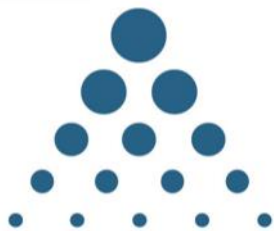




Adopted July 16, 2021

Barstow Service Area 2020 Urban Water Management Plan



Golden State
Water Company

A Subsidiary of American States Water Company

Prepared by:



Table of Contents

Executive Summary ..Layperson’s Description.....	ES-1
ES-1 Golden State Water Company – Barstow	ES-2
ES-2 GSWC Barstow’s Water Service Reliability	ES-3
Chapter 1 GSWC Barstow Service Area Introduction	1-1
1.1 Background and Purpose	1-2
1.2 Basis for Plan Preparation	1-2
1.3 Coordination and Outreach	1-3
1.4 UWMP Adoption	1-4
1.5 Document Organization	1-5
Chapter 2 GSWC Barstow Service Area Water Service and System Description	1
2.1 Service Area Climate	2-3
2.2 Land Use and Economic Outlook	2-4
2.3 Service Area Population and Demographics	2-5
2.3.1 Current Population and Historic Trends	2-5
2.3.2 Projected Population	2-6
2.4 Delivery System Details	2-6
2.4.1 Potable System	2-7
2.4.2 Non-potable System	2-7
2.5 Energy Intensity.....	2-7
Chapter 3 GSWC Barstow Service Area Water Supply	3-1
3.1 Groundwater	3-2
3.1.1 Mojave Groundwater Basin Description	3-2
3.1.2 Mojave Basin Area Adjudication.....	3-3
3.1.3 Mojave Water Agency Role with GSWC Barstow Supplies	3-6
3.1.4 GSWC Barstow’s Free Production Allowance	3-6
3.1.5 Carryover Groundwater Supplies	3-7
3.2 Groundwater Quality	3-8
3.3 Recycled Water Supplies	3-11
3.4 Desalination Opportunities	3-11
3.5 Water Transfers and Exchanges	3-11

3.6	Climate Change	3-11
3.7	Supply Summary.....	3-12
Chapter 4 GSWC Barstow Service Area Water Use		4-1
4.1	Historic Water Use	4-1
4.1.1	Distribution System Losses	4-1
4.2	Compliance with 2020 Urban Water Use Target	4-2
4.3	Demand Management Measures	4-2
4.4	Projected Water Demands.....	4-4
4.5	Forecasting Water Use for Dry Year Conditions	4-5
4.6	Forecasting Water Use for the DRA and Annual Assessment.....	4-6
4.6.1	Projecting Water Use for 5-year Drought Risk Assessment	4-6
4.7	Low Income Water Use Projection	4-7
Chapter 5 GSWC Barstow Service Area Water System Reliability.....		5-1
5.1	Five Year Drought Risk Assessment	5-1
5.2	Long Term Service Reliability	5-2
5.2.1	Long Term Service Reliability.....	5-2
5.3	Annual Reliability Assessment	5-4
5.3.1	Normal Year Supply and Current Water Use.....	5-4
5.3.2	Single Dry Year Supply and Dry-Year Current Demand	5-5
5.4	Water Supply Reliability Summary.....	5-5
Chapter 6 GSWC Barstow Service Area Water Shortage Contingency Plan.....		6-1
6.1	Water Supply Reliability Analysis	6-2
6.2	Annual Water Supply and Demand Assessment Procedures	6-3
6.2.1	Analytical and Decision-making Processes	6-3
6.2.2	Submittal Procedure	6-4
6.3	Six Standard Water Shortage Stages and Triggers.....	6-4
6.4	Shortage Response Actions.....	6-4
6.4.1	California Public Utilities Commission Role in Implementation	6-4
6.4.2	GSWC Water Shortage Contingency Plan - Activation Overview	6-5
6.4.3	Staged Response.....	6-5
6.4.4	Demand Reduction Actions per Stage	6-8
6.4.5	Supply Augmentation Actions	6-12
6.4.6	Operational Changes	6-12
6.4.7	Mandatory Prohibitions.....	6-12
6.4.8	Emergency Response Plan for Catastrophic Water Shortages.....	6-13

6.4.9	Seismic Risk Assessment and Mitigation Plan	6-15
6.5	Communication Protocols.....	6-15
6.5.1	Rule 14.1 Communications	6-15
6.5.2	Additional Communication Protocols.....	6-16
6.6	Compliance and Enforcement.....	6-17
6.7	Legal Authorities	6-17
6.8	Financial Consequences of WSCP	6-17
6.8.1	Revenue and Expenditure Impacts.....	6-17
6.8.2	Drought Rate Structures and Surcharges	6-19
6.8.3	Use of Financial Reserves	6-19
6.9	Monitoring and Reporting.....	6-19
6.10	Re-evaluation and Improvement Procedures.....	6-20
6.11	Special Water Feature Distinction	6-20
6.12	Plan Adoption, Submittal, and Availability.....	6-20
Appendix A.....		A-1
Appendix B.....		B-1

List of Tables

Table 1-1: Public Water System Information.....	1-2
Table 1-2: Public and Agency Coordination.....	1-4
Table 2-1: Current and Projected Population.....	2-6
Table 2-2: Barstow 2019 Energy Intensity – Total Utility Approach.....	2-7
Table 3-1: Projected Mojave Adjudication FPA for GSWC Barstow through 2025 (AFY)	3-7
Table 3-2: Projected Mojave Adjudication FPA for GSWC Barstow through 2045 (AFY)	3-7
Table 3-3: Projected Carryover Water Supplies through 2025 (AFY)	3-8
Table 3-4: Projected Carryover Water Supplies through 2045 (AFY)	3-8
Table 3-5: GSWC Barstow Service Area Consumer Confidence Report	3-10
Table 3-6: Total Supplies Available in GSWC Barstow Service Area Through 2025 (AFY)	3-12
Table 3-7: Total Supplies Available in GSWC Barstow Service Area Through 2045 (AFY)	3-12
Table 4-1: Historic Water Use 2016 to 2020	4-1
Table 4-2: Distribution System Losses 2016 to 2019	4-2
Table 4-3: Demonstration of Compliance with 2020 GPCD Target	4-2
Table 4-4: 2016-2020 Average Unit Demand Factors.....	4-5
Table 4-5: Projected Water Demands	4-5
Table 4-6: Forecast DRA Water Use for 2021 through 2025 (acre-feet per year).....	4-7
Table 5-1: Five Year Drought Risk Assessment (values in acre-feet).....	5-2
Table 5-2: Normal and Single Dry Year Water Supply and Demand through 2045 (values in acre-feet)	5-3
Table 5-3: Five Consecutive Dry Years Water Supply and Demand through 2045 (values in acre-feet)	5-3
Table 5-4: Normal Year Water Supply and Demand (values in acre-feet)	5-4
Table 5-5: Single Dry Year Water Supply and Demand (values in acre-feet)	5-5
Table 6-1: 2020 WSCP Stages and Demand Reduction Actions for each Stage	6-9
Table 6-2: Summary of Actions and Conditions that Impact Revenue.....	6-18
Table 6-3: Summary of Actions and Conditions that Impact Expenditures.....	6-18
Table 6-4: Proposed Measures to Overcome Revenue Impacts	6-18
Table 6-5: Proposed Measures to Overcome Expenditure Impacts.....	6-18

List of Figures

Figure ES-1: GSWC Barstow Water Service Area ES-3

Figure 2-1: GSWC Barstow Customer Service Area 2-2

Figure 2-2: Average Climate Conditions 2-4

Figure 3-1: GSWC Barstow Service Area Boundary and Water System 3-1

Figure 3-2: Groundwater Basins in GSWC Barstow Service Area 3-2

Figure 3-3: Mojave Adjudication Subareas..... 3-4

Figure 3-4: GSWC Barstow Boundary within Baja and Centro subbasins 3-5

Figure 6-1: GSWC Barstow Service Area Location 6-2

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This 2020 Urban Water Management Plan was prepared under the direction of a California licensed civil engineer.



Executive Summary

GSWC Barstow Service Area

Layperson's Description

After the devastating drought in the late 1970s, the California Legislature declared California's water supplies a limited resource, subject to ever-increasing demands and that the long-term, reliable supply of water is essential to protect California's businesses, communities, agricultural production, and environmental interests. The Legislature also recognized a need to strengthen local and regional drought planning and increase statewide resilience to drought and climate change. Thus, in 1983, the California Legislature created the Urban Water Management Planning Act (UWMPA).¹ The UWMPA requires urban water suppliers serving over 3,000 customers or supplying at least 3,000 acre-feet of water annually to prepare and adopt an urban water management plan every five years,² and demonstrate water supply reliability in a normal year, single dry year, and droughts lasting at least five years over a twenty-year planning horizon.³ The UWMPA also requires each urban water supplier to prepare a drought risk assessment and water shortage contingency plan.⁴ And last, beginning in July 2022, each urban water supplier must prepare an annual water supply and demand assessment.⁵ The California Legislature asserts that aggregating all of these legal requirements at the urban water supplier level will improve local, regional, and statewide water planning and water resilience.

At a practical level, the Urban Water Management Plan (UWMP) is the legal and technical water management foundation for urban water suppliers throughout California. A well-constructed UWMP will provide the supplier's elected officials, management, staff, and customers with an understanding of past, current, and future water conditions and management. The UWMP integrates local and regional land use planning, regional water supply, infrastructure, and demand management projects as well as providing for statewide challenges that may manifest through climate change and evolving regulations. Thoughtful urban water management planning provides an opportunity for the supplier to integrate supplies and demands in a balanced and methodical planning platform that addresses short-term and long-term planning conditions. In brief, the UWMP gathers, characterizes, and synthesizes water-related information from numerous sources into a plan with local, regional, and statewide practical utility.

¹ California Water Code Section 10610 *et seq.* (Chapter 1 added by Stats. 1983, Ch. 1009, Sec. 1).

² California Water Code Section 10610 *et seq.*

³ California Water Code Sections 10631-10635

⁴ California Water Code Sections 10632

⁵ California Water Code Sections 10632.1



ES-1 Golden State Water Company – Barstow

Golden State Water Company's Barstow service area (GSWC Barstow) is located in San Bernardino County (County) in the center of the Mojave River Basin area of the Mojave Desert and serves mostly residential connections in the City of Barstow (City) and surrounding unincorporated areas of the County, along with some commercial and industrial customers. The local economy is closely tied to the City's role as an important transportation corridor and it also includes a strong military presence. The City's water supplies have long relied on local groundwater resources and have been augmented over time to adapt to changing conditions and provide a diverse and flexible water supply portfolio. GSWC Barstow's water service area is shown in Figure ES-1.

GSWC Barstow has historically relied upon groundwater from the Upper Mojave River Valley subbasin. GSWC Barstow's primary supply is pumped groundwater from this Centro Subarea to serve its customer demand based upon the Watermaster's Free Production Allowance (FPA) calculation in each year. Moreover, GSWC Barstow relies upon its carryover supplies derived from unused FPA in any given year. GSWC has been successful in managing its FPA so as to maximize its carryover supplies. In addition to these actions, GSWC Barstow coordinates with Mojave Water Agency's (MWA) water management activities in efforts to increase the groundwater basin supplies and also provide additional water as necessary to support the Mojave Basin Adjudication. GSWC Barstow is also developing recycled water supplies for potential future use but these supplies are limited until the tertiary treatment methodologies can better address total dissolved solids contained in the produced water.

In short, GSWC Barstow's water supply portfolio is determined by the terms and structure of the Mojave Basin Area Adjudication and its efforts to cooperatively work with the Mojave Water Agency to augment water supplies for use in GSWC Barstow's service area. GSWC Barstow's water supply portfolio as it relates to MWA imported supplies, projects, and adjudicated allocations can be summarize as follows:

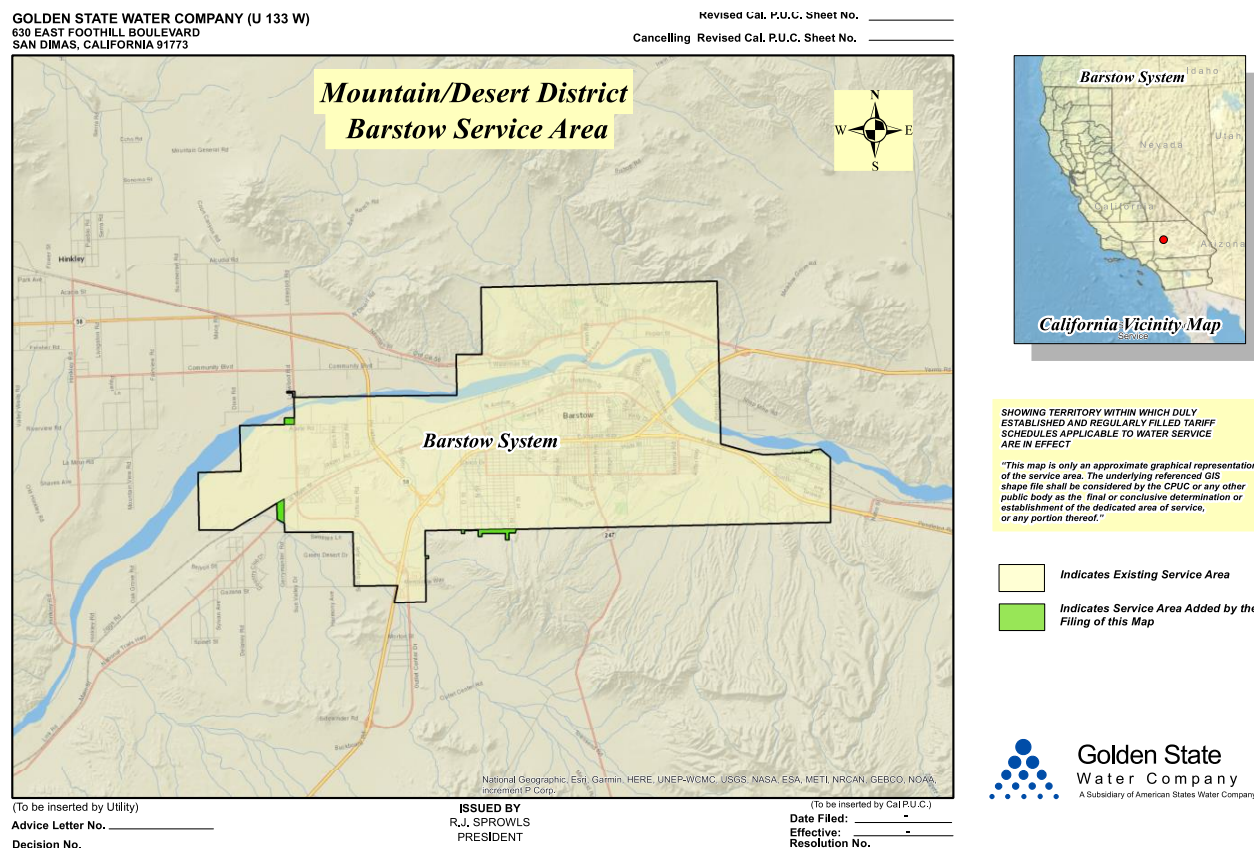
- ◆ GSWC Barstow's Free Production Allowance (FPA)
- ◆ GSWC Barstow's Carryover Groundwater Supplies

GSWC Barstow's water allocations have certain variability in different regulatory and hydrological conditions. For example, GSWC Barstow's FPA changes over time as the Mojave Basin Watermaster assesses supply availability for all adjudicated purveyors against the production safe yield of the Mojave Basin. Similarly, GSWC invests time and effort in storing unused FPA as well as other water assets it has accumulated through purchases or leases to augment its FPA. These sorts of management dynamics embedded in the GSWC Barstow's water supplies must be carefully considered in order to improve the utility of all the service area water supplies.

GSWC Barstow coordinates its water supply management primarily with Mojave Water Agency and its authority as Watermaster for regional supplies. GSWC Barstow participates in local transfer and exchange programs and continues to explore opportunities to purchase water supplies from other water agencies and sources. Where feasible in the future, GSWC Barstow will support and coordinate recycled water projects. This water supply portfolio requires accurately assessing available information and appropriately planning for potential future water supply conditions.



Figure ES-1: GSWC Barstow Water Service Area



The service area population has seen slow growth recently—estimated at 32,154 people in 2020—and is expected to grow only about 6% through 2045. This urban population coupled with a small amount of agricultural, commercial and industrial users constitute the total water demand in GSWC Barstow. This total demand is just over 5,500 acre-feet of water per year (where one acre-foot of water is about the size of one football field covered in one foot of water). GSWC is analyzing its water supplies in the context of potential future growth that would increase future water demands by about 400 acre-feet over the 2045 planning horizon.

ES-2 GSWC Barstow's Water Service Reliability

GSWC Barstow's water service reliability hinges on the active management of GSWC Barstow's water supply portfolio to meet its demands. More succinctly, even though GSWC's total annual water supplies meet the GSWC Barstow's annual water demands, the availability of some supplies are managed to meet monthly water demands throughout the year. In addition, the supplies must be astutely managed in order to ensure sufficient water supplies to meet GSWC Barstow's demands during extended dry conditions as the FPA changes in the Centro Subarea.

The fundamental management tenet for GSWC Barstow's water service reliability in dry periods is to coordinate its Free Production Allowance adjudicated groundwater supplies with carryover supplies. In general, supplies are available to GSWC Barstow regardless of the current year's hydrology. Discretion

over the amount of groundwater pumped allows GSWC Barstow to match its total supplies to meet annual demands. Additionally, stored water supplies derived from GSWC Barstow's unused FPA in each year as well as any water that GSWC Barstow has accumulated through purchases or leases increases GSWC Barstow's dry year resilience.

GSWC Barstow has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045 even with the planned FPA reductions. Groundwater reliability is based on GSWC's share of the projected Mojave Basin's annual Free Production Allowance and the numerous current and planned projects in the Mojave Basin designed to increase the reliability of the groundwater supply. As such, GSWC Barstow is not faced with shortages during normal or dry years through this UWMPs planning horizon. Because GSWC Barstow extracts only as much groundwater as is necessary to meet customer demands, it is anticipated that supplies and demands are congruent across all the scenarios examined.

Over the long term, GSWC Barstow's water supply portfolio should be adequate to meet its potential long-term growth objectives. GSWC Barstow's long-term water service reliability considerations have three important components: (1) an increase in the annual total demand that GSWC Barstow's water supplies will need to satisfy; (2) management of its existing water supply portfolio in the context of Watermaster adjustments to regional water management; and (3) no increase in GSWC Barstow's total water supply available in its water supply portfolio. All of these items are considered in GSWC Barstow's water service reliability projections. The analysis in this 2020 UWMP contemplates all of these components in showing GSWC Barstow's water service reliability through 2045.

In addition to these water service reliability considerations, GSWC Barstow also has updated its Water Shortage Contingency Plan (WSCP) under the requirements in Water Code Section 10632 of the Urban Water Management Planning Act to address any potential water shortage conditions. This updated WSCP allows GSWC Barstow to reduce the water demands on its water GSWC Barstow customers in shortage or catastrophic outage conditions. The measures contemplated in the updated WSCP include typical dry condition water management actions imbedded into six water shortage categories (up to 10%, 11-20%, 21-30%, 30-40%, 40-50% and over 50%). Importantly, in the event there were to be a catastrophic water outage in the service area, water demands will be limited to use for health and safety purposes only. Combining the updated WSCP with GSWC Barstow's active water management of its supply portfolio provides additional buffer against unpredictable water conditions.

In summary, GSWC Barstow's water supply portfolio, its active management of its water supply portfolio, and its WSCP provide GSWC Barstow with stable and reliable water service to meet its current and 2045 projected water demands. This supply reliability encompasses normal, single dry, and five consecutive dry year scenarios.



Chapter 1

GSWC Barstow Service Area

Introduction

Golden State Water Company (GSWC) is an investor-owned public utility company that supplies quality, reliable water to more than one million people in over 80 communities throughout California. This Urban Water Management Plan (UWMP) is prepared for the GSWC Barstow Service Area. GSWC Barstow is located in San Bernardino County (County) in the center of the Mojave River Basin area of the Mojave Desert. The GSWC Barstow service area serves mostly residential connections in the City of Barstow and surrounding unincorporated areas of the County, along with some commercial and industrial customers.

Barstow derives its water supplies from the managed groundwater systems in the Mojave Basin. Specifically, under the Mojave Basin Area Adjudication, Barstow pumps its groundwater allocation from the Centro Subarea and delivers those supplies to its customers. Barstow works cooperatively with the Mojave Water Agency – the watermaster for the Mojave Basin Area Adjudication – in augmenting and managing water supplies for use in GSWC’s Barstow service area.

The City of Barstow area has long been an important transportation corridor, dating back to its American settlement in the 1830s. People, goods, and animals would travel through the area from Utah and New Mexico to Los Angeles and back. Importantly, water was readily available in the areas where the Mojave River rose to the surface during and after the rainy season on its course through the desert. These locations came to be known as the Fish Ponds and Grapevines areas which are located in and around the GSWC Barstow service area. During a mining boom east of the City in the 1860s and 1870s railways were built to transport goods and people through the area and further into the American interior. These railways were eventually accompanied by major interstate highways, including Route 66, Interstate 15, Interstate 40 and California State Route 58, all of which converge in the City of Barstow. The local economy is closely tied to transportation industry, and it also includes a strong military presence.

Ensuring an adequate supply of water is available to serve the existing and future needs for GSWC’s Barstow service area residents and Commercial, Institutional and Industrial (CII) customers is a critical component of successful planning. This Urban Water Management Plan (UWMP) draws on local, regional and statewide inputs to synthesize information from numerous sources into a reliable water management action plan designed to be referred to as management decisions arise and conditions change. water supply portfolio is sufficient to meet its customer demands through the 2045 planning horizon contemplated in this UWMP.



