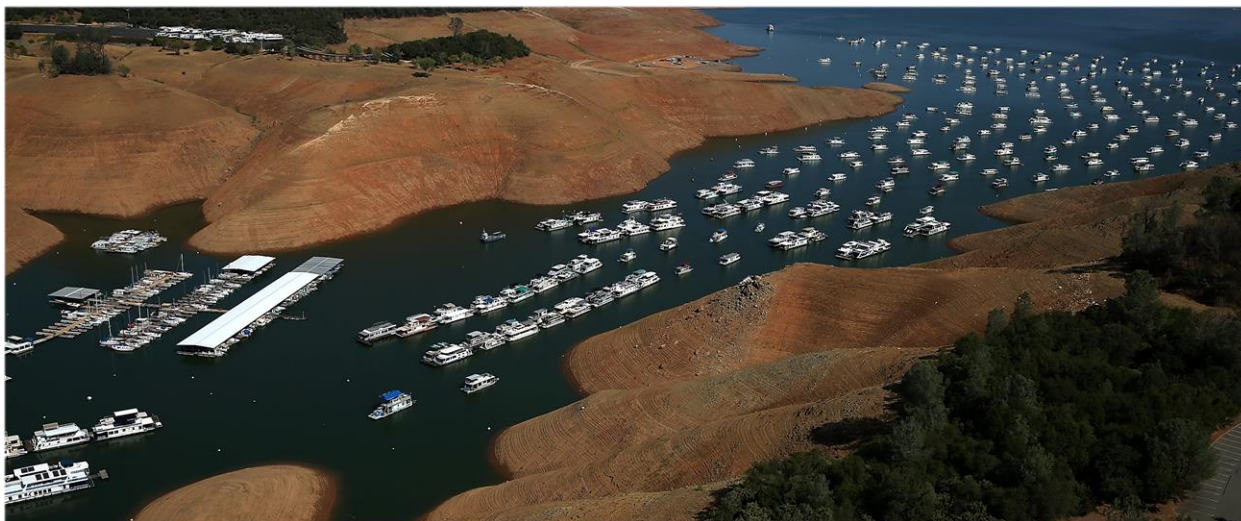


Figure 6.2: Effects of Recent Drought on California's Reservoirs

6.3 RECENT DROUGHT (2011-2016) AND CURRENT STATE

A significant drought has hit the state of California since 2011. The drought has depleted reservoir levels all across the state, as reflected by **Figure 6.2** above. In January of 2014, Governor Brown declared a state of emergency and directed state officials to take all necessary actions to prepare for water shortages. As the drought prolonged into 2015, to help cope with the drought, Governor Brown gave an executive order in April 2015 which mandated a statewide 25 percent reduction in water use. This executive order assigned specific reduction requirements to each agency. In some cases, the reduction requirement was less than 25 percent (for those agencies that are already efficient).

In January of 2016, the DWR and the U.S. Bureau of Reclamation have finalized the 2016 Drought Contingency Plan that outlines State Water Project and Central Valley Project operations for February 2016 to November 2016. The plan was developed in coordination with staff from State and federal agencies. One of the key purposes of this plan is to communicate goals for 2016 water management and the potential operations needed to achieve those goals for water resources stakeholders and the public. The plan was updated in 2020 to reflect the recently dry conditions of 2019-2020.

Although the drought has more significantly impacted surface waters and other agencies that use water for agriculture, ALW is still affected by the drought, primarily due to reduced reliability of imported water.

During 2017, the state received an above average amount of rainfall in which significantly aided in the replenishment of the state's water supplies. As a result, in April 2017, Governor Brown ended the drought state of emergency in most of California, however, retains prohibition over water waste practices. This is to ensure the continued efforts for water conservation and to maintain supply reliability for the future.

6.3.1 Current State

As of 2021, the state is experiencing severe to exceptional drought and is in a second consecutive year of dry conditions. Furthermore, on April 21, 2021, Governor Gavin Newsom visited Lake Mendocino and declared drought emergency for Sonoma and Mendocino Counties. An Executive Order was signed, which officially declared a drought emergency for these two counties. The executive order did not enact any mandates, but allows for mandates to follow should the conditions persist.

This declaration signifies a high probability of another prolonged drought in the near future. Although numerous reports indicate improvements in water supplies throughout the state since previous drought, water agencies across the state have plans in place in the event another prolonged drought period occurs.



Figure 6.3: San Gabriel Canyon Spreading Grounds

6.4 REGIONAL SUPPLY RELIABILITY

As a result of continued challenges to its water supplies, SWP Contractors understand the importance of reliable water supplies. With close participation of its Contractors, DWR strives to meet the water needs of Southern California by developing new projects to increase the capacity of its supplies while encouraging its member agencies to develop local supply project to meet the needs of its customers. Also, DWR is committed to developing and maintaining high-capacity storage reservoirs, including both those which are DWR-owned and Contractor-owned., such as Diamond Valley Lake (MWD), to meet the needs of the region during times of drought and emergency.

Colorado River Aqueduct Reliability

Water supply from the CRA continues to be a critical issue for Southern California as the San Gabriel Valley region (via Upper District and MWD) indirectly competes with several agricultural water agencies in California for unused water rights to the Colorado River. Although California's allocation has been established at 4.4 MAF per year, MWD's allotment stands at only 550,000 AFY, with additional allowances which can increase MWD's allotment to 842,000 AFY if there is any unused water from the agricultural agencies.

Upper District recognizes that competition from other states and other agencies within California has decreased the CRA's supply reliability. In 2003, the Quantification Settlement Agreement (QSA) was signed, which facilitated the transfer of water from agricultural agencies to urban uses. This historic agreement provides California the means to implement transfers and supply programs that will allow California to live within the state's 4.4 MAF basic annual apportionment of Colorado River water.

State Water Project Reliability

The reliability of the SWP impacts MWD's member agencies' ability to plan for future growth and supply. In August 2020, SWP released the 2019 Delivery Capability Report, providing information on the reliability of the SWP to deliver water to its contractors assuming historical precipitation patterns.

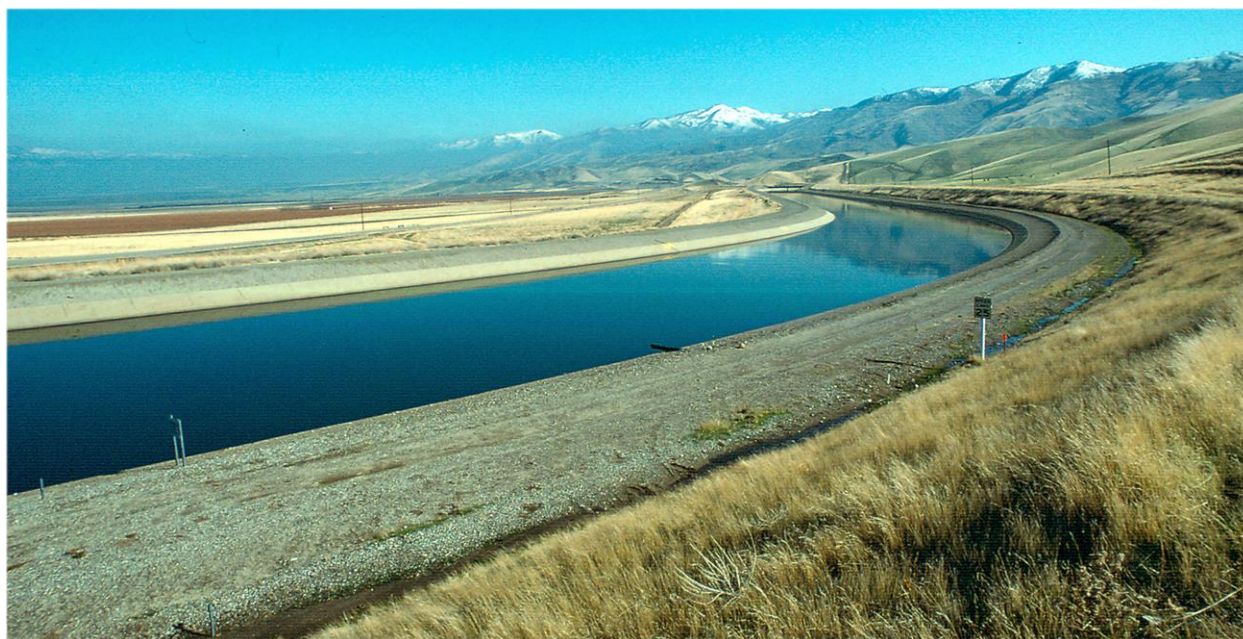


Figure 6.4: State Water Project (SWP)

On an annual basis, each of the 29 SWP Contractors, including San Gabriel District, request an amount of SWP water based on their anticipated yearly demand. In some cases, San Gabriel District's requested supply is equivalent to its full Table A amount. After receiving the requests, DWR assesses the amount of water supply available based on precipitation, snow pack on

Northern California watersheds, volume of water in storage, projected carry over storage, and Sacramento-San Joaquin Bay Delta regulatory requirements. For example, according to the State Water Project Delivery Reliability Report 2015, the total SWP annual delivery of water to contractors ranged from 3.7 MAF in 2005 to 476,743 AF in 2014. Due to the uncertainty in water supply, contractors are not typically guaranteed their full Table A amount, but instead a percentage of that amount based on available supply.

Each December, DWR provides the Contractors with their first estimate of allocation for the following year. As conditions develop throughout the year, DWR revises the allocations. Currently, the total contractor requested allocation for Table A water is 4.2 MAF. Of this amount, San Gabriel District is expected to have an allocation of 28,800 AF.

Due to the variability in supply for any given year, it is important to understand the reliability of the SWP to supply a specific amount of water each year to the contractors.

DWR estimates of SWP supply reliability in its 2019 Delivery Capability Report are based on existing facilities, and so do not include the proposed conveyance facilities that are part of the DCP. Since this UWMP uses DWR's 2019 Delivery Capability Report to estimate SWP supplies at 2040, any changes in SWP supply reliability that would result from the proposed DCP are not included in this UWMP.

With the state undergoing a second consecutive dry year, DWR has already taken the steps to prolong the SWP supplies. On March 2021, DWR decreased the allocation of 2021 SWP deliveries for the contractors from 422,848 AF to 210,266 AF. Based on the recent low amount of precipitation and runoff, and an assessment of overall water supply conditions, SWP supplies are projected to be 5 percent of most SWP contractor's 2021 requested Table A amounts. This reduction decreased MWD's initial request from 1,911,500 AF to 95,575 AF, and SGVMWD's initial request of 28,800 AF to 1,440 AF.

