

# 2025 Urban Water Management Plan for Twentynine Palms Water District

Public Draft

Prepared by Kennedy Jenks

April 2026

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# Twentynine Palms Water District 2025 Urban Water Management Plan

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April 2026

Prepared for

**Twentynine Palms Water District**
72401 Hatch Rd.
Twentynine Palms, CA 92277

KJ Project No. 2544227*00

# Table of Contents

*List of Tables* ..... *v*

*List of Figures* ..... *vi*

*List of Appendices* ..... *vi*

*Executive Summary* ..... *I*

Twentynine Palms Water District ..... II
Water Use ..... II
Water Supply ..... III

**Chapter 1: Layperson's Description/Introduction ..... 1-1**

1.1 Overview ..... 1-1
1.2 Purpose ..... 1-1
1.3 Basis for Preparing a Plan ..... 1-4
1.3.1 Relationship to Other Planning Done by the District ..... 1-4
1.3.2 Relationship to Water Shortage Contingency Plan ..... 1-4
1.4 Implementation of the 2025 UWMP and WSCP ..... 1-4
1.4.1 Public Water Systems ..... 1-5
1.4.2 Fiscal or Calendar Year ..... 1-5
1.5 Cooperative Preparation of the Plan ..... 1-5
1.5.1 Plan Adoption ..... 1-6
1.5.2 Public Outreach ..... 1-6
1.6 Water Management within the Twentynine Palms Water District Service Area ..... 1-7
1.7 Population, Demographics, and Socioeconomics ..... 1-8
1.8 Population ..... 1-12
1.9 Land Uses in the Service Area ..... 1-13
1.10 Climate ..... 1-14
1.11 Potential Effects of Climate Change ..... 1-14
1.12 Climate Change Vulnerability Analysis ..... 1-16

**Chapter 2: Water Use ..... 2-1**

2.1 Overview ..... 2-1
2.2 Water Use Sectors ..... 2-1
2.3 Historical and Current Water Use ..... 2-2
2.3.1 Historical Sales ..... 2-4
2.3.2 Distribution System Water Losses ..... 2-4
2.4 Projected Water Use ..... 2-5
2.4.1 Water Delivery Demand Projections Based on Land Use ..... 2-5
2.4.2 Effects of Codes, Standards, and Other Ordinances ..... 2-9
2.5 Characteristic Five-Year Water Use ..... 2-10
2.5.1 Water Use Projections for Lower Income Households ..... 2-11
2.5.2 UWUO Compliance ..... 2-12

# Table of Contents (cont'd)


**Chapter 3: SBx7-7 Baseline and Targets ..... 3-1**

3.1 Introduction ..... 3-1
3.2 Existing and Targeted Per Capita Water Use ..... 3-1
3.2.1 Base Daily Per Capita Water Use ..... 3-3
3.2.2 Compliance Water Use Targets ..... 3-4

**Chapter 4: Water Resources ..... 4-1**

4.1 Overview ..... 4-1
4.2 Wholesale (Imported) Water Supplies ..... 4-3
4.3 Groundwater ..... 4-3
4.3.1 Twentynine Palms Valley Basin ..... 4-1
4.3.1.1 Mesquite Lake Subbasin ..... 4-1
4.3.1.2 Mainside Subbasin ..... 4-1
4.3.2 Joshua Tree Basin ..... 4-2
4.3.2.1 Indian Cove Subbasin ..... 4-2
4.3.2.2 Eastern Subbasin ..... 4-3
4.3.2.3 Fortynine Palms Subbasin ..... 4-3
4.3.3 Adopted Groundwater Management Plan ..... 4-3
4.3.3.1 Basin Management Objectives ..... 4-4
4.3.3.2 Sustainable Groundwater Management Act ..... 4-5
4.3.4 Groundwater Supply Reliability ..... 4-5
4.3.5 Historical Groundwater Pumping ..... 4-6
4.3.6 Projected Groundwater Pumping ..... 4-8
4.4 Potential Supply Inconsistency ..... 4-9
4.5 Transfers and Exchanges ..... 4-10
4.6 Recycled Water ..... 4-10
4.7 Water Energy Reporting ..... 4-10
4.8 Planned Water Supply Projects and Programs ..... 4-11
4.9 Development of Desalination ..... 4-12
4.9.1 Opportunities for Brackish Water and/or Groundwater Desalination ..... 4-12
4.9.2 Opportunities for Seawater Desalination ..... 4-12

**Chapter 5: Recycled Water ..... 5-1**

5.1 Wastewater and Recycled Water ..... 5-1

**Chapter 6: Water Quality ..... 6-1**

6.1 Groundwater Quality ..... 6-1
6.2 Water Quality Constituents ..... 6-2
6.2.1 Fluoride ..... 6-2
6.2.2 Arsenic ..... 6-3
6.2.3 Hexavalent Chromium ..... 6-3
6.2.4 Salts and Nutrients ..... 6-3

# Table of Contents (cont'd)


6.2.5 Uranium....6-4
6.2.6 Disinfection By-Products....6-4
6.2.7 Microbiological....6-4
6.2.8 Radiological Tests....6-4
6.3 Water Quality Management Actions....6-5
6.3.1 Control of High-Salinity Waters....6-5
6.3.2 Regulation of the Migration of Contaminated Groundwater....6-5
6.3.3 Wellhead Protection Areas and Recharge Areas....6-5
6.3.4 Well Construction Policies....6-6
6.3.5 Well Abandonment and Destruction Program....6-6
6.4 Groundwater Monitoring....6-7
6.4.1 Groundwater Monitoring Implementation Plan....6-7
6.5 TPWD Water Treatment....6-8
6.6 Wastewater Management....6-9
6.7 Water Quality Impacts on Reliability....6-9

**Chapter 7: Reliability Planning....7-1**

7.1 Reliability of Water Supplies....7-1
7.2 Supply and Demand Comparisons....7-1
7.2.1 Normal Water Year....7-1
7.2.2 Single-Dry Year....7-2
7.2.3 Multiple-Dry Year....7-2
7.2.4 Summary of Comparisons....7-3
7.3 Drought Risk Assessment....7-3
7.3.1 Data and Methodologies Used....7-3
7.3.1.1 Water Demands....7-3
7.3.1.2 Water Supplies....7-3
7.3.2 Comparison of Total Water Supply Sources and Total Projected Water Use 2026 through 2030....7-4

**Chapter 8: Water Demand Management Measures....8-1**

8.1 Demand Management....8-1
8.1.1 Water Waste Prohibitions....8-1
8.1.2 Metering....8-2
8.1.3 Conservation Pricing....8-3
8.1.4 Public Education and Outreach....8-3
8.1.5 Programs to Assess and Manage Distribution System Real Loss....8-4
8.1.6 Water Conservation Program Coordination and Staffing Support....8-4
8.2 Other DMMs....8-4
8.3 Planned DMMs to Meet Water Use Targets....8-5
8.3.1 Planned Implementation of DMMs to Achieve Water Use Targets....8-6

# Table of Contents (cont'd)

**Chapter 9: Seismic Risk Assessment ..... 9-1**

*References ..... i*

## List of Tables


Table ES-1: Projected Potable Water Demands 2030 to 2050 (AFY) ..... III
Table ES-2: Supply and Demand Comparison-Normal Year (AFY) ..... III
Table ES-3: Supply and Demand Comparison – Single-Dry Year (AFY) ..... III
Table ES-4: Supply and Demand Comparison – Multiple-Dry Year (AFY) ..... IV
Table 1-1: Retail Public Water System *(DWR Table 2-1)* ..... 1-5
Table 1-2: Agency Coordination ..... 1-6
Table 1-3: Public Participation Timeline ..... 1-7
Table 1-4: Average Demographics for Twentynine Palms ..... 1-12
Table 1-5: Historical Service Connections ..... 1-12
Table 1-6: Historical Population Estimates ..... 1-13
Table 1-7: Projected Population Estimates ..... 1-13
Table 1-8: Existing Land Uses in the TPWD Service Area ..... 1-13
Table 1-9: Climate Data ..... 1-14
Table 2-1: Water Deliveries 2020 and 2025 (AF) ..... 2-3
Table 2-2: Historical Pay Meter Sales (AF) ..... 2-4
Table 2-3: 12-Month Water Loss Audit Report Summary *(DWR Table 4-5R)* ..... 2-4
Table 2-4: Unit Demand Factors ..... 2-6
Table 2-5: Acreage of Remaining Undeveloped Parcels within TPWD Service Area ..... 2-6
Table 2-6: Projected Demands for Potable Water ..... 2-7
Table 2-7: Demands from Anticipated Future Developments (AF) ..... 2-8
Table 2-8: Projected Five-Year Water Use (2026 – 2030) ..... 2-11
Table 2-9: Projections of Future Lower-Income Household Water Use ..... 2-11
Table 2-10: UWUO Standards, Compliance, and Water Savings Needed ..... 2-14
Table 3-1: SBx7-7 Calculations Specific to TPWD ..... 3-2
Table 3-2: Baseline Period Ranges ..... 3-3
Table 3-3: Baseline Water Use ..... 3-4
Table 3-4: Components of Target Daily per Capita Water Use ..... 3-5
Table 4-1: TPWD Production Well Summary ..... 4-2
Table 4-2: Available Water Supplies (AFY) ..... 4-3
Table 4-3: Active Production Well Capacity by Subbasin ..... 4-4
Table 4-4: Historical Water Production (1990-2024) ..... 4-7
Table 4-5: Historical Groundwater Pumped (2021-2025, AFY) *(DWR Table 6-1 R)* ..... 4-8
Table 4-6: Groundwater Pumping Capacity ..... 4-8
Table 4-7: Projected Groundwater Pumping and Demands (AF) ..... 4-9
Table 6-1: Current and Projected Water Supply Changes ..... 6-10
Table 7-1: Factors Resulting in Inconsistency of Supply ..... 7-1
Table 7-2: Supply and Demand Comparison-Normal Year (AFY) ..... 7-2
Table 7-3: Supply and Demand Comparison – Single-Dry Year (AFY) ..... 7-2
Table 7-4: Supply and Demand Comparison – Multiple-Dry Year (AFY) ..... 7-3
Table 7-5: Five-Year Drought Risk Assessment 2026-2030 (AF) ..... 7-4