1.1 Background and Purpose

GSWC has prepared this 2020 UWMP to comply with the Urban Water Management Planning Act (UWMPA) requirements for urban water suppliers.⁶ This 2020 UWMP addresses GSWC's water management planning efforts to assure adequate water supplies to meet forecast demands over the next 25 years. As required by the UWMPA, GSWC's 2020 UWMP specifically assesses the availability of its supplies to meet forecast water uses during average, single-dry and five consecutive drought years through 2045. Verification that future demands will not exceed supplies and assuring the availability of supplies in dry-year conditions are critical outcomes of this 2020 UWMP.

The 2020 UWMP is an update to the GSWC's 2015 Barstow service area UWMP and presents new data and analysis as required by the California Department of Water Resources (DWR) and the California Water Code (CWC) since 2015. The 2020 UWMP is also a comprehensive water planning document that describes existing and future supply reliability, forecasts future water uses, presents demand management progress, and identifies local and regional efforts to meet projected water use.

The UWMP is designed to be a valuable water management and planning tool to guide and inform GSWC's managers, its customers, and the State of California about its water management practices. It reflects the System's planning assumptions and goals and should be used in combination with other planning resources and documents over the UWMP planning horizon.

The State of California's drought vulnerability and the additional pressures of climate change and population growth have emphasized the importance of planning ahead to meet water demands with potentially at-risk water supplies. Such forward planning is an important outcome of the 2020 UWMP.

1.2 Basis for Plan Preparation

GSWC operates a Public Water System as described in California Health and Safety Code 116275. The Agency qualifies as a Retail Urban Water Supplier as described in Water Code Section 10617, providing water for municipal purposes to more than 3,000 customers or 3,000 acre/feet of water per year. This qualification requires the preparation of an Urban Water Management plan every five years. The GSWC's Barstow Public Water System detail is listed in Table 1-1.

Table 1-1: Public Water System Information

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020
CA1910004	GOLDEN STATE WATER CO - BARSTOW	8,926

⁶ California Water Code sections 10610 through 10657.



The State Legislature passed numerous new requirements since the 2015 UWMP which are detailed throughout this 2020 UWMP.⁷ Major updates to the requirements are listed below along with a reference to the corresponding section in which they are addressed in this document.

- ◆ **Five Consecutive Dry-Year Water Reliability Assessment:** The Legislature modified the dry-year water reliability planning from a “multiyear” time period to a “drought lasting five consecutive water years” designation. This statutory change requires a Supplier to analyze the reliability of its water supplies to meet its water use over an extended drought period. This new requirement is addressed in Chapter 3—Water Supply, Chapter 4—Water Use, and Chapter 5—Water Service Reliability Assessment.
- ◆ **Drought Risk Assessment (DRA):** Due to the extensiveness of recent California droughts and the variability associated with climate change predictions, the California Legislature created a DRA requirement for UWMPs. The DRA requires assessment over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability for five consecutive dry years. The DRA is addressed in Chapter 5—Water Service Reliability Assessment and Chapter 6—Water Shortage Contingency Plans.
- ◆ **Seismic Risk:** Evaluating seismic risk to water system infrastructure and facilities and having a mitigation plan is now required by the Water Code. Incorporating the water system into regional or county hazard mitigation planning is an important aspect of this new statute. Seismic risk is addressed in Chapter 6.
- ◆ **Water Shortage Contingency Plan:** In 2018, the Legislature modified the UWMPA to require a Water Shortage Contingency Plan (WSCP) with specific elements. The WSCP is a document that provides a Supplier with an action plan for a drought or catastrophic water supply shortage. The WSCP is in Chapter 6 of this UWMP.
- ◆ **Groundwater Supplies Coordination:** 2020 UWMPs are required to be consistent with Groundwater Sustainability Plans following the 2014 Legislature enactment of the 2014 Sustainable Groundwater Management Act (SGMA). The reliance on groundwater is described in Chapter 3—Water Supply.
- ◆ **Lay Description:** A synopsis of the fundamental determinations of the UWMP is a new statutory requirement in 2020. This section of the is intended for new staff, new governing members, customers, and the media, and it can ensure a consistent representation of the UWMP’s detailed analysis.

1.3 Coordination and Outreach

As required by the Urban Water Management Planning Act (UWMPA), GSWC has coordinated with nearby agencies while developing this UWMP in order to ensure consistency with other related planning efforts such as General Plan(s), Water Master Plan (WMP), and Groundwater Sustainability Plan (GSP). This requirement includes coordination with (a) water suppliers that share a common water source, (b) relevant water management agencies that affect the System’s water assets, and relevant public agencies that may have land use or other regulatory relationships with GSWC. GSWC has prepared this 2020

⁷ California Water Code Section 10608 to 10608.44; Section 10609 to 10609.38; Section 10610 to 10657

UWMP in coordination with regional water purveyors and has appropriately notified and coordinated with other appropriate local government agencies as listed in Table 1-2.

GSWC participates in region-wide planning efforts with other agencies, cities, and counties. It is involved in efforts such as Integrated Regional Water Management and will continue to prioritize coordination with other agencies and stakeholders during its planning processes.

Further, as stipulated in Water Code Section 10621(b), every urban water supplier shall seek active involvement from diverse elements of the community. GSWC Barstow sought public participation through a public hearing and notices to members of the community. These coordination efforts and Statutory Requirements for Notice are also included in Table 1-2.

Table 1-2: Public and Agency Coordination

Coordinating Agencies	Sent Copy of Draft UWMP	Sent 60-Day Notice	Notice of Public Hearing
City of Barstow	X	X	X
Mojave Water Agency	X	X	X
San Bernardino County	X	X	X

1.4 UWMP Adoption

GSWC Barstow held a public hearing regarding its 2020 UWMP on July 16, 2021. Before the hearing, a draft was made available for public inspection on GSWC's website. Pursuant to CWC Section 10642, notice of the public hearing was provided through publication of the hearing date and time under the requirements of Government Code 6066 and posting of the hearing at the service area office.

GSWC adopted this 2020 UWMP on July 16, 2021. A copy of the adopted 2020 UWMP will be submitted to DWR, provided to the County and the California State Library, and posted onto GSWC's website.

GSWC plans to submit all required documentation related to the UWMPA through the DWR submittal website soon after adoption. The submittals include the following required DWR Excel workbooks:

- "FINAL Submittal 2020 UWMP Tables 05.10.2021.xls"
- "FINAL SBX7-7 Verification Form 04.02.2021.xls"
- "FINAL Energy Use Tables 04.01.21.xls"

1.5 Document Organization

This UWMP is organized as follows:

- Chapter 2 provides a description of the GSWC Barstow service area, demographic characteristics and climate, and describes the future population GSWC anticipates needing to serve.
- Chapter 3 describes the GSWC Barstow current and future water supplies and the availability of the supplies through 2045.
- Chapter 4 details the customer uses, including the past and future estimated uses, and describes GSWC's past and on-going demand management measures.
- Chapter 5 presents GSWC's Barstow service area service reliability into the future, including an assessment of reliability if a drought occurred over the next five consecutive years.
- Chapter 6 is GSWC Barstow's stand-alone water shortage contingency plan, incorporated as a chapter in this UWMP, but also available to be shared and utilized separate from the UWMP.

NOTE TO DWR:

Golden State Water Company has written this Urban Water Management Plan (UWMP) for its Barstow System primarily as a water resources planning tool to effectively manage water supply, reliability and demand. This UWMP also satisfies all the requirements of the Urban Water Management Planning Act (UWMPA).

The body of the document provides narratives, analysis and data that DWR requests in its 2020 UWMP Guidebook, including changes to the California Water Code since 2015. Efforts have also been made to include enhancements to this document wherever possible as recommended in the 2020 UWMP Guidebook.

To facilitate review by DWR for compliance with the UWMPA, data from the body of the document has been transferred into required DWR submittal tables consistent with the organization of the tables in Appendix E of the 2020 UWMP Guidebook. These tables are separately uploaded to DWR's web portal. This UWMP has been reviewed for adequacy according to the UWMP Checklist as contained in Appendix F in the 2020 UWMP Guidebook.



Chapter 2

GSWC Barstow Service Area

Water Service and System Description

Golden State Water Company's Barstow service area (GSWC Barstow) is located in the County of San Bernardino and serves the City of Barstow and surrounding unincorporated areas of the Mojave Desert. Elevations range from 2,073 feet to 2,760 feet above mean sea level. The Mojave River, an intermittent river whose headwaters are in the San Bernardino Mountains, flows mostly underground through the City of Barstow area from west to east and is a major source of groundwater for GSWC Barstow. Figure 2-1 illustrates the customer service area of GSWC Barstow. The GSWC Barstow service area is primarily characterized by residential land use, with some commercial and industrial land use.

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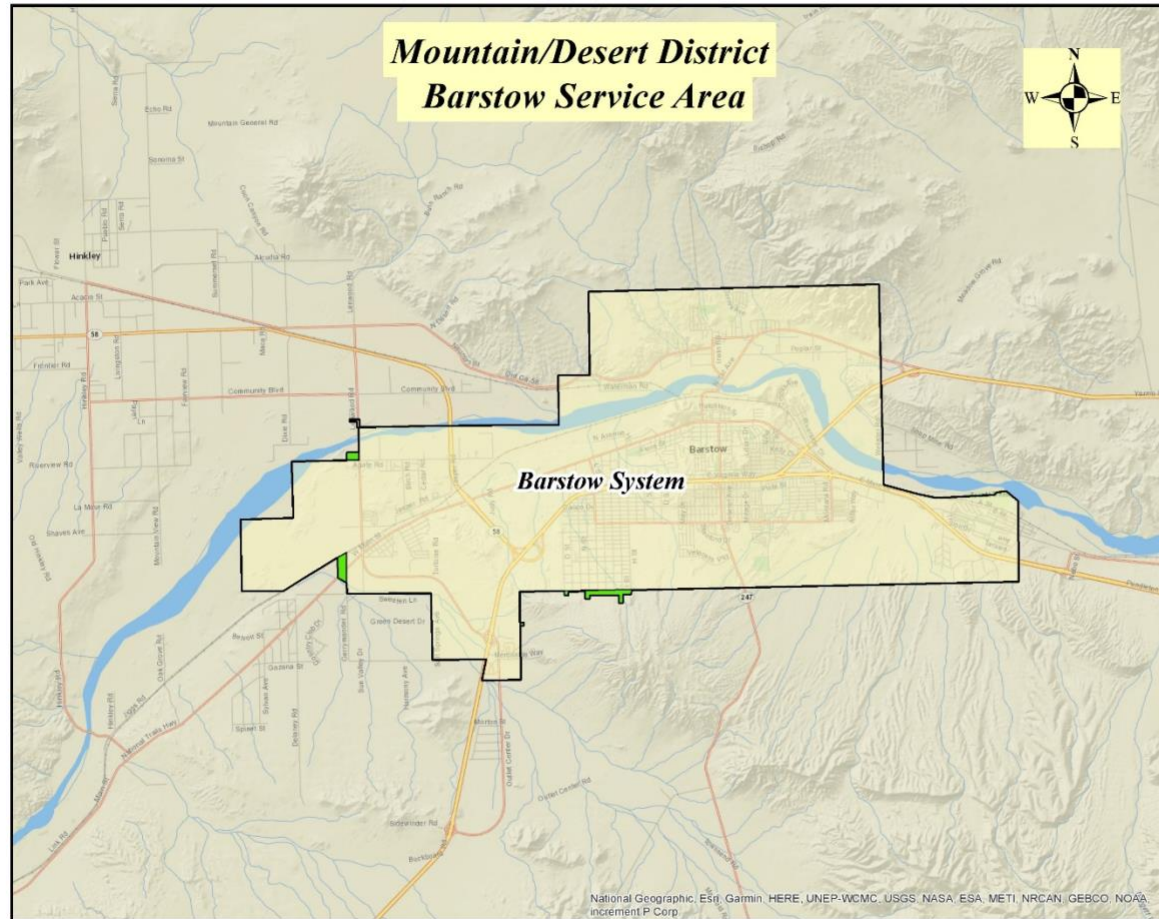


Figure 2-1: GSWC Barstow Customer Service Area

GOLDEN STATE WATER COMPANY (U 133 W)
630 EAST FOOTHILL BOULEVARD
SAN DIMAS, CALIFORNIA 91773

Revised Cal. P.U.C. Sheet No. _____

Cancelling Revised Cal. P.U.C. Sheet No. _____



SHOWING TERRITORY WITHIN WHICH DULY
ESTABLISHED AND REGULARLY FILLED TARIFF
SCHEDULES APPLICABLE TO WATER SERVICE
ARE IN EFFECT

"This map is only an approximate graphical representation
of the service area. The underlying referenced GIS
shape file shall be considered by the CPUC or any other
public body as the final or conclusive determination or
establishment of the dedicated area of service,
or any portion thereof."

Indicates Existing Service Area

Indicates Service Area Added by the
Filing of this Map

(To be inserted by Utility)

Advice Letter No. _____

Decision No. _____

ISSUED BY
R.J. SPROWLS
PRESIDENT

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**Golden State
Water Company**
A Subsidiary of American States Water Company

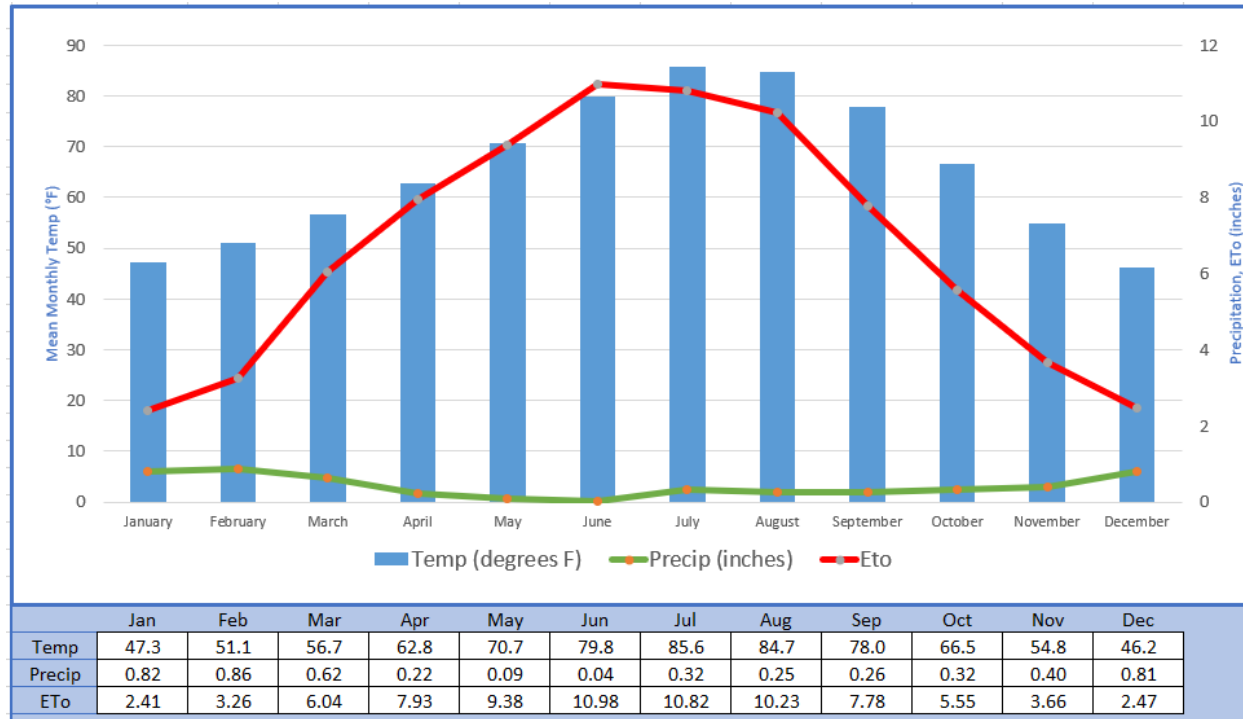


2.1 Service Area Climate

GSWC Barstow experiences a high desert climate typical of the Mojave Desert, with cool winters and hot dry summers.

The Oregon State University Prism Climate Group website (<https://prism.oregonstate.edu/explorer/>) maintains historical climate records for the past 38 years for Barstow (1981-2019). In winter, the average monthly low temperature is approximately 31 degrees Fahrenheit (°F) while the average monthly high temperature reaches approximately 102 °F in the summer. Over the period of record, monthly low temperatures have been warming faster than mean or monthly high temperatures. The rainy season is from November to March, with an annual average rainfall of 5 inches. February is typically the wettest month with an average precipitation of 0.86 inches, while June is the driest with an average of only 0.04 inches.

The California Irrigation Management Information System (CIMIS) website (<http://www.cimis.water.ca.gov>) tracks and maintains records of evapotranspiration (ET_o) for cities across California, including the Newberry Springs II gage located approximately 8 miles east of the Barstow System along the Mojave River wash. (Previously operating stations located closer to Barstow, including the NE Barstow Station used in the 2015 UWMP, discontinued operation in 2013 and are no longer active.) ET_o is a standard measurement of environmental parameters that affect the water use of plants. ET_o is given in inches per month and is an estimate of the ET_o from a large field of well-watered, cool-season grass that is 4- to 7-inches tall. Figure 2-2 presents the monthly average precipitation, ET_o, and mean temperature. The figure indicates that like much of California, ET_o is greatest during the summer months when temperatures are highest and rainfall is minimal, resulting in higher water demand.

Figure 2-2: Average Climate Conditions⁸

According to California’s Fourth Climate Change Assessment, the Inland Deserts region where GSWC Barstow is located is already the hottest and driest region of California,⁹ and climate change is expected to create further challenges in this already arid region. Inter-annual rainfall variability is expected to increase, as will the frequency of extremely high maximum temperatures. GSWC Barstow is somewhat buffered from these extremes because of its reliance on groundwater, but climate change in other parts of California will affect the availability of State Water Project imports which are crucial for maintaining and recharging groundwater. Other climate-related hazards include the spread of invasive non-native grasses, which increase the risk of wildfire in areas of the Mojave Desert with no history of wildfire activity. Climate impacts to agriculture, which is a major economic driver in other Inland Desert communities, may be less severe for GSWC Barstow because most water is instead used for residential, commercial, and industrial purposes.

2.2 Land Use and Economic Outlook

Current land use in the GSWC Barstow service area is mostly zoned as residential, with some areas zoned for commercial and industrial uses too. According to the City of Barstow’s 2015 General Plan (General Plan), the land use patterns that existed in 2015 are not expected to change significantly in 2020 or beyond. Residential growth, where expected, will likely consist of infill in neighborhoods

⁸ Temperature and rainfall data represents annual averages from 1981-2019 from the PRISM Climate Group <https://prism.oregonstate.edu/>; ETo data is from CIMIS Newberry Springs II - Station 234.

⁹ Hopkins, Francesca. (University of California, Riverside). 2018. *Inland Deserts Summary Report*. California’s Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-008.

already zoned for single or multifamily residential, served by GSWC, but not yet fully built out. The General Plan also anticipates modest growth of commercial and/or industrial land use in the southwest corner of the City along Interstate-15 at the Lenwood Road exit. Limitations on land use north of the Mojave River, such as the Federal and State protected status of habitat for the endangered Mojave Desert Tortoise, will prevent growth of the City to the north.¹⁰ In fact, much of the outskirts of the City of Barstow has been zoned as *Open Space/Resource Conservation*. While the GSWC Barstow service area boundary and the City limits do not match, the entire GSWC Barstow service area falls within the City of Barstow planning sphere of influence, and development will be guided by the current and subsequent City General Plans. Agriculture is entirely absent from within the service area, although some agriculture exists elsewhere in the Lower Mojave River Valley groundwater basin.

Economic activity in the GSWC Barstow service area has historically been anchored by the logistics and transportation sectors related to Interstates 40 and 15 and the BNSF Railroad, as well as support services related to nearby military bases. Warehousing and distribution centers are major sources of employment, but future growth in the logistics industry is forecasted to be slower in Barstow than for the Inland Empire region as a whole.¹¹ High housing prices in the major cities of Southern California have historically played an important role in driving the growth of comparatively more affordable Mojave Desert communities like the City of Barstow, but the 2015 Barstow City General Plan notes that, “a substantial increase in [Barstow]’s employment base would likely be necessary to provide the demand for [a two percent level] of housing growth.”¹² According to more recent growth forecasts by Mojave Water Agency (MWA), slower economic growth, on the order of 0.25 percent annually, is likely.¹³ Current economic conditions are expected to closely resemble current conditions.

2.3 Service Area Population and Demographics

The 2020 estimated GSWC Barstow service area population was 32,154 according to Mojave Water Agency’s (MWA) *Population Forecast – 2020 Edition*.¹⁴ GSWC records indicate that GSWC Barstow served about 9,000 accounts that same year, the vast majority of which were single-family homes.

2.3.1 Current Population and Historic Trends

The 2020 population estimate for GSWC Barstow was prepared by MWA in partnership with the University of California – Riverside Center for Economic Forecasting and Development and presented in Appendix C of MWA’s *Population Forecast – 2020 Edition*.¹⁵ MWA’s population projections were developed using a comprehensive econometric forecasting model for the MWA service area, to include population estimates for the incorporated cities, subareas, and water purveyors. The model includes

¹⁰ City of Barstow. (2015). *2015 – 2020 General Plan*. Retrieved from <https://www.barstowca.org/home/showdocument?id=2924>

¹¹ Mojave Water Agency, Zeineddine, M. B., Martinez, R., Macke, J., (2020). *Population Forecast*. Riverside, CA: UC Riverside.

¹² City of Barstow. (2015).

¹³ Mojave Water Agency. (2020).

¹⁴ Mojave Water Agency. (2020).

¹⁵ Mojave Water Agency. (2020).

economic indicators such as residential housing stock, home prices, and employment trends. Historical population data was collected from two primary sources: The United States decennial census, and the California Department of Finance (DOF) for annual estimates dating back to 1970. Census estimates were used to derive shares of population by census block in order to calculate population for subareas and purveyors by cities/towns. In order to be consistent with MWA, these same projections were used by GSWC as the basis for its current population estimate and future population projections.