An ongoing planning effort to increase long-term supply reliability for both the SWP and Central Valley Project (CVP) is taking place. Consistent with Executive Order N-10-19, in early 2019, the state announced a new single tunnel project, which proposed a set of new diversion intakes along Sacramento River in the north Delta for SWP. In 2019, DWR initiated planning and environmental review for a single tunnel Delta Conveyance Project (DCP) to protect the reliability of State Water Project (SWP) supplies from the effects of climate change and seismic events, among other risks. DWR's current schedule for the DCP environmental planning and permitting extends through the end of 2024. DCP will potentially be operational in 2040 following extensive planning, permitting and construction.

Current Reservoir Levels

Statewide, storage reservoir levels rise and fall due to seasonal climate changes, which induce increase in demand. During periods of drought, reservoir levels can drop significantly and can limit the amount of supplies available. As a result, both DWR and MWD monitor their reservoir levels regularly. In 2016, conditions of several key reservoirs indicated drought conditions. Currently, several reservoir levels are below historical average levels as indicated by **Figures 6.5** and **6.6** on the following pages.

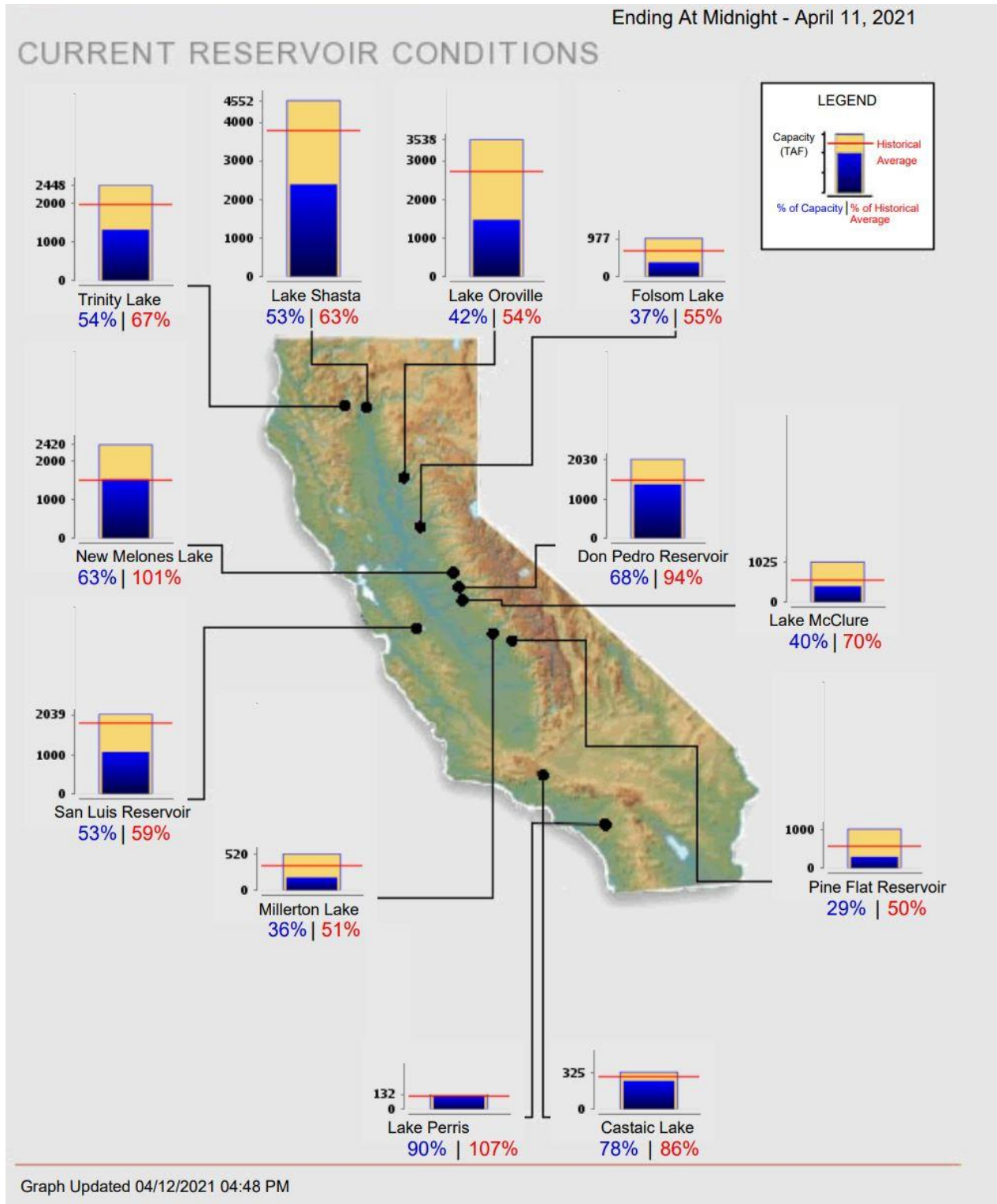


Figure 6.5: California State Reservoir Levels

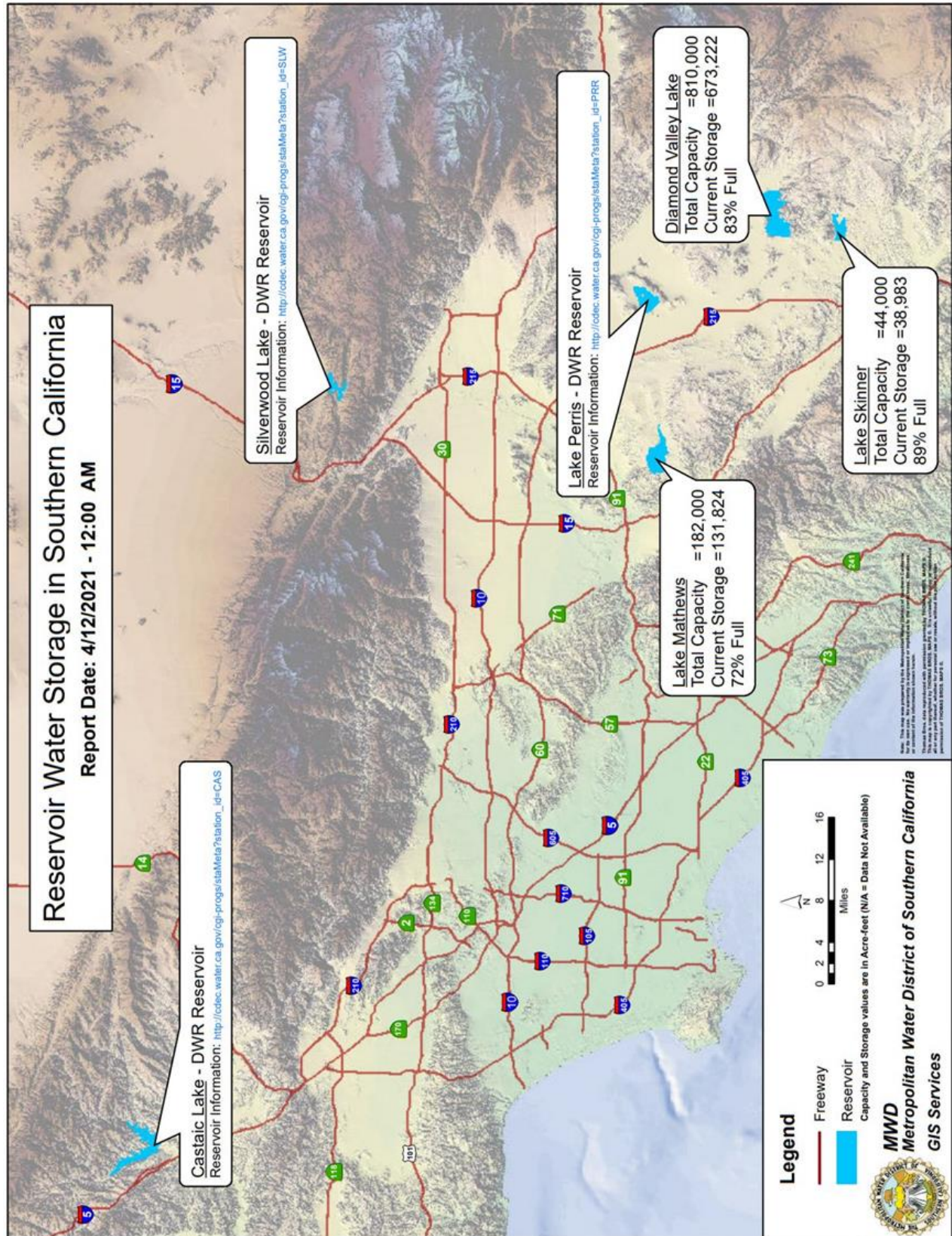


Figure 6.6: MWD Reservoir Levels

6.5 SUPPLY VS. DEMAND

As San Gabriel District's member agencies obtain the majority of their supplies from local groundwater, their reliability is based on the natural and imported replenishment of the Main Basin and vulnerability of its infrastructure in addition to the seasonal demand changes brought about by periods of drought. Population growth will also continue to be a factor in future reliability projections.

Regional Supply vs. Demand

Southern California is expected to experience an increase in regional demands in the years 2020 through 2045 as a result of population growth. Although increases in demand are expected, they are limited due to the requirements of SBx7-7, which provides a cap on water consumption rates (i.e., per capita water use). It can be reasonably expected that the majority of agencies will be at or near their compliance targets by 2020 and thereafter as conservation measures are more effectively enforced.

Tables 2.8 to 2.10 of MWD's 2020 UWMP shows supply reliability projections for average and single dry years through the year 2045. Since San Gabriel District operates in an area indirectly served by MWD, and since its member agencies rely on MWD water (via Upper District), the data in these tables is important to effectively project and analyze supply and demand over the next 25 years for San Gabriel District (and also for many regional agencies). It is noteworthy that Projected Supplies During a Single Dry Year and Multiple Dry Years indicates MWD's projected supply will exceed its projected single dry year and multiple dry year demands in all years. Likewise, for average years, MWD supply exceeds projected demands for all years. The data contained in these tables has an indirect effect on the San Gabriel District, and thus is included in this Section. **Tables 6.1** and **6.2** on the following pages show MWD's supply reliability

It is noteworthy that projected supplies during a single dry year and multiple dry years will exceed projected single dry year and multiple dry year demands through 2045. Likewise, for average years, MWD supply exceeds projected demands for all years.

San Gabriel District Supply vs. Demand

San Gabriel District's future supply is based on average, single dry year, and multiple dry year percentages based on the 2019 SWP Delivery Capability Report. On average and single dry years, San Gabriel District obtains 58 percent and 5 percent, respectively, of their maximum Table A amount of 28,800 AFY. For multiple dry years, San Gabriel District obtains 26 - 32 percent of their maximum Table A amount. This is summarized in **Table 6.3**.