## List of Figures


Figure 1-1: TPWD Service Area ....1-9
Figure 1-2: TPWD Land Use....1-10
Figure 1-3: TPWD Disadvantaged Communities ....1-11
Figure 2-1: System Demand Water Use (2020 and 2025)....2-3
Figure 2-2: Projected Water Demand by Land Use Category ....2-8
Figure 2-3: City of Twentynine Palms Number Housing Units (19902025) ....2-10
Figure 4-1: Groundwater Subbasins in the TPWD Service Area ....4-5
Figure 4-2: Groundwater Subbasins and Wells in the TPWD Service Area ....4-6


## List of Appendices


A UWMP DWR Checklist
B Adoption Resolutions (to be provided with the Final UWMP)
C Public Outreach Materials
D Climate Change Vulnerability Assessment
E AWWA Water Loss Audits
F DWR Submittal Tables
G Groundwater Management Plan
H Demand Management Measures
I 2025 Water Shortage Contingency Plan

## List of Acronyms

| | |
|---|---|
| AB | Assembly Bill |
| Ac | acre |
| AF | acre-feet |
| AFY | acre-feet-per-year |
| AMI | Automated Meter Infrastructure |
| AMR | Automated Meter Reading |
| AWWA | American Water Works Association |
| BGS | below ground surface |
| Board | Twentynine Palms Board of Directors |
| BMO | Best Management Objective |
| BMPs | Best Management Practices |
| CASGEM | California Statewide Groundwater Elevation Monitoring |
| Chromium-6 | Hexavalent Chromium |
| CII | commercial, industrial, and institutional |
| CIMIS | California Irrigation Management Information Systems |
| City | City of Twentynine Palms |
| COC | constituent of concern |
| Cr-6 | Hexavalent Chromium |
| CWC | California Water Code |
| DAC | Disadvantaged Communities |
| DBP | Disinfectant By-Products |
| DDW | Division of Drinking Water |
| DIM | dedicated irrigation meter |
| Delta | San Joaquin-Sacramento Bay Delta |
| District | Twentynine Palms Water District |
| DMM | Demand Management Measures |
| DRA | Drought Risk Assessment |
| DWR | Department of Water Resources |
| DWSAP | Drinking Water Source Assessment and Protection |
| ETo | evapotranspiration |
| EPA | Environmental Protection Agency |
| FEMA | Federal Emergency Management Agency |
| GIS | Geographic Information Systems |
| GMP | Groundwater Management Plan |
| GPCD | gallons per capita per day |
| GPM | gallons per minute |
| GSP | Groundwater Sustainability Plan |
| HAA5 | Haloacetic Acids |
| INI | Irrigable not Irrigated |
| IRWMP | Integrated Regional Water Management Plan |

| | |
|---|---|
| JBWD | Joshua Basin Water District |
| LDE | Local Data Exchange |
| LHMP | Local Hazard Mitigation Plan |
| kWh | kilowatt hour |
| MCL | Maximum Contaminant Level |
| MG | million gallons |
| MGD | million gallons per day |
| mg/L | milligram per liter |
| MHI | median household income |
| MWA | Mojave Water Agency |
| MWD | Metropolitan Water District of Southern California |
| NL | Notification Level |
| OWTS | onsite wastewater treatment system |
| PCA | potentially contaminating activities |
| pCi/L | picocuries per liter |
| PHG | Public Health Goal |
| Plan | Urban Water Management Plan |
| PWS | Public Water System |
| RL | Response Level |
| RWQCB | Regional Water Quality Board |
| SB | Senate Bill |
| SBC | San Bernardino County |
| SBx7-7 | Senate Bill 7 of Special Extended Legislative Session 7 |
| SCAG | Southern California Association of Governments |
| SCE | Southern California Edison |
| SDACs | Severely Disadvantaged Communities |
| SDWA | Safe Drinking Water Act |
| SGMA | Sustainable Groundwater Management Act |
| SNMP | Salt & Nutrient Management Plan |
| SMCL | Secondary Maximum Contaminant Level |
| SSME | Septic System Management Element |
| SSMP | Septic System Management Program |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| TDS | total dissolved solids |
| THM | Trihalomethane |
| US | United States |
| USGS | United States Geological Survey |
| UWMP | Urban Water Management Plan |
| UWUO | Urban Water Use Objective |
| WSCP | Water Shortage Contingency Plan |
| WWMP | Wastewater Master Plan |

| | |
|---|---|
| °F | degrees Fahrenheit |
| % | percent |
| µg/L | microgram per liter |

# Executive Summary

This document presents the 2025 Urban Water Management Plan (UWMP, Plan) for the Twentynine Palms Water District (TPWD, District) service area. The State of California mandates that all urban water suppliers prepare a UWMP. Detailed information on what must be included in these plans, as well as who is responsible for completing them, can be found in California Water Code Sections 10610 through 10657. This executive summary outlines the general purpose and implementation of the UWMP, as well as provides general information about TPWD and its service area characteristics.

A UWMP is a planning tool that generally guides the actions of urban water suppliers. It provides managers and the public with a broad perspective on various water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "…describes the opportunities for exchanges or water transfers on a short-term or long-term basis." (Wat. Code, § 10631, subd. [d]). The identification of such opportunities and the inclusion of those opportunities in a plan's general water service reliability analysis neither commits an urban water supplier to pursue a particular water exchange/transfer opportunity, nor precludes it from exploring exchange/transfer opportunities never identified in its plan. Before an urban water supplier can implement any potential future water supply sources identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed, and all required environmental analyses are completed.

"A plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers." (*Sonoma County Water Coalition v. Sonoma County Water Agency* (2010) 189 Cal. App. 4th 33, 39.) It should not be viewed as an exact blueprint for supply and demand management. Water management in California must address uncertainty. Planning projections may change in response to several factors associated with uncertainty, such as climate change, population growth, and water demand.

The California Supreme Court has recognized the uncertainties inherent in long-term land use and water planning and observed that the generalized information required in the early stages of the planning process is replaced by firm assurances of water supplies at later stages" (*Id.* at 41). From this perspective, it is appropriate to view the UWMP as a general planning framework rather than a specific action plan; it is an effort to generally answer a series of planning questions, such as:

- What are the potential sources of supply, and what amounts are estimated to be available from them?
- What is the projected demand, given a reasonable set of assumptions about growth and implementation of good water management practices?
- How do the projected supply and demand figures compare and relate to each other?

Using these "framework" questions and resulting answers, the implementing agency or agencies will pursue feasible, cost-effective options and opportunities to develop supplies and meet demands.

The UWMP Act requires preparation of a plan that, among other things:

- Accomplishes water supply planning over a 20-year period in five (5)-year increments (TPWD is going beyond the requirements of the UWMP Act by developing a plan that spans twenty-five years to 2050).
- Identifies and quantifies existing and projected water supplies and water supply opportunities, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Implements conservation and efficient use of urban water supplies.

State legislation, Senate Bill 7 of Special Extended Session 7 (SBx7-7), was signed into law in November 2009, calling for progress towards a 20 percent reduction in per capita water use statewide by 2020. The legislation requires that retailers develop and report their 2020 and 2025 water use targets, their baseline daily per capita use, their 2020 and 2025 compliance daily per capita use, and the basis for determining those estimates. This UWMP reports on TPWD's progress in meeting the SBx7-7 targets of a 20 percent reduction in per capita demand. This UWMP also includes projections consistent with legislative requirements of Making Conservation a California Way of Life Urban Water Use Objectives (UWUOs), and California Assembly Bill 1572 (AB 1527) regarding reductions in non-functional turf.

## Twentynine Palms Water District

The TPWD service area encompasses approximately 87 square miles and includes the City of Twentynine Palms. Located in the high desert of southern California, TPWD is approximately 72 miles due east of the City of San Bernardino and 35 miles northeast of the City of Palm Springs. Groundwater is the primary source of water for TPWD. Groundwater is provided by TPWD to approximately 17,373 residents, including 8,362 service connections, 361 miles of pipeline, and 17 million gallons of storage capacity. Wastewater is disposed of through individual septic systems, and TPWD does not use any recycled water or other non-potable water sources. Annual water usage is approximately 2,200 – 2,500 acre-feet (AF), which is mostly used by single-family residential (approximately 60 percent), and the other 40 percent is a combination of multi-family residential, commercial/institutional, or landscape/irrigation.

## Water Use

This UWMP describes historic and current water usage and the methodology used to project future demands within the TPWD service area. Water use is divided into sectors: residential, commercial, industrial, irrigation, and institutional. To undertake this evaluation, existing land use data and new housing construction information were compiled. Based on average water consumption, the projected 2050 potable water demand will be approximately 2,610 AFY (Table ES-1). TPWD met and exceeded the required reductions under SBx7-7 (20 percent reduction in per capita water use) in 2020 and 2025. TPWD has met its 2025 Urban Water Use Objectives (until 2028). Beginning in 2028, projected standards are expected to require an 18 to 46 percent reduction in water use through 2050.