The MWA *Population Forecast* does not yet contain the 2020 census data, and population estimates may change once the more recent census data is available. It is also expected that due to the pandemic, customer connections and capita per connection, as well as unit water use, were greatly affected and it remains to be seen how these trends will level out in the future. From 2015 to 2020, the number of total residential accounts increased from 8,151 to 8,353.

The City of Barstow was assumed to be demographically representative of the GSWC Barstow service area. According to the US Census Bureau,¹⁶ the median age of Barstow's residents in 2019 was 30.1 years. Barstow has a median household income of approximately \$40,633 (in 2019 inflation adjusted dollars).

2.3.2 Projected Population

Projected population is based on the current estimated population and projected growth from the Mojave Water Agency (MWA).¹⁷ The MWA population projection provides future population estimates specific to the GSWC Barstow service area, and these same population projections were used as the basis of this UWMP. The MWA growth rate of 0.25 percent per year was assumed to be constant throughout the planning period until 2045. Table 2-1 presents the current and projected population of GSWC Barstow.

Table 2-1: Current and Projected Population

2020	2025	2030	2035	2040	2045
32,154	32,574	33,017	33,427	33,801	34,135

2.4 Delivery System Details

The GSWC Barstow system consists of 14 active wells that extract water from the adjudicated Lower Mojave River Valley groundwater basin, 11 facilities that provide stored water by gravity or through booster pumping stations, and 182 miles of distribution pipelines.

¹⁶ U.S. Census Bureau (2019). 2019: *American Community Survey 5-year estimates Subject Tables Barstow city, CA*. Retrieved from <https://data.census.gov/cedsci/table?q=barstow,%20ca%20household%20income&tid=ACST5Y2019.S1901&hidePreview=false>

¹⁷ Mojave Water Agency. (2020).

2.4.1 Potable System

The GSWC Barstow system wells pump directly to the distribution system. Sodium hypochlorite is injected at the wellheads, using 12.5 percent liquid, to provide a disinfectant residual in the water entering the distribution system. As a result, the entire system is considered a potable water system. GSWC Barstow has no imported water connections or emergency interconnections. This system configuration also means that purchased water is not directly available either, although imported water from the Mojave Water Agency is used to recharge local groundwater supplies, as discussed in more detail in Chapter 3.

2.4.2 Non-potable System

Raw water is not used within the GSWC Barstow system. GSWC Barstow also does not include a recycled water system, although the roles of neighboring agencies are discussed briefly here. The GSWC Barstow service area is larger than the City of Barstow's municipal sewer system. Approximately 64 percent of the wastewater generated within the GSWC Barstow service area is collected by 113 miles of gravity sewers, owned by the City of Barstow, and transported to the Barstow Regional Wastewater Treatment Facility (WWTF), owned and operated by the City of Barstow. The remaining effluent is treated by private septic systems. The Barstow Regional WWTF provides primary and secondary treatment but not the tertiary treatment of effluent required to meet recycled water standards set forth in Title 22 of the California Code of Regulations. Wastewater is currently disposed of in percolation ponds after treatment. The City of Barstow's 2009 *Draft Sewer Master Plan* recommends the planning and construction of a new West Side Wastewater Treatment Plant (WWTP) that would provide tertiary treatment and allow the use of recycled water in the GSWC Barstow service area, but the City has not yet reached the build out levels to trigger this project. The Barstow Regional WWTF, acting as the recycled water wholesaler, would lead the way in implementing the recycled water plan and distribution network if implemented in future. More detail on the status of recycled water is given in Chapter 3.

2.5 Energy Intensity

The energy required to supply water to GSWC Barstow is reported in Table 2-2 below, per UWMP requirements. The System is entirely supplied by local groundwater pumped by GSWC, and the majority of GSWC Barstow's energy consumption to supply retail potable water is attributed to groundwater pumping. For the period of January 1, 2019 to December 31, 2019, a total of 5,275,851 kWhs were needed to deliver 5,476 AF of water. The resulting energy intensity, expressed in kilowatt-hours per AF of water delivered (kWh/AF), is reported as 964 kWh/AF.

Table 2-2: Barstow 2019 Energy Intensity – Total Utility Approach

Energy Consumed (kWh)	Volume of Water Entering Process (AF)	Energy Intensity (kWh/AF)
5,275,851	5,475	934

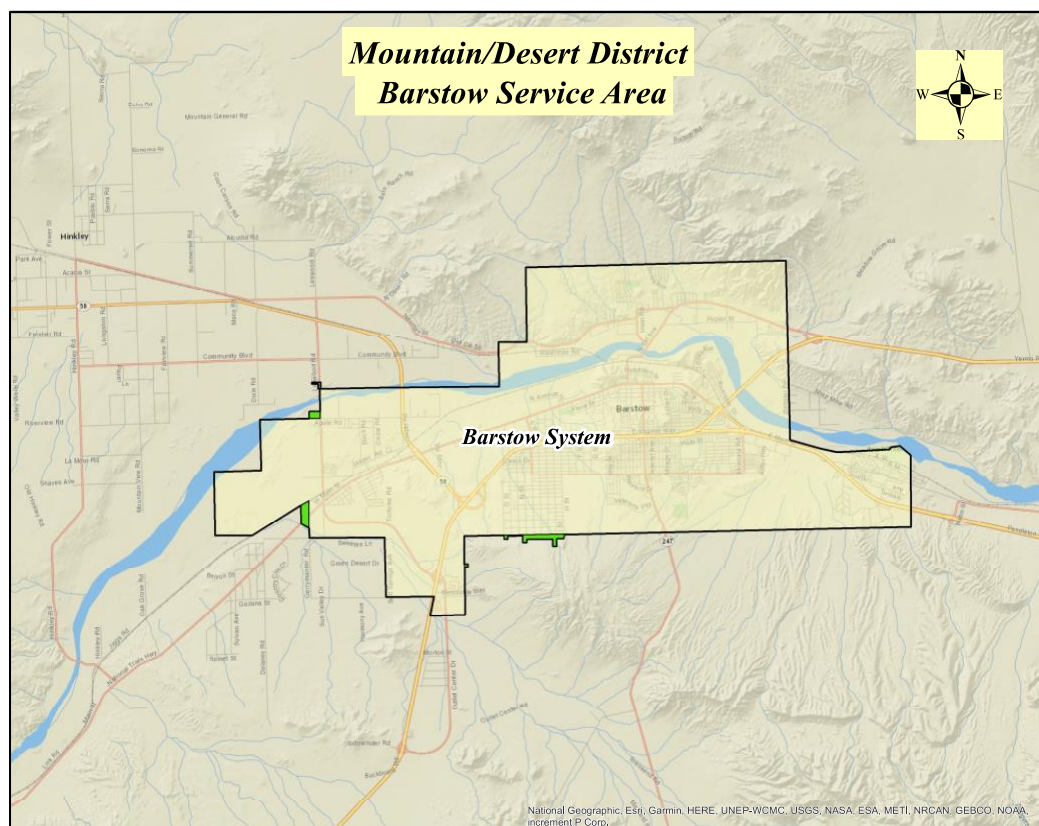
Chapter 3

GSWC Barstow Service Area

Water Supply

This chapter describes and quantifies the current and projected water supplies for Golden State Water Company Barstow Service Area (GSWC Barstow). GSWC Barstow has historically relied upon groundwater supplies as its primary source of supply to meet demands within the service area boundary. GSWC Barstow has also incorporated water supplies derived from Mojave Water Agency's (MWA) water management activities as part of its groundwater development and use actions. GSWC Barstow is also developing recycled water supplies for potential future use. As of December 2020, GSWC Barstow had not yet perfected its recycled water supplies for use in its service area. Figure 3-1 depicts the GSWC Barstow service area boundary. All of the GSWC Barstow's water supply sources and quantities are described in the following sections.

Figure 3-1: GSWC Barstow Service Area Boundary and Water System



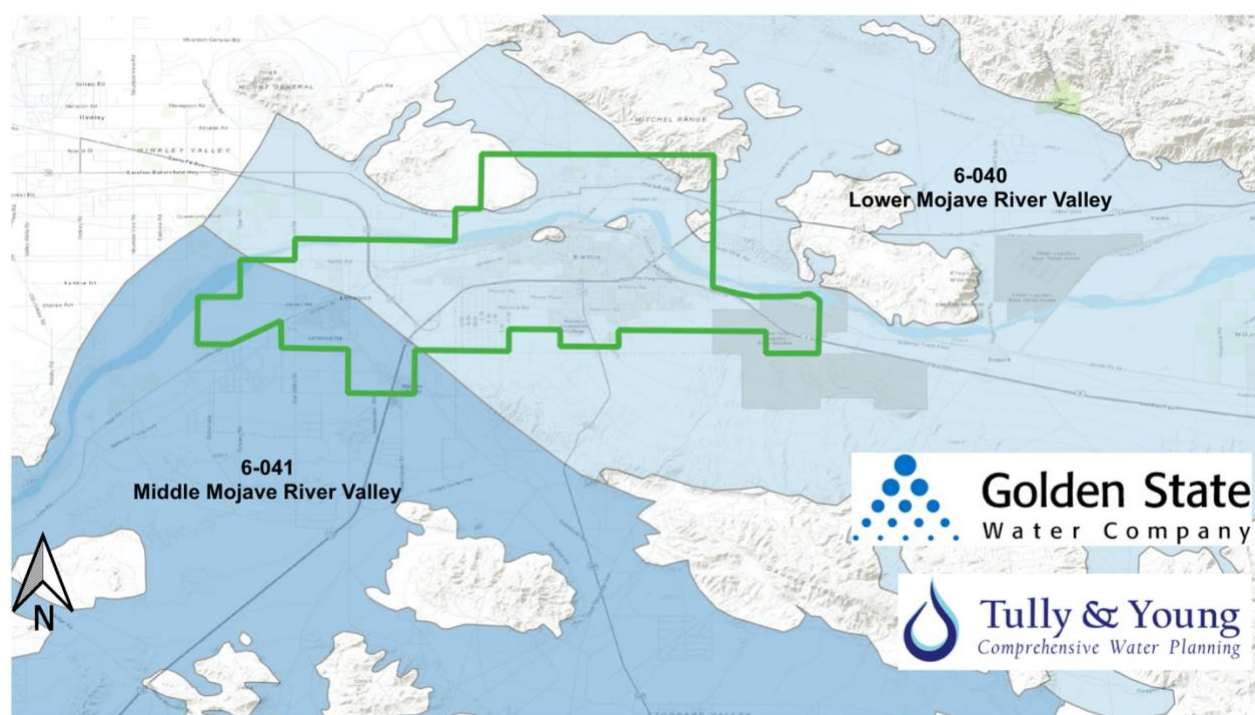
3.1 Groundwater

Groundwater is the primary water supply source for GSWC Barstow. GSWC Barstow pumps groundwater from the Upper Mojave River Valley subbasin that is part of the groundwater basins covering the broader Mojave region. More specifically, GSWC Barstow pumps groundwater from the Centro Subarea which is a subarea of the Mojave Basin Area as defined in the Mojave Basin Adjudication.¹⁸ This section will describe the intricacies of the groundwater basins and management structure for GSWC Barstow’s groundwater use.

3.1.1 Mojave Groundwater Basin Description

The Mojave region overlies 36 groundwater basins and subbasins as defined by DWR Bulletin 118.¹⁹ Collectively, these basins and subbasins are broadly grouped into two larger hydrogeologically distinct areas – the South Lahontan Hydrologic Region and the Colorado River Hydrologic Region. Groundwater basins along the Mojave River and adjacent areas are referred to collectively as the Mojave River Groundwater Basin and the area is commonly referred to as the “Mojave Basin Area.” The two key state recognized groundwater subbasins in the GSWC Barstow service area are shown in Figure 3-2 below.

Figure 3-2: Groundwater Basins in GSWC Barstow Service Area



¹⁸ Mojave Basin Area Judgment, 1996. Judgment After Trial, *City of Barstow et al. vs. City of Adelanto et al.*, Superior Court Case No 208568, Riverside County, CA.

¹⁹ <https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118>

In the Mojave Basin Area, the Mojave River is the largest stream, formed by the confluence of two smaller streams - the West Fork Mojave River and Deep Creek that originate in the San Bernardino Mountains. Groundwater is recharged into the basin predominantly by infiltration of water from the Mojave River. Other sources of recharge include infiltration of storm runoff from the mountain, desert washes, and other activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water.

The Floodplain Aquifer is composed of sand and gravel weathered from metamorphic and granitic rocks of the San Gabriel and the San Bernardino Mountains, respectively, and deposited in a fluvial depositional environment. These highly permeable sediments can yield large quantities of water to wells. The Floodplain Aquifer is directly recharged by infiltration of surface and subsurface flows from the Mojave River during the rainy season. Recharge is greater near the mountain front where surface flows are more frequent.

The Regional Aquifer underlies and surrounds the Floodplain Aquifer with interconnected alluvial fan and basin fill deposits that generally drain toward the Mojave River. The Regional Aquifer is generally recharged by groundwater movement from the Floodplain Aquifer to the Regional Aquifer, infiltration of runoff from the higher altitudes of the San Gabriel and San Bernardino Mountains, and additional amounts of runoff from local intermittent streams and washes.

3.1.2 Mojave Basin Area Adjudication

The Adjudication of the Mojave Basin Area was the legal process that allocated the right to produce water from the available natural water supply. Until adjudication proceedings were initiated and an independent Court issued the Mojave Basin Area Judgment, water production rights and obligations had never been defined in the Mojave Basin. Triggered by the rapid growth within the Mojave Water Agency service area, particularly in the Victor Valley area (the cities of Adelanto, Apple Valley, Hesperia, Victorville and surrounding communities), the City of Barstow and the Southern California Water Company (name changed to Golden State Water Company in 2005) filed a complaint in 1990 against upstream water users claiming that the increased withdrawals and lowering of groundwater levels reduced the amount of natural water available to downstream users. The complaint requested that 30,000 acre-feet of water be made available to the GSWC Barstow area annually and that MWA obtain supplemental water for use in other areas of MWA's service area.

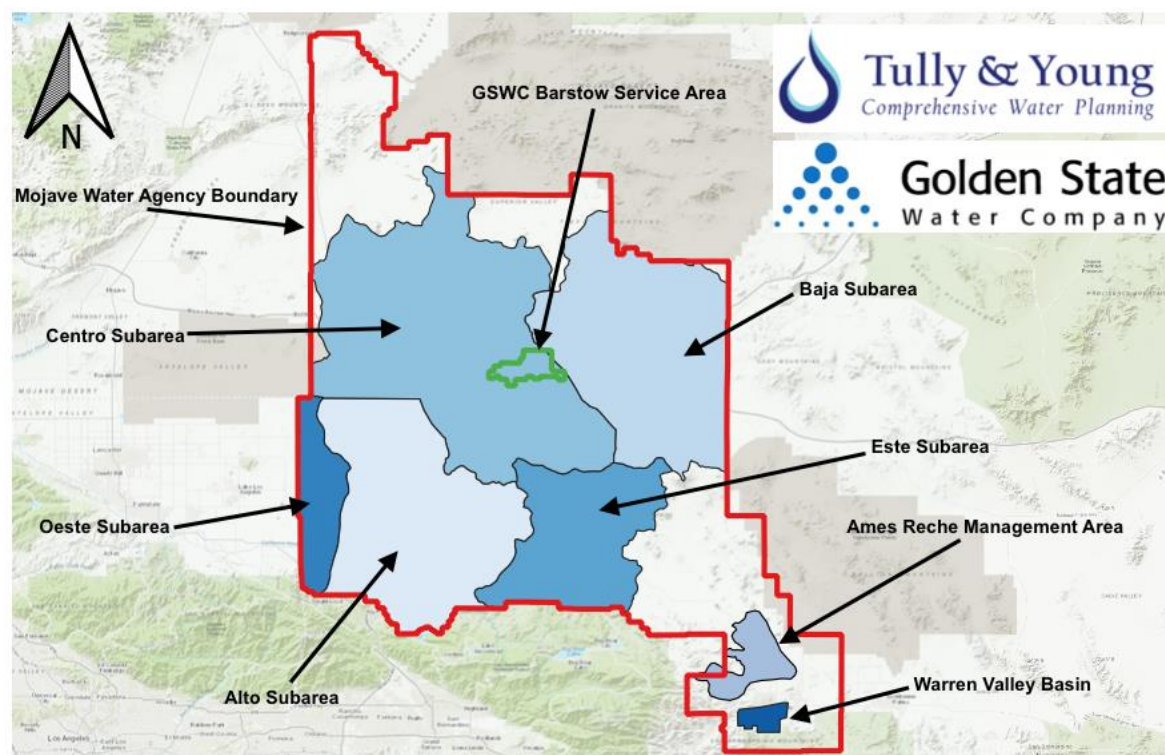
The Mojave Water Agency filed a cross-complaint that declared that the native waters of the Mojave River and underlying groundwater were insufficient to meet the current and future demands made upon them. The cross-complaint asked the court to determine the water rights of all surface water and groundwater users within the Mojave Basin Area and the Lucerne and El Mirage Basins. During the following two years, negotiations resulted in a proposed Stipulated Judgment that: 1) formed a minimal class of producers using 10 acre-feet or less per year who were dismissed from the litigation, and 2) offered a physical solution (an equitable remedy designed to alleviate overdrafts in a Mojave Basin Area, consistent with the constitutional mandate to prevent waste and unreasonable water use and to maximize the beneficial use of the limited resource) for water production by the remaining producers. The Riverside Superior Court (Court) bound the parties to the Stipulated Judgment in September 1993,

and further bound the non-stipulating parties to the terms of the Stipulated Judgment in January 1996 following trial. The Court appointed the Mojave Water Agency as Watermaster of the Mojave Basin Area.

Some of the non-stipulating parties appealed the Judgment of the Superior Court and the Appellate Court issued a final decision in June 1998. The final decision of the Appellate Court held the stipulating parties to the terms of the Stipulated Judgment, but excluded the appealing parties, with the exception of one appellant who sought a revised water production right under the Judgment. MWA requested the California Supreme Court to review the Appellate Court's decision in July 1998. The Supreme Court affirmed the Appellate Court's decision in August 2000, regarding the Stipulated Judgment and the exclusion of the appealing parties from the Judgment but overturned the decision of the Appeals Court as to the one party seeking additional production rights. Since 1996, most of the appealing parties have stipulated to the Judgment.

For management purposes, the Mojave Basin Area is separated into five distinct "Subareas", 1) Oeste, 2) Este, 3) Alto, 4) Centro and 5) Baja, as shown in Figure 3-3. The Subarea boundaries are generally based on a combination of hydrologic, geologic, engineering and political considerations. The Warren Valley Basin and the Ames-Reche Management Area are also managed pursuant to a judgment and agreement, respectively. These two areas are also shown in Figure 3-3.

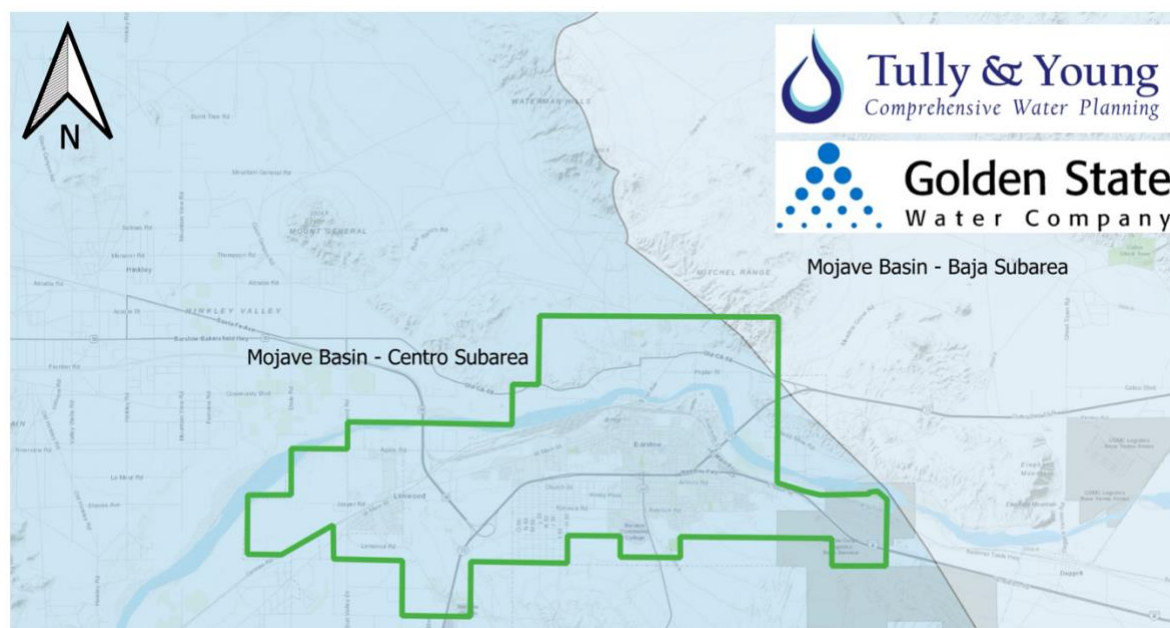
Figure 3-3: Mojave Adjudication Subareas



Although the GSWC Barstow service area overlies both the Baja Subarea and the Centro Subarea, GSWC only uses supplies derived from the Centro Subarea to serve the GSWC Barstow system. Figure 3-4

shows the GSWC Barstow jurisdictional area within the Baja and Centro subarea boundaries of the Mojave Basin Adjudication.