For future demands, each member agency of San Gabriel District has projected their total demands from 2025 to 2045 as shown in their 2020 UWMPs. To determine an estimated amount of supplemental water requirement from each agency, the projected total demand is subtracted from the total supply "rights" (i.e., groundwater rights) and rights to other sources (imported water, surface water, recycled water, etc.). **Tables 6.4** to **6.9** show the supply vs. demand comparisons for San Gabriel District through the various dry period scenarios. The demand shown for the member agencies is based on projected supplemental water requirements.

**Table 6.1: MWD Regional Imported Water Supply Reliability Projections
Average and Single Dry Years (AF) for 2025 to 2045**

	Row	Region Wide Projections	2025	2030	2035	2040	2045
Supply	A	Projected Supply: Average Year	3,932,000	3,962,000	3,960,000	3,598,000	3,622,000
	B	Projected Supply: Dry Year	2,727,000	2,791,000	2,789,000	2,551,000	2,572,000
	C = B/A	Projected Dry Yr. / Avg. Yr. Supply (%)	69.4%	70.3%	70.4%	70.9%	71.0%
Demand	D	Projected Average Year Demand	1,274,000	1,256,000	1,273,000	1,294,000	1,319,000
	E	Projected Dry Year Demand	1,402,000	1,387,000	1,408,000	1,431,000	1,457,000
	F=E/D	Projected Dry Year / Avg. Year (%)	110.0%	110.4%	110.6%	110.6%	110.5%
Surplus	G = A-D	Projected Surplus: Average Year	2,658,000	2,706,000	2,687,000	2,304,000	2,303,000
	H = B-E	Projected Surplus: Dry Year	1,325,000	1,404,000	1,381,000	1,120,000	1,115,000
Programs Under Dev.	I	Projected Capability of Programs (Average Year)	47,000	113,000	13,000	372,000	347,000
	J	Projected Capability of Programs (Dry Year)	0	0	0	0	0
Potential Surplus	K=A+I-D	Projected Surplus: Average Year	5,253,000	5,331,000	5,246,000	5,264,000	5,288,000
	L=B+J-E	Projected Surplus: Dry Year	4,129,000	4,178,000	4,197,000	3,982,000	4,029,000
Comparison	I = A/D	Projected Avg. Yr. Supply/Demand (%)	308.6%	315.4%	311.1%	278.1%	274.6%
	J = A/E	Projected Dry Yr. Supply/Demand (%)	280.5%	285.7%	281.3%	251.4%	248.6%

Table 6.2: MWD Regional Imported Water Supply Reliability Projections
Average and Multiple Dry Years (AF) 2025 to 2045

	Row	Region Wide Projections	2025	2030	2035	2040	2045
Supply	A	Projected Supply: Average Year	3,932,000	3,962,000	3,960,000	3,598,000	3,622,000
	B	Projected Supply: Multiple Dry Year	2,198,000	2,210,000	2,209,000	1,973,000	1,995,000
	C = B/A	Projected Dry Yr. / Avg. Yr. Supply (%)	55.9%	55.8%	55.8%	54.8%	55.1%
Demand	D	Projected Average Year Demand	1,274,000	1,256,000	1,273,000	1,294,000	1,319,000
	E	Projected Dry Year Demand	1,412,000	1,414,000	1,435,000	1,457,000	1,484,000
	F=E/D	Projected Dry Year / Avg. Year (%)	110.8%	112.6%	112.7%	112.6%	112.5%
Surplus	G = A-D	Projected Surplus: Average Year	2,658,000	2,706,000	2,687,000	2,304,000	2,303,000
	H = B-E	Projected Surplus: Multiple Dry Year	786,000	796,000	774,000	516,000	511,000
Programs Under Dev.	I	Projected Capability of Programs (Average Year)	47,000	113,000	13,000	372,000	347,000
	J	Projected Capability of Programs (Multiple Dry Year)	10,000	0	0	235,000	213,000
Potential Surplus	K=A+I-D	Projected Surplus: Average Year	5,253,000	5,331,000	5,246,000	5,264,000	5,288,000
	L=B+J-E	Projected Surplus: Multiple Dry Year	4,129,000	4,178,000	4,197,000	3,982,000	4,029,000
Comparison	I = A/D	Projected Avg. Yr. Supply/Demand (%)	308.6%	315.4%	311.1%	278.1%	274.6%
	J = A/E	Projected Dry Yr. Supply/Demand (%)	278.5%	280.2%	276.0%	246.9%	244.1%

Table 6.3: San Gabriel District Supply During Normal, Single Dry, & Multiple Dry Year Scenarios

Year	Percent of Maximum SWP Contract Amount ^[1]	Deliveries (AF)
Long – Term Average	58%	16,704
Single Dry Year (1977)	7%	2,016
2-Year Drought (1976 – 1977)	32%	9,216
4-Year Drought (1931 – 1934)	30%	8,640
6-Year Drought (1987 – 1992)	26%	7,488

[1] Percentages based on DWR's SWP Delivery Capability Reliability Report 2019

Table 6.4: SGVMWD Normal Year Supply & Demand (AF) (DWR Table 7-2 Wholesale)

	2025	2030	2035	2040	2045
Supply totals ^[1]	16,704	16,704	16,704	16,704	16,704
Demand totals ^[2]	14,482	14,766	15,054	15,345	15,641
Difference ^[3]	2,222	1,938	1,650	1,359	1,063

[1] Supply based on long-term average deliveries from SWP of 58 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

Table 6.5: SGVMWD's Normal Year Demand Breakdown (AF)

Retail Agency	Year				
	2025	2030	2035	2040	2045
Azusa Light & Water	3,847	4,079	4,314	4,552	4,795
City of Alhambra	1,688	1,714	1,740	1,766	1,793
City of Monterey Park	3,947	3,973	4,000	4,027	4,054
City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
Total Demand	14,482	14,766	15,054	15,345	15,641

Table 6.6: SGVMWD Single Dry Year Supply & Demand (AF) (DWR Table 7-3 Wholesale)

	2025	2030	2035	2040	2045
Supply totals ^[1]	2,016	2,016	2,016	2,016	2,016
Demand totals ^[2]	18,401	18,708	19,020	19,336	19,656
Difference ^[3]	(16,385)	(16,692)	(17,004)	(17,320)	(17,640)

[1] Supply based on single dry year deliveries from SWP of 7 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

Table 6.7: SGVMWD's Single Dry Year Demand Breakdown (AF)

Retail Agency	Year				
	2025	2030	2035	2040	2045
Azusa Light & Water	4,739	4,985	5,234	5,488	5,746
City of Alhambra	3,247	3,278	3,309	3,340	3,371
City of Monterey Park	5,414	5,445	5,476	5,507	5,538
City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
Total Demand	18,401	18,708	19,020	19,336	19,656

Table 6.8: SGVMWD's Multiple Dry Years Supply & Demand (AF) (DWR Table 7-4 Wholesale)

		2025	2030	2035	2040	2045
First year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	18,422	18,734	19,050	19,373	19,699
	Difference ^[3]	(10,934)	(11,246)	(11,562)	(11,885)	(12,211)
Second year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	19,809	20,138	20,472	20,811	21,154
	Difference ^[3]	(12,321)	(12,650)	(12,984)	(13,323)	(13,666)
Third year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	20,183	20,513	20,847	21,186	21,529
	Difference ^[3]	(12,695)	(13,025)	(13,359)	(13,698)	(14,041)
Fourth year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	19,560	19,876	20,197	20,521	20,851
	Difference ^[3]	(12,072)	(12,388)	(12,709)	(13,033)	(13,363)
Fifth year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	15,458	15,735	16,016	16,300	16,588
	Difference ^[3]	(7,970)	(8,247)	(8,528)	(8,812)	(9,100)

[1] Supply based on multiple dry year deliveries from SWP of 26 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

Table 6.9: SGVMWD's Multiple Dry Year Demand Breakdown (AF)

Retail Agency		Year				
		2025	2030	2035	2040	2045
Multiple Dry Year 1	Azusa Light & Water	5,139	5,391	5,648	5,908	6,173
	City of Alhambra	3,249	3,279	3,309	3,342	3,373
	City of Monterey Park	5,034	5,063	5,093	5,123	5,153
	City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
	Total Demand	18,422	18,734	19,050	19,373	19,699
Multiple Dry Year 2	Azusa Light & Water	6,076	6,343	6,615	6,891	7,171
	City of Alhambra	3,349	3,381	3,412	3,443	3,475
	City of Monterey Park	5,384	5,415	5,446	5,476	5,508
	City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
	Total Demand	19,809	20,138	20,472	20,811	21,154
Multiple Dry Year 3	Azusa Light & Water	6,005	6,272	6,542	6,817	7,097
	City of Alhambra	3,587	3,619	3,651	3,683	3,715
	City of Monterey Park	5,591	5,623	5,654	5,686	5,717
	City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
	Total Demand	20,183	20,513	20,847	21,186	21,529
Multiple Dry Year 4	Azusa Light & Water	5,125	5,377	5,633	5,893	6,158
	City of Alhambra	3,690	3,723	3,755	3,788	3,820
	City of Monterey Park	5,745	5,777	5,809	5,841	5,873
	City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
	Total Demand	19,560	19,876	20,197	20,521	20,851
Multiple Dry Year 5	Azusa Light & Water	3,087	3,306	3,528	3,754	3,984
	City of Alhambra	2,464	2,493	2,521	2,550	2,579
	City of Monterey Park	4,907	4,937	4,966	4,996	5,025
	City of Sierra Madre	5,000	5,000	5,000	5,000	5,000
	Total Demand	15,458	15,735	16,016	16,300	16,588

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As a result of diminished supplies and difficulty in developing new supplies, water conservation plays an important role in Southern California's sustainability. The San Gabriel District recognizes the importance of water conservation and promotes conservation efforts.



SECTION 7: CONSERVATION MEASURES

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 7 CONSERVATION MEASURES

7.1 INTRODUCTION

As a result of diminished supplies and difficulty in developing new supplies, water conservation plays an important role in Southern California’s sustainability. In Water Year 2018-2019, Governor Brown signed SB 606 and AB 1668 into law. The legislation required DWR, the State Water Resources Control Board (SWRCB), and three other state agencies to develop a long-term water conservation framework to “make conservation a California way of life.” In order to conform to the Water Action Plan, including meeting the SBx7-7 target (20 percent by 2020), many water agencies had to re-examine traditional conservation programs. Agencies statewide acknowledge that efficient water use is the foundation of its current and future water planning and operations policies.



Figure 7.1: Water Waste is Prohibited by San Gabriel District's Member Agencies

In March 2018, the CUWCC disbanded, and members of the California Urban Water Conservation Council (CUWCC) worked together to form the CalWEP. CalWEP’s mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. The CUWCC (now CalWEP) drafted the Memorandum of Understanding Regarding Urban Water Conservation (MOU) in 1991. At that time, the MOU established 14 Best Management Practices (BMPs) which define policies, programs, practices, rules, regulations, or ordinances that result in the more efficient use or conservation of water. Eventually, the original 14 BMPs were diminished to five BMPs.