**Table ES-1: Projected Potable Water Demands 2030 to 2050 (AFY)**

| Water Use | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| Total Water Deliveries | 2,170 | 2,220 | 2,290 | 2,350 | 2,410 |
| Sales to Other Agencies | 20 | 20 | 20 | 20 | 20 |
| Non-Revenue Water | 170 | 170 | 170 | 180 | 180 |
| **Total Demand** | **2,360** | **2,410** | **2,480** | **2,550** | **2,610** |
| Assumed Conservation | (280) | (360) | (400) | (400) | (400) |
| **Total Demand with Conservation** | **2,070** | **2,050** | **2,080** | **2,150** | **2,210** |

Notes: Chapter 2 provides more details on water use demands.

## Water Supply

TPWD currently does not import water and relies solely on local groundwater to meet its demand. Although TPWD does not use, nor does it have immediate plans to use, imported water, surface water, storm water, or recycled water, these could be future supply sources. A summary of current and future supplies is provided in Table ES-2, Table ES-3, and Table ES-4 below. These supplies are anticipated to be available in a normal year, a single-dry year, and during multiple-dry years.

**Table ES-2: Supply and Demand Comparison-Normal Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Delivery Demands[(b)] | 2,320 | 2,360 | 2,410 | 2,470 | 2,550 | 2,610 |
| *Difference (Supply–Demand)* | *4,680* | *4,630* | *4,590* | *4,520* | *4,450* | *4,380* |

Notes: Values are rounded.
(a) From Table 4-2. DWR-recommended pumping limit to prevent overdraft.
(b) From Total Water Deliveries in Table 1-1 and Table 2-6.

**Table ES-3: Supply and Demand Comparison – Single-Dry Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Delivery Demands[(b)] | 2,550 | 2,600 | 2,650 | 2,720 | 2,810 | 2,880 |
| *Difference (Supply–Demand)* | *4,440* | *4,400* | *4,340* | *4,270* | *4,190* | *4,120* |

Notes: Values are rounded.
(a) From Table 4-2. DWR-recommended pumping limit to prevent overdraft.
(b) Assumes a 10 percent increase in demand during a single-dry year, not including anticipated sales to other agencies. Based on the highest single-dry year increase (2002) in demand over the historical period 1990-2015.

**Table ES-4: Supply and Demand Comparison – Multiple-Dry Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Demands[(b)] | 2,380 | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| *Difference (Supply –Demand)* | *4,620* | *4,580* | *4,530* | *4,460* | *4,380* | *4,320* |

Notes: Values are rounded.
(a) From Table 4-1. DWR-recommended pumping limit to prevent overdraft.
(b) Assumes a 2.5 percent increase in demand during a multiple-dry year, not including anticipated sales to other agencies. Based on the highest five (5)-year multiple-dry-year increase (2011-2015) in demand over the historical period 1990-2015.

## Water Quality

TPWD groundwater is typically of good quality. The historical and current use of septic systems for wastewater disposal affects groundwater quality. In addition, high levels of naturally occurring fluoride, arsenic, and hexavalent chromium are present in some water supply wells in certain areas.

Based on current conditions and knowledge, water quality is not anticipated to affect water supply reliability. Nonetheless, water quality issues are constantly evolving. It is understood that water quality treatment can be costly. TPWD is committed to and will continue to work proactively to address water quality concerns in a timely manner, ensuring that safe drinking water is available to its customers.

## Fundamental Findings of the UWMP

The stated goal of TPWD is to deliver a reliable and high-quality water supply to its customers, even during dry periods. Based on water supply and demand assumptions over the next 25 years, the UWMP successfully achieves this goal. TPWD anticipates having adequate supplies to meet demand during normal, single-dry, and multiple-dry years through 2050. Additionally, during a consecutive five (5)-year drought, TPWD anticipates supply exceeding in years 2026 through 2030. Therefore, additional supplies are assumed to be needed to meet demands under those conditions.

TPWD has met current compliance targets and will continue to implement demand management measures, such as residential educational programs and information, leak detection and auditing, and the use of Automated Infrastructure Metering when feasible and appropriate, to meet future water standards. TPWD is committed to providing its customers with education and tools to maintain their low use.

Lastly, this UWMP and TPWD's 2025 Water Shortage Contingency Plan identifies opportunities to reduce customer demand during dry years. Therefore, it is anticipated that TPWD will continue to meet all future water demands under all hydrologic conditions through the end of the planning period.

# Chapter 1: Layperson's Description/Introduction

## 1.1 Overview

This document presents the 2025 Urban Water Management Plan (UWMP) for the Twentynine Palms Water District (TPWD, District). This chapter describes the general purpose, discusses implementation, and provides general information about the TPWD service area characteristics.

The State of California mandates that all urban water suppliers prepare a UWMP. Detailed information on what must be included in these plans and how to complete them is in the California Water Code (CWC) Sections 10610 through 10657. According to the Urban Water Management Planning Act (UWMP Act) of 1983, an urban water supplier is defined as a supplier, public or private, that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet (AF) annually.

## 1.2 Purpose

A UWMP is a planning tool that generally guides the actions of urban water suppliers, providing managers and the public with a broad perspective on water supply issues. A UWMP is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the State Legislature mandated that a UWMP include a chapter which "…describes the opportunities for exchanges or water transfers on a short-term or long-term basis" (Wat. Code, § 10631, subd. (d)).

The identification of such opportunities and the inclusion in the general water service reliability analysis neither commits an urban water supplier to pursue a particular water exchange/transfer opportunity nor precludes it from exploring exchange/transfer opportunities never identified in its plan. Before an urban water supplier can implement any potential future water supply sources identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed, and all required environmental analysis is completed.

"A plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers" (*Sonoma County Water Coalition v. Sonoma County Water Agency* (2010) 189 Cal. App. 4th 33, 39). A UWMP should not be viewed as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty, and planning projections may change in response to various factors. Long-term water planning involves expectations and not certainties.

Our Supreme Court has recognized the uncertainties inherent in long-term land use and water planning and observed that the generalized information required . . . in the early stages of the planning process is replaced by firm assurances of water supplies at later stages" (Id., at 41). From this perspective, it is appropriate to view the UWMP as a general planning framework rather than a specific action plan. A UWMP is an effort to answer general planning questions, such as:

- What are the potential sources of supply, and what amounts are estimated to be available from them?

- What is the projected demand, given a reasonable set of assumptions about growth and implementation of good water management practices?

- How do the projected supply and demand figures compare and relate to each other?

Using these framework questions and resulting answers, the implementing agency will pursue feasible, cost-effective options and opportunities to develop supplies and meet demands. Water suppliers will also explore enhancing basic supplies from traditional sources such as local groundwater and imported water, as well as other options. These include groundwater extraction, water exchanges and transfers, water conservation, recycling, brackish water desalination, and water banking/conjunctive use. Additional specific planning efforts may be undertaken regarding each option, involving detailed evaluations of how each would fit into the overall supply/demand framework, potential environmental impacts, and how each would affect customers.

The UWMP Act requires the preparation of a plan that, among other things:

- Accomplishes water supply planning over 20 years in five (5)-year increments, and TPWD is going beyond the UWMP Act requirements by developing a 25-year plan.

- Identifies and quantifies existing and projected water supply opportunities, including recycled water, in normal, single-dry, and multiple-dry years.

- Implements conservation and efficient use of urban water supplies.

The TPWD 2025 UWMP revises the 2020 UWMP and incorporates changes enacted by legislation since that time. The UWMP Act has not undergone significant changes since 2020; however, the UWMP Act has been modified over the years in response to water shortages, droughts, and other factors in the state. The main changes since 2020 to note include:

1. UWMP Submittal Date: 2025 UWMP updates must be adopted and submitted to DWR by July 1, 2026.

2. Reporting on Compliance with SBx7-7 Targets: Senate Bill 7 of the Special Extended Legislative Session 7 (SBx7-7) introduced standards for water use. These standards are based on gallons per capita per day and target a reduction per capita per day to be achieved by 2020. SBx7-7 was alternatively called “20 by 2020,” which encapsulated the intention of the regulation to reduce water use by 20 percent by 2020. Despite the tie to 2020, SBx7-7 does not have a sunset clause, and suppliers must comply with SBx7-7 targets in the 2025 UWMP.

3. Reporting compliance with Water Loss Standard: Though the Urban Water Loss Standard is a separate regulation from the UWMP Act, within the 2025 UWMP, a supplier must report a summary of the past five (5) years of water loss audit reports, report total system water losses for the current year and projected losses for future years, describe programs to assess and manage distribution system real loss in the last five (5) years, and provide data demonstrating whether the supplier will meet is water loss performance standard. Compliance with the Water Loss Standard must occur before January 1, 2028.

4. Five (5)-year Drought Risk Assessment: In past UWMPs, suppliers were to conduct a drought risk assessment, assuming a drought lasting three (3) consecutive years. This requirement has changed, and suppliers must now assess a drought lasting five (5) years.

5. Sustainable Groundwater Management Act (Assembly Bill (AB) 1739, Senate Bill (SB) 1168, and SB 1319): UWMPs must consistently meet Groundwater Sustainability Plan (GSP) supply projections, if applicable. Since 2020, many groundwater sustainability plans have been completed, and many will reassess sustainability indicators, water budgets, and mitigation actions. Given that TPWD does not currently use or plan to use groundwater from a basin subject to the Sustainable Groundwater Management Act (SGMA), this does not apply to the TPWD UWMP.