Figure 3-4: GSWC Barstow Boundary within Baja and Centro subbasins



The Mojave Basin Judgment assigned Base Annual Production (BAP) rights to each producer using 10 acre-feet or more, based on historical production from 1986 to 1990. Parties to the Judgment are assigned a variable Free Production Allowance (FPA), which is a percentage of the BAP set annually by the Court for each Subarea based on the recommendation of the Watermaster. The BAP is reduced or “ramped-down” over time until FPA comes within 5 percent of the Production Safe Yield (PSY) as defined by the Judgment. The FPA is set as follows for each Subarea for water year 2020-2021:²⁰

- Alto Subarea - 65 percent of BAP for agriculture and 55 percent of BAP for municipal and industrial
- Oeste Subarea - 65 percent of BAP
- Este Subarea - 70 percent of BAP
- Centro Subarea - 70 percent of BAP
- Baja Subarea – 25 percent of BAP

Any Producer that pumps more than their FPA must purchase Replacement Water from the Watermaster equal to the amount of production in excess of their total available FPA or transfer unused FPA from another party within their Subarea. Funds collected for Replacement Water are then used by the MWA for purchase of imported supplies and recharged into the Subarea they were produced from.

²⁰ Watermaster Report at 37. Revised by Court Order on 6/16/20 revising Watermaster report to reduce Alto FAP and Court Order on 8/18/2020 revising Watermaster report to reduce Oeste FAP.

GSWC Barstow derives its water supply from the Centro subarea. GSWC Barstow's BAP is 14,407 AFY.²¹ The GSWC Barstow is categorized as municipal and industrial and therefore is allocated an FPA of 70% of its BAP for the upcoming year. Thus, GSWC Barstow's FPA for 2020-2021 is 10,085 AFY.²²

3.1.3 Mojave Water Agency Role with GSWC Barstow Supplies

Mojave Water Agency is integral in the groundwater basin management in the Mojave Area. MWA acts as the Watermaster for managing supplies and the agency charged with importing water supplies to meet long-term basin sustainability objectives. In other words, MWA's actions to obtain and deliver imported supplies to the groundwater basins is one of the primary actions that improve regional groundwater management. The following sections provide context for MWA's water management activities as those activities impact GSWC Barstow.

MWA State Water Project Supplies

In June of 1963, MWA entered a State Water Project water service contract (SWP Contract) with the State of California Department of Water Resources (DWR). The SWP Contract authorized DWR to deliver SWP water to MWA under certain terms and conditions. MWA's original SWP Contract has numerous amendments that modify the original 1963 terms and conditions. The SWP Contract was "consolidated" into the "Consolidated Contract" to provide a more approachable reference document" for contract terms.²³

MWA's water supply activities intersect with groundwater management in the MWA service area. MWA provides its surface water for groundwater recharge as part of the Mojave Basin Area Adjudication (Mojave Adjudication) and the Warren Basin Adjudication (Warren Adjudication). For both adjudications, MWA imports water through its SWP Contract and delivers the water to designated recharge sites to meet the essential purposes of the adjudications.

3.1.4 GSWC Barstow's Free Production Allowance

GSWC Barstow's Free Production Allowance (FPA) changes over time as the Mojave Basin Watermaster assesses supply availability for all adjudicated purveyors against the long-term health and Production Safe Yield of the Mojave Basin. GSWC Barstow's Free Production Allowance has continued to be significantly reduced as a percentage of the Base Annual Production number.

²¹ Twenty-Sixth Annual Report of the Mojave Basin Area Watermaster for Water Year 2018-19, May 1, 2020 at Appendix H (hereafter "Watermaster Report").

²² Watermaster Report at Appendix H.

²³ The Consolidated Contract has the following disclaimer: "This document integrates Mojave Water Agency's State Water Project water supply contract and amendments to the contract entered into since June 22, 1963. It is intended only to provide a convenient reference source, and the Department of Water Resources is unable to provide assurances that this integrated version accurately represents the original documents. For legal purposes, or when precise accuracy is required, users should direct their attention to original source documents rather than this integrated version."

The current 70% FPA represents a reduction that aligns with the existing Production Safe Yield considered by the Watermaster. Accordingly, the GSWC Barstow’s projected FPA in a Normal Year, Single Dry Year in the near term align with the current FPA. However, the Centro Subbasin remains in an overdraft condition and GSWC anticipates that its FPA will continue to ramp down by five percent (5%) per year over the next five years. As such and for planning purposes, the FPA shows a gradual decline from 70% to 50% through 2025. This ramped down FPA corresponds to the a five consecutive drought year condition through 2025 and is shown both as an FPA percent and quantified FPA in Table 3-1.

Table 3-1: Projected Mojave Adjudication FPA for GSWC Barstow through 2025 (AFY)

Year		FPA	FPA Percent
Normal		10,085	70
Single Dry		10,085	70
Multi-Year Drought	2021 (1st year)	10,085	70
	2022 (2nd year)	9,365	65
	2023 (3rd year)	8,644	60
	2024 (4th year)	7,924	55
	2025 (5th year)	7,204	50

Although the Production Safe Yield of the Mojave Basin appears to be declining in the Centro Subarea, the FPA is predicted to stabilize after 2025. As such, we have standardized the future FPA at 50% in order to address long-term water supply planning options. Table 3-2 shows the GSWC Barstow’s projected FPA in a Normal Year, Single Dry Year, and Five Consecutive Dry Years from 2025 through 2045 at 50%.

Table 3-2: Projected Mojave Adjudication FPA for GSWC Barstow through 2045 (AFY)

FPA at 50%		2025	2030	2035	2040	2045
Normal		7,204	7,204	7,204	7,204	7,204
Single Dry Year		7,204	7,204	7,204	7,204	7,204
Multi-Year Drought	Year 1	7,204	7,204	7,204	7,204	7,204
	Year 2	7,204	7,204	7,204	7,204	7,204
	Year 3	7,204	7,204	7,204	7,204	7,204
	Year 4	7,204	7,204	7,204	7,204	7,204
	Year 5	7,204	7,204	7,204	7,204	7,204

3.1.5 Carryover Groundwater Supplies

GSWC Barstow has taken actions to protect its water supplies against hydrological and regulatory variability. Specifically, GSWC Barstow has invested time and effort in storing water assets for future use through the carryover provisions of the Mojave Basin Adjudication. The carryover water supplies are derived from GSWC Barstow’s unused FPA in each year. This carryover supply, however, cannot exceed the previous year’s FPA. As such, any unused carryover supply is returned to the Centro Subarea to be considered in the Watermaster’s annual basin reports. GSWC Barstow’s 2020-2021 carryover

supply totals 11,526 acre-feet.²⁴ As noted, however, the carryover supplies diminish over time for non-use and we have considered GSWC Barstow service area’s carryover supplies starting in the 2021-2022 water year. Table 3-3 shows the projected carryover supplies available to GSWC Barstow through 2025 in Normal, Single Dry, and Five Consecutive Dry Years.

Table 3-3: Projected Carryover Water Supplies through 2025 (AFY)

Year		
Normal		10,085
Single Dry		10,085
Multi-Year Drought	2021 (1st year)	10,085
	2022 (2nd year)	10,085
	2023 (3rd year)	9,365
	2024 (4th year)	8,644
	2025 (5th year)	7,924

Table 3-4 shows the projected carryover supplies available to GSWC Barstow through 2045 in Normal, Single Dry, and Five Consecutive Dry Years. As noted above, since the Mojave Basin Adjudication does not allow carryover supplies to exceed the previous year’s FPA, this UWMP ramps down the carryover supplies in accordance with the rule where 2025 would retain 55% FPA as a maximum carryover supply and 2026 would reflect 50% FPA as a maximum carryover supply.

Table 3-4: Projected Carryover Water Supplies through 2045 (AFY)

Carryover Supply		2025	2030	2035	2040	2045
Normal		7,924	7,204	7,204	7,204	7,204
Single Dry Year		7,924	7,204	7,204	7,204	7,204
Multi-Year Drought	Year 1	7,924	7,204	7,204	7,204	7,204
	Year 2	7,204	7,204	7,204	7,204	7,204
	Year 3	7,204	7,204	7,204	7,204	7,204
	Year 4	7,204	7,204	7,204	7,204	7,204
	Year 5	7,204	7,204	7,204	7,204	7,204

3.2 Groundwater Quality

MWA has made efforts to greatly increase the understanding of the water quantity and quality of the groundwater basins that lie within its service area. The Agency established a Cooperative Water Resources Program (CWRP) with the USGS to maintain a monitoring network that currently includes approximately 850 monitoring wells. Water levels from these wells are recorded on a regular basis and several of the wells are tested for water quality on a rotating sampling schedule.

²⁴ Watermaster Report at Appendix H. This supply is fully available for GSWC’s Barstow service area’s use through the 2020-2021 water year.

Numerous studies dating back to the early 1900's have been conducted by various agencies to characterize groundwater quality in the Mojave service area and further the understanding of the Mojave River and Morongo Groundwater Basins. The most recent study was the Mojave Salt and Nutrient Management Plan completed in 2015.²⁵ Despite local groundwater quality degradation, these studies generally confirmed the suitability of groundwater for beneficial uses in the Region.

The impairment of groundwater from the perspective its beneficial as drinking water is determined by comparing concentrations of constituents of concern in the groundwater against drinking water maximum contaminant levels (MCLs) and agricultural water quality parameters needed for specific crops. MCLs consist of primary and secondary MCLs. Primary MCLs are assigned to constituents for which a health-based risk is associated with consumption of water that exceeds a particular concentration. Secondary MCLs are assigned to constituents for which there is no considered health risk, but for which there may be aesthetic concerns such as taste, odor, color, etc. above a particular concentration. Key groundwater constituents of concern in the MWA service area include arsenic, nitrates, iron, manganese, Cr-VI, fluoride, and total dissolved solids (TDS). Some of these constituents are naturally occurring in desert environments while others are associated with human (anthropogenic) activities. Measurements exceeding drinking water standards have been found for some of these constituents within the Mojave River Basin. Groundwater in these areas may require treatment prior to consumption.

Table 3-5 shows the GSWC Barstow Service Area's most recent Consumer Confidence Report.

²⁵ All of the relevant water quality studies are available at <http://www.mojavewater.org/regional-studies.html>. (Hereafter "2015 Salt and Nutrient Plan").



Table 3-5: GSWC Barstow Service Area Consumer Confidence Report

Water Quality Standards	Goal Level	Max Level	Range	Average
Primary Standards				
Arsenic (µg/L)	0.004	10	2.1-4	2.9
Barium (mg/L)	2	1	ND-.14	ND
Fluoride (natural) (mg/L)	1	2	.33-.56	0.44
Nickel (µg/L)	12	100	ND-10	ND
Nitrate (as N) (mg/L)	1	10	1.8-8	3.3
Gross Alpha (pCi/L)	0	15	ND-11	4.3
Uranium (pCi/L)	0.43	20	1.5-5.1	3.1
Secondary Standards				
Color (units)	n/a	15	ND-5	ND
Chloride (mg/L)	n/a	500	69-100	80
Iron (µg/L)	n/a	300	ND-100	ND
Odor (units)	n/a	3	ND-2	ND
E.C. (µS/L)	n/a	1600	650-880	750
Sulfate (mg/L)	n/a	500	93-170	120
Turbidity (units)	n/a	5	.1-1.5	0.48
TDS (mg/L)	n/a	1000	420-570	490
Federal Unregulated Contaminates				
Alkalinity (mg/L)	n/a	n/a	120-170	120
Calcium (mg/L)	n/a	n/a	51-91	69
Hardness as CaCO ₃ (mg/L)	n/a	n/a	160-290	220
Hardness as CaCO ₃ (grains/gal)	n/a	n/a	9.4-17	13
Magnesium (mg/L)	n/a	n/a	8.8-16	12
pH (units)	n/a	n/a	7.5-7.9	7.7
Potassium (mg/L)	n/a	n/a	2.3-3.3	2.8
Sodium (mg/L)	n/a	n/a	62-76	69
HAA6Br (µg/L)	n/a	n/a	1.5-7.7	3.8
HAA9 (µg/L)	n/a	n/a	1.5-8.3	4
Manganese (µg/L)	n/a	n/a	ND-2.3	0.5



3.3 Recycled Water Supplies

The GSWC Barstow Regional WWTF does not currently treat any of the effluent to meet direct-delivery recycled water standards set forth in Title 22 of the California Code of Regulations and deliver those supplies to GSWC’s Barstow Service Area customers. However, the City of GSWC Barstow’s 2009 Draft Sewer Master Plan recommends that the existing Wastewater Treatment Plant (WWTP) will require an expansion of 1.0 mgd when the projects within the Public Improvement District (PID) Scenario approach build-out. Expanding the existing WWTF could maximize the capacity of the existing interceptor sewer system. The City plans to develop and expand the West Side WWTP to handle 4.6 mgd by the year 2030. This new facility would consist of secondary and tertiary treatment processes with the tertiary reclaimed water being treated to Title 22 standards and produced for local reuse. GSWC has submitted a plan to study recycled water use in the Mojave Water Agency Integrated Regional Water Management Plan (IRWMP). The utility of using recycled water in the GSWC Barstow service area, necessitates improving tertiary treatment protocols in order to reduce total dissolved solids in the produced recycled water. At this time, GSWC Barstow does not incorporate recycled water as part of its long-term water supply portfolio but is actively pursuing the identified opportunities.

3.4 Desalination Opportunities

The California UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]). At this time, no desalination opportunities are practical or economically feasible for GSWC Barstow, and GSWC Barstow has no current plans to pursue them. Therefore, desalinated supplies are not included in the supply summaries in this Plan.

3.5 Water Transfers and Exchanges

In addition to groundwater, GSWC Barstow continues to explore opportunities to purchase water supplies from other water agencies and sources. Transfers, exchanges, and groundwater banking programs are important opportunities to investigate in order to enhance the long-term reliability of the GSWC Barstow’s supplies currently available to meet the demands. GSWC Barstow participates in local transfer and exchange programs to augment its groundwater supplies. GSWC Barstow has executed several permanent transfers of groundwater Base Annual Production rights from other parties in the Centro Subarea to increase its local groundwater rights.

3.6 Climate Change

While the California Water Code does not prescribe specific climate change planning and management measures for water suppliers, it does emphasize that climate change is appropriate to consider when assessing drought risk assessment, water conservation and use efficiency, and demand management and supply – both in an historical and future-projection context. GSWC Barstow’s primary climate change concern involves its capability of MWA providing imported SWP water for groundwater recharge. As shown in MWA’s 2020 UWMP, MWA uses DWR’s Delivery Capability Report (DCR) to assess current and future reliability of SWP Contract Table A supplies. The DCR modified the normal

year reliability of Table A Contract Allocations from 62% to 58% by incorporating, among other things, climate change. In addition, the DCR used a 7% supply reliability number for a single dry year. MWA took a more conservative approach to short-term and long-term reliability to incorporate potential unforeseen conditions attributable to climatic variability. Moreover, MWA chose to taper its long-term SWP projections to a 52% reliability by 2040 to account for climatic variability. Last, MWA used the driest year on record with the lowest Table A percentage allocation of 5% to characterize both the single dry year supply availability as well as two of the five years in the Five Consecutive Dry Year drought scenario. Accordingly, MWA's conservative approach to capture SWP supply availability captures future unpredictable climatological issues that may impact water supply reliability beyond the considerations reflected by DWR in its 2020 DCR. The result did not show long-term impacts to managed groundwater in the Mojave Basin Adjudication area.

3.7 Supply Summary

This section summarizes the total supplies available in the GSWC Barstow's service area. Table 3-6 shows the supplies available in the GSWC Barstow Service Area through 2025 under various supply conditions and Table 3-7 shows the supplies available in the GSWC Barstow Service Area through 2045 under various supply conditions.

Table 3-6: Total Supplies Available in GSWC Barstow Service Area Through 2025 (AFY)

Year		Total Supply
Normal		20,170
Single Dry		20,170
Multi-Year Drought	2021 (1st year)	20,170
	2022 (2nd year)	19,450
	2023 (3rd year)	18,009
	2024 (4th year)	16,568
	2025 (5th year)	15,128

Table 3-7: Total Supplies Available in GSWC Barstow Service Area Through 2045 (AFY)

Total Supply		2025	2030	2035	2040	2045
Normal		15,128	14,408	14,408	14,408	14,408
Single Dry Year		15,128	14,408	14,408	14,408	14,408
Multi-Year Drought	Year 1	15,128	14,408	14,408	14,408	14,408
	Year 2	14,408	14,408	14,408	14,408	14,408
	Year 3	14,408	14,408	14,408	14,408	14,408
	Year 4	14,408	14,408	14,408	14,408	14,408
	Year 5	14,408	14,408	14,408	14,408	14,408

Chapter 4

GSWC Barstow Service Area

Water Use

This section presents information on GSWC Barstow's water use, including past, current, and projected demands.

4.1 Historic Water Use

Historic connections and sales data from 2016-2020 were analyzed to provide an overview of historic water usage trends for GSWC Barstow. GSWC combines the commercial and institutional/governmental categories in its system. "Other" water uses include customer accounts that are inactive or idle. All customers are metered and there are no un-metered connections.

Water use for the past five years (2016-2020) has been primarily single-family residential, multi-family residential, or commercial/institutional. System losses are the only other use category representing over two percent of the system total. Water use and estimated losses for GSWC Barstow during the most recent five years, 2016 – 2020, are presented in Table 4-1

Table 4-1: Historic Water Use 2016 to 2020

Category	Annual Demands, acre-feet				
	2016	2017	2018	2019	2020
Single Family	1,883	1,893	1,911	1,819	2,020
Multi Family	745	793	800	755	847
Commercial/ Institutional	1,737	1,887	1,939	1,786	1,750
Industrial	102	116	124	38	92
Landscape	40	44	39	51	79
Other	0	0	0	0	0
Water Loss	640	745	790	1,028	933
Total	5,147	5,478	5,603	5,477	5,721

4.1.1 Distribution System Losses

Per DWR requirements, annual water loss for the period 2016-2019 is reported using the DWR/AWWA water audit methodology and is presented in Table 4-2 below. The results of the 2020 AWWA water audit are not yet available. Recent losses have averaged 13 percent. For planning projections, it is assumed loss remains at the recent average of 13 percent.

Table 4-2: Distribution System Losses 2016 to 2019

Year	2016	2017	2018	2019
Distribution System Loss	11%	12%	13%	17%
Average =				13%

4.2 Compliance with 2020 Urban Water Use Target

Pursuant to California Water Code Section 10608.24(b)²⁶, must demonstrate its 2020 water use met the GPCD target adopted in its 2015 UWMP. As set forth in the 2015 UWMP, GSWC's 2020 GPCD target was established as 320 GPCD, derived as the "gross water use" divided by the population during a defined baseline period, and reduced pursuant to one of four methods defined under California Water Code Section 10608.20(b). GSWC's 2020 actual GPCD must use the same methodology to derive "gross water use" for 2020, then divide by the estimated 2020 population presented in Chapter 2.

As presented in GSWC Barstow service area 2015 UWMP, GSWC selected Urban Water Use Target Method 1, 80 percent of base daily per capita water use, resulting in a 2020 target of 236 GPCD. The actual 2020 GPCD is calculated as the gross water use divided by the served population. The resulting gross water supplied to City retail customers in 2020 was 5,721 acre-feet. As shown in Table 2-4, the service area population in 2020 was estimated to be 32,154. This results in a calculated 2020 compliance value of 159 GPCD, which is less than the established target. Thus, GSWC Barstow is in compliance with CWC Section 10608.24(b) and has met its 2020 GPCD Target. The important compliance calculation parameters are summarized in Table 4-3.

Table 4-3: Demonstration of Compliance with 2020 GPCD Target

2020 Gross Water Supplied	5,721 AF
2020 Population	32,154
2020 Actual GPCD	159 GPCD
2020 Target GPCD	236 GPCD
Compliance Achieved?	Yes

4.3 Demand Management Measures

As required by the State legislature, GSWC has developed and implemented Demand Management Measures (DMMs) in the GSWC Barstow service area. DMMs are designed to strengthen water resiliency in the face of future droughts which can improve water service reliability and help the State meet its conservation goals. At a minimum, retail water suppliers must implement the following DMMs: water waste prevention ordinances, metering, conservation pricing, public education and outreach, programs to assess and manage distribution system real loss, and water conservation program coordination and staffing support. These and other DMMs in GSWC Barstow service area are described in detail in Appendix A and briefly summarized below.

²⁶ 10608.24. (b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

Water Waste Prevention Ordinances

Although GSWC does not have rule-making authority, it supports member agencies and local cities in efforts to adopt ordinances that will reduce water waste. For GSWC, this provision is implemented through CPUC-approved rules provided in Appendix A, including Rule No. 14.1, the Water Conservation and Rationing Plan, Rule 20, prohibition of water waste, and Rule 11, Discontinuance and Restoration of Service.

Metering

California law requires meters to be installed on all customer services by 2025. Presently, all 101,016 customers in Region III, which includes GSWC Barstow, are metered and billed by volume monthly.

Conservation Pricing

All metered customers in Region III including those metered customers in the GSWC Barstow service area are charged volumetrically for water service. Starting on September 1, 2009, GSWC implemented a tiered conservation pricing rate structure for residential customers as approved by the CPUC for GSWC Barstow. The current rate structure for residential customers has a fixed charge as well as volumetric escalating pricing tiers, depending on customer usage. Non-residential customers have a fixed charge and a constant volumetric charge. GSWC submitted a General Rate Case filing with the CPUC in 2020 that included proposed rates over the next three years based on volumetric charges for customers in Region III's Rate Making Area. If approved, this rate decision will allow GSWC to adjust volumetric revenues and maintain a conservation-oriented rate structure that encourages efficient water use today and in the future.

Public Education and Outreach

GSWC's public information outreach efforts in the GSWC Barstow service area include free conservation literature and brochures in the customer service area office and annual water conservation ads in the local paper in addition to participating in various conservation events. Customers can learn about rebates and other conservation programs on GSWC's website. GSWC also conducted school conservation education programs in the GSWC Barstow service area through which students learn about conservation practices and receive a free conservation kit. GSWC also sponsors the WaterWise school education program in City of Barstow elementary schools.

Programs to Assess and Manage Distribution System Real Loss

GSWC has an active Water Loss Control Program. Water losses are monitored by the Operations Engineering Department by reviewing the annual Distribution System Water Audits conducted in each water system. GSWC tracks both real and apparent losses as part of its on-going water loss control efforts. If the Operations Engineer determines from the annual water audit analysis that a leak detection survey is needed, GSWC will contract with a qualified leak detection company to perform the survey using the most current leak detection technology.