This section of the UWMP satisfies the requirements of § 10631 (f) & (j) of the CWC and describes how San Gabriel District implements each applicable BMP and how San Gabriel District evaluates the effectiveness of the BMPs. This section also provides an estimate of existing conservation savings where information is available.

7.1.1 CalWEP BMPS

The updated CalWEP BMPs from 2015 will still be in effect for the 2020 UWMP. The BMPs are:

- **BMP 1:** *Utility Operations*
- **BMP 2:** *Public Education & Outreach*
- **BMP 3:** *Residential Programs*
- **BMP 4:** *Commercial, Institutional, and Industrial Programs*
- **BMP 5:** *Landscape Programs*

7.2 CONSERVATION MEASURES

Although San Gabriel District is a unique wholesale agency with no legal authority to implement most of the BMPs, San Gabriel District recommends its member agencies to implement and continue to expand water use efficiency measures that are specified by DWR. San Gabriel District has committed to use good-faith efforts to help implement water efficiency and awareness described as follows.

7.2.1 BMP 1: UTILITY OPERATIONS

This BMP deals with water waste prohibitions, water efficiency ordinances, metering, conservation pricing, and other items related to managing water use.

Metering

As a wholesale agency that provides imported water for the purposes of groundwater recharge, San Gabriel District does not maintain metered service accounts. However, San Gabriel District does have meters for the sake of measurement of discharges into one of five separate turnout stations, such as the one(s) at its San Dimas Facility. The meters are checked and serviced routinely to ensure good working condition and to ensure balance of its imported water purchases and deliveries.

Asset Management

San Gabriel District operates its Devil Canyon-Azusa Pipeline to deliver untreated SWP water to the Main Basin for groundwater replenishment. As such, San Gabriel District inspects the pipeline to ensure good working condition and also to repair leaks, if detected. Inspections consist of weekly inspections of the 38 miles of pipeline and Supervisory Control and Data Acquisition (SCADA) remote monitoring.

Also as part of this process, San Gabriel District's staff maintains records of discharge from its turnouts in the San Gabriel Valley and compares that data to flow records maintained by DWR at the Devil Canyon Afterbay. Differences between the two flow measurements will cause San Gabriel District staff to investigate and correct the problem.

7.2.2 BMP 2: PUBLIC EDUCATION & OUTREACH

This BMP deals with outreach efforts including e-newsletters, advertisements, presentations, public outreach, etc., related to outreach and education.

Public Education & Outreach

In 2003, San Gabriel District started its public information program regarding water conservation and drought. San Gabriel District has held public workshops to address its Public Information/School Education programs, provided e-newsletters, a map of San Gabriel District's service area, and among others. The San Gabriel District's External Affairs program carries out the school education program which consists of partnering with our local school districts to hold water conservation assemblies for all 3rd to 5th students. In addition to presenting at the assemblies, the San Gabriel District provides other educational resources, including videos, and activity sheets.



Figure 7.2: San Gabriel District Mascot, H2Owl

The San Gabriel District mascot H2Owl attends community and school events in the member cities to promote wise water use to younger members of the community. Examples of events attended are: Earth Day in Monterey Park, Eco-Fair in Alhambra, summer concerts in the park in Azusa, and 4th of July in Sierra Madre.



Figure 7.3: School Education Programs

The San Gabriel District also provides information brochures to member agencies which promote and explain water conservation. San Gabriel District board members and staff are available for speaking engagements regarding water conservation.

In addition, the San Gabriel District web site has video links concerning water conservation.

Water Conservation Program Coordination and Staffing Support

San Gabriel District's External Affairs Manager functions as a water conservation coordinator. Activities include oversight of public information programs, school education programs and serving as a liaison to the member cities for its water conservation programs.

In addition, the San Gabriel District contracts with a private consultant to carry out various water conservation activities. This is primarily due to the size of the San Gabriel District and the available budget for water conservation activities.

The reported expenditures for the conservation coordinator activities are covered in the annual external affairs budget.

7.2.3 BMP 3: RESIDENTIAL & BMP 4: COMMERCIAL, INDUSTRIAL, & INSTITUTIONAL PROGRAMS

This BMP 3 deals with showerheads, faucets, toilets, and leak detection surveys related to residential water use. BMP 4 deals with toilets, urinals, steamers, cooling towers, food/restaurant equipment, medical equipment, and items related to commercial, institutional, and industrial water use. These BMPs are not applicable to wholesalers. The San Gabriel District, as a wholesaler, does not provide direct service to the public. However, the District recognizes the importance of water conservation and promotes conservation efforts.

The San Gabriel District provides rebate programs for customers from Cities of Alhambra, Monterey Park, and Sierra Madre. Effective 2017, customers with accounts with Azusa Light & Water would need to visit Azusa Light & Water's website to obtain rebate information. The District rebate programs include **residential plumbing devices** (washing machines, rain barrels, smart irrigation controllers, nozzles, toilets, etc), and **commercial plumbing devices** (waterless urinals). **Table 7.1** shows the District's rebates on the various appliances and fixtures. San Gabriel District has not recorded nor does it intend to record the number of devices actually installed; the District simply budgets for these assistance programs as part of its public and school education & outreach activities.

Table 7. 1: SGVMWD's Rebate Programs

Appliance / Fixture	Rebate Amount
Rain Barrel	\$35 per Rain Barrel or up to \$350 Cistern Rebate
Water Efficient Washing Machine	\$85
Weather Based Irrigation Controller	Up to \$80
Soil Moisture Sensor System	Up to \$80
Premium High Efficiency Toilet	\$40
Commercial Waterless Urinal	Up to \$150
Rotating Sprinkler Nozzles	\$2 per nozzle, minimum 30

7.2.4 OTHER SGVMWD CONSERVATION MEASURES

The San Gabriel District provides annual grants of \$10,000 to its member cities for conservation messaging and materials, such as water conservation banners and print material.

In 2020, San Gabriel District provided \$200,000 in grants for various pilot projects to reduce water consumption. These projects included landscaping demonstration projects that show landscape alternatives for lower water consumption. In addition, the San Gabriel District funded a pilot project that installs sophisticated water meters that provide detailed accounting of water which can be used to

isolate and identify water leaks which reduces overall losses in the water system.

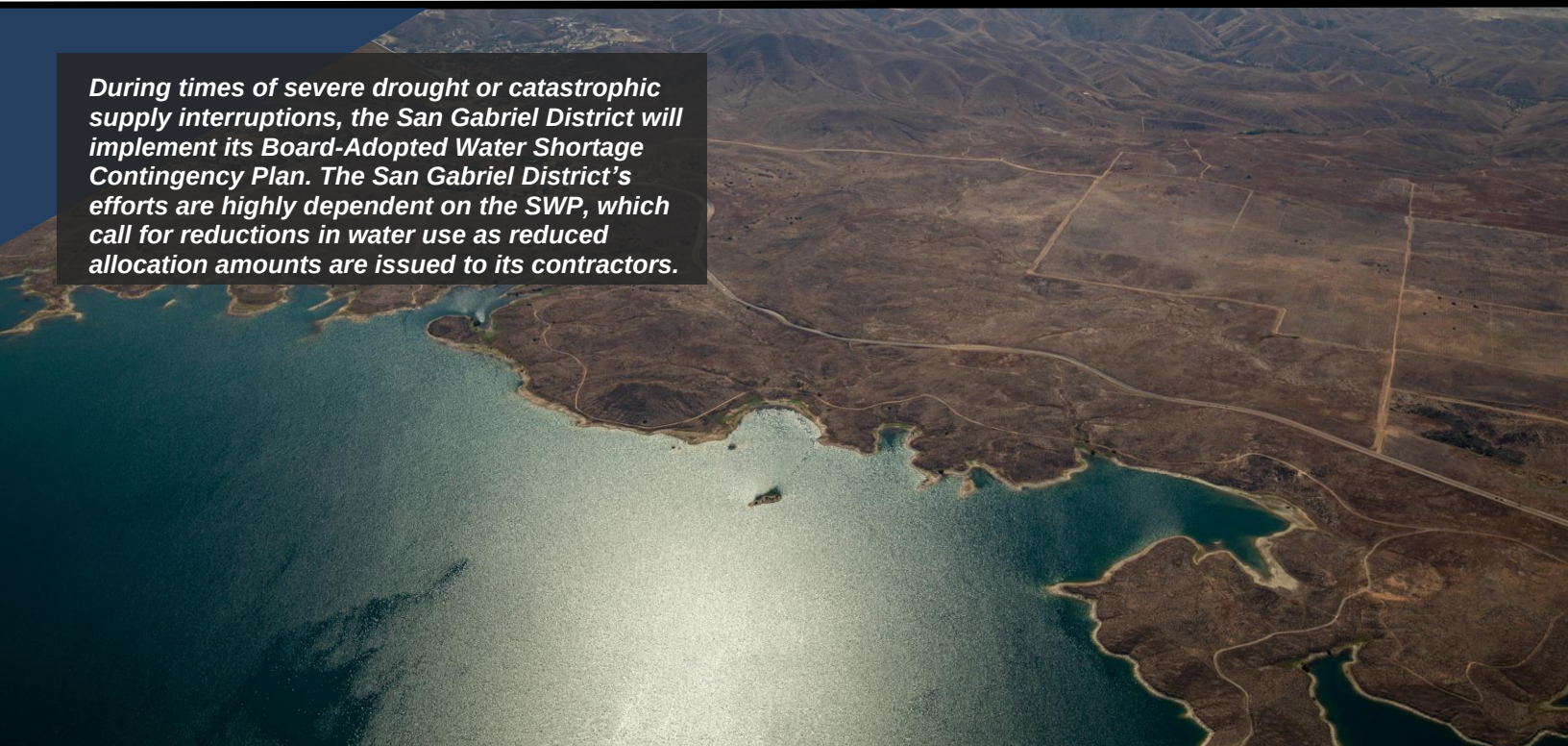
San Gabriel District has adopted Resolution No. 8-2018-756 (see **Appendix H**) to encourage the implementation and expansion of water use efficiency practices of its member agencies to achieve high levels of voluntary water conservation. In conjunction with its member agencies, San Gabriel District's resolution establishes the continued promotion of water efficiency and awareness through outreach to the general public and the stakeholders to help ensure the reliability of the region.