6. Seismic Risk Assessment (SB 664): Like the 2020 UWMP, the 2025 UWMP must include a seismic risk assessment and mitigation plan to assess the vulnerability of each water system facility and mitigate those vulnerabilities. Compliance can be documented by submitting a copy of the most recently adopted Local Hazard Mitigation Plan (LHMP) or a multi-hazard mitigation plan, if that plan specifically addresses seismic risk to the water supplier's infrastructure. An LHMP for TPWD was developed in 2018 and updated in 2024, identifying potential hazards and formulating mitigation measures for protecting critical infrastructure in the TPWD service area. The 2025 UWMP will summarize the 2024 LHMP and any updates made since its development.

7. Water Shortage Contingency Plan (WSCP) Updates: State requirements call for updating the existing WSCP and adopting it as a stand-alone plan. The WSCP must be updated in parallel with the UWMP.

8. Making Water Conservation a California Way of Life (AB 1668 and SB 606): Making Water Conservation a California Way of Life concluded July 3, 2024. For simplicity, the Making Water Conservation a California Way of Life regulation is hereafter referred to as the Urban Water Use Objective (UWUO). The UWUO framework establishes individual efficiency goals for each urban retail water supplier based on the supplier's unique service area characteristics. The UWUO is a sum of efficient residential indoor water use, residential outdoor water use, real water loss, and efficient outdoor use in commercial, industrial, and institutional (CII) landscapes with dedicated irrigation meters. Starting in 2027, suppliers must meet the overall objective, not individual budgets for residential outdoor water use or CII water use.

9. Since 2022, Urban Water Suppliers have provided the California Department of Water Resources (DWR) with Annual Water Shortage Reports. The Annual Water Shortage Report is prepared using the current WSCP. Water supply and demand data and projections provided in the 2025 UWMP must be consistent with the past reporting. The update is also an opportunity to revise the WSCP and TPWD's drought response actions (demand reduction and/or supply enhancement). Items previously optional but now required include calculating the water energy intensity, incorporating land-use changes into demand forecasting, and quantifying water savings from codes and standards.

A checklist to ensure compliance with the UWMP Act requirements is provided in Appendix A. The stated goal of TPWD is to deliver a reliable, high-quality water supply to its customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years, combined with conservation of non-essential demand during normal water years, the 2025 UWMP successfully achieves this goal.

## 1.3 Basis for Preparing a Plan

In accordance with the CWC, urban water suppliers with 3,000 or more service connections or supplying 3,000 or more acre-feet per year (AFY) are required to prepare a UWMP every five (5) years. As such, TPWD qualifies as an urban supplier, and its 2025 UWMP must be approved and submitted to the DWR by July 1, 2026.

### 1.3.1 Relationship to Other Planning Done by the District

TPWD developed plans and policies to expand and ensure adequate water supply and quality for its service area and the City of Twentynine Palms. The plans and policies include:

- 2025 Groundwater Management Plan (GMP) – The GMP was prepared in accordance with Assembly Bill 3030 (AB 3030) to protect the quantity and quality of groundwater within its service area and ensure a sustainable groundwater basin to meet future water supply needs.

- Salt and Nutrient Management Plan (SNMP) – The SNMP was developed to monitor and protect groundwater resources in the TPWD service area. The SNMP is a response to an increased need to assess potential impacts to groundwater quality from salt and nutrient sources derived primarily from septic tanks.

- Local Hazard Mitigation Plan (LHMP) – The LHMP was developed to identify potential hazards to TPWD. The LHMP formulates mitigation measures to protect critical infrastructure and community safety for TPWD facilities and services.

- Pipeline and Storage Tank Condition Desktop Assessment – The condition assessment was prepared to perform a pipeline risk assessment, a seismic evaluation, and develop a prioritized pipeline and capital improvement program for TPWD.

- Groundwater Monitoring Implementation Plan – In 2017, TPWD prepared a Groundwater Monitoring Implementation Plan. The purpose of the Groundwater Monitoring Implementation Plan is to provide a detailed monitoring plan and schedule for the proposed groundwater monitoring activities in accordance with the SNMP.

### 1.3.2 Relationship to Water Shortage Contingency Plan

Concurrently with the 2025 UWMP update, TPWD will also update its WSCP, consistent with CWC Sections 10632 and 10635. The WSCP outlines the TPWD action plan for a drought or catastrophic water supply shortage and specifies opportunities to reduce demand and augment supplies under such conditions. The WSCP was adopted as a stand-alone document referenced in this UWMP and included as an attachment in Appendix I.

## 1.4 Implementation of the 2025 UWMP and WSCP

This subsection outlines the cooperative framework for implementing the 2025 UWMP and WSCP, including agency coordination, public outreach, and resource optimization.

### 1.4.1 Public Water Systems

Public water systems (PWS) that provide drinking water for human consumption and are regulated by the State Water Resources Control Board Division of Drinking Water (SWRCB DDW). Electronically filing Annual Reports with the SWRCB DDW, which include water usage and other information, is required by PWSs. Table 1-1 provides the name and PWS number of the public drinking water system that TPWD manages and the 2025 UWMP covers.

**Table 1-1: Retail Public Water System *(DWR Table 2-1)***

| Public Water System Number | Public Water System Name | Number of Municipal Connections 2025 | Total Volume of Water Supplied 2025 (AF)[(a)] |
|---|---|---|---|
| 3610049 | TPWD | 8,362 | 2,320 |
| **Total** | **-** | **8,362** | **2,320** |

Notes:
(a) Total water supplied for 2025 includes deliveries, losses, and sales to other agencies (Table 2-1, 2-2, and 2-3).

### 1.4.2 Fiscal or Calendar Year

A water supplier may report on a fiscal-year or calendar-year basis, but they must clearly state in the UWMP the type of year used for reporting. The type of year should remain consistent throughout the UWMP. The DWR prefers that agencies report on a calendar-year basis to ensure UWMP data is consistent with data submitted in other reports to the State. All data in this UWMP is reported in calendar years and in AF.

## 1.5 Cooperative Preparation of the Plan

The State encourages water agencies to coordinate planning in developing and updating UWMPs within their service area. The TPWD 2025 UWMP and WSCP address all aspects of the UWMP Act under the control of TPWD, specifically water supply and water use. While preparing the 2025 UWMP, TPWD coordinated with relevant agencies to ensure that data and issues were presented accurately.

Pursuant to CWC 10621(b), TPWD provided, with at least 60 days' prior notice to interested agencies, the City and County that an update of the 2025 UWMP and WSCP was underway and requested their participation during this process. Table 1-2 summarizes agency coordination.

**Table 1-2: Agency Coordination**

| | Participated in UWMP Development | Received Link to Draft | Commented on Draft | Attended Public Meetings | Contacted for Assistance | Sent Notice of Intent to Adopt | Not Involved |
|---|---|---|---|---|---|---|---|
| City of Twentynine Palms | ✓ | ✓ | | | | ✓ | |
| San Bernardino County Land Use Services | ✓ | ✓ | | | | ✓ | |
| Joshua Basin Water District | ✓ | ✓ | | | | ✓ | |
| Natural Resources Environmental Affairs | ✓ | ✓ | | | | ✓ | |
| Twentynine Palms Band of Mission Indians | ✓ | ✓ | | | | ✓ | |
| Hi-Desert Water District | ✓ | ✓ | | | | ✓ | |
| Joshua Tree National Park | ✓ | ✓ | | | | ✓ | |

### 1.5.1 Plan Adoption

Pursuant to 10621(b), TPWD provided interested water agencies, the City, and the County, with a 60-day notice of how the UWMP and WSCP could be reviewed and when and where a public hearing was to be held for adoption of the planning documents. The public hearing, held on May 27, 2026, was also noticed in the local newspaper. The final version of the UWMP was adopted by the TPWD Board on May 27, 2026 and submitted to DWR, the California State Library, the City of Twentynine Palms, and San Bernardino County within 30 days of adoption, by July 1, 2026.

This plan includes all information necessary to meet the requirements of the Water Conservation Act of 2009 (Wat. Code, §§ 10608.12-10608.64) and the UWMP Act (Wat. Code, §§ 10610-10656). The Final UWMP and WSCP were made available on the TPWD website to the public within 30-days of adoption. Plan adoption materials are provided in Appendices C and D.

### 1.5.2 Public Outreach

TPWD encouraged community participation in water planning. Interested groups were informed about the development of the UWMP along with the schedule of public activities. Notices of public meetings were published in the local press and on the water supplier's website. The TPWD neither receives water from wholesale nor supplies water to retail water purveyors. As such, information from other agencies was not necessary for the completion of this report. However, copies of the draft UWMP were sent to the County of San Bernardino and City of Twentynine Palms for review and comment as noted in Table 1-2. Table 1-3 presents a timeline for public participation during the UWMP development. Appendix B provides a copy of the public outreach materials.

**Table 1-3: Public Participation Timeline**

| Date | Milestone | Public Participation Task |
|---|---|---|
| September 2, 2025 | UWMP Kick-off | Describe UWMP requirements and process |
| April 1, 2026 | Draft UWMP | Draft released to solicit input |
| May 27, 2026 | Public Hearing | Review contents of the Draft UWMP and WSCP and take comments |
| May 27, 2026 | Board Adoption | UWMP and WSCP considered for approval by the Board |

## 1.6 Water Management within the Twentynine Palms Water District Service Area

The TPWD service area encompasses approximately 87 square miles and includes the City of Twentynine Palms (Figure 1-1). Located in the high desert of southern California, TPWD is approximately 72 miles due east of the City of San Bernardino and 35 miles northeast of the City of Palm Springs. Groundwater is the primary source of water for TPWD. Before 1954, the Twentynine Palms area was served by three (3) privately owned water companies: Abell Water Company, Condor Mutual Water Company, and Pacific Water Company.