Water Conservation Program Coordination and Staffing Support

GSWC maintains a fully staffed Conservation Department with a companywide Water Use Efficiency Manager, Water Conservation Analyst and one Water Conservation Coordinator for each of its three regions to administer conservation programs and support wholesaler programs. GSWC also utilizes a number of consultants to support program development and implementation on an as-needed basis.

Other DMMs

In addition to the required DMMs summarized above, GSWC Barstow provides other DMMs which further support the goals of the State. Many of these other measures are implemented through coordination with GSWC's regional partners, including MWA. Other DMMs include:

- ◆ Residential Assistance Programs
- ◆ Commercial and residential audits
- ◆ Landscape water surveys
- ◆ Rebates for High Efficiency Clothes Washers (to be discontinued soon, see Appendix B)
- ◆ Commercial, Industrial, and Institutional (CII) DMMs
- ◆ Large landscape audits
- ◆ Financial incentives such as rebates
- ◆ Support for building code standards
- ◆ Information/tracking
- ◆ Membership in the Alliance for Water Efficiency

GSWC has been actively implementing DMMs over the last five years through both local and regional programs in collaboration with MWA and other agencies. In 2020, GSWC spent \$430,562 to implement DMMs across GSWC Region III which includes GSWC Barstow. The budget for implementation in the current 2020-2021 water year totals \$443,954 for Region III. GSWC will continue to review opportunities to leverage DMM practices for GSWC Barstow to strengthen water resiliency. Appendix A presents more detail on all aspects of DMMs in GSWC Barstow.

4.4 Projected Water Demands

Projected water demands include GSWC Barstow's retail customers and water losses. Customer demands are projected by projecting the number of connections and then applying unit demand factors. The number of customer accounts is projected using the 2016-2020 growth rate for single family accounts of 0.34 percent. The non-residential customer category counts are significantly smaller and do not exhibit stable growth rates over the time period, fluctuating from year to year. Therefore, the single-family account growth rate is utilized as a proxy for long-term stable growth of the non-residential accounts.

Unit demand factors for each customer category were averaged over 2016-2020 for each customer category, as summarized in Table 4-4. The new State-mandated Water Use Objectives will mandate water budgets that include residential indoor and landscape usage, as well as non-residential allowances. These Water Use Objectives are to be finalized by 2023 and will become the new reporting

standard. Using the current 3.81 capita per connection from the DWR population tool and 55 GPCD, the indoor usage correlates to 0.23 AF/DU, which is approximately equal to the current unit demand for single family homes. Once finalized by the State, GSWC should re-evaluate its current water use and projected water demands per the detailed requirements. For this UWMP, the current unit demand factors will be used, but it is recognized they may change in the near future per the Water Use Objectives. These unit demands include all current savings from building codes and water efficient requirements, including the California Green Building Standards Code (CALGreen) and Model Water Efficient Landscape Ordinance (MWELO), but do not include potential savings from additional future measures.

Table 4-4: 2016-2020 Average Unit Demand Factors

Category	Unit Demand Factor, AFY/Connection
Single Family	0.26
Multi Family	1.85
Commercial/ Institutional	2.10
Industrial	10.22
Landscape	2.03
Other	0.00

The average unit demand factors presented above were then applied to the projected number of customer connections to calculate projected water use for each customer category. For planning purposes, it is anticipated that future unit demands will remain constant, but these should be reevaluated once the Water Use Objectives are finalized. Water losses are assumed at 13 percent of customer demands. Table 4-5 presents GSWC Barstow's projected water use through 2045.

Table 4-5: Projected Water Demands

Category	Annual Demands, acre-feet				
	2025	2030	2035	2040	2045
Single Family	1,954	1,988	2,021	2,056	2,091
Multi Family	833	847	862	877	891
Commercial/ Institutional	1,854	1,885	1,917	1,950	1,983
Industrial	98	100	102	103	105
Landscape	66	68	69	70	71
Other	0	0	0	0	0
Water Loss	630	640	651	662	674
Total	5,435	5,528	5,622	5,718	5,815

4.5 Forecasting Water Use for Dry Year Conditions

The demand forecasts presented above represent expected water needs under normal hydrologic conditions. In many places in California, customers can be expected to use more water in dry years because of the earlier start of the landscape irrigation season due to limited rainfall. However, in GSWC

Barstow, the climate is arid even in average years and local precipitation is too rare to meaningfully offset landscape water demands even in average years. It is therefore assumed that the hydrology of the current year does not exert a strong influence on outdoor water use. Therefore, unconstrained dry year demand conditions would equal customer demand during normal years. GSWC Barstow does not experience a change in demand between average and dry conditions.

It is noted these assumptions assume no drought stage or demand reduction measures are in place.

4.6 Forecasting Water Use for the DRA and Annual Assessment

The California Legislature created two new UWMP requirements to help suppliers assess and prepare for drought conditions – the Drought Risk Assessment²⁷ and the Annual Water Supply and Demand Assessment.²⁸ These new planning requirements were established in part because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change.

The Drought Risk Assessment (DRA) requires assessing water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years. As a slight variant, the Annual Water Supply and Demand Assessment (Annual Assessment) undertakes a similar analytical exercise as the DRA but uses actual, and not hypothetical, conditions anticipated for the particular upcoming water year. The Annual Assessment is further detailed in Chapter 6, the Water Shortage Contingency Plan.

4.6.1 Projecting Water Use for 5-year Drought Risk Assessment

A critical component of new statutory language for the 2020 UWMP cycle is the requirement to prepare a five-year DRA using a supplier-defined hypothetical drought conditions expected to occur from 2021 through 2025. This drought condition is meant to allow suppliers to test the resiliency of their water supply portfolio and Water Shortage Contingency Plan actions to meet severe conditions, as needed.

DWR recommends that suppliers first estimate expected water use for the next five years without drought conditions (also known as unconstrained demand). These estimates would then be adjusted to estimate the five-years' cumulative drought effects. If normal water use includes water conservation programs, either currently implemented or planned for implementation, estimated water use values would incorporate the effect of those conservation programs when reporting projected water use.

Total water use for 2021, for example, is developed by modifying the projected water demands for “normal” conditions taking into consideration the anticipated factors affecting water use, with each subsequent year further adjusted, as appropriate. Adjustments year-to-year reflect several factors GSWC anticipates may occur, including increases from growth. Table 4-6 presents the DRA demand forecast.

²⁷ California Water Code Section 10635(b)

²⁸ California Water Code Section 10632.1

Table 4-6: Forecast DRA Water Use for 2021 through 2025 (AFY)

Annual DRA Demand, AFY				
2021	2022	2023	2024	2025
5,362	5,380	5,399	5,417	5,435

4.7 Low Income Water Use Projection

Legislation requires GSWC to project water demands for low-income housing needs. Although the GSWC Barstow service area does not match the City of Barstow boundary, the GSWC Barstow service area encompasses the majority of the City of Barstow. This analysis assumes the City of Barstow's housing element is representative of the GSWC Barstow service area. The City of Barstow last updated its General Plan Housing Element in 2015 (City of Barstow 2015). A lower income household is defined as a household with income that is 80 percent of median family income for that jurisdiction, adjusted for family size. The City of Barstow's Housing Element identifies the target number of very low-income households in the City from 2014 to 2021 as 16.4 percent and extremely low-income households as 22.3 percent. However, it is unknown what percentage of the low-income and very low-income households are within the GSWC Barstow service area. For this reason, it is not possible to project water use for lower income households separately from overall residential demand. Low-income water use projections are therefore included in the overall demand projections at this time.

Chapter 5

GSWC Barstow Service Area

Water System Reliability

This chapter provides the Golden State Water Company's Barstow service area (GSWC Barstow) reliability findings as required under Water Code Section 10635 and provides reliability information that GSWC may use in completing an annual supply and demand assessment pursuant to Water Code Section 10632.1.

Assessing water service reliability is the fundamental purpose for GSWC Barstow in preparing its 2020 UWMP. Water service reliability reflects the GSWC Barstow's ability to meet the water needs of its customers under varying conditions. The 2020 UWMP considers the reliability of meeting customer water use by analyzing plausible hydrological variability, regulatory variability, climate conditions, and other factors that impact the GSWC Barstow's water supply and its customers' water uses. The reliability assessment looks beyond past experience and considers what could be reasonably foreseen in the future. This chapter synthesizes the details imbedded in Chapters 3 and 4 and provides a rational basis for future decision-making related to supply management, demand management, and project development. This chapter presents three system reliability findings:

- Five Year Drought Risk Assessment: The 2021 through 2025 Drought Risk Assessment (DRA) for the GSWC Barstow service area.
- Long-Term Service Reliability: The reliability findings for a Normal Year, Single Dry Year, and Five Consecutive Drought Years in five-year increments through 2045.
- Annual Reliability Assessment: The reliability findings for an existing condition for both a Normal Year and Single Dry Year that can inform an annual supply and demand assessment for 2021 or 2022.

In short, the GSWC Barstow has reliable water supplies available for its service area through 2045.

5.1 Five Year Drought Risk Assessment

The Drought Risk Assessment is a new requirement for the 2020 UWMP cycle. The DRA requires a methodical assessment of water supplies and water uses under an assumed drought period that lasts five consecutive years.

GSWC Barstow is supplied by local groundwater pumped from the Centro Subarea of the Mojave Basin Area that has historically been more than sufficient to meet customer demands and is projected to

remain reliable throughout the simulated five-year drought analyzed in the DRA. This water is used to serve GSWC Barstow's retail customers, including approximately 13 percent water loss.

Table 5-1 below shows the GSWC Barstow DRA that integrates its supplies for 2021 through 2025 as described in Chapter 3 and reflects the dry year unconstrained water uses described in Chapter 4.

Table 5-1: Five Year Drought Risk Assessment (AFY)

	2021	2022	2023	2024	2025
Service Area Supply	20,170	19,450	18,009	16,568	15,128
Service Area Demand	5,362	5,380	5,399	5,417	5,435
Difference	14,808	14,070	12,610	11,151	9,693

5.2 Long Term Service Reliability

The Urban Water Management Planning Act directs urban water purveyors to analyze water supply reliability in a normal, single dry, and five consecutive dry years over a 20-year planning horizon. The 2020 UWMP Guidebook recommends extending that period to twenty-five (25) years to provide a guiding document for future land use and water supply planning through the next UWMP cycle.

5.2.1 Long Term Service Reliability

The GSWC Barstow long term service reliability reflects the recommended 25-year planning horizon anticipating a normal, single dry, and five consecutive dry years from 2020 through 2045.

Normal and Single Dry Conditions 2025-2045

GSWC Barstow's future water supplies in normal and single dry conditions reflect the same conditions described for the DRA and as detailed in Chapter 3. In general, supplies are not heavily impacted by drought and are available to GSWC Barstow regardless of the current year's hydrology. Discretion over the amount of groundwater pumped also allows GSWC Barstow to match supplies to meet demands, resulting in zero shortfalls or surpluses.

All of this information is detailed in Chapter 4 and reflected in the numbers shown in the tables below.

Table 5-2 shows the normal year supplies and demands on an annual timestep from 2025 through 2045.

Table 5-2: Normal and Single Dry Year Water Supply and Demand through 2045 (AFY)

Normal Year	2025	2030	2035	2040	2045
Service Area Supply	15,128	14,408	14,408	14,408	14,408
Service Area Demand	5,435	5,528	5,622	5,718	5,815
Difference	9,693	8,880	8,786	8,690	8,593

Single Dry Year	2025	2030	2035	2040	2045
Service Area Supply	15,128	14,408	14,408	14,408	14,408
Service Area Demand	5,435	5,528	5,622	5,718	5,815
Difference	9,693	8,880	8,786	8,690	8,593

Five Consecutive Dry Years 2025 – 2045

GSWC Barstow defines a drought condition lasting five consecutive years as one that requires GSWC Barstow to reduce water service to its customers.

GSWC Barstow also assumes that because of the extremely arid conditions in the Mojave Desert even in relatively wet years, the hydrology of the current year does not exert a strong influence on outdoor water use. Therefore, unconstrained dry year demand conditions would equal customer demand during normal years. This characterization of water demands provides a conservative estimation of demand conditions in a five-year drought scenario.

Together, the supply availability as paired against the increased demand conditions demonstrate that GSWC Barstow has sufficient supplies to meet five consecutive dry year conditions through 2045. Table 5-3 below shows the annual water supply and demand conditions in five consecutive dry years from 2025 through 2045.

Table 5-3: Five Consecutive Dry Years Water Supply and Demand through 2045 (AFY)

		2025	2030	2035	2040	2045
Year 1	Service Area Supply	15,128	14,408	14,408	14,408	14,408
	Service Area Demand	5,435	5,528	5,622	5,718	5,815
	Difference	9,693	8,880	8,786	8,690	8,593
Year 2	Service Area Supply	14,408	14,408	14,408	14,408	14,408
	Service Area Demand	5,454	5,547	5,641	5,737	5,815
	Difference	8,954	8,861	8,767	8,671	8,593
Year 3	Service Area Supply	14,408	14,408	14,408	14,408	14,408
	Service Area Demand	5,472	5,565	5,660	5,757	5,815
	Difference	8,936	8,843	8,748	8,651	8,593
Year 4	Service Area Supply	14,408	14,408	14,408	14,408	14,408
	Service Area Demand	5,491	5,584	5,679	5,776	5,815
	Difference	8,917	8,824	8,729	8,632	8,593
Year 5	Service Area Supply	14,408	14,408	14,408	14,408	14,408
	Service Area Demand	5,509	5,603	5,699	5,796	5,815
	Difference	8,899	8,805	8,709	8,612	8,593



5.3 Annual Reliability Assessment

GSWC Barstow may consider current supply and demand conditions and perform an annual water supply and demand assessment (Annual Assessment) pursuant to Water Code Section 10632.1 to evaluate real-time or near-term circumstances that are different than the DRA scenario. This assessment would evaluate actual current water supply and use conditions. For purposes of this UWMP, the “current” water use conditions as described in Chapter 4 are compared to the availability of GSWC Barstow’s existing water supplies as described in Chapter 3. Two scenarios are illustrated:

- ◆ Normal Year condition: reflecting the availability of supplies under normal conditions and the “current” water uses.
- ◆ Single-Dry Year condition: reflecting the availability of supplies under a severe, single-dry year and “current” water uses.

5.3.1 Normal Year Supply and Current Water Use

GSWC Barstow’s current normal year water supply and demand conditions represent the expected water supply and demand conditions that would likely occur based upon a reasonable assessment of regional and statewide hydrology and limited regulatory constraints. Under these conditions, GSWC Barstow anticipates that its access to its water supplies would be fully available.

GSWC Barstow’s characterization of current water use conditions represents an historical assessment of water use within GSWC Barstow as well as reasonable characterizations of growth and potential customer use patterns. The combination of these considerations represents a normal water year use assessment that is incorporated into this reliability determination. Demands in normal conditions are generally lower in wetter months and higher in drier months. The demands also account for reasonable water conservation measures derived from improved efficiencies in indoor fixtures, improved management of outdoor landscape irrigation, and a general awareness of the value of long-term water conservation at the consumer level. These demand conditions are described in more detail in Chapter 4 and reflected in the monthly demand assessments shown below.

Table 5-4 below shows the normal year water supply and demand conditions for the GSWC Barstow service area.

Table 5-4: Normal Year Water Supply and Demand (AFY)

Normal Year	Current
Service Area Supply	20,170
Service Area Demand	5,721
Difference	14,449

5.3.2 Single Dry Year Supply and Dry-Year Current Demand

GSWC Barstow defines a single dry year condition as one that may require reduced water deliveries to customers caused by regulatory decrees, as noted in 5.2.1. Nevertheless, GSWC Barstow's water supplies are reliable in single dry year conditions based upon the groundwater basin management as noted in Chapter 3.

Single dry year demands include the anticipated demands based upon historical trends in water usage in drought conditions by GSWC Barstow's customers. Because all years are relatively dry, GSWC does not expect an increase in water demands during a dry year as compared to normal year demands presented above. These conditions are described in Chapter 4 and reflected in the demand tables below. The analysis uses the "current" water use, adjusted as described in Chapter 4.

Table 5-5 below shows the single dry year water supply and demand conditions.

Table 5-5: Single Dry Year Water Supply and Demand (AFY)

Single Dry Year	Current
Service Area Supply	20,170
Service Area Demand	5,721
Difference	14,449

5.4 Water Supply Reliability Summary

As the analysis presented in this chapter demonstrates, GSWC Barstow has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045. Groundwater is resilient during dry conditions and GSWC Barstow is therefore not faced with shortages during normal or dry years.

Chapter 6

GSWC Barstow Service Area

Water Shortage Contingency Plan

This Water Shortage Contingency Plan (WSCP) addresses the requirements in Water Code Section 10632 of the Urban Water Management Planning Act (The Act). The WSCP is incorporated into the 2020 Urban Water Management Plan (UWMP) and used by Golden State Water Company (GSWC) to respond to water shortage contingencies for the GSWC Barstow service area as they may arise. This WSCP consists of the following required elements:

1. An analysis of water supply reliability
2. Procedures for conducting an annual water supply and demand assessment
3. Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage
4. Shortage response actions that align with the defined shortage levels
5. Communication protocols and procedures
6. Customer compliance, enforcement, appeal, and exemption procedures
7. A description of legal authorities
8. A description of financial consequences
9. Monitoring and reporting requirements
10. Reevaluation and improvement procedures
11. Special Water Feature Distinction
12. Plan Adoption, Submittal, and Availability

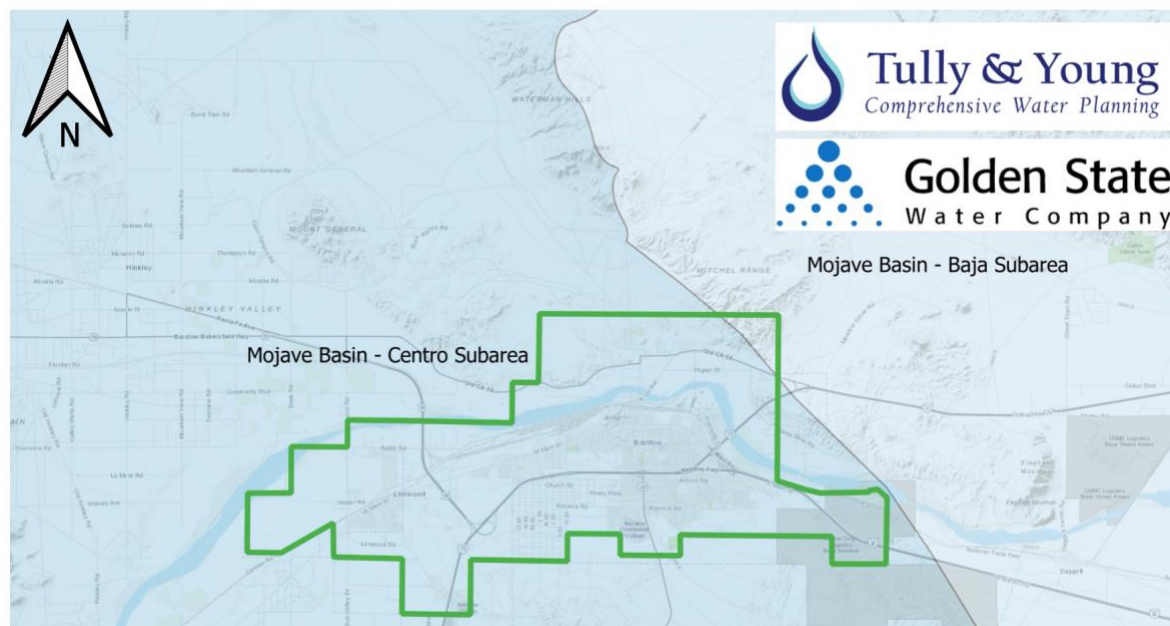
This WSCP is a stand-alone plan, that may be adopted independently from the UWMP and may be amended or refined and readopted as needed over coming months and years.



6.1 Water Supply Reliability Analysis

GSWC delivers quality, reliable water to more than 1 million people in over 80 communities throughout California. GSWC's Barstow System is located in San Bernardino County and provides retail water to about 32,000 people in the City of Barstow and the surrounding unincorporated areas. The service area is primarily characterized by residential land use, with some commercial and industrial land use. Figure 6-1 shows the location of the Barstow Service Area.

Figure 6-1: GSWC Barstow Service Area Location



The Barstow System receives all of its water supply from groundwater from the Centro Subarea of the Mojave Basin, which is replenished with natural infiltration from the Mojave River, return flows, and imported supplies delivered by a wholesale water supplier, the Mojave Water Agency. The Mojave Basin is adjudicated and no changes to groundwater management are anticipated. Contaminants present in groundwater wells are subject to well head treatment, and changes to groundwater quality that would constrain supply are not anticipated.

The Barstow System has a reliable water supply in normal, single dry and five consecutive dry years through 2045 (UWMP Chapter 5). Groundwater reliability is based on GSWC's share of the projected Mojave Basin's annual Free Production Allocation, carryover water, and the numerous current and planned projects in the Mojave Basin designed to increase the reliability of the region's groundwater supply. GSWC's groundwater supply may be augmented by future supplemental water projects, including potential surface water treatment and water reclamation.

Nevertheless, GSWC recognizes the fragility of California's water supply sources and systems and has created this WSCP to prepare for droughts, regulatory actions, and unforeseen man-made and natural disasters.

6.2 Annual Water Supply and Demand Assessment Procedures

The WSCP describes GSWC’s procedural methodology for managing shortages and developing its Annual Water Supply and Demand Assessment (Annual Assessment) for the GSWC Barstow service area. The Annual Assessment is to be submitted to DWR by July 1 each year with the first Annual Assessment due July 1, 2022. The Annual Assessment examines the GSWC Barstow service area’s anticipated water reliability for the current year and one additional dry year to determine what, if any, water shortages stages may be triggered during the required period. The Annual Assessment will be used by GSWC decision-makers to prepare for and initiate implementation of any needed response actions, as well as to inform customers, the general public, interested parties, and local, regional, and state governments entities to prepare for such required actions, if necessary.