7.2.5 PLANNED CONSERVATION MEASURES

San Gabriel District will continue to implement all of the BMPs described previously. San Gabriel District will also continue to participate in the management of the Main Basin through its role in the Main Basin Watermaster. Main Basin management will continue to include all practicable water conservation measures. A brief review of these activities that promote water conservation follows:

1. Establishment of annual Main Basin Operating Safe Yield.
2. Assessments on excess production of water to purchase imported water for replenishment.
3. Cyclic storage agreements to store available imported water.
4. Testing of flow meters at water production facilities at least once every two years.
5. Coordinating the delivery of usable water and make-up water to the Lower Area.
6. Working with LACDPW to maximize utilization of water conservation facilities.
7. Continued participation in the Ground Water Replenishment Coordinating Group.
8. Continued participation in WQA.

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An aerial photograph showing a large, calm reservoir with a dark blue-green surface. The surrounding landscape is arid and hilly, with brownish-tan soil and sparse vegetation. Several winding roads and paths are visible across the terrain. The sky is not visible, as the image is cropped to focus on the water and land.

During times of severe drought or catastrophic supply interruptions, the San Gabriel District will implement its Board-Adopted Water Shortage Contingency Plan. The San Gabriel District's efforts are highly dependent on the SWP, which call for reductions in water use as reduced allocation amounts are issued to its contractors.

SECTION 8: WATER SHORTAGE CONTINGENCY PLAN

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 8

WATER SHORTAGE CONTINGENCY PLAN

8.1 INTRODUCTION

Water supplies may be interrupted or reduced significantly in a number of ways including droughts, earthquakes, and power outages, which hinder a water agency's ability to effectively deliver water. The ability to manage water supplies in times of drought or other emergencies is an important part of water resources management for a community. A Water Shortage Contingency Plan (WSCP) should enable water suppliers to provide water for public health and safety and minimize impacts on economic activity, environmental resources and the region's lifestyle. During times of sudden or temporary reduction of water supplies, the following should be priorities for use of available water:

1. Health and Safety (Residential)
2. Commercial, Industrial, & Institutional
3. Permanent Crops
4. Annual Crops
5. Landscaping
6. New Demand

As San Gabriel District receives imported water from the SWP and distributes it for the broader needs of its member agencies, the District's response to an emergency will be a coordinated effort of its own staff in conjunction with other local water agencies.

8.2 WATER SUPPLY RELIABILITY ANALYSIS

8.2.1 Water Service Reliability Assessment

Southern California is expected to experience an increase in regional demands in the years 2025 through 2045 as a result of population growth. Although increases in demand are expected, future demands are effectively limited due to the requirements of SBx7-7. It can be reasonably expected that the majority of agencies have met or were near their compliance targets for 2020 and will continue to meet, or will soon meet, their per-capita usage limit in the future.

The data in the MWD 2020 UWMP shows supply reliability projections for average and single dry years and is important to effectively project and analyze supply and demand over the next 25 years for many regional agencies. Projected supplies during single and multiple dry year scenarios indicate MWD's projected supply will exceed its projected single dry year demands in all years. Likewise, for average years, MWD supply exceeds projected demands for all years.

Due to the semi-arid nature of San Gabriel District's climate and as a result of past drought conditions, San Gabriel District is vulnerable to water shortages due to its climatic environment and seasonally hot summer months. **Section 6** describes the water availability during single and

multiple dry year scenarios. **Tables 8.1, 8.2, and 8.3** summarize the supply and demand comparisons during normal, single-dry year, and multiple dry year, respectively.

Table 8.1: SGVMWD Normal Year Supply & Demand (AF) (DWR Table 7-2 Wholesale)

	2025	2030	2035	2040	2045
Supply totals ^[1]	16,704	16,704	16,704	16,704	16,704
Demand totals ^[2]	14,482	14,766	15,054	15,345	15,641
Difference ^[3]	2,222	1,938	1,650	1,359	1,063

[1] Supply based on long-term average deliveries from SWP of 58 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

Table 8.2: SGVMWD Single Dry Year Supply & Demand (AF) (DWR Table 7-3 Wholesale)

	2025	2030	2035	2040	2045
Supply totals ^[1]	2,016	2,016	2,016	2,016	2,016
Demand totals ^[2]	18,401	18,708	19,020	19,336	19,656
Difference ^[3]	(16,385)	(16,692)	(17,004)	(17,320)	(17,640)

[1] Supply based on single dry year deliveries from SWP of 7 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

Table 8.3: SGVMWD's Multiple Dry Years Supply & Demand (AF) (DWR Table 7-4 Wholesale)

		2025	2030	2035	2040	2045
First year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	18,422	18,734	19,050	19,373	19,699
	Difference ^[3]	(10,934)	(11,246)	(11,562)	(11,885)	(12,211)
Second year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	19,809	20,138	20,472	20,811	21,154
	Difference ^[3]	(12,321)	(12,650)	(12,984)	(13,323)	(13,666)
Third year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	20,183	20,513	20,847	21,186	21,529
	Difference ^[3]	(12,695)	(13,025)	(13,359)	(13,698)	(14,041)
Fourth year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	19,560	19,876	20,197	20,521	20,851
	Difference ^[3]	(12,072)	(12,388)	(12,709)	(13,033)	(13,363)
Fifth year	Supply totals ^[1]	7,488	7,488	7,488	7,488	7,488
	Demand totals ^[2]	15,458	15,735	16,016	16,300	16,588
	Difference ^[3]	(7,970)	(8,247)	(8,528)	(8,812)	(9,100)

[1] Supply based on multiple dry year deliveries from SWP of 26 percent of Table A amount of 28,800 AF.

[2] Demands based on retail agencies supplement water requirements.

[3] Difference will be met by each retail agency or through future supply projects.

8.2.2 Five-Year Drought Risk Assessment

San Gabriel District's sole source of water supply is the SWP. As a contractor with SWP, San Gabriel District is entitled to 28,800 AFY. Based upon the current DWR allocation policy and worst-case supply conditions, San Gabriel District would be allotted 5 percent of its entitlement. This would at least provide San Gabriel District 1,440 AF annually, or a total of 7,200 AF over a five-year period. San Gabriel District is not required to deliver Supplemental Water for groundwater replenishment in the following year. Consequently, the potential accumulated deficit may be delivered in subsequent years.

Because San Gabriel District's member agencies rely on MWD imported water, it is important to note that, during a drought, imported water supplies are subject to demand increases and reduced supplies; however, MWD modeling in its 2020 UWMP, as referenced in **Tables 6.1** and **6.2** in **Section 6**, results in 100 percent reliability for full-service demands through the year 2045 for all climatic conditions. Thus, for purposes of this analysis, it is assumed that both MWD and San Gabriel District will be able to maintain the identified supply amounts for San Gabriel District's member agencies throughout the five-year period.

New to the 2020 UWMP is the Drought Risk Assessment (DRA) over a 5-year period examining the reliability of San Gabriel District's water supplies. **Table 8.4** shows the results of the analysis. The analysis was done utilizing DWR's DRA Planning Tool to determine supply and demand projections, and to analyze San Gabriel District's vulnerability to droughts. The tool also allows water purveyors to utilize potential water usage saving or supply augmentation methods to mitigate supply shortfalls. These water usages saving methods (restrictions) and supply augmentations are further discussed in the WSCP.

Table 8.4: Five-Year Drought Risk Assessment (AF) (DWR Table 7-5)

	2021	2022	2023	2024	2025
Total Water Use	14,258	14,314	14,370	14,426	14,482
Total Supplies	1,440	1,440	1,440	1,440	1,440
Surplus/Shortfall w/o WSCP Action	(12,818)	(12,874)	(12,930)	(12,986)	(13,042)
Planned WSCP Actions (Use Reduction and Supply Augmentation)					
Supply Augmentation Benefit from WSCP Response	0	0	0	0	0
Use Reduction Savings Benefit from WSCP Response	0	0	0	0	0
Revised Surplus/Shortfall	-12,818	-12,874	-12,930	-12,986	-13,042
Resulting % Use Reduction from WSCP Action	0%	0%	0%	0%	0%

Part of the five-year drought analysis was a review of projected SWP allocations based on historical hydrologies. As with the recent drought, potential impacts to SWP supplies from further drought, the implemented 2019 Biological Opinions for federally listed species, the 2020 Incidental Take Permit for state listed species, and the 2021 SWP contractors' demands are anticipated to be the biggest challenges facing San Gabriel District in the coming five years.

Furthermore, in response to the state undergoing a second consecutive dry year, DWR decreased the allocation of 2021 SWP deliveries for the contractors from 422,848 AF to 210,266 AF on March 2021. This reduction decreased San Gabriel District's initial request of 28,800 AF to 1,440 AF, which is 5 percent of San Gabriel District's 2021 requested Table A amounts. As reflected in **Table 8.4**, San Gabriel District estimates a shortfall in its supplies from 2021 to 2025 due to anticipated low supply conditions from the SWP. Nevertheless, San Gabriel District believes that its coordination with the Main San Gabriel Basin Watermaster, San Gabriel Basin Water Quality Authority, and other agencies as well as its efforts in promoting water conservation will reduce demand and increase groundwater reliability for its member agencies throughout the next 25 years.

8.3 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Under CWC Section 10632(a)(2), beginning by July 1, 2022, each urban water supplier is required to prepare their annual water supply and demand assessment (Annual Assessment) and submit an Annual Water Shortage Assessment Report to DWR. The Annual Water Shortage Assessment Report will be due by July 1 of every year, as required by CWC Section 10632.1. In addition, an urban water supplier that relies on imported water from the SWP or the Bureau of Reclamation shall submit its Annual Assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

This section outlines San Gabriel District's procedures used in conducting an Annual Assessment, including the following: 1) written decision-making process for determining water supply reliability; and 2) key data inputs and assessment methodology for evaluating the water supply reliability for the current year and one dry year.

8.3.1 Decision-Making Process

San Gabriel District's Annual Assessment will be mostly based on the recorded quantity of water delivered for replenishment and supply figures, which are reported to the General Manager on a regular basis throughout the year. To determine its water supply reliability and actual reductions in water use during declared water shortages or emergencies, San Gabriel District can rely on its regularly recorded deliveries as well as the annual reports prepared. These periodical analyses are used by San Gabriel District to manage resources to meet projected demands and adjust to changing conditions (i.e., precipitation) throughout the year.

Starting in 2022, San Gabriel District staff will submit and present a finalized Annual Water Shortage Assessment Report to the Board for approval by June each year. Following approval, San Gabriel District staff will submit the approved Annual Water Shortage Assessment Report to DWR by July 1 of every year. The functional procedures for the decision-making process are depicted in the following timeline shown in **Figure 8.1**.