Formed in 1954, TPWD immediately purchased these water companies. Their wells, storage facilities, and piping served as the initial TWPD water system. Historical pumping and water deliveries by TPWD have steadily increased since its formation in the mid-1950s. The mission of TPWD is to provide a safe and adequate water supply at the lowest feasible cost to the people of the district and to preserve and protect the water resources within the established district boundaries.

Groundwater is provided by TPWD to approximately 17,373 residents within an 87-square-mile area, consisting of 8,362 service connections, 361 miles of pipeline, and 17 million gallons of water storage capacity. Wastewater is disposed of through individual septic systems, and TPWD does not use any recycled water or other non-potable water sources. Annual water usage is approximately 2,200 – 2,500 AF, which is mostly used by single-family residential (approximately 60 percent), and the other 40 percent is a combination of multi-family residential, commercial/institutional, or landscape/irrigation (Figure 1-2).

The TPWD water supply is provided by groundwater pumped from six (6) water production wells, mostly along the southern edge of the service area. There is one (1) groundwater treatment facility operated by TPWD, which removes fluoride from one (1) water production well. The pipelines distribute the water via six (6) booster pump stations and ten (10) water storage reservoirs. The booster pump stations are electrically powered with provisions for back-up power from the mobile emergency generators. Water pressure for customers is determined by TPWD's eight (8) pressure zones, which range from 2,080 to 2,830 ft.

Potable water is scarce in TPWD for the following reasons:

- Drought conditions caused the area to receive far less rain than the historical average of approximately five (5) inches of annual rainfall.

- There is negligible infiltration of direct precipitation in areas where alluvial deposits are thick.

- Substantial available runoff is lost to evaporation after flowing into the basin.

There is no community sewage system, and wastewater is disposed of through individual septic tanks and tile-field systems. Some of the local groundwater is unsuitable for drinking water due to naturally occurring soluble minerals, such as fluoride, and other contaminants, including hexavalent chromium and arsenic. Chapter 6 further discusses potable water scarcity.

## 1.7 Population, Demographics, and Socioeconomics

The TPWD service area falls within the Mojave Region, just east of Yucca Valley, Joshua Tree National Park, and includes the Twentynine Palms Marine Corps Base (Figure 1-1). The TPWD service area also includes the incorporated and unincorporated areas of the City of Twentynine Palms. Residential development is currently the single largest land use within TPWD.[1,2] Approximately 86 percent of land use is single-family homes. The remaining 14 percent is multi-family residential units, commercial properties, or light industry (Figure 1-2).

The current (2025) population of the TPWD service area is approximately 17,373. The 2025 population estimate involved projecting Census Redistricting Block Geographic Information System (GIS) data for San Bernardino County from the 2020 Decennial Census as reported by the United States (US) Census Bureau for the State of California. The GIS data was projected onto the TPWD service area using an area-weighted approach to estimate populations within the service area. Population Density (people/area) was calculated for each Census Block prior to clipping to the Service Area. Clipped Census Blocks were recalculated using population (population density multiplied by the clipped area).

An estimated 82 percent of the TPWD service area is considered disadvantaged, including approximately 6 percent severely disadvantaged based on the definition of a disadvantaged community having an income under 80 percent of the California Median Household Income (MHI) (Figure 1-3). Using 2025 US Census data, 80 percent of the Statewide MHI is $79,970. Table 1-4 describes the demographics of the City of Twentynine Palms and Joshua Tree.

[1]Land use data from the California General Plan - California Open Data Portal. California_General_Plan_Land_Use (FeatureServer); California General Plan Land Use - Dataset - California Open Data
[2]Parcel data from San Bernardino County. San_Bernardino_County_Parcel_Dataset (FeatureServer)