6.2.1 Analytical and Decision-making Processes

GSWC plans to conduct its Annual Assessment according to the following timeline and process:

By February 1	Initial data collection and analysis
By March 1	Preliminary Draft Annual Assessment subject to internal review
By April 1	Draft Annual Assessment and results briefing for GSWC decision-makers
By May 1	Approval of Annual Assessment by GSWC Decision-makers
By June 1	Public Release of Annual Assessment and Public Notifications
By June 15	Submit Annual Assessment to DWR in advance of July 1 deadline

GSWC will prepare its Annual Assessment using the following key data and analytical methods:

- Prepare supply estimates for each water source (e.g surface water, groundwater) on a monthly basis for the analysis period.
- Update unconstrained customer demand and estimate anticipated actual water use on a monthly basis for the analysis period.
- Update infrastructure assessment, including estimated water supply production capability on a monthly basis for the analysis period.
- Identify and quantify of any locally applicable factors that may influence or disrupt supplies during the analysis period.

For the purposes of conducting the Annual Assessment, GSWC’s definition of “dry year” mimics characteristics of 2014-2015 water year.

6.2.2 Submittal Procedure

GSWC will submit its Annual Assessment to DWR via email by June 15 each year, but in no case later than July 1 each year. At the time of DWR submittal GSWC will also notify the City of Barstow, San Bernardino County, MWA, the public, and other stakeholders concerning the results of the Annual Assessment and where it is available for review.

6.3 Six Standard Water Shortage Stages and Triggers

The WSCP requires water suppliers to adopt six water shortage stages, which correspond to progressively severe water shortage conditions (up to 10%, 20%, 30%, 40%, 50%, and greater than 50% percent shortage) as compared to the normal reliability condition. These water shortage stages have been standardized to allow for a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. Reduction of available water supply by the indicated percentages, whether loss of physical supply or mandated water supply reductions, will trigger an appropriate water shortage stage. GSWC will then implement the response actions as specified below. GSWC will adopt the six standard water shortage stages for this 2020 WSCP as shown in Table 6-1.

6.4 Shortage Response Actions

The WSCP is required to identify locally appropriate shortage response actions that align with the defined shortage stages and include demand reduction actions, supply augmentation actions, system operational changes, and mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions. For each response action the WSCP is to provide an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

6.4.1 California Public Utilities Commission Role in Implementation

GSWC is an investor-owned public utility that is subject to California Public Utilities Commission (CPUC) jurisdiction. Section 357 of the California Water Code requires that suppliers subject to regulation by the CPUC secure its approval before imposing water consumption regulations and restrictions required by water supply shortage emergencies. Implementation of the actions is dependent upon approval of the CPUC. Prior to declaration of mandatory rationing, a utility may request the addition of a Schedule 14.1 – Staged Mandatory Water Rationing tariff, via a Tier 2 advice letter with full justification. The utility may not add the Schedule 14.1 until it has been authorized to do so by the Commission as delegated to DWA or other staff authorized by the Commission.

CPUC Rule 14.1 “Water Conservation and Rationing Plan” (Rule 14.1) has specific criteria that must be integrated with the WSCP implementation procedures. Rule 14.1 requires each GSWC Service Area to “elect to activate voluntary conservation” or prepare a Schedule 14.1 to implement Staged Mandatory Water Conservation and Rationing. The Schedule 14.1 may only be prepared as a direct response to an acute water shortage situation and it requires CPUC deliberation and approval. Rule 14.1 has 16 voluntary conservation criteria in place that may be exercised by each Service Area without CPUC

approval should GSWC elect to do so. Alternatively, in order for GSWC to engage in mandatory water rationing, GSWC must prepare a Schedule 14.1 and submit a Tier 2 Advice Letter, with full justification for the water rationing action. Additionally, GSWC must prepare a Schedule 14.1 and submit a Tier 2 Advice Letter and receive CPUC approval to move from one water shortage stage to another and implement many of the shortage response actions associated with each shortage stage and conduct a public hearing.

6.4.2 GSWC Water Shortage Contingency Plan - Activation Overview

As described above, GSWC must receive approval from the CPUC before it can activate demand reduction measures that impact customers. Several steps must first occur before GSWC can impose measures to reduce customer water demands. Steps are taken in the context that each water shortage condition triggering stages of action is different and unique. The water shortage contingency plan information below represents GSWC's proposed response for the GSWC Barstow service area and can be updated as needed. The typical steps for activating GSWC water shortage response are as follows:

Step 1: GSWC determines water shortage conditions exist for GSWC Barstow based on the results of the Annual Assessment, supply shortfalls, state cutbacks, or emergency conditions.

Step 2: GSWC requests CPUC approval of Rule 14.1 to establish three (3) broad categories of conservation policy as follows:

- Rule 14.1 A. Conservation-Non-Essential or Unauthorized Water Use – Voluntary – GSWC authorized to implement without additional CPUC advice.
- Rule 14.1 A. Conservation-Non-Essential or Unauthorized Water Use – Mandatory but without fines or surcharge tariff – GSWC required to file Tier 1 Advice Letter requesting authorization to institute a Schedule 14.1 Stage.
- Rule 14.1 B. Staged Mandatory Rationing of Water Usage – Includes authorization of fines and surcharge tariff. GSWC required to file Tier 2 Advice Letter requesting authorization to institute a Schedule 14.1 Stage.

Step 3: GSWC receives CPUC approval of Schedule 14.1 and begins implementation of the response actions based on water shortage conditions and need. GSWC will request approval of Schedule 14.1 as deemed necessary to meet actual shortage condition or water use reduction targets.

Step 4: GSWC would deactivate Schedule 14.1 in effect if water shortage conditions or need no longer exist by filing a Tier 1 Advice Letter.

6.4.3 Staged Response

GSWC has grouped the actions to be taken during a water shortage condition into six stages, providing flexibility to address water shortages up to and in excess of the 50 percent shortage level condition. The following is an overview of the staged response GSWC could follow during a given water shortage

condition including sequential stages (1-6) based on shortage severity, relative supply conditions for each stage, necessity of Schedule 14.1 policy activation, and percent shortage reduction levels. The stages would be implemented based on specific conditions and need to meet water service and system revenue requirements. A water shortage declaration would be made by resolution of the American States Water Company Board (Board), delegating to GSWC officers the authority to make decisions regarding the need to activate Schedule 14.1 or change water shortage stages. Alternatively, an authorized government official or state agency may issue water use reduction mandates, which would be implemented by a resolution of the Board to activate an appropriate water shortage stage. The actions to be undertaken during each stage cannot be implemented until necessary Board and CPUC approvals have been executed. The following six (6) Stages list the shortage response actions:

Stage 1 (0 to 10% shortage) – Stage 1 is a “Water Alert” where voluntary conservation is encouraged. The drought situation is explained to the public and governmental bodies. GSWC explains the possible subsequent water shortage stages in order to forecast possible future actions for the customer base. The focus is on customers with high per capita water usage to achieve proportionally greater reduction than those with low use. The activities performed by GSWC during this stage include, but are not limited to:

- Implementation of all Voluntary Water Conservation Measures authorized under Rule 14.1.
- Public information campaign consisting of distribution of literature, speaking engagements, website updates, bill inserts, and conversation messages printed in local newspapers.
- Educational programs in area schools.
- Initiating a Conservation Hotline, a toll-free number with trained Conservation Representatives to answer customer questions about conservation and water use efficiency.
- Voluntary outdoor irrigation restrictions including limiting number of watering days per week, and time when irrigation can occur (e.g., between 7:00 pm and 8:00 am).
- Discussion of equitable water waste response policy.

Stage 2 (10 to 20% shortage) – Stage 2 is a “Moderate Shortage” and will be implemented if the Stage 1 restrictions are deemed insufficient to achieve necessary demand reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official. Stage 2 will include all actions undertaken in Stage 1. In addition, GSWC may propose voluntary conservation allotments and/or require mandatory conservation rules. The severity of actions depends upon the percentage of shortage and customer response. The level of voluntary or mandatory water use reduction requested from the customers is also based on the severity of the supply shortage. It should be noted that prior to implementation of any mandatory reductions, GSWC must obtain approval from the CPUC. If necessary, GSWC may also support passage of drought ordinances by appropriate governmental agencies or officials. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stage 1.
- Establishing customer baseline use period to be used as basis for usage reductions.
- Usage in excess of customer baseline to be charged at regular rate plus a drought emergency surcharge (to be determined as approved by the CPUC).

Stage 3 (20– 30% shortage) – Stage 3 is a “Severe Shortage” that requires water allocations and mandatory conservation. Stage 3 will be implemented if the Stage 2 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official. This phase becomes effective upon notification to customers by the GSWC that water usage is to be reduced by a mandatory percentage. GSWC implements mandatory reductions after receiving approval from the CPUC. Rate changes are implemented to penalize excessive water usage. Water use restrictions are put into effect, i.e., prohibited uses can include restrictions of daytime hours for watering, excessive watering resulting in gutter flooding, using a hose without a positive shutoff device, use of decorative fountains with non-recirculating pumps, washing down sidewalks or patios, not repairing leaks in a timely manner, etc. GSWC monitors water production weekly for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages 1 and 2.
- Adherence to customer baselines and actual water use reductions.
- Flow restrictors would be used if abusive practices are persistent and documented.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

Stage 4 (30 - 40% shortage) – Stage 4 is a “Critical Shortage” that includes all steps taken in prior stages regarding allocations and mandatory conservation. Stage 4 will be implemented if the Stage 3 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages 1-3.
- Possible reductions in customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

Stage 5 (40 - 50% shortage) – Stage 5 is a “Shortage Crisis” that includes all steps taken in prior stages regarding allotments and mandatory conservation. This stage will be implemented in the event that the source of supply is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages 1-4.
- Possible reductions in customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

Stage 6 (50 % or greater shortage) – Stage 6 is an “Emergency Shortage” condition that includes all steps taken in prior stages regarding allotments and mandatory conservation. This stage will be implemented in the event that the source of supply is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages 1-5.
- Possible reductions in customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

GSWC may update current water shortage condition response measures based on CPUC approvals and direction, state policy directives, emergency conditions, or to improve customer response.

6.4.4 Demand Reduction Actions per Stage

GSWC has identified a range of available and feasible customer demand reduction actions that can be used interdependently and adaptably and implemented with a progressively greater intensity to meet the supply shortage challenges faced under each water shortage stage. These response actions are identified by the associated water shortage stage in which they may be implemented. Other response action may also be identified and implemented, subject to CPUC approval. The potential effectiveness of these demand reduction actions has been estimated by GSWC based on previous experience with their implementation. Table 6-1 shows the Demand Reduction Actions aligned with each identified water supply stage.

Table 6-1: 2020 WSCP Stages and Demand Reduction Actions for each Stage

2020 WSCP Stage and Percentage Savings		Actions to Reduce Customer Use
Stage Name	% Savings	
Stage 1 Water Alert	up to 10%	•Voluntary conservation encouraged (up to 10%) •Situation and possible subsequent water shortage stages explained to the public and governmental bodies (up to 10%) •Focus on customers with high per capita water usage to achieve proportionally greater reduction than those with low use •Actions include, but not limited to: -public information campaign consisting of distribution of literature, speaking engagements, website updates, bill inserts, and conservation messages printed in local newspapers; -educational programs in area schools; -Conservation Hotline; -voluntary outdoor irrigation restrictions including limiting number of watering days per week, and time when irrigation can occur (e.g., between 7:00 pm and 8:00 am) -Discussion of equitable water waste response policy. (combined up to 10%) •Consumption Reduction Methods, including: -Demand reduction program -Plumbing fixture replacement -Water conservation kits -Education programs -Voluntary rationing (combined up to 10%)
Stage 2 Moderate Shortage	10-20%	•All measures implemented in Stage 1 •Voluntary conservation allotments/usage reductions (up to 20%) •Mandatory Conservation Rules and Restrictions and Prohibitions on End Uses (as approved by the CPUC) (10-20%) •Usage in excess of customer baseline to be charged at regular rate plus a drought emergency surcharge (as approved by the CPUC) (up to 20%) All Consumption Reduction Methods from Stage I and intensified as needed; additionally: -Use prohibitions -Water shortage pricing; per capita allotment by customer type (combined up to 20%)

Table 6-1 (continued): 2020 WSCP Stages and Actions for each Stage

2020 WSCP Stage and Percentage Savings		Actions to Reduce Customer Use
Stage Name	% Savings	
Stage 3 Severe Shortage	20-30%	•All measures implemented in Stages 1 and 2 •Some or all of the following upon approval by CPUC: -adherence to customer baselines and actual water use reductions water allocations and mandatory conservation rules; -water usage goals established by an authorized government agency or official; -customer water usage in excess of baseline to be charged at regular rate plus an additional drought emergency surcharge amount; -water use prohibitions can include restrictions of daytime hours for watering, excessive watering resulting in gutter flooding, using a hose without a positive shutoff device, use of decorative fountains with non-recirculating pumps, washing down sidewalks or patios, not repairing leaks in a timely manner, etc (up to 30%) •GSWC monitors water production weekly for compliance with necessary reductions; •All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. (up to 30%) •All Consumption Reduction Methods from Stage 2 and intensified as needed; additionally: -Reduce pressure in water lines; Flow restriction -Mandatory rationing -Incentives to reduce water consumption; Excess use penalty -Percentage reduction by customer type (combined up to 30%) •Penalties and Charges for Excessive Use, including penalties for not reducing consumption, charges for excess use flat fine; charge per unit over allotment, flow restriction, termination of service (20-30%)
Stage 4 Critical Shortage	30-40%	•All measures implemented in Stages 1-3 •All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. (up to 40%) • All Consumption Reduction Methods from Stage 3 and intensified as needed; additionally: -Restrict building permits; Restrict for only priority uses •Penalties and Charges for Excessive Use, including penalties for not reducing consumption, charges for excess use (up to 40%) flat fine; charge per unit over allotment, flow restriction, termination of service •Catastrophic Event (Supply reduction up to 40%): Implement Applicable Actions for Catastrophic Events

Table 6-1 (continued): 2020 WSCP Stages and Actions for each Stage

2020 WSCP Stage and Percentage Savings		Actions to Reduce Customer Use
Stage Name	% Savings	
Stage 5 Shortage Crisis	40-50%	•All measures implemented in Stages 1-4 •Source of supply for the System is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes (up to 50%) •All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions (up to 50%) •All Consumption Reduction Methods from previous stages and intensified as needed •Possible reductions in customer baselines and actual water use reductions (up to 50%) •Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC) (up to 50%) GSWC may update current water shortage condition response measures based on CPUC approvals and direction, state policy directives, emergency conditions, or to improve customer response •Catastrophic Event (Supply reduction up to 50%): Implement Applicable Actions for Catastrophic Events
Stage 6 Emergency Shortage	Greater than 50%	•All measures implemented in Stages 1-5 •Source of supply for the System is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes (>50%) •All activities are intensified and production is monitored continually by GSWC for compliance with necessary reductions (up to >50%) •All Consumption Reduction Methods from previous stages and intensified as needed •Possible reductions in customer baselines and actual water use reductions (up to >50%) - Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC) (up to >50%) GSWC may update current water shortage condition response measures based on CPUC approvals and direction, state policy directives, emergency conditions, or to improve customer response •Catastrophic Event (Supply reduction greater than 50%): Implement Applicable Actions for Catastrophic Events and safety purposes

6.4.5 Supply Augmentation Actions

There are no current or anticipated supply augmentation actions, such as transfer and/or exchange opportunities and no adjacent systems for which emergency interconnections could be established.

The Regional Recharge and Recovery Project is a conjunctive use project by MWA that stores imported water underground in the local aquifer and later recovers and distributes it to local retail water purveyors. R³ is part of a comprehensive solution developed by the MWA and the region's stakeholders to ensure a sustainable water supply for the region. Although the R3 project does not supply water to the GSWC Barstow service area, it provides an indirect benefit by expanding the region's supply source portfolio.

6.4.6 Operational Changes

The following water system operational changes may be used as response actions for the appropriate Water Shortage Stage. GSWC is permitted to operate its water systems a no less than 40 psi under rules established by the CPUC. Operations in specific service areas that exceed the 40 psi minimum operating pressure may have opportunity to reduce system pressures in order to improve dry year water supply availability. GSWC Barstow could reduce system operating pressures to improve water supply availability if needed. Any action to reduce pressures must be in accordance with CPUC operating guidelines.

6.4.7 Mandatory Prohibitions

This section is required to identify any mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions. Given that GSWC is an investor-owned entity, it does not have the authority to pass any ordinance enacting specific prohibitions or penalties. In order to enact or rescind any prohibitions or penalties, GSWC would seek approval from CPUC to enact or rescind Rule No. 14.1, Mandatory Conservation and Rationing, and Rule No.11, which prohibits the waste of water. When Rule No.14.1 has expired or is not in effect, mandatory conservation and rationing measures will not be in place.

Rule No. 14.1 details the various prohibitions and sets forth water use violation fines, charges for removal of flow restrictors, as well as establishes the period during which mandatory conservation and rationing measures will be in effect. The prohibitions on various wasteful water uses, include, but are not limited to, the hose washing of sidewalks and driveways using potable water, and cleaning for filling decorative fountains. In addition to prohibitions during water supply shortage events requiring a voluntary or mandatory program, GSWC will make available to its customers water conservation kits as required by GSWC's Rule No. 20. GSWC will notify customers of the availability of conservation kits and literature.

Landscape Irrigation

Landscape irrigation reductions focus on less watering and reducing or avoiding water waste during irrigation. Landscape irrigation reductions may vary by user class or customer type depending on water shortage conditions and ability to meet overall water use reduction targets. Water allocation or budget concepts may be applied by GSWC to equitably reduce landscape water use while minimizing customer impact. Priority will be given to irrigation of mature landscape trees, both public and private property. Any landscape irrigation reduction policies require approval by the CPUC before GSWC can implement such measures.

Commercial, Industrial, and Institutional (CII)

The CII category of customers is diversified and may require a tailored approach for meeting specified water use reduction targets. This could include focusing on large landscape irrigation, process water, business practices, or other means to meet CII water use reduction targets. The ability of CII customers to conserve water during a water shortage condition would be considered depending on which stage has been triggered and how much water use has already been reduced during previous stages. GSWC would work collaboratively with CII customers since water use cutbacks can impact business operations and solvency.

6.4.8 Emergency Response Plan for Catastrophic Water Shortages

This section identifies actions to be undertaken by GSWC to prepare for, and implement during, a catastrophic interruption of water supplies. A catastrophic interruption could result from any event (either natural or man-made) that causes a water shortage severe enough to trigger a Stage 1-6 water supply shortage condition.

In order to prepare for catastrophic events, GSWC has prepared an Emergency Response Plan (ERP) in accordance with other state and federal regulations. The purpose of the ERP is to design actions necessary to minimize the impacts of supply interruptions due to catastrophic events.

The ERP coordinates overall company response to a disaster in any and all of its districts. In addition, the ERP requires each district to have a local disaster plan that coordinates emergency responses with other agencies in the area. The ERP also provides details on actions to be undertaken during specific catastrophic events. The following is a summary of actions cross-referenced against specific catastrophes for three of the most common possible catastrophic events: regional power outage (such as Public Safety Power Shutoff or “PSPS” events), natural disasters (such as earthquake, flood or storm damage, or fire), and malevolent acts.

Summary of Actions for Catastrophic Events	
Possible Catastrophe	Summary of Actions
Regional Power Outage or Public Safety Power Shutoff (PSPS) Events.	- Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water. - Establish water distribution points and ration water if necessary. - If water service is restricted, attempt to provide potable water tankers or bottled water to the area. - Make arrangements to conduct bacteriological tests, in order to determine possible contamination. - Utilize backup power supply to operate pumps in conjunction with elevated storage.
Natural Disaster	- Assess the condition of the water supply system. - Complete the damage assessment checklist for reservoirs, water treatment plants, wells and boosters, system transmission and distribution. - Coordinate with Cal EMA utilities group or fire district to identify immediate firefighting needs. - Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water. - Prepare report of findings, report assessed damages, advise as to materials of immediate need and identify priorities including hospitals, schools and other emergency operation centers. - Take actions to preserve storage. - Determine any health hazard of the water supply and issue any "Boil Water Order" or "Unsafe Water Alert" notification to the customers. - Cancel the order or alert information after completing comprehensive water quality testing. - Make arrangements to conduct bacteriological tests, in order to determine possible contamination.
Malevolent acts	- Assess threat or actual intentional contamination of the water system. - Notify local law enforcement to investigate the validity of the threat. - Get notification from public health officials if potential water contamination - Determine any health hazard of the water supply and issue any "Boil Water Order" or "Unsafe Water Alert" notification to the customers, if necessary. - Assess any structural damage from an intentional act. - Isolate areas that will take the longest to repair and or present a public health threat. Arrange to provide emergency water.

In addition to specific actions to be undertaken during a catastrophic event, GSWC performs maintenance activities, such as annual inspections for earthquake safety, and budgets for emergency items, such as auxiliary generators, to prepare for potential events.

6.4.9 Seismic Risk Assessment and Mitigation Plan

Beginning January 2020, CWC Section 10632.5 mandates urban water suppliers include in their UWMP a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities. This requirement can be met by submittal of a copy of the most recent adopted local hazard mitigation plan (LHMP) or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

For GSWC Barstow service area, GSWC intends to submit a copy of San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP, 2017), which addresses seismic risk for the area in which the system is located. The City of Barstow is a municipal partner in the preparation of this plan. The MJHMP indicates that earthquake hazard probability is “high” and impact is “high”, and that a significant earthquake is expected to occur within the next 30 years associated with the San Andreas or Garlock Fault zones (each about 50 miles to the southwest and northwest respectively). Ground shaking severity for the area within and surrounding the Barstow System is “moderate”, and liquefaction susceptibility is “low” to “moderate”.