Figure 8.1: Sample Annual Assessment Decision-Making Process Timeline

Key Data Inputs and Assessment Methodology

This section defines the key data inputs and assessment methodology used to evaluate the water supply reliability for the anticipated conditions for the current year and for one dry year that follows. The Annual Assessment determination will focus on the current year unconstrained demand, infrastructure constraints, and total water supply availability. Moreover, the Annual Assessment will consider the current year's weather, population growth, policies in place that will impact demands, and other influencing factors. The current year available supply will incorporate the hydrological regulatory conditions for the current year and following dry year.

Locally Applicable Evaluation Criteria

The locally applicable evaluation criteria that will be consistently relied on for each Annual Assessment include the following:

- 1) Assumed unconstrained demand for current year and one dry year
- 2) Assumed total water supply availability for current year and one dry year
- 3) Existing infrastructure capabilities and plausible constraints
 - Any known issues with the water facilities (including water quality conditions limiting local sources)
 - Planned power outages for operation and maintenance
 - New construction and repairs
 - Environmental mitigation measures
 - Other constraints that may affect near-term water supply reliability

Water Supply Sources Description and Quantification

As part of the Annual Assessment, the total available water supply evaluation criteria will comprise of San Gabriel District's water supply sources as shown and quantified in **Tables 8.5** and **8.6**.

Table 8.5: 2020 Water Supply (AF) (DWR Table 6-8 Wholesale)

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	State Water Project	7,728	Drinking Water	28,800
Total		7,728		28,800

Table 8.6: Projected Water Supply Availability (AF) (DWR Table 6-9 Wholesale)

Water Supply	Additional Detail on Water Supply	Projected Water Supplies				
		2025	2030	2035	2040	2045
Purchased or Imported Water	State Water Project	16,704	16,704	16,704	16,704	16,704
Total		16,704	16,704	16,704	16,704	16,704

Imported Water Purchases

San Gabriel District receives its untreated, imported water supply from the SWP through the slide-gate at the Devil Canyon Plant located in San Bernardino. As shown in **Table 8.6**, San Gabriel District is projected to be able to have access to 58 percent Table A amount with SWP of 16,704 AFY.



Figure 8.2: Severe Droughts Highlight the Importance of Conservation Ordinances (Lake Oroville in 2014)

8.4 SHORTAGE STAGES AND SHORTAGE RESPONSE ACTIONS

8.4.1 MWD Stages of Action

Water Surplus & Drought Management Plan (WSDM)

In addition to the provisions of the San Gabriel District's response plan, San Gabriel District's service area will also be impacted, at least indirectly, by MWD's Plan WSDM. It is understood that San Gabriel District's member agencies will work within the framework of the WSDM Plan. The WSDM Plan was developed in 1999 by MWD with assistance and input with its member agencies. The plan addresses both surplus and shortage contingencies.

The WSDM Plan guiding principle is to minimize adverse impacts of water shortage and ensure regional reliability. The plan guides the operations of water resources (local groundwater and surface water resources, Colorado River, State Water Project, and regional storage) to ensure regional reliability. It identifies the expected sequence of resource management actions MWD will take during surpluses and shortages of water to minimize the probability of severe shortages that require curtailment of full-service demands. Mandatory allocations are avoided to the extent practicable; however, in the event of an extreme shortage, an allocation plan will be adopted in accordance with the principles of the WSDM Plan.

8.4.2 San Gabriel District's Response Plan

During water shortage emergencies, San Gabriel District will implement its drought ordinance and will work with its member agencies in implementing their own plans. San Gabriel District passed its drought ordinance in 1991 (Resolution 3-91-421; see **Appendix I**) after DWR had to reduce

SWP delivers to San Gabriel District due to the drought at that time. The purpose of the resolution is to:

1. Acknowledge that SWP deliveries can be reduced in a given drought year.
2. Recommend minimum water use restrictions.
3. Advise its member agencies in the proper management of water use.

As a wholesale agency that provides an indirect source of water, San Gabriel District cannot legally enforce the water use restrictions at the local level; however, since the passage of resolution 3-91-421 in 1991, San Gabriel District's member agencies have passed their own response plans.

San Gabriel District's Stages of Action

The Main Basin Watermaster typically requests San Gabriel District to deliver supplemental imported water to replenish the Main Basin within one year of San Gabriel District's member agencies incurring a Replacement Water assessment. Such deliveries could be made as surface flow, deducted from San Gabriel District's Cyclic Storage account, or deferred to the future at such time sufficient water is available.

Due to the significant amount of groundwater in storage, even after multiple dry years, Main Basin Watermaster can exercise its discretion to grant San Gabriel District an extension to deliver Supplemental Water over more than a one-year period. San Gabriel District stages of action consist of storing water in its cyclic storage account with the Main Basin Watermaster. San Gabriel District would also work with its member agencies to inform retail water users of the need to expand water conservation measures. A 50 percent allocation of San Gabriel District's SWP entitlement would yield 14,400 AF. Currently, with a 50 percent allocation and San Gabriel District's Cyclic Storage, San Gabriel District will not be able to meet future demands; however, San Gabriel District and its member agencies are looking into a wide variety of future projects and programs to alleviate this issue.

To date, San Gabriel District does not utilize reduction stages. Although San Gabriel District is a wholesaler, the District indirectly supplies to its agencies via groundwater replenishment. The amount of groundwater replenishment is dependent on SWP supplies which varies depends on climatological conditions. Therefore, the six standard water shortage stages mandated by CWC Section 10632(a)(3)(A) do not apply to San Gabriel District.

8.4.3 Prohibitions

Mandatory Prohibitions

Although this section does not apply to San Gabriel District because it does not provide water for direct use, San Gabriel District adopted Resolution 3-91-421 (see **Appendix I**), which encourages water conservation and recommends minimum restrictions be placed on water use. In addition, San Gabriel District's member agencies implement additional water conservation measures, as described in those agencies' WSCPs.

8.4.4 Consumption Reduction Methods

As a wholesale supplier, San Gabriel District is not in a position to directly control the water use of its member agencies; however, the water conservation programs promoted by San Gabriel District enable its member agencies to reduce retail water usage and, in turn, the demand from San Gabriel District on SWP water.

8.4.5 Catastrophic Supply Interruption

San Gabriel District does not supply water for retail use and Main Basin management does not require delivery of supplemental water in subsequent years. Consequently, interruption of supply from SWP would not have adverse effects upon San Gabriel District or the Main Basin. San Gabriel District is not required to deliver its Supplemental Water requirement when it is incurred. If water is not available to San Gabriel District at the time when the Supplemental Water is requested by Main Basin Watermaster, it can be delivered when it becomes available and/or can be deducted from the Cyclic Storage account.

8.4.6 Seismic Risk Assessment and Mitigation Plan

Introduction

Earthquakes can vary significantly in magnitude and the amount of damage caused. Major earthquakes can cause loss of electrical power, damage to San Gabriel District's structures and equipment, disruption of service, and injuries to staff. This section provides a description of San Gabriel District's procedures (i.e., response and mitigation) after an earthquake event.

As mandated in CWC Section 10632.5, beginning January 1, 2020, water suppliers are required to include a seismic risk assessment and mitigation plan as part of their WSCP to assess the vulnerability of each of the various facilities of their water system and mitigate those vulnerabilities. If an urban water supplier does not have a seismic risk assessment and mitigation plan, the urban water supplier may instead, per CWC Section 10632.5(c), include a local hazard mitigation plan (LHMP) or a multi-hazard mitigation plan. This requirement is satisfied by the incorporation of elements and assessments from the 2019 County of Los Angeles All-Hazards Mitigation Plan and LHMPs of two of San Gabriel District's four member agencies: City of Azusa (**Appendix XX**) and City of Sierra Madre (**Appendix XX**). The other two member agencies, City of Alhambra and City of Monterey Park, are currently planning development of their LHMPs. Although San Gabriel District does not currently have a seismic risk assessment and mitigation plan, San Gabriel District is in the discussion stage for preparation of an LHMP. Because San Gabriel District does not have water infrastructure with high risk of earthquake damage, a definite timeline for the development of an LHMP has not been determined at this time.

Seismology of Water Facilities & Vulnerability

An earthquake is caused by the shifting of tectonic plates beneath the Earth's surface. Ground shaking from moving geologic plates collapses buildings and bridges, and sometimes triggers landslides, avalanches, flash floods, fires and tsunamis. The strong ground motion of earthquakes

has the potential to cause a great deal of damage to drinking water and wastewater utilities, particularly since most utility components are constructed from inflexible materials (i.e., concrete, metal pipes). Earthquakes create many cascading and secondary impacts that may include, but are not limited to:

- Structural damage to facility infrastructure and equipment
- Water tank damage or collapse
- Water source transmission line realignment or damage
- Damage to distribution lines due to shifting ground and soil liquefaction, resulting in potential water loss, water service interruptions, low pressure, contamination and sinkholes and/or large pools of water throughout the service area
- Loss of power and communication infrastructure
- Restricted access to facilities due to debris and damage to roadways

According to the maps provided on the California Office of Emergency Services' online planning tool (My Plan) and the California Geological Survey's online earthquake hazards zone application (EQ Zapp), no portion of San Gabriel District's system is crossed by a known fault line as shown in **Figure 8.3**. Therefore, there are no water structures with an extremely high risk of earthquake damage. There are, however, facilities within areas of increased risk due to landslides and liquefaction.

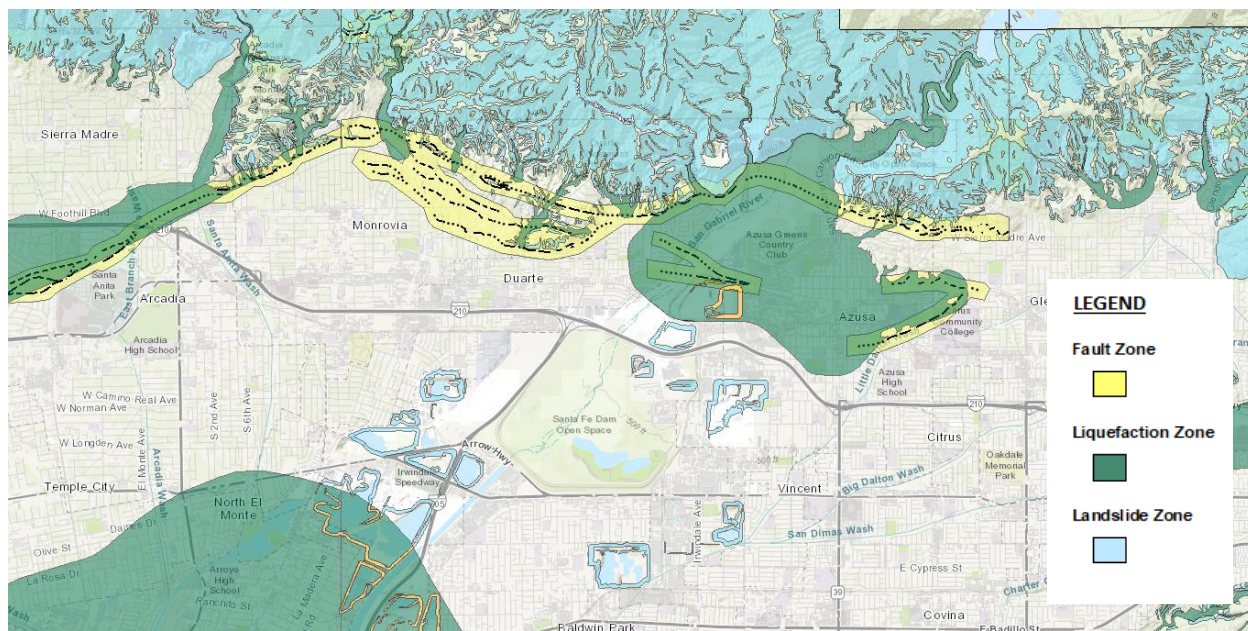


Figure 8.3: Seismic Hazards within San Gabriel District Service Area (California Geological Survey)

Mitigation Actions

Hazard mitigation may occur during any phase of a threat, emergency, or disaster. Mitigation can and may take place during the preparedness (before), response (during), and recovery (after) phases. The process of hazard mitigation involves evaluating a hazard's impact and identifying and implementing actions to minimize or eliminate the impact.