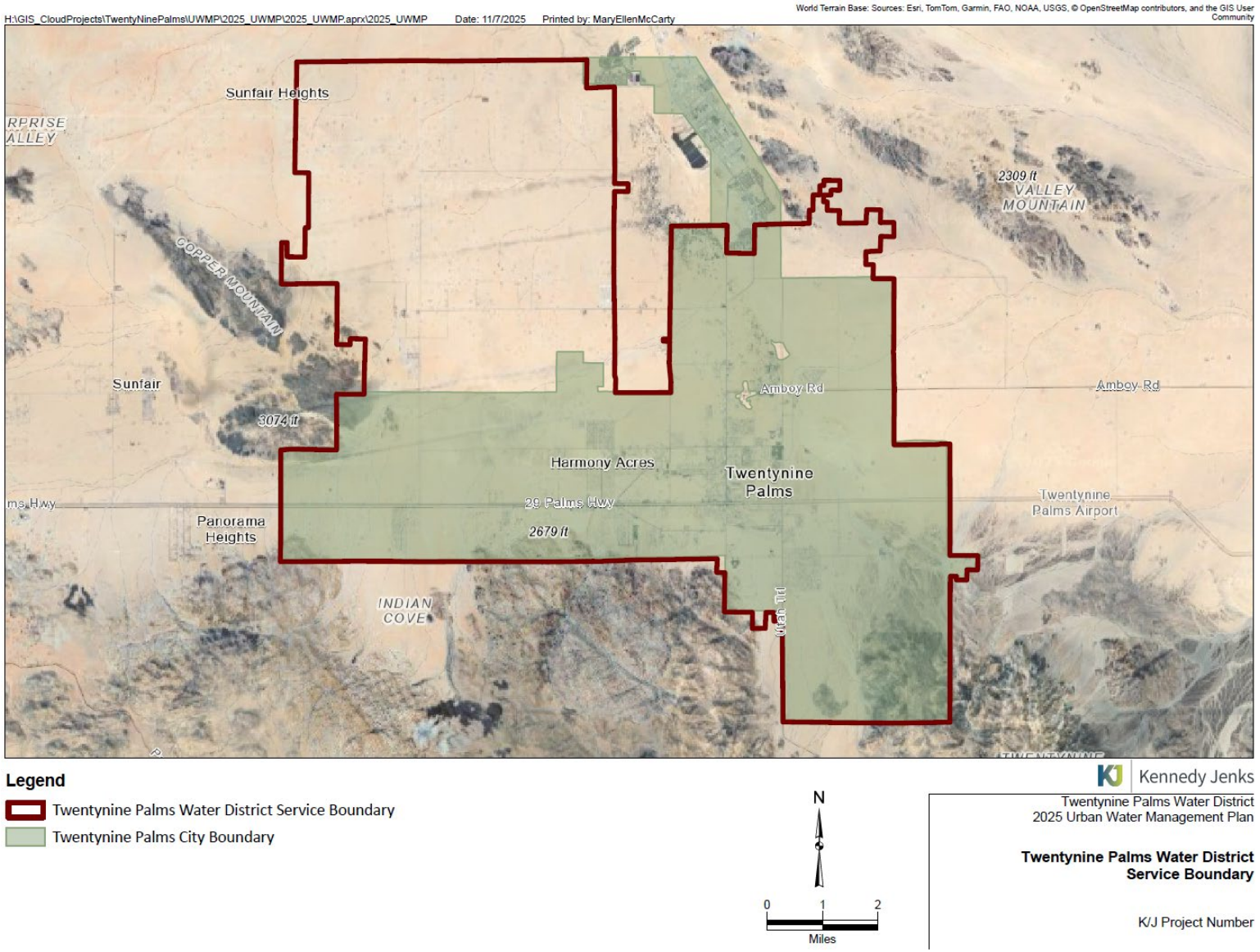



**Figure 1-1: TPWD Service Area**

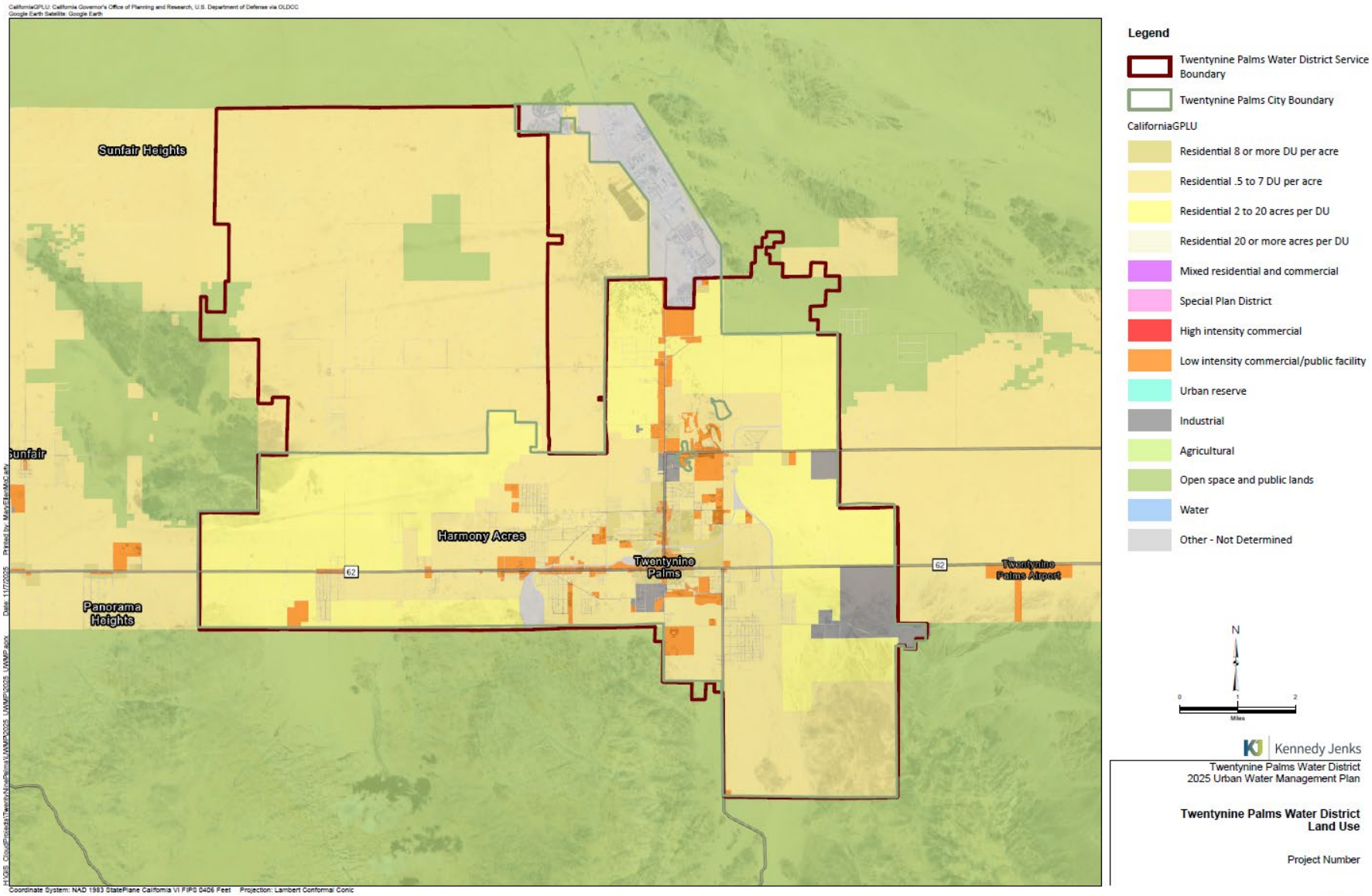



**Figure 1-2: TPWD Land Use**

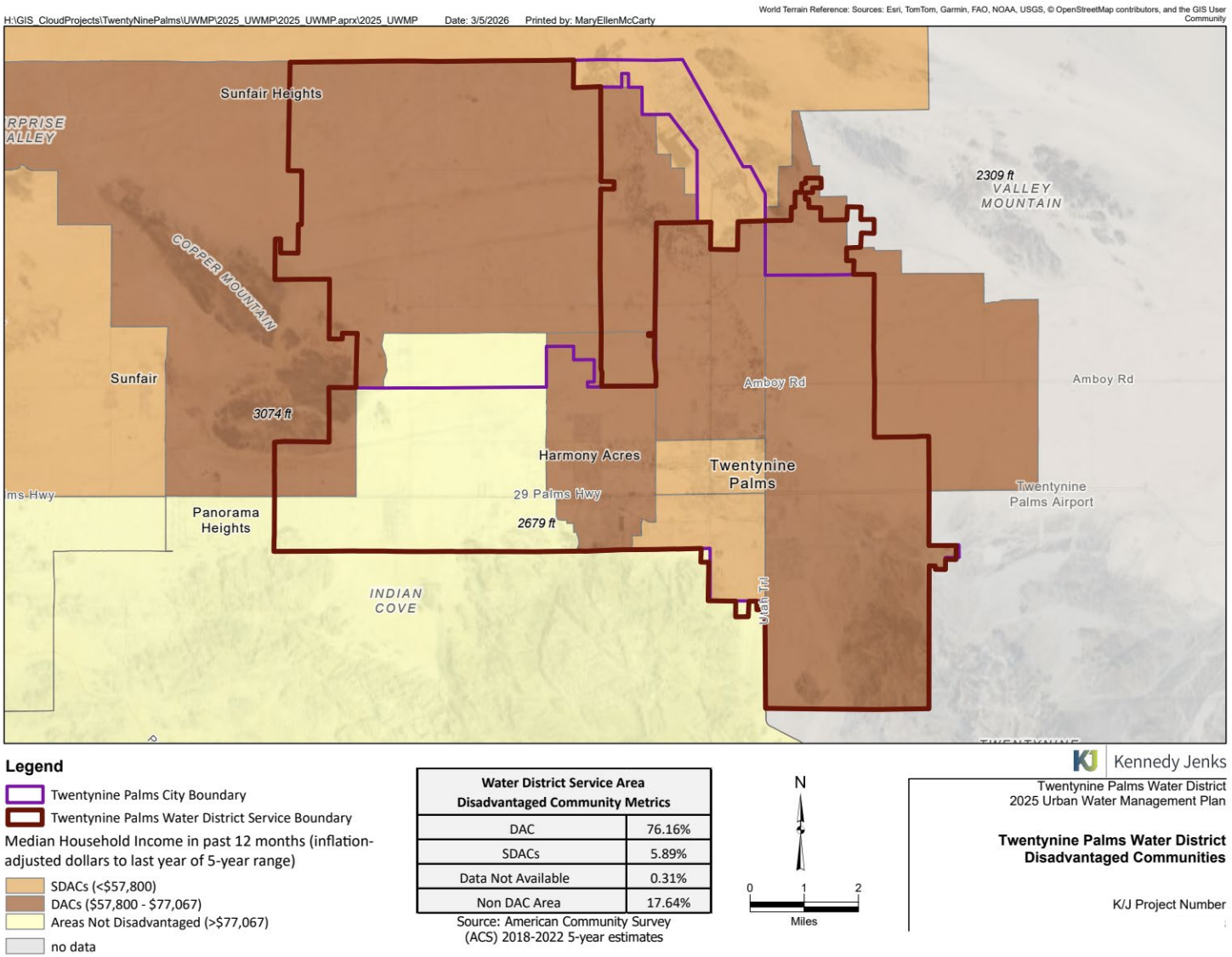



**Figure 1-3: TPWD Disadvantaged Communities**

**Table 1-4: Average Demographics for Twentynine Palms[(a)]**

| Demographic Category | Twentynine Palms |
|---|---|
| **Age and Sex** | |
| Persons under 5 years, percent | 12.1% |
| Persons under 18 years, percent | 25.3% |
| Persons 65 years and over, percent | 6.8% |
| Female persons, percent | 43.9% |
| **Race and Hispanic Origin** | |
| White alone, percent | 56.8% |
| White alone, not Hispanic or Latino, percent | 49.6% |
| Black or African American alone, percent | 9.9% |
| American Indian and Alaska Native alone, percent | 1.0% |
| Asian alone, percent | 4.0% |
| Native Hawaiian and Other Pacific Islander alone, percent | 1.4% |
| Two or More Races, percent | 23.4% |
| Hispanic or Latino, percent | 25.8% |
| **Housing** | |
| Owner-occupied housing unit rate, 2023 | 37.4% |
| Median value of owner-occupied housing units, 2023 | $238,400 |
| **Families & Living Arrangements** | |
| Persons per household, 2023 | 2.56 |
| **Economy** | |
| In civilian labor force, total, percent of population age 16 years+, 2023 | 53.2% |
| Persons in poverty, percent | 15.4% |

Notes:
(a) Data taken from the US Census Bureau (census.gov) for the City of Twentynine Palms.

## 1.8 Population

Currently, TPWD serves 8,362 active connections, all of which are metered accounts, mostly residential (over 90 percent). Commercial connections account for approximately five (5) percent, and landscape irrigation, fire line, and construction use/non-potable connections account for less than two (2) percent of the total connections. Table 1-5 provides a summary of the TPWD historical service connections.

**Table 1-5: Historical Service Connections**

| Land Use | 2020 | 2025 |
|---|---|---|
| Single Family Residential | 6,038 | 6,707 |
| Multi-Family Residential | 1,083 | 1,083 |
| Commercial/Institutional | 282 | 382 |
| Industrial | 0 | 0 |
| Landscape Irrigation | 34 | 46 |
| Fireline | - | 119 |
| Other (Construction Use/ Non-potable) | 1 | 1 |
| **Total** | **7,438** | **8,362** |

Source: District Public Water System Statistics.

The TPWD population for 2020 was derived using the DWR online population tool, which utilizes GIS and connection data based on Census years (provided the 2020 UWMP). The TPWD 2025 population was calculated using Census Redistricting Block GIS data and the area-weighted approach described in Section 1.7. These estimates were then interpolated to derive the population for 2021 through 2024. Since 2020, the population has increased by about seven (7) percent. Table 1-6 shows the resulting historic population estimates.

**Table 1-6: Historical Population Estimates**

| | 2020[a] | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Population[b] | 16,182 | 16,420 | 16,658 | 16,897 | 17,135 | 17,373 |

Notes:
(a) DWR online population tool.
(b) The population for 2021 through 2024 was interpolated from the 2020 and 2025 values.

Population projections for TPWD were derived by applying growth percent data from the Southern California Association of Governments (SCAG) 2024 Local Data Exchange (LDE) onto the estimated 2025 population. Table 1-7 reflects the TPWD population projections.

**Table 1-7: Projected Population Estimates**

| | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| Population[a] | 17,794 | 18,225 | 18,747 | 19,284 | 19,837 |

Notes:
(a) SCAG 2024 Local Data Exchange for the Twentynine Palms Water District.