Other Shortage Response Actions

Other shortage response actions may be considered by GSWC as required to meet specific water shortage conditions and will be incorporated into the Schedule 14.1 as needed. Before these actions can be implemented, an amendment to this WSCP and approval by the CPUC may be required.

6.5 Communication Protocols

GSWC will engage in specific communication protocols in developing and implementing the WSCP to inform the California Public Utilities Commission, GSWC’s customers, and neighboring public agencies. Some communication protocols are required by applicable CPUC Rules and others are broader efforts that are meant to inform GSWC’s customers and neighboring public agencies of the voluntary and mandatory water conservation activities.

6.5.1 Rule 14.1 Communications

Rule 14.1 requires GSWC to prepare notifications at various stages of implementing its WSCP. The following list identifies the required communications:

- When GSWC activates the voluntary conservation under Rule 14.1, GSWC must:
 - notify the Director of the Commission’s Division of Water and Audits with a letter delivered in both hard-copy and email;
 - notify GSWC’s customers through a bill insert or direct mailing; and
 - notify GSWC’s customers of the availability of water conservation kits with a bill insert or direct mailing.



- In the event that GSWC seeks to implement conservation actions (voluntary or mandatory) by discouraging or prohibiting non-essential or unauthorized water use, GSWC must notify customers in writing to repair “broken or defective plumbing, sprinkler, water or irrigation system.” This notification must include a “warning” that states, in relevant part, “in the event a customer does not comply with the notification, a flow restricting-device may be installed.” Any GSWC customer that seeks a variance from the notification and warning, must notify GSWC “in writing, explaining in detail the reasons for such a variation.” GSWC must “respond to each such request in writing.”
- Where GSWC seeks to implement a Schedule 14.1 – Staged Mandatory Water Conservation and Rationing tariff, per Rule 14.1, and issues a Tier 2 advice letter, then GSWC must complete all of the following:
 - notify customers of the availability of water conservation kits
 - notify customers through a bill insert or direct mailing of the Tier 2 advice letter number with a brief description and the opportunity to participate in a public hearing, including date, time, and place of public hearing;
 - provide a copy of the Schedule 14.1 to each customer via bill insert or direct mailing;
 - publish in a newspaper the Tier 2 advice letter number with a brief description and public hearing date, time, and place per California Water Code section 352²⁹;
 - notify customers who seek “a variance from any of the provisions of... mandatory rationing plan” and respond “in writing” where a customer seeks such a variance; and
 - provide, during the period that a stage of Schedule 14.1 is activated, “customers with updates in at least every other bill, regarding its water supply status and the results of the customer’s conservation efforts.”

6.5.2 Additional Communication Protocols

GSWC will seek to engage customers and provide notice with locally-relevant actions that further the voluntary or mandatory water conservation actions permitted by Rule 14.1. These locally-relevant actions may include:

- Publishing information on GSWC’s website.
- Establishing a telephone hotline.
- Providing bill inserts and direct mailings above and beyond those legally required.
- Directly calling customers.
- Developing materials for non-English speaking customers.
- Preparing social media posts to communicate GSWC actions.
- Advertising actions on other local audio and video media.
- Coordinating voluntary and mandatory water conservation activities with other local and regional governing bodies.

²⁹ Rule 14.1, Section E, 2 has a typographical error in citing CWC section 351 for public hearing guidance.

Taken together, all of these communication actions will result in a more effective implementation of GSWC's WSCP.

6.6 Compliance and Enforcement

In addition to prohibitions, Rule No. 14.1 provides penalties and charges for excessive water use. The enactment of these penalties and charges is contingent on approval of Rule 14.1 implementation by the CPUC. When the rule is in effect, violators receive one verbal and one written warning after which a flow-restricting device may be installed on the violator's service connection for a reduction of up to 50 percent of normal flow or 6 hundred cubic feet (ccf) per month, whichever is greater. The notification protocols identified in Section 8.5 will be adhered to.

6.7 Legal Authorities

GSWC is empowered to implement and enforce its shortage response actions specified in this section through the following legal authorities: Water Code sections 350-359 and CPUC Rule 11, Rule 20 and Rule 14.1. With regard to GSWC's authority to implement and enforce its shortage response actions, Section 357 of the California Water Code requires that suppliers subject to regulation by the CPUC secure its approval before imposing water consumption regulations and restrictions required by water supply shortage emergencies. Accordingly, implementation of the actions identified in this section is dependent upon approval of the CPUC.

6.8 Financial Consequences of WSCP

Implementation of this WSCP will likely have financial impacts to GSWC. Specifically, in accordance with CPUC guidelines and principles, GSWC has established water rates that support its capital projects as well as its operation and maintenance activities. The rates are tied to GSWC's customers' normal water consumption activities that may be reduced through voluntary or mandatory water conservation activities. In this way, there may be revenue reductions to GSWC. In addition to the revenue reductions, GSWC may also see an increase in expenses resulting from augmented communication actions, increased enforcement activities, and overall water shortage management actions. This section addresses aspects of revenue reduction, expense increases, and additional costs that may arise during implementation of this WSCP.

6.8.1 Revenue and Expenditure Impacts

The Act requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. Because GSWC is an investor-owned water utility and, as such, is regulated by the CPUC, the CPUC authorizes it to establish memorandum accounts (i.e., rate stabilization accounts) to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts.

Utilities with CPUC-approved water management plans are authorized to implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts.

Table 6-2 provides a summary of actions with associated revenue reductions.

Table 6-2: Summary of Actions and Conditions that Impact Revenue

Type	Anticipated Revenue Reduction
Reduced sales	Reduction in revenue will be based on the decline in water sales and the corresponding quantity tariff rate
Recovery of revenues with CPUC-approved surcharge	Higher rates may result in further decline in water usage and further reduction in revenue

Table 6-3 provides a summary of actions and conditions that impact expenditures.

Table 6-3: Summary of Actions and Conditions that Impact Expenditures

Category	Anticipated Cost
Increased staff cost	Salaries and benefits for new hires required to administer and implement water shortage program
Increased O&M cost	Operating and maintenance costs associated with alternative sources of water supply
Increased cost of supply and treatment	Purchase and treatment costs of new water supply

Table 6-4 summarizes the proposed measures to overcome revenue impacts.

Table 6-4: Proposed Measures to Overcome Revenue Impacts

Names of Measures	Summary of Effects
Obtain CPUC-approved surcharge	Allows for recovery of revenue shortfalls brought on by water shortage conditions
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of revenue shortfall

Table 6-5 provides a summary of the proposed measures to overcome expenditure impacts.

Table 6-5: Proposed Measures to Overcome Expenditure Impacts

Names of Measures	Summary of Effects
Obtain CPUC-approved surcharge	Allows for recovery of increased expenditures brought on by water shortage conditions
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of increased expenditures

Any CPUC approved rate surcharges are imposed based on specific conditions and need and are deactivated when the condition no longer exists and/or is no longer needed.

6.8.2 Drought Rate Structures and Surcharges

GSWC can pursue CPUC approval of drought surcharges if water shortage conditions persist and the demand reductions needed are significant enough to warrant special rate increases to meet system revenue requirements. GSWC received CPUC approval of drought surcharges during the most recent extended drought condition. These drought surcharge revenues allowed GSWC to meet system revenue requirements while meeting demand reduction targets. Drought surcharges would be discontinued when triggered water shortage conditions are deactivated and no longer in effect.

6.8.3 Use of Financial Reserves

Being a regulated utility under the CPUC, GSWC is not allowed a financial reserve account. GSWC has General Rate Cases (GRCs) approved covering three years of rate schedules that include the cost of providing service in each water system, accounting for operation and maintenance, repair and replacement, and capital improvement costs required to meet all regulations and provide sustainable water service to customers. For extended water shortage conditions, GSWC would likely request CPUC approval of Memorandum Accounts to track emergency or unforeseen costs during the extended demand reduction period. The tracked costs would later be reviewed by the CPUC and recovered through drought surcharges to generate additional revenues during extended demand reduction periods. Per CPUC rate making policy, GSWC financial reserves are not allowed to be addressed in the CPUC GRC process.

6.9 Monitoring and Reporting

GSWC is committed to providing detailed monitoring and reporting updates in implementing the WSCP for the CPUC, GSWC management, and GSWC customers. Applicable CPUC rules require GSWC to determine when “water supplies are again sufficient to meet normal demands, and mandatory rationing measures are no longer necessary.” In order to make this determination, GSWC must aggregate data, assess GSWC monitoring actions, and determine WSCP implementation effectiveness. Moreover, GSWC must continually update its customers in its communication protocols with the “water supply status and results of customers’ conservation efforts.”

GSWC’s monitoring and reporting actions may include the following, as locally necessary:

- Gathering monthly or bi-weekly customer water use data
- Preparing technical assessments of customer water use and identifying deficiencies.
- Analyzing trends in water supply availability, including meteorological events, regional water supply coordination actions, and statewide regulatory trends.
- Assessing water conservation activities and the effectiveness of enforcement actions, as applicable to achieving conservation objectives.
- Preparing written reports and presentations, as necessary, for GSWC management meetings and other public meetings summarizing key information and data.

All of these monitoring and reporting actions will be used to continually update GSWC's customers on the status of water supplies, voluntary water conservation, and mandatory water conservation activities.

6.10 Re-evaluation and Improvement Procedures

GSWC will continually review and assess its procedures for implementing the WSCP. Specifically, GSWC will use the monitoring and reporting protocols identified above as a quality assurance and quality control measure to understand the effectiveness of water conservation activities. These re-evaluation and improvement procedures will include developing reports, memoranda, and presentations that assess the effectiveness of water conservation actions and the WSCP. These protocols will be continually assessed and updated by GSWC management staff.

6.11 Special Water Feature Distinction

For purposes of water shortage contingency planning and implementation within the Barstow System, GSWC defines as "special water features" those that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains. Such special water features are considered distinct from swimming pools and spas (as defined in subdivision (a) of Section 115921 of the Health and Safety Code). Special water feature use and management will be addressed in each service area's Schedule 14.1 in implementing a mandatory water conservation and rationing plan.

Water shortage response actions would focus on health and safety issues and tempering these uses based on the severity of the water shortage condition. The relative total water use from these sources would be a consideration for how special water features and swimming pool uses could be curtailed during specific water shortage conditions. Generally swimming pool filling and refilling would be impacted in the later stages of a water shortage condition. GSWC has determined that special water features are a relatively small discretionary use but would be restricted during a Stage 2 or higher water shortage condition.

6.12 Plan Adoption, Submittal, and Availability

The WSCP has been adopted, submitted, and is available as required by the Urban Water Management Planning Act. As a stand-alone document, the WSCP is also subject to the following separate adoption, submittal, and availability processes, and whenever it is separately amended or revised in the future. GSWC may refine each service area's WSCP through GSWC's governing procedures and CPUC rules and regulations in altering each service area's WSCP. GSWC has followed all applicable law in adopting the WSCPs. The current adopted WSCP for the GSWC Barstow service area shall be available to its customers and to the City of Barstow, San Bernardino County, MWA, within 30 days of its adoption. A copy of the current WSCP is available for public inspection during business hours at GSWC's Barstow service area office and posted on GSWC's website and available for download here:

<https://www.gswater.com/urban-water-management-plan>.

Appendix A



Appendix A: Demand Management Measures

This Appendix addresses the Demand Management Measure (DMM) requirements for the part of Region III currently served by GSWC's Barstow Customer Service Area (CSA). There are approximately 8,800 customers in the Barstow CSA. Accessing groundwater pumped from the Mojave River Basin-Centro Sub-Basin, which is the center of the Mojave Basin extending northwesterly and southeasterly from the Mojave River, Barstow CSA has been in operation since 1929.

DMMs are designed to strengthen water resiliency in the face of future droughts with provisions that include establishing water use objectives and long-term standards for efficient water use including indoor and outdoor residential water use, commercial, industrial, and institutional ("CII") use, irrigation with dedicated irrigation meters, water loss, and other uses. The DMM framework requires accountability to annual budgets.

In daily practice, demand management is an integral part of sustainably managing water resources in California. As population continues to grow, demand for water increases. Coupled with reduced supplies or shifts in supplies because of climate change and other factors, water reliability is jeopardized if no mitigation is in place. Implementing water use-demand management measures helps lower demand by preparing for and reducing effects caused by these situations. This can improve the water service reliability and help meet state and regional water conservation goals. Reducing demands can also benefit Barstow CSA by reducing energy costs, putting the Barstow CSA in a better position to provide customers future water security.

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There are several regional partnerships in which GSWC participates to better serve customers. These partnerships are typically associated with a regional wholesaler, regional organization, sewer, municipal, or energy utility. For instance, with Region III, which includes Barstow CSA, there are cooperative arrangements with the following organizations:

- Mojave Water Agency (MWA)
- Various cities
- Southern California Edison (SCE)
- The Southern California Gas Company (SCE)

Customers in GSWC's Mountain/Desert service area are provided a package of programs and incentives managed in-house by GSWC and in partnership with MWA. Demand Management Measures for Retail Agencies

Sections 1.1 through 1.6 provide narrative descriptions of utility based DMMs consistently



implemented by Golden State Water Company (GSWC). GSWC became a signatory to the California Urban Water Conservation Council in 1991. GSWC has been implementing DMMs since that time. Section 1.7 provides a narrative description of other DMMs being implemented in the Barstow CSA that impact total water demands. Moreover, GSWC's extensive drought and conservation initiatives resulted in water usage reductions in some areas more than 30% compared to 2013 baseline usage. As a result of these significant water savings, GSWC proposed to maintain its currently adopted level of conservation programs and expenses approved by the California Public Utilities Commission (CPUC) in its 2017 GRC.

GSWC's 2022-2024 proposed conservation programs and expenses are designed to maintain conservation gains and ensure GSWC's service areas are better positioned to comply with new state regulations and policies pertaining to water conservation, water loss management, and groundwater management, including California's New Water Efficiency Laws AB 1668, SB 606 and SB 555 and the Sustainable Groundwater Management Act.

Water Waste Prevention Ordinances

Although GSWC does not have rule-making authority, it supports member agencies and local cities in efforts to adopt ordinances that will reduce water waste. For GSWC, this provision is implemented through CPUC-approved rules provided in Appendix B, including Rule No. 14.1, the Water Conservation and Rationing Plan, Rule 20, Prohibition of Water Waste, and Rule 11, Discontinuance and Restoration of Service.

CPUC's methodology for water utilities to implement Rule No. 14.1 is documented in Standard Practice U-40-W, "Instructions for Water Conservation, Rationing, and Service Connection Moratoria." Rule No. 14.1 sets forth water use violation fines, charges for removal of flow restrictors, and the period during which mandatory conservation and rationing measures will be in effect. Water conservation restrictions include:

- Use of potable water for more than minimal landscaping
- Use through a broken or defective water meter
- Use of potable water which results in flooding or runoff in gutters or streets
- Use of potable water for washing private cars or commercial aircrafts, cars, buses, boats, or trailers, except at a fixed location where water is properly maintained to avoid wasteful use
- Use of potable water for washing buildings, structures, driveways, street cleaning or other hard-surfaced areas
- Use of potable water to irrigate turf, lawns, gardens, or ornamental landscaping
- Use of potable water for construction purposes
- Use of potable water for filling or refilling of swimming pools

Rule No. 20 (approved by the CPUC in 2015) discourages wasteful use of water and promotes use of water saving devices. The stated purpose of the rule is to "ensure that water resources available to the utility are put to a reasonable beneficial use and that the benefits of the utility's water supply and service extend to the largest number of persons." Together, Rules 11, 14.1 and 20 prohibit negligent or wasteful use of water, create a process for mandatory conservation and rationing, and promote the use of water-saving devices.

Metering

California law requires meters to be installed on all customer services by 2025. Presently, all



101,016 customers in Region III, which includes the Barstow CSA, are metered, and billed by volume monthly. GSWC follows the requirements of CPUC General Order 103-A which prescribes minimum water system design, operation, and maintenance (O&M) standards for water utilities including specifications for meter calibration, testing, and replacement activities.

GSWC will continue meter maintenance practices in accordance with CPUC General Order 103-A. More than 50 percent of Region III which includes Barstow CSA meters are less than 10 years old. GSWC complies with this DMM, and no additional activities are anticipated.

Conservation Pricing

All metered customers in Region III including those metered customers in the Barstow CSA are charged volumetrically for water service. It is important to continue implementing water conservation programs at appropriate levels to maintain adequate water supply, alleviate steep rate increases and assist and educate customers in becoming more water efficient. Starting on September 1, 2009, GSWC implemented a tiered conservation pricing rate structure for residential customers as approved by the CPUC for the Region 3 Rate Making Area (RMA) that includes the Barstow CSA. The current rate structure (included as Appendix B) for residential customers has a fixed charge as well as volumetric escalating pricing tiers, depending on customer usage. Non-residential customers have a fixed charge and a constant volumetric charge. Implementation of this revised pricing policy is the result of GSWC's collaboration with CPUC to implement conservation tiered rates for residential customers of investor-owned utilities. Tiered rates are consistent with the CPUC's 2010 Water Action Plan.

GSWC submitted a General Rate Case filing with the CPUC in 2020 that included proposed rates over the next three years based on volumetric charges for customers in Region III's Rate Making Area that includes the Barstow CSA. If approved, this rate decision will allow GSWC to adjust volumetric revenues and maintain a conservation-oriented rate structure that encourages efficient water use today and in the future. A General Rate Case (GRC) is a regulatory proceeding conducted by the California Public Utilities Commission (CPUC) to determine rates for regulated utilities. Every three years, the CPUC conducts an open and transparent review of Golden State Water's rate proposal to ensure customers receive a fair rate for reliable, safe water service.

The GRC process is very thorough and generally lasts 18 months with oversight from the Public Advocates Office (PAO), a division of the CPUC that scrutinizes the filing on behalf of customers. The utility's customers have an opportunity to participate in the GRC process by attending Public Participation Hearings and/or testifying in a public proceeding before an Administrative Law Judge.

To better service customers, GSWC has updated its Customer Care & Billing (CC&B) system companywide. The updated system allows access to customer information as well as total fixed and volumetric charge data. GSWC can utilize this data to better track water use patterns.

Public Education and Outreach

Public Information Programs

Region III customers, which include those in the Barstow CSA, are notified of various conservation programs. From 2019-2021 GSWC was authorized to spend up to \$34,443 annually for conservation outreach and \$37,500 annually for conservation promotional items in



Region III. GSWC's outreach efforts in the Barstow CSA include free conservation literature and brochures in the customer service area office and water conservation ads in the local paper in addition to participating in various conservation events. Customers can learn about rebates and other conservation programs on GSWC's website gswater.com, which provides links to MWDSC's website for detailed information.

GSWC customer outreach efforts have largely shifted to online efforts through the Company website and social media. Special events including "May is Water Awareness Month" and "Fix-a-Leak Week" can be promoted through local media. May is the ideal time for raising awareness of the importance of conservation inside and outside the home as the dry summer months arrive in California. Reminders of available rebates and other simple water and money saving techniques are most effective at this time of year.

Engaging customers to participate in GSWC's DMM programs has been impacted due to temporary COVID restrictions. GSWC recognizes the value in increased customer awareness of the various DMM programs that are available. To that end, GSWC will review opportunities to enhance its outreach program over the next three years. Public information measures that will be evaluated include additional direct mail, increased outreach participation at community events, and an improved conservation website. As a budget item, this category is expected to provide media advertisements to promote water conservation messaging for events, training and to market conservation programs. This category was "capped" per the previous GRC decision.

School Education Programs

GSWC conducted school conservation education programs for an estimated 15,525 students within its entire customer base. The GSWC school education program reaches over 5,000 students in Region III elementary schools each year. GSWC sponsors the WaterWise school education program in elementary schools with a CPUC approved budget of \$96,000 annually from 2019-2021. Students learn about conservation practices and receive a free conservation kit that includes a water survey, 1.5 gpm low-flow shower head, 1.5 gpm kitchen sink and 1.0 gpm bathroom aerators, leak detection dye tablets, a water gauge, and step-by-step instructions. The students are given a homework assignment to complete a water audit form and replace inefficient showerheads and aerators with water-saving devices provided in the kit. The program has been a remarkably effective way for GSWC to educate students, who in turn educate their parents about water-efficiency practices and low-flow plumbing devices.

Results from the program are tracked and a program Summary Report is generated at the end of each school year. This report documents the estimated reduction in water usage that was achieved through the retrofits and provides data on the percentage of students who participated in the program.

GSWC sponsors the WaterWise school education program in Barstow CSA elementary schools. The program reaches approximately 500 students annually. The curriculum conforms to the California education standards for math and sciences. The program has been an effective way for GSWC to reach many customers and educate students, who in turn educate their parents about water-efficiency practices and high-efficiency plumbing devices.

Workshops

GSWC will sponsor community workshops to help educate customers in-person and online in a hands-on environment about achieving water use efficiencies in their landscapes and homes. The curriculum will include landscape planning, efficient irrigation concepts, and proper turf



reduction or removal.

Programs to Assess and Manage Distribution System Real Loss

GSWC has an active Water Loss Control Program. Water losses are monitored by the Operations Engineering Department by reviewing the annual Distribution System Water Audits conducted in each water system. GSWC tracks both real and apparent losses as part of its on-going water loss control efforts. If the Operations Engineer determines from the annual water audit analysis that a leak detection survey is needed, GSWC will contract with a qualified leak detection company to perform the survey using the most current leak detection technology.

GSWC has been performing annual Distribution System Water Audits, consistent with American Water Works Association (AWWA) M36 methodology, since its 2010 UWMPs. If annual audit results indicate water losses would exceed water system goals, a full audit is triggered to identify water loss sources and determine impacts on overall system water losses.