The following mitigation actions and goals established by the County of Los Angeles and the cities of Azusa and Sierra Madre to mitigate seismic risks and vulnerabilities are further described within their respective hazard mitigation plans.

County of Los Angeles

The goals of the County of Los Angeles All-Hazard Mitigation Plan (AHMP) are based on a risk assessment, representing a long-term vision for hazard reduction or enhanced mitigation capabilities.



Figure 8.4: The Five Phases of Emergency Management

The five mitigation goals and descriptions are listed below:

1. **Protect Life and Property** – Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural, human-caused, and technological hazards. Improve hazard assessment information to make recommendations for avoiding new development in high-hazard areas and encouraging preventive measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.
2. **Enhance Public Awareness** – Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards. Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.
3. **Preserve Natural Systems** – Support management and land use planning practices with hazard mitigation to protect life. Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.
4. **Encourage Partnerships and Implementation** – Strengthen communication and coordinate participation with public agencies, citizens, nonprofit organizations, business, and industry to support implementation. Encourage leadership within the County and public organizations to prioritize and implement local and regional hazard mitigation activities.
5. **Strengthen Emergency Services** – Establish policy to ensure mitigation projects are considered for critical facilities, services, and infrastructure.

City of Azusa

The mitigation actions for earthquake events described in the City of Azusa's 2018 LHMP are included on the following page.

- Integration of the LHMP into Safety Element of the Azusa General Plan
- Public awareness, education, outreach, and preparedness program enhancements
- Establish CERT Program
- Develop Emergency Operations Plan Update
- Evacuation planning
- City Ordinances and Regulatory updates for natural resources protection and public information
- Improvements of above ground storage tanks to install appropriate seismic safeguards

In addition, in order to mitigate the effects of earthquakes and liquefaction, the City of Azusa may pursue the following:

- Conduct a seismic evaluation of essential/critical facilities, such as municipal-owned facilities, schools, and convalescent homes and hospitals that are located in or near mapped faults, or in areas mapped as susceptible to liquefaction or earthquake-induced slope instability. Funding sources will be sought to retrofit facilities at risk.
- Where appropriate, relocate, strengthen, or retrofit those essential/critical facilities found to be at risk from seismic hazards.
- Conduct an inventory of seismically vulnerable private buildings, including unreinforced masonry and soft first-story structures, and prioritize retrofits for more vulnerable structures and lower income housing.
- In cooperation with utility providers, conduct seismic evaluations of gas lines, water distribution pipelines, sewer lines and critical roadways that extend across mapped fault zones. Facilities at risk will be strengthened.

City of Sierra Madre

According to the City of Sierra Madre's 2020 LHMP, mitigation actions for seismic hazards include, but are not limited to, the following:

- Encourage hazard reduction with non-structural and structural earthquake retrofits and other strategies in homes, businesses, and City of Sierra Madre facilities.
- Replace water mains in fault zones with seismic pipe thereby maintaining water system integrity and reducing the threat to life and property loss by providing fire suppression.
- Renovate main booster plant with new booster pumps and control panels thereby ensuring reliable water delivery to the City of Sierra Madre's distribution system.
- Seismic retrofit of Auburn reservoir thereby preserving stored water for domestic use and fire suppression.
- Conduct geological studies on fault zones within the City of Sierra Madre and identify threatened structures and limitations on land for potential construction.
- Promote public awareness of the need to upgrade seismically hazardous buildings for the protection of health and safety.
- Require seismic review of buildings.
- Maintain and update multi-hazard emergency preparedness plan that includes seismic safety.

DWR – SWP Seismic Improvements

The following write-up regarding seismic mitigation improvements to SWP facilities is from the State Water Contractors (SWC):

DWR's recent SWP seismic resiliency efforts have focused heavily on SWP Dam Safety. The most prominent is the joint USBR/DWR corrective action study of Sisk Dam which will result in a massive seismic stability alteration project, which is expected to begin construction in 2021. Similarly, Perris Dam had a major foundation modification and stability berm added to the downstream face which has resulted in the removal of the DSOD imposed storage restriction. Several analyses have been conducted on SWP dam outlet towers/access bridges which has resulted in seismic upgrades (some completed/some on-going). Updated dam seismic safety evaluations are being performed on the Oroville Dam embankment and the radial gate control structure on the flood control spillway.

In addition to the dam safety elements, DWR has procured and stockpiled spare pipe sections for the South Bay Aqueduct to increase recovery times following seismic induced damage (as part of the 2015 South Bay Aqueduct Reliability Improvement Project). Seismic retrofits have also been completed on 23 SWP bridges located in four Field Divisions with additional retrofits in various development stages. DWR has also updated the earthquake notification procedures and has replaced and expanded instrumentation for the SWP's seismic network.

8.5 COMMUNICATION PROTOCOLS

8.5.1 Introduction

San Gabriel District's communication protocol includes the various channels that San Gabriel District will utilize to convey critical messages regarding water shortage allocations and voluntary and mandatory actions. A strong communication strategy and a common understanding on the water supply situation and necessary actions between San Gabriel District and its member agencies, the public, elected officials, and other key stakeholders are essential should the WSCP need to be activated. How the water shortage messages are addressed to the public are described in this communication protocol. The communication protocol will be in place prior to a water supply shortage. Activation of the communication protocol will continue through all subsequent water shortage stages. San Gabriel District will ensure outreach efforts are reaching key audiences as needed.

It is important to communicate to its customers the following when urgent conservation is needed:

- What is the extent of the water shortage emergency;
- What response actions should be triggered to save water;
- Why water needs to be saved; and
- What actions San Gabriel District is taking to respond to the water supply situation.

8.5.2 Coordination

The goal of San Gabriel District's outreach plans during dry periods and water shortages is to maintain effective coordination with key audiences. In order to maintain reliability in this communication, San Gabriel District will work closely with the Board of Directors. During dry periods or other times of limited supply, the frequency and extent of coordination will increase to ensure outreach tactics are consistent with the changing needs of San Gabriel District and its member agencies.

8.5.3 Communication Goals

Communication objectives during an existing or anticipated water shortage condition include the following:

- Motivate key audiences (i.e., member agencies) to increase conservation in following any voluntary or mandatory actions called for at the current stage of the WSCP.
- Raise awareness of the drought, regulations, or other conditions affecting water sources and supplies.
- Educate customers, key stakeholders, elected officials, and the general public about water supply reliability, water quality, and water delivery.
- Prepare member agencies for any potential escalation of the supply shortage stages.

8.5.4 Communication Protocol for Current or Predicted Shortage

A current or predicted shortage, as determined by San Gabriel District's Annual Assessment, will be addressed to the public and its customers upon submittal of the Annual Water Shortage Assessment Report to DWR by July 1 of every year. This notice may be conducted by San Gabriel District's website, signage in front of the District's Office, and wholesale agency coordination.

8.5.5 Communication Protocol for Shortage Response Actions Triggered or Anticipated to be Triggered

Because San Gabriel District indirectly supplies to its agencies via groundwater replenishment, San Gabriel District does not utilize standard reduction stages. As noted previously, San Gabriel District stages of action consist of storing water in its cyclic storage account with the Main Basin Watermaster. Should a water shortage emergency exist, San Gabriel District will work with its member agencies to notify their customers of the need to increase water conservation measures.

8.5.6 Other Relevant Communication Protocols

To reduce water use consumption during any water shortage stage, San Gabriel District will increase its public education and outreach efforts to build awareness of needed actions from the public. Moreover, San Gabriel District will regularly revise its outreach campaign to reflect current supply conditions. Key communication strategies are listed below:

- Promote available water assistance resources for vulnerable populations; specialized

- outreach for impacted industries.
- Keep stakeholders aware of conditions.
- Conduct meetings with elected officials and other key civic and business leaders.
- Encourage reduced optional outdoor use through outreach.

San Gabriel District may implement these communication strategies through its newsletters, website, and social media platforms to reflect supply conditions. In addition, San Gabriel District may conduct news briefings or other media outlets (i.e., TV, radio, newspapers) to announce changes in supply conditions.

8.5.7 Crisis Communication Protocol

In the event of a catastrophic supply interruption due to a natural disaster or damage to its facilities, San Gabriel District will implement communication procedures in accordance with local, regional, state, and federal emergency response guidelines. Depending upon the severity of the emergency and potential damage to San Gabriel District's facilities, San Gabriel District may determine that it is necessary to utilize the Standardized Emergency Management System (SEMS) response and the Incident Command System (ICS). Public information and crisis communication are an integral part of the ICS structure.

When an incident occurs interrupting supply, the General Manager, Assistant General Manager, or the Supervising System Operator will go to the designated EOC and begin implementation of San Gabriel District procedures and employ appropriate strategies.

Crisis communication efforts will concentrate on providing information to the public and external audiences. Furthermore, outreach messaging will reflect emergency conditions and the need to focus on health and public safety. San Gabriel District will keep the Board of Directors informed of incident status and coordinate with public health officials.

San Gabriel District will maintain communication with its member agencies. In addition, San Gabriel District may also authorize release of public information to news media to announce conditions and explain needed action. Finally, San Gabriel District will ensure ongoing coordination with emergency response services with daily advisories or alerts as needed.

8.6 COMPLIANCE AND ENFORCEMENT

8.6.1 Penalties or Charges

Although San Gabriel District has its drought resolution that identifies wasteful uses of water, the District is not in a position to directly control retail water use through penalties or charges. Thus, San Gabriel District has not developed penalties or charges related to wasteful water use, but have reserved implementation of penalties or charges for wasteful use to its member agencies.