## 1.9 Land Uses in the Service Area

The breakdown of land uses in the service area was calculated from San Bernardino County (SBC) parcel data and from the California General Plan. Existing land uses were determined from only developed parcels that are not classified as “vacant” by SBC parcel data. Table 1-8 provides a breakdown of these land uses. Figure 1-2 displays the land-use categories in the TPWD service area. Of the 45,511 acres that make up the TPWD service area, 14,178 are currently developed. Most of the developed regions in the TPWD service area are single-family residential (86 percent). The remaining developed areas are multi-family residential (2.5 percent), industrial (3.8 percent), commercial (4.0 percent), and landscape (3.7 percent).

**Table 1-8: Existing Land Uses in the TPWD Service Area**

| Land Use Type | Acreage |
|---|---|
| Single Family Residential | 12,199 |
| Multi-Family Residential | 351 |
| Commercial | 567 |
| Industrial | 533 |
| Landscape/Irrigation | 529 |
| **Total** | **14,178** |

## 1.10 Climate

The climate in the TPWD service area is arid with average annual rainfall of less than five (5) inches, most of which occurs during the winter months. Temperatures range on average from 33 to 66°F during the winter and from 40 to 106°F during the summer. Table 1-9 presents the annual average climate data. The temperature, rainfall, and standard monthly average evapotranspiration (ETo) are provided from the California Irrigation Management Information System (CIMIS) Station Number 233 in Joshua Tree. As noted in the table, CIMIS Station 233 did not register Total ETo for the period shown. The 2025 UWMP reports the ETo dataset for 2021 to 2020, as ETo rates are known to be significant in the region due to regular hot, dry conditions. The remaining data represents the years 2020 to 2025.

**Table 1-9: Climate Data**

| Month | Standard Monthly Average Evapotranspiration, ETo (in)[(a)] | Average Total Rainfall (in) | Average Temperature (°F) Max | Min |
|---|---|---|---|---|
| January | 2.83 | 0.47 | 61.4 | 33.2 |
| February | 3.67 | 0.21 | 66.1 | 36.9 |
| March | 5.98 | 0.32 | 71.1 | 40.5 |
| April | 7.65 | 0.01 | 82.9 | 46.9 |
| May | 9.69 | 0.27 | 90.9 | 55.3 |
| June | 10.8 | 0.01 | 101 | 65.7 |
| July | 10.2 | 0.29 | 106 | 72.7 |
| August | 9.39 | 1.03 | 104 | 71.3 |
| September | 7.4 | 0.41 | 96.7 | 63.3 |
| October | 5.18 | 0.74 | 87.4 | 51.9 |
| November | 3.29 | 0.14 | 69.6 | 37.7 |
| December | 2.42 | 0.37 | 64.5 | 33.6 |

Source: California Irrigation Management System (CIMIS) data provided from Station No. 233 in Joshua Tree, San Bernardino County, January 1, 2021, to September 30, 2025. http://wwwcimis.water.ca.gov/cimis/welcome.jsp.

(a) The ETo data shown is for the years 2021 to 2025.

## 1.11 Potential Effects of Climate Change

A topic of growing interest and research for water planners and managers is climate change and the potential impacts on future water supplies in California. The DWR California Water Plan 2018 Update considers how climate change may affect water availability, use, quality, and ecosystems, when providing recommended actions, funding scenarios, and investment strategies. The California Water Plan 2023 Update builds on previous updates by providing recommended actions that address climate urgency, strengthen watershed resilience, and achieve equity in water management.

Chapter 5 of the California Water Plan, “Focus on Supporting Watershed Resilience”, describes resilience planning and implementation through regional cross-sector initiatives, introducing a watershed resilience program administered by DWR that builds on existing collaborative relationships, planning, and investments to improve regional climate resilience. Chapter 8 of the

California Water Plan, “Roadmap to Resilience,” provides recommendations and actions to develop resilient watershed planning, improve built and natural water infrastructure, incorporate equitable solutions, and address a changing climate.

The California Water Plan 2023 update increases understanding of uncertainties and vulnerabilities in California water management and outlines initiatives to address them. Future updates will continue testing response packages or combinations of resource management strategies for each scenario. These response packages help decision-makers, water managers, and planners develop Integrated Water Management (IWM) plans that provide resource sustainability and investments in actions with more sustainable outcomes.

The California Water Plan 2023 update provides recommended actions to support each of the identified goals. The goals are:

- Improve water data monitoring, reporting, and access.
- Modernize observation and forecasting techniques.
- Develop water accounting systems, models, and decision-support tools.
- Strength alignment of open data and analytical tools used by DWR, State agencies, and regional water programs.
- Improve understanding of climate vulnerabilities and risks across the state.
- Identify appropriate adaptation strategies.

California faces additional water management challenges due to population growth, regulatory restrictions, and climate change. Climate change is of particular interest because of the range of possibilities and their potential impact on essential operations. The most likely scenarios involve increased temperatures, which will reduce the Sierra Nevada snowpack, shift more runoff to winter months, and accelerate sea level rise.

Earlier snowmelt and more rain versus snow will also result in an increasing inability to capture that runoff for later use, and most of the extra flows in the winter and early spring in the Sacramento-San Joaquin Delta (Delta) watershed will be released as floodwater, becoming the Delta outflow. Overall, water supply from snowpack is projected to decline by 67 percent in the State by 2050. Additionally, climate change may cause more frequent water quality degradation, such as salinity impacts from sea-level rise, which may also heavily impact delivery capability.

Climate change will increasingly affect groundwater resources, the only water source for TPWD. While groundwater is often considered a drought-resistant water resource, warmer temperatures, changing precipitation patterns, and more extreme drought conditions can impact groundwater supplies. These conditions can lead to reduced groundwater recharge and increased dependence on groundwater if other supplies, such as imports, are unavailable due to drought. As such, TPWD must take significant measures to ensure the sustainability of its groundwater supply and groundwater operations.

Climate change also impacts water demands. Warmer temperatures and changes in precipitation patterns, as well as more frequent and extreme drought, are anticipated to increase water needs

to support aquatic habitats and irrigation, including outdoor landscaping and irrigated agriculture, among other uses. Warmer temperatures increase plant evapotranspiration and reduce soil moisture, increasing water demands. On the other hand, drought conditions that impact water supply reliability may also require demand reductions to avoid shortages, thereby counteracting demand increases. Climate change impacts on water demand have been considered in this UWMP primarily based on demand trends during historical dry weather conditions.

Even without population changes, water demand could increase. Evaporative coolers and outdoor water use are major components of water demand in the TPWD service area. Lower spring rainfall increases the need for irrigation water. Furthermore, warmer temperatures increase crop evapotranspiration, which increases water demand. Chapter 2 considers these effects and their potential to impact water demands.

## 1.12 Climate Change Vulnerability Analysis

Identifying watershed characteristics that could be vulnerable to future climate change is the first step in assessing climate change vulnerabilities in the TPWD service area. In the context of this analysis, vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with and adapt to the adverse effects of climate change, consistent with the definition in the Climate Change Handbook for Regional Water Planning (US Environmental Protection Agency (EPA) and DWR, 2011).

Water-related resources considered important in the region and potentially sensitive to future climate change include water demand, water supply, water quality, flooding, and ecosystems. Vulnerability issues for the TPWD service area include:

- Limited ability to meet summer demand decreases in seasonal reliability.
- Increases in flash flooding due to more frequent and intense storms.
- Lack of groundwater storage to buffer drought.
- Reduced water quality due to increased constituent concentrations.

Climate change vulnerability is included in Appendix C as a checklist assessment as defined in the Climate Change Handbook for Regional Water Planning. This assessment highlights water-related resources that are regionally important and sensitive to climate change. The effects of climate change on water use and reliability are further addressed in the chapters related to water use (Chapter 2), future supplies (Chapter 4), and water supply reliability (Chapter 7).

# Chapter 2: Water Use

## 2.1 Overview

This section describes historical and current water usage as well as the methodology used to project future demands within the TPWD service area. Water usage is divided into sectors, including residential, industrial, commercial, landscape, and other. To undertake this evaluation, TPWD compiled existing land use data and new housing construction information. This information was then compared with historical trends for new water service connections and customer water usage information. Additionally, the evaluation considered the impacts of weather and water conservation on historical water usage.

Several factors can affect demand projections, including:

- Land use revisions
- New regulations
- Consumer choice
- Economic conditions
- Transportation needs
- Environmental factors
- Conservation programs
- Building and plumbing codes

The foregoing factors affect the amount and timing of water needed. For example, an economic recession may cause a downturn in development and a subsequent slowing of the projected water demand. The projections in this UWMP do not attempt to forecast recessions or droughts. Likewise, no speculation is made about future building and plumbing codes or other regulatory changes. However, the projections do include water conservation consistent with legislative requirements to maintain a 20 percent reduction in per capita demand through 2025 (SBx7-7).

An analysis was performed combining growth projections with water-use data to forecast total water demand in future years. Three (3) separate data sets were collected and evaluated, including historical water use by land use type, current population, and projected population.

## 2.2 Water Use Sectors

Only potable water is supplied within the TPWD service area, except for non-potable water for construction use, and recycled water is not provided. The water use categories are characterized as follows:

- Single-Family Residential – A single-family dwelling unit, generally a single lot containing a single home.
- Multi-Family Residential – Multiple dwelling units contained within one building or a complex of several buildings.
- Commercial/Institutional – Water customers conducting business (i.e., providing a product or service), as well as water users dedicated to public service.
- Industrial – Water users under this category are typically manufacturers or processors of materials.
- Landscape/Irrigation – Water connections supplying water for landscape irrigation, including landscapes in a residential, commercial, or institutional setting.
- Other – This water use category includes non-potable water provided for construction use.