Starting Calendar Year 2014, GSWC implemented the AWWA M36 Standard Water Audit methodology which was upgraded to Version 6 (v6.0) in 2020. The approach consists of a component analysis of metered water sources, metered water demands, quantification of water losses (apparent and real), and calculation of non-revenue water as a percentage of total system flows. Results of the analysis are included in Appendix C. According to general guidelines, an ILI of 1.0 to 3.0 is appropriate for systems where water resources are costly to develop or purchase. Additionally, the same ILI range fits systems where the ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability and operating with system leakage above this level may require expansion of existing infrastructure and/or additional water resources to meet the demand.

GSWC will continue to annually implement the Standard Audit and Water Balance worksheets procedures following the AWWA M36 protocol for calendar years 2020-2025, having taken measurable steps to validate water audit data since October 2017. Data validation improves data accuracy while cost-effectively reducing the ILI and non-revenue water through repair of leaks and other measures.

GSWC already has a comprehensive work order management system in place that documents leak locations and repair history which provides a solid foundation for future water loss control actions.

Water Conservation Program Coordination and Staffing Support

GSWC maintains a Water Use Efficiency Department with a companywide Water Use Efficiency Manager and a Senior Water Use Efficiency Specialist who develop and manage programs for all the GSWC systems. GSWC primarily utilizes several consultants to support program development and implementation on an as-needed basis.

Other Demand Management Measures

GSWC intends to continue to plan and implement other DMM programs in the Barstow CSA that are within the structures agreed to with the CPUC. GSWC will focus on improving customer outreach and promoting awareness of available DMM programs.

Once the next rate case is approved by the CPUC, GSWC will review their prioritized water use



efficiency program and implementation schedule for all customer service areas in the company focusing on systems that do not appear to be consistently meeting water use reduction targets. Specific conservation activities will be implemented that are both locally cost-effective and/or cost-effective to implement on a companywide basis. GSWC understands that market transformation has likely been achieved with the progression of plumbing code standards and natural replacement. Most GSWC residential rebate applications for HETs self-identify the reason for purchasing a new toilet as remodeling. This implies that most rebates are going to program “free riders” who would have purchased a toilet regardless of the offer of a rebate. Even if the customer would have chosen a 1.28 Gallon per Flush (“GPF”) as opposed to a 1.06 GPF UHET, the water savings differential between devices is simply not cost effective. High-Efficiency Clothes Washers (HECW) also fall into this category. To summarize, now that market transformation is being achieved with California plumbing codes and significant amounts of indoor product that have been provided, GSWC proposes to focus on the following base measures and markets:

1. Outdoor landscape (Residential, Commercial, Industrial, Institutional (CII))
 - a. Smart irrigation controllers and moisture sensors
 - b. Efficient irrigation nozzles and rotors
 - c. Large landscape retrofits and audits
 - d. Drip and low-emitting irrigation
2. Multifamily and CII
 - a. Audits
 - b. Indoor/outdoor retrofits
3. Homeowners Associations (HOA)
 - a. Audits
 - b. Landscape retrofits
 - i. Smart irrigation controllers
 - ii. Efficient irrigation nozzles and rotors
 - iii. Drip and low-emitting irrigation conversions
4. Low Income
 - a. Indoor product delivery and installation
 - i. Ultra-High Efficiency Toilet (UHET) & High Efficiency kits (High-Efficiency Showerheads, Bath and Kitchen Aerators)

Residential Assistance Programs

The Residential Assistance Program will continue to provide residential audits to respond to high bill investigations and assist high water users. The emphasis will remain on identifying leaks, high water use plumbing items and appliances, and outdoor opportunities for repairs, replacement, and efficiencies.

Customers are provided free high efficiency conservation kits if needed and are provided information on program incentives or services to assist them in achieving water savings based on audit recommendations.

GSWC also has a water audit program targeting high-use single-family (SF) and multi-family (MF) customers. GSWC identifies these customers based on billing data and contacts them to offer free audits. Audits may also be offered to walk-in customers at the local customer service area office. Additional home surveys are conducted as part of the school education program. High-Efficiency devices are available for free to customers at the GSWC office and are distributed to students as part of the free conservation kits they receive in the school education program.



Landscape Water Surveys

Customers in the Barstow CSA are provided free water audits upon request. When there is a high bill or leak suspected, GSWC is considering offering their services more broadly with marketing. Barstow CSA's residential assistance survey program has a landscape component that will be implemented concurrently. Barstow CSA's assistance survey programs have a landscape component to them and will be implemented concurrently. GSWC believes that outdoor landscape technologies offer the next best available opportunity to achieve water savings through device installation. GSWC will continue to provide rebates for the following devices:

- Weather-based irrigation controllers (WBIC)
- Soil moisture sensor systems
- Efficient spray nozzles and rotors

High-Efficiency Toilets/Clothes Washers

Although, MWDSC will likely continue to offer rebates for HECW as stated above, GSWC will discontinue the High Efficiency Clothes Washer (HECW) rebate program in areas not supported by MWDSC. It has been determined that market transformation has been achieved now that most HECW models meet or exceed Consortium for Energy Efficiency (CEE) Tier 3.

GSWC is transitioning several of its programs. GSWC will continue to provide the rebate programs described in Financials 1.7.6

WaterSense Specification (WSS) Toilets

Although MSDSC will likely continue to offer rebates for UHET, as stated above, GSWC will discontinue the UHET rebate program in areas not supported by MWDSC. Market transformation has likely been achieved with the progression of plumbing code standards and natural replacement. The GSWC webpage for Barstow CSA advertises the rebates and provides a link to the Metropolitan website for full details.

WaterSense Specification for Residential Development

Integration of WSS fixtures for new development has been accelerated by the California Green Building Standards Code (CAL Green Code), which became effective in January 2011. The CAL Green Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design. Local jurisdictions, at a minimum, must adopt the mandatory measures; the CAL Green Code also identifies voluntary measures that set a higher standard of efficiency for possible adoption. GSWC supports these new standards however does not have legal authority to adopt ordinances or regulations pertaining to this standard.

Commercial, Industrial, and Institutional (CII) DMMs

The CII survey program targets a variety of commercial, institutional, and industrial customers. Individual water-using devices are inspected, and customers receive a detailed report listing improvements that can be made to the equipment and to the maintenance of that equipment. Rebates are offered as an incentive to upgrade to more efficient equipment.



Large Landscape

Audits of large landscapes are the only service currently provided on a stand-alone basis by GSWC and are available as needed without a targeted effort.

Financial Incentives

Financial incentives for Barstow CSA are primarily provided through GSWC and in partnership with the MWA. GSWC has been shifting conservation program focus to Commercial, Industrial, Institutional (CII) and multi-family customers. This includes both indoor and outdoor measures for all customer classes to achieve the next best available water savings. GSWC water audits typically find older plumbing fixtures and higher water use that can be reduced with the installation of a new efficient toilet, urinal, and high efficiency showerheads and aerators. The CII and multi-family sectors have been underserved in efficiency programs. Significant water savings opportunities can be achieved by maintaining rebates and direct install services for these customer classes.

Residential customers have installed significant indoor measure changes either through incentive programs or natural replacement. These programs have included a mix of rebates and direct installs. As stated above, funding is limited, and programs can close anytime.

As stated previously, GSWC partners with the MWA to provide the Barstow CSA customers with programs and incentives to help them use water more efficiently. Customers apply for all rebates through the gswater.com website. Most programs only allow specific approved high efficiency products to be purchased and installed.

Additional program information and resources can be found at www.gswater.com.

Residential Programs

- Premium High Efficiency Toilet (PHET) Rebate
- High Efficiency Clothes Washer (HECW) Rebate
- Weather-Based Irrigation Controllers (Smart Controllers) Rebate
- Efficient Sprinkler Nozzle Rebate

Free High Efficiency Water Conservation Kits at gswater.com

Indoor Water Conservation Kit (Maximum order of two)

- 1.5 GPM High Efficiency Showerhead
- 1.5 GPM Kitchen Aerator
- GPM Bath Aerator (2)
- Leak test tablets and instructions

Commercial/Institutional and Large Landscape Programs

- Golden State Water Company participates with its regional partner in providing various rebates. Inquire and apply at www.gswater.com
- Plumbing Fixtures
- Landscape Equipment
- *Multifamily Programs*

Multifamily property owners and property managers can participate in a variety of GSWC



programs. Inquire and apply at the www.gswater.com site. GSWC can also provide customers with a supply of quality, high efficiency showerheads, and aerators.

- Residential, Commercial, Institutional sites larger than 1 acre are eligible to participate and receive a free landscape survey.

Building Code/New Standards

GSWC supports adoption of the CAL Green Building Code standards and SB407 provisions (Plumbing Retrofit on Resale) that improve the water use efficiency of new accounts and older accounts that retrofit fixtures and appliances with efficient products. These code changes will assist GSWC in meeting future water use targets on a reliable basis.

Information/Tracking

GSWC currently follows the requirements of CPUC General Order 103-A, which prescribe minimum water system design, O&M standards for water utilities, and include requirements for calibrating, testing frequency, and replacing water meters. GSWC will continue to follow this standard and will continue to improve DMM program database tracking tools for water savings associated with its conservation plans and increase flexibility in adding or changing program elements to improve results.

Implementation over the Past Five Years

This section describes the DMMs that have been implemented over the past five years from 2016 through 2020. The Barstow CSA has been actively implementing DMMs over the past five years through both local and regional programs.

Past DMM Program Budget Expenditures (2015-2020)

Table A-1 summarizes GSWC's actual DMM expenditures over the past five years for Region III which includes the Barstow CSA. The DMM budget is constrained by CPUC rate case approvals establishing allowable DMM expenditures for each Rate Making Area.

Table A-1: GSWC Annual Reporting Requirements DMM Program Budget – Actual Expenditures Summary Table (2016-2020)					
Program/Item	2016	2017	2018	2019	2020
Total Annual Expenditures	\$234,497	\$759,787	\$361,783	\$651,140	\$430,562
NOTES: Based on GSWC annual reports filed with the CPUC from 2016 through 2020					

The annual budget is established by the CPUC rate case approvals and actual expenditures based on DMM program activity levels experienced in each RMA. Annual expenditures vary by RMA and by year depending on budget availability, DMM participation rates, outreach, and marketing efforts, as well as impacts from regional programs.



Past DMM Program Summary (2016-2020)

Table A-2 summarizes the GSWC DMM programs provided to Region III which includes the Barstow CSA customers over the past five years.

Table A-2: DMM Program Summary Table (2016-2020)					
Program/Item	2016	2017	2018	2019	2020
Public Information/Outreach Program	Yes	Yes	Yes	Yes	Yes
UHET Rebate Program (*)	Yes	Yes	Yes	Yes	No
HECW Rebate Program (*)	Yes	Yes	Yes	Yes	Yes
Weather-based Irrigation (WBIC)	Yes	Yes	Yes	Yes	Yes
Residential/CII Partnership Programs (*)	Yes	Yes	Yes	Yes	Yes
Efficient Irrigation Nozzles	Yes	Yes	Yes	Yes	Yes
Audits (CII/Residential)	Yes	Yes	Yes	Yes	Yes
Conservation Kits/Devices	Yes	Yes	Yes	Yes	Yes
School Education Program	Yes	Yes	Yes	Yes	Yes
NOTES: (*) = collaborative GSWC DMM Program					

DMM Water Savings Over the Past Five Years

Table A-3 summarizes the estimated water savings on both an annual and lifetime (i.e., over the useful life of the device) basis for the DMMs implemented over the past years in Region III which includes the Barstow CSA described above.

Table A-3: DMM Program Water Savings Summary Table (2016-2020)					
Savings Period	2016	2017	2018	2019	2020
Annual Water Savings	32.43	319.36	101.71	153.30	89.56
Lifetime Water Savings	348.55	3,524.75	2,034.47	2,881.62	1,786.02
NOTES: Units are in AFY					
Source: PUC testimony Edwin Deleon Schedule 3 (CPUC E-3)					



Planned Implementation to Achieve Water Use Targets

In planning for future DMM programs, GSWC would consider the following factors: current PUC approved conservation funds, cost-effective program design and implementation, sustainability of water savings, and ability to meet future water use targets. DMM programs are an important long-term strategy to enable GSWC to provide affordable water service to customers. While meeting water use targets is important, it is not the only consideration in planning future DMM programs. The key provisions impacting GSWC include:

- New urban water use targets and standards replacing those set under SB x7-7
- Permanent monthly urban water usage reporting, the amount of water conservation achieved, and any related enforcement actions
- Permanent prohibitions on wasteful water use practices
- New rules for conducting validated water loss audits and minimizing system water loss per Senate Bill 555 (“SB 555”) and pending SWRCB water loss standards, and
- New performance measures for CII water use, including
 - Classification of all CII accounts using the North American Industry Classification System (“NAICS”) and where feasible development of CII subsector water use benchmarks for identification of CII accounts with potential for water use efficiency improvements
 - Completion of water use audits or water management plans for CII account over a specified size, volume, or percentage threshold, and
 - Conversion of all landscapes over a specified size threshold that are served by mixed-use meter CII account to dedicated irrigation accounts.

As an investor-owned utility, GSWC’s ability to obtain funding and implement DMM programs is contingent on approval of the GRC by the CPUC which covers a three-year rate cycle. GSWC is constantly in the process of reviewing and evaluating its existing DMM programs.

In 2020, GSWC submitted a GRC with the CPUC which is facilitating further development of cost-effective DMM programs covering Test Years 2022, 2023, and 2024.

The goals set forth in the 20×2020 plan and the State Water Plan complement the requirements of SB X7-7, which mandated a 20 percent reduction in urban per-capita water use by Dec. 31, 2020. Retail Water Suppliers as defined by the California Water Code (3,000 connections or water sales of more than 3,000 acre-feet of water annually) are required to develop targets to decrease per-capita water use.

Planned DMM Budget (2020 - 2021)

Table A-4 summarizes GSWC’s projected DMM annual budget consistent with expenditures approved by the CPUC in its most recent GRC for Region III which includes the Barstow CSA. The expenditures are based on CPUC rate case approvals establishing allowable DMM expenditures for each rate making area. California’s Public Advocates Office (PAO) agreed to GSWC’s conservation budget. Region III’s CPUC approved annual conservation budget for Test Year 2019-2021 is \$1,331,862.



Table A-4. Region III Planned DMM Annual Budget starting 2022

Conservation Programs	Budget
Conservation Promotional Items	\$ 12,500
Conservation Outreach	\$ 11,500
School Education Program	\$ 96,320
Workshops	\$ 7,000
CII Audit and Incentive	\$ 50,000
Irrigation Audits	\$ 25,000
Outdoor Incentives	\$ 35,000
Direct Install Programs	\$ 206,634
Total	\$ 443,954

Planned DMM Narrative Summary (2021-2025)

Table A-5 summarizes the GSWC planned DMM program implementation over the next three years (as determined by currently approved GRCs). GSWC has been a leader in distributing and rebating the best available technologies through all its CSAs. It has been determined that there is a declining rate of opportunity to focus on indoor water savings. Homeowners are likely replacing more recent models or are subject to free ridership in remodeling applications. GSWC proposes to reduce or discontinue residential rebates for UHETs, for instance, and focus on outdoor and irrigation savings opportunities.



Table A-5: DMM Narrative Summary Table (2021, 22, 23, 24, 25)					
Program/Item	2021	2022	2023	2024	2025
Public Information/Outreach Program	Yes	Yes	Yes	Yes	TBD
UHET Rebate Program (*)	No	No	No	No	TBD
HECW Rebate Program (*)	No	No	No	Yes	TBD
Residential/CII Partnership Programs (*)	Yes	Yes	Yes	Yes	TBD
Audits (CII/Residential)	Yes	Yes	Yes	Yes	TBD
Conservation Kits/Devices	Yes	Yes	Yes	Yes	TBD
School Education Program	Yes	Yes	Yes	Yes	TBD
NOTES: (*) = collaborative GSWC DMM Program.					

Planning for Future DMM Programs

GSWC will continue to review water saving opportunities to leverage DMM projects for the Barstow CSA to strengthen water resiliency. The DMM framework contributes to efficient water use including indoor and outdoor residential water use, commercial, industrial, and institutional (“CII”) use, irrigation with dedicated irrigation meters, water loss, and other uses. And it requires accountability to annual budgets.

California Water Stakeholder Membership

GSWC is a member of the Alliance for Water Efficiency, a stakeholder-based nonprofit organization dedicated to the efficient and sustainable use of water, serving as an advocate for water-efficient products and programs in North America. The Alliance for Water Efficiency provides information and assistance on water conservation efforts to its members, industry associations, water-impact policy-making organizations of all types and utilities. GSWC’s Region III systems which includes the Barstow CSA participation benefits customers through increased awareness of innovative approaches to efficient water use.

GSWC aligns its conservation practices with WaterSense. WaterSense is a voluntary partnership program sponsored by the U.S. Environmental Protection Agency (EPA), for utilities, manufacturers, and other water professional stakeholders. WaterSense partnerships encourage innovation in manufacturing and support sustainable jobs for American workers. At the same time, it is a resource for helping consumers save water. The WaterSense label makes it easy for Barstow CSA customers to find water-efficient products and programs that meet EPA’s criteria for efficiency and performance.

In the past, as part of the Barstow CSA, GSWC signed a MOU and adapted associated BMPs in its approach to DMMs. The California Urban Water Conservation Council (CUWCC) is now merged with California Water Efficiency Partnership (CalWEP). CalWEP maximizes 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 original utility-based (foundational) DMMs described in section 1.1 through 1.6 of this Appendix represent standard practices in most utilities that GSWC has been implementing for many years. Future direction on BMP implementation for GSWC will be impacted by membership in the Alliance for Water Efficiency, its alignment to WaterSense practices and the California-focused example of Cal-WEP.



Appendix B



Appendix B

Delta Reliance

This Appendix provides the Delta Reliance assessment for Golden State Water Company Barstow service area. The Mojave Water Agency (MWA) service area boundary includes the following retail water service agencies: Liberty Utilities – Apple Valley Water Company, Bighorn-Desert View Water Agency, City of Adelanto Water District, San Bernardino County Service Area 64, San Bernardino County Service Area 70J, Golden State Water Company – Barstow System, Helendale Community Services District, Hesperia Water District, Hi-Desert Water District, Joshua Basin Water District, Phelan Pinon Hills Community Services District, and Victorville Water District. These retail agencies are subject to the minimum threshold requirements of the Urban Water Management Planning Act (UWMP Act) and work with MWA on managing regional water supplies. Additional entities that are not currently subject to the UWMP Act but may be subject to the UWMP Act in the future and that rely upon water supplies derived from MWA’s and the retail agencies’ management are also considered in this assessment. This assessment is consistent with all applicable water management activities within the MWA service area boundary including the Mojave Basin Area Adjudication, the Warren Valley Basin Judgment, and the Ames/Reche Groundwater Storage and Recovery Program Management Agreement.

B.1 Delta Reform Act and Certification of Consistency

The Delta Reform Act of 2009 required state and local agencies to prepare a written certification of consistency with Delta Plan policies before initiating a covered action in the Delta.¹ The written certification of consistency must be submitted to the Delta Stewardship Council and include detailed findings as to whether the covered action is consistent with applicable Delta Plan policies.² The submitted certification of consistency may be appealed by any person and the Delta Stewardship Council may grant the appeal to address contested issues.³ In short, water suppliers that anticipate participating in a proposed covered action must comply with the requirements of the Delta Reform Act. For more detail on the specific provisions of the Delta Reform Act covered by this Delta Reliance Analysis, see Mojave Water Agency’s 2020 Urban Water Management Plan, Appendix A.

¹ California Water Code section 85057.5.

² California Water Code section 85225.

³ California Water Code section 85225.10-85225.25.

B.2 Expected Outcomes for Reduced Delta Reliance and Regional Self Reliance

The expected outcomes for this Delta reliance and improved regional self-reliance assessment were developed using guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 issued in March 2021 (Guidebook 2020). The data used in this assessment represent the total regional efforts of MWA and the retail agencies and were developed as part of a region-wide coordination process. Table B-1 shows MWA's expected outcomes for reduced Delta reliance.

Table B-1: Expected Outcomes for Reduced Reliance on the Delta

Year	2010	2015	2020	2025	2030	2035	2040	2045
Total Water Supplies from the Delta Watershed	34.2%	34.2%	31.9%	28.7%	26.2%	24.4%	22.9%	22.2%
Change in Water Supplies from the Delta Watershed		-0.1%	-2.4%	-5.6%	-8.0%	-9.8%	-11.4%	-12.1%

Table B-2 shows the expected outcomes for supplies contributing to regional self-reliance.

Table B-2: Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance	2010	2015	2020	2025	2030	2035	2040	2045
Water Use Efficiency	-	17,735	33,701	46,803	54,025	59,962	64,920	68,828
Water Recycling	62,000	47,825	52,536	47,495	49,699	50,930	52,172	53,559
Conjunctive Use Projects	54,045	57,349	57,349	57,349	57,349	57,349	57,349	57,349
Water Supplies Contributing to Regional Self-Reliance	116,045	122,909	143,586	151,647	161,073	168,241	174,441	179,736
Service Area Water Demands without Water Use Efficiency	2010	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands without Water Use Efficiency	145,066	155,744	163,296	176,846	188,351	196,641	203,965	210,600
Change in Regional Self Reliance (Acre-Feet)	2010	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	116,045	122,909	143,586	151,647	161,073	168,241	174,441	179,736
Change in Water Supplies Contributing to Regional Self-Reliance		6,864	27,541	35,602	45,028	52,196	58,396	63,691
Percent Change in Regional Self Reliance	2010	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	80.0%	78.9%	87.9%	85.8%	85.5%	85.6%	85.5%	85.3%
Change in Water Supplies Contributing to Regional Self-Reliance		-1.1%	7.9%	5.8%	5.5%	5.6%	5.5%	5.4%

The data presented in this section demonstrate the expected outcomes for reduced Delta reliance and regional self-sufficiency. The information contained in this Appendix is also intended to be an addendum to GSWC's Barstow Service Area 2015 UWMP consistent with WR P1 subsection (c)(1)(C). The information has been noticed and presented in accordance with applicable law. Further information related to these determination may be found in Mojave Water Agency's 2020 Urban Water Management Plan, Appendix A.