8.7 LEGAL AUTHORITIES

Under California law, including CWC Chapter 3 (commencing with Section 350) of Division 1,

Parts 2.55 and 2.6 of Division 6, Division 13, and Article X, Section 2 of the California Constitution, the Board of Directors is authorized to implement the water shortage response actions outlined in this section. In all water shortage cases, shortage response actions to be implemented will be at the discretion of the Board and will be based on an assessment of the supply shortage, customer response, and need for demand reductions.

It is noted that upon proclamation by the Governor of a state of emergency under the California Emergency Services Act, Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code, based on drought conditions, the state will defer to implementation of locally adopted water shortage contingency plans to the extent practicable. San Gabriel District will coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

8.8 FINANCIAL CONSEQUENCES OF WSCP IMPLEMENTATION

San Gabriel District is invoiced for fixed and variable costs associated with the SWP. The fixed expenditures of San Gabriel District's operations, administration and SWP repayment are funded through fixed income from property taxes, including repayment of bonded indebtedness. The cost of imported water for groundwater replenishment is based on the quantity delivered and that cost is passed on to its member agencies. Consequently, a reduction of revenue will be correspondingly matched by a reduction in expenditures and will not impact the ability of San Gabriel District to conduct business.

8.9 MONITORING AND REPORTING

8.9.1 Evaluation of Reductions

San Gabriel District cannot impact or directly quantify actual reductions in retail water use. However, San Gabriel District can obtain agencies' water uses from Watermaster and can develop trends to assist with determination of actual reductions. These trends are also impacted by seasonal precipitation and population growth.

8.10 WSCP ADOPTION AND REFINEMENT PROCEDURES

8.10.1 WSCP Public Notice and Adoption

To encourage broad community participation in the WSCP preparation process, San Gabriel District provided 60-day notification letters to agencies within San Gabriel District's service area. Copies of the draft WSCP were made available for public review at the District's Office and on the San Gabriel District website prior to the public hearing. Shortly before the public hearing, a two-week and a one-week notice was published in the local press alerting the public of the public hearing. At a subsequent board meeting following the public hearing, San Gabriel District's final WSCP was approved and adopted by its Board of Directors on **June 24, 2021**. **Appendix XX** contains the Board resolution adopting the WSCP. The final plan was submitted to DWR within 30 days of Board adoption and includes all information necessary to meet the requirements of CWC Section 10632.

By **June XX, 2021**, San Gabriel District's approved WSCP was filed with DWR. By **July 1, 2021**, San Gabriel District's plan was submitted to the California State Library, County of Los Angeles, and cities within its service area. San Gabriel District will make the plan available for public review no later than 30 days after filing with DWR.

8.10.2 WSCP Refinement Procedures

This section discusses the process for reviewing and updating the WSCP to ensure it remains actively used, relevant and appropriate to the community, and consistent with applicable state and local requirements. It is vital that San Gabriel District's WSCP remain up to date so as to best ensure shortage risk tolerance is adequate, appropriate water shortage mitigation strategies are implemented as needed, proper procedures for water efficient practices are in place for the community, and better alignment with long-term water use goals.

San Gabriel District's Management is responsible for maintaining this plan and updating it as needed. The Assistant General Manager is the primary San Gabriel District staff member who will carry out this process, under the direction of the General Manager or other appropriate staff member. In addition, the General Manager, or their designee, will serve as the WSCP project manager and will coordinate maintenance of the plan, conduct the formal review process, and direct the plan updates. The project manager will assign tasks, which may include collecting data, developing new or updated water shortage mitigation measures, updating sections of the plan, and presenting the plan to others.

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The San Gabriel District currently does not utilize recycled water. However, the District continues to investigate the feasibility and cost-effectiveness of using recycled water as a source for groundwater recharge and other usages within its member agencies service area.



SECTION 9: RECYCLED WATER

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT | 2020 URBAN WATER MANAGEMENT PLAN

SECTION 9 RECYCLED WATER

9.1 INTRODUCTION

The Southern California region, from Ventura to San Diego, discharges over 1.3 billion gallons of treated wastewater to the ocean each day. This is considered a reliable and drought-proof water source and could greatly reduce the region's reliance on imported water. As technological improvements continue to reduce treatment costs, and as public perception and acceptance continue to improve, more reuse opportunities should develop. Recycled water is a critical part of the California water picture because of the area's high likelihood of drought. As treatment technology continues to improve, recycled water use will continue to increase. As part of its overall water resources planning, the San Gabriel District continues to investigate the feasibility and cost-effectiveness of using recycled water.

9.2 WASTEWATER DESCRIPTION & DISPOSAL

The San Gabriel District does not provide wastewater collection services for its member agencies. Instead, each agency services their own sanitation sewer system which ultimately is collected by the Los Angeles County Sanitation District (LACSD) for wastewater treatment. Wastewater generated in the service area is treated at one of two water reclamation plants. The treatment plants are the San Jose Creek Water Reclamation Plant (SJCWRP) and the Whittier Narrows Water Reclamation Plant (WNWRP). Both of the facilities are within the Main San Gabriel Groundwater Basin. LACSD treats wastewater conveyed through roughly 9,500 miles of wastewater conveyance lines, the majority of which are owned and maintained by the respective Cities they serve. LACSD owns and operates approximately 1,400 miles of these conveyance.



Figure 9.1: San Jose Creek Water Reclamation Plant

9.3 CURRENT & PROJECTED RECYCLED WATER USAGE

The San Gabriel District does not distribute recycled water to its member agencies; however, the District promotes and encourages the usage of recycled water when it is feasible.

9.4 RECYCLED WATER POTENTIAL

Recycled water has been extensively studied for feasibility for SGVMWD and its member agencies.

Groundwater Replenishment Potential

Reclamation of wastewater in the Main Basin has been extensively reviewed in both local and regional studies. In 1976, San Gabriel District and Upper District completed a study entitled “Potential Use of Reclaimed Water for Ground-Water Replenishment in the Main San Gabriel Basin.” This study was updated at the request of the Main Basin Watermaster in 1980 and again in 1987. This study along with others concluded water reuse in the Main Basin could be feasible.

The Main Basin Judgment originally did not allow the use recycled water for groundwater replenishment without Court approval, but did permit the Main Basin Watermaster to study the feasibility of using such water. In April 1991, an amendment to the Main Basin Judgment was passed allowing a maximum of 30,000 AFY of recycled water for replenishment, Replacement Water, and Cyclic Storage purposes in the Main Basin. Subsequently, in the early 1990s, Upper District and San Gabriel District, in cooperation with the Main Basin Watermaster, proposed to implement a water recycling/groundwater replenishment program referred to as the San Gabriel Valley Recycled Water Demonstration Project (the Demonstration Project). The Demonstration Project proposed to replenish up to 10,000 AFY of tertiary treated recycled water in the Main San Gabriel Basin using the San Gabriel River as the point of replenishment.

Direct Re-Use Potential

During 1994, San Gabriel District co-sponsored a study to determine potential direct users of recycled water. In October 1994, a draft study entitled “Direct Reuse Study” was released that identified 612 potential users in the Main Basin. At the time the draft study noted although there were over 600 potential recycled water users in the Main Basin, delivering water to many of these users would be cost prohibitive because of their distance from the reclamation plants and the relatively low quantity of recycled water use. The study concluded the most economical use of recycled water would be to provide water to several large users located in close proximity to the Demonstration Project water transmission main.

During calendar year 2005, San Gabriel District entered into a Memorandum of Understanding (MOU) with the Upper District and Central Basin to identify the potential to expand use of recycled water. A copy of that MOU is included as **Appendix J**. The cities of Alhambra and Monterey Park will be the only two San Gabriel District member agencies that may benefit from this particular study. Subsequently, a report entitled “Recycled Water Master Plan Update,” dated October 2008, was developed. That report identified potential recycled water uses.

Recycled Water Feasibility Study

In 2017, San Gabriel District conducted the “San Gabriel Valley Regional Recycled Water Supply Program Feasibility Study” which analyzed potential ways for the District’s member agencies to obtain and utilize recycled water. Each member agencies potential to obtain and use recycled water is shown on the following page.

City of Azusa	The City of Azusa can obtain recycled water by connecting through Upper San Gabriel Valley Municipal Water District's (USGVMWD) Indirect Reuse Replenishment Project Main. Recycled water would be supplied by USGVMWD which originated from SJCWRP. Potential users comprised of one (1) industrial user, five (5) parks, six (6) schools, and one (1) residential area, approximating a total demand of 400 AFY. The potential projects will require 43,086 feet of pipeline, two (2) pumps, and will cost approximately \$12.9 million to implement in 2017 dollars. Currently, this is not recommended due to the lack of recycled water supply from USGVMWD and project cost.
City of Monterey Park	The City of Monterey Park can obtain recycled water through existing Central Basin Municipal Water Districts (CBMWD) recycled water mains near the Montebello Country Club. Recycled water would be supplied by CBMWD which originated from SJCWRP. Connection to CBMWD's main would require a two-phase project with CBMWD to expand their facilities. Potential users comprised of one (1) school, and one (1) commercial/industrial application, approximating a total demand of 1,150 AFY. The potential projects will require 79,807 feet of pipeline, three (3) pumps, and one (1) recycled water reservoir. The system is estimated at \$30.2 million in 2017 dollars.
City of Alhambra	The City of Alhambra can obtain recycled water through the two-phase CBMWD expansion project mentioned previously for the City of Monterey Park. Potential users comprised of (8) schools, four (4) parks, three (3) industrial applications, four (4) irrigation applications, one (1) laundry facility, one (1) golf course, and one (1) car wash, which equates to an approximate total demand of 1,675 AFY. The potential project will require 49,301 feet of pipeline, three (3) pumps, and will have an estimated cost of \$14.3 million in 2017 dollars.
City of Sierra Madre	Due to the City's location, accessibility to recycled water from existing LACSD facilities is not feasible. However, one approach would be to implement a membrane bioreactor scalping plant. The recycled water supplied by the scalping plant will be used for groundwater replenishment purposes only and would have to comply with Title 22 groundwater recharge regulations. This project will require 2,650 feet of pipeline, two (2) pumps, and one (1) MBR scalping plant, approximating a total estimated cost at \$37 million in 2017. Currently, this is not recommended due to system costs and LACSD requirements.

Actions to Encourage Use

San Gabriel District has entered into agreements with Upper District and Central Basin to develop recycled water projects that will enable San Gabriel District's member agencies to have access to recycled water. Because none of these projects have been constructed, it is premature to quantify financial incentives.

Optimization of Recycled Water

As described above, San Gabriel District is cooperating on a variety of projects that may facilitate recycled water use for its member agencies

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