## 2.3 Historical and Current Water Use

The TPWD service area encompasses residential, irrigation, commercial, and institutional users. There are TPWD meters on all residential, commercial, and landscape connections in the service area, and TPWD requires meters on all new connections. Table 2-1 summarizes all water supplies used to meet the TPWD municipal water requirements. Over the last five (5) years, total water use has shown an overall decreasing trend, as shown in Figure 2-1.

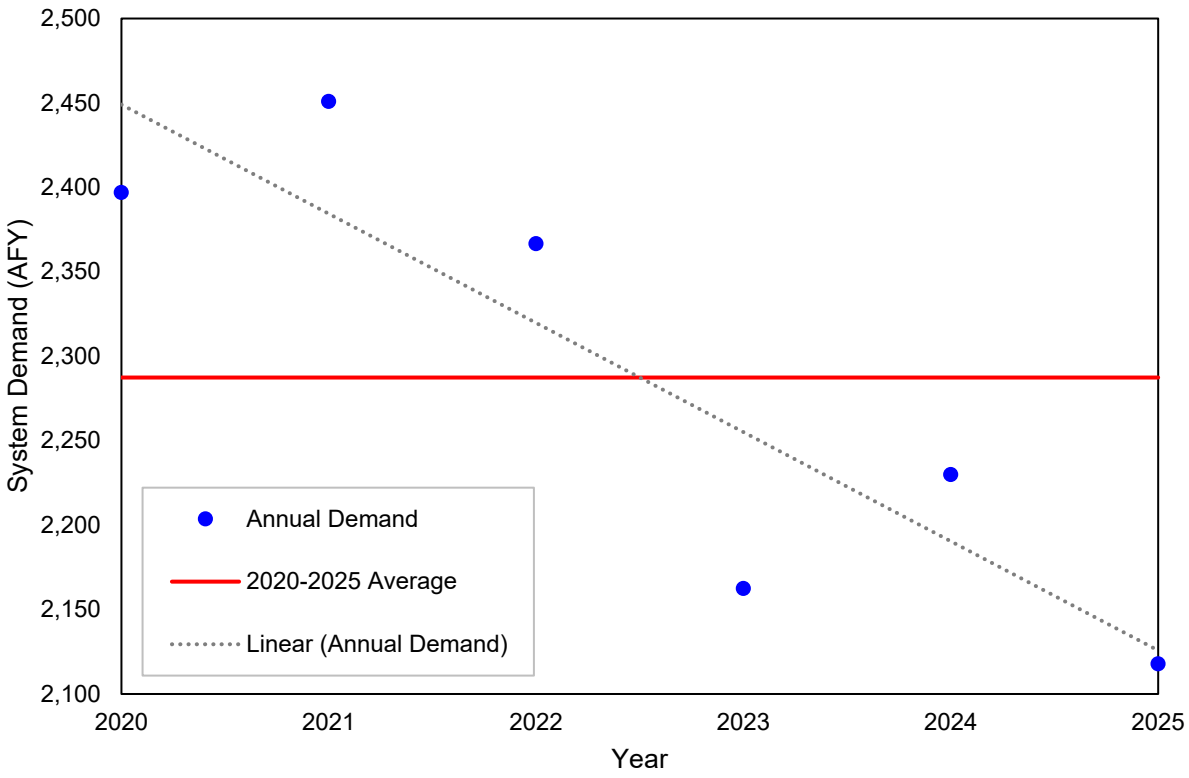



**Figure 2-1: System Demand Water Use (2020-2025)**

Table 2-1 shows the historical (2020) and current (2025) water deliveries by demand category, excluding losses and sales to other agencies. Approximately 60 percent of demand comes from the residential demand category based on average demand data from 2020 to 2025.

**Table 2-1: Water Deliveries 2020 and 2025[(a)] (AF)**

| | Level of Treatment | 2020 | 2025 |
|---|---|---|---|
| Single Family Residential | Drinking Water | 1,609 | 1,263 |
| Multi-Family Residential | Drinking Water | 405 | 360 |
| Commercial[(b)] | Drinking Water | 182 | 296 |
| Industrial | Drinking Water | 0 | 0 |
| Landscape/Irrigation | Drinking Water | 133 | 119 |
| Other (Construction Use/ Non-potable) | Non-Potable | 9 | 80 |
| **Total** | | **2,338** | **2,118** |

Note:
(a) TPWD Billed Metered Authorized Consumption. Does not include losses (178 AF in 2025) and sales (23 AF in 2025) to other agencies.
(b) Includes institutional deliveries.

### 2.3.1 Historical Sales

While TPWD does not sell water to other water agencies, TPWD does operate a pay meter station for residents who reside outside the service area, as shown in Table 2-2. No other arrangements for delivery or sales to other agencies currently exist with TPWD.

**Table 2-2: Historical Pay Meter Sales[(a)] (AF)**

| Agency | 2020 | 2021 | 2022 | 2023 | 2024 | 2025[(b)] |
|---|---|---|---|---|---|---|
| Pay Meter Sales (AF) | 30 | 32 | 19 | 16 | 19 | 23 |
| Total | 30 | 32 | 19 | 16 | 19 | 23 |

Notes:
(a) Water is provided at a pay meter for residents who reside outside of the TPWD service area.
(b) Average of the years 2020 to 2024.

### 2.3.2 Distribution System Water Losses

In addition to traditional demands, water losses impact TPWD water resources. Water losses are defined as the difference between water production and water sales. Authorized, but unmetered sources, such as firefighting and main flushing, or unauthorized sources, such as leakage, illegal connections, and inaccurate flow meters, can cause these water losses.

For the 2025 UWMPs, water retailers must use the distribution system loss methodology provided by DWR to calculate these losses, in accordance with the American Water Works Association (AWWA) M36 Manual. Table 2-3 summarizes the water losses, and Appendix E provides the water audits. On average, over the past five (5) years, system water losses have been seven (7) percent of total water consumption.

**Table 2-3: 12-Month Water Loss Audit Report Summary *(DWR Table 4-5R)***

| Reporting Period Start Date (Month/Year) | Volume of Water Loss (AF)[(a)] | Water Loss as % of Water Supplied |
|---|---|---|
| 01/2020 | 290 | 10.8% |
| 01/2021 | 213 | 8.0% |
| 01/2022 | 87 | 3.5% |
| 01/2023 | 183 | 7.8% |
| 01/2024 | 118 | 5.0% |

Note:
(a) Sum of real and apparent losses based on AWWA water audit software output (provided in Appendix E) and water loss from groundwater pumping to TPWD (Table 4-3).

The Real Water Loss Standard has also already been set by California Code of Regulations Title 23 Sections 980-986. The standard is based on either gallons per connection per day or gallons per mile of distribution system. Water loss is the one standard that has its own compliance deadline and is also part of the overall water use objective. Water-loss audits are already required, but compliance with the water-loss standard goes into effect on January 1, 2028.

In August 2025, the SWRCB released water loss standards for all urban suppliers. According to the State Board, TPWD estimates a water loss of approximately 26.6 gallons per service

connection per day. According to data from the State Board, TPWD meets the current water-loss standard.

To reduce labor costs to manually read the water meters, provide early leak detection that will ultimately provide cost saving to the customer and provide water conservation, TPWD investigated the use of Automated Meter Infrastructure (AMI) and/or Automated Meter Reading (AMR) systems to reduce labor costs associated with manually reading water meters, provide early leak detection with potential customer cost savings, and encourage water conservation. The Board of Directors adopted Resolution 19-0 on March 12, 2019, to secure funding to convert all meters within TPWD to AMI/AMR. In June 2020, TPWD completed installing 8,000 small- to medium-sized water meters.

The AMI system provides TPWD with a tool to assist with water conservation, leak audits, and real-time data collection. AMI generates a continuous leak report that alerts TPWD weekly on meters that are not shutting off. Customers, in turn, are being made aware of potential leaks before they escalate in their next billing cycle and are making the necessary repairs, helping to conserve water. Another advantage of AMI is its assistance with TPWD leak audits. This involves helping customers with high water usage, billing issues, and other concerns.

Collecting real-time hourly data is another important tool for the AMI system. Currently, the AMI system reads every meter in the district once an hour, and the data is being captured by the collectors and repeaters. Whether bringing months of collected data to a customer or analyzing a specific customer's account, real-time data and water-use trends are critical for water conservation and for identifying unknown leaks on a customer's property.

In late 2023 and early 2024, TPWD staff completed the final phase of the larger water meter replacement project. TPWD is currently reading all meters through the AMI system, except for a select few customers who have opted out of the AMI program and fire line services. The AMI system has proven instrumental in detecting water leaks, ultimately saving customers hundreds of dollars and conserving hundreds of gallons of water. TPWD is still dedicated to installing a customer portal that would allow customers to access their water consumption, leak alerts, and real-time data via the web. This is a priority for TPWD, and the hope is to begin implementation of the portal in 2025/2026.

## 2.4 Projected Water Use

### 2.4.1 Water Delivery Demand Projections Based on Land Use

Projected water deliveries for the TPWD service area were estimated from historical and current demands, SCAG population projection data, and land-use data. Table 1-8 shows the land use classifications of both the developed and undeveloped areas within the TPWD service area.

A relationship was first developed between the projected population and the projected land use of the undeveloped areas within the TPWD service area, integrating the estimated 2025 population and the total developed residential acreage. The estimated 2025 population within the TPWD service area is 17,373 (Table 1-6). Given the existing land-use data, approximately 12,550 acres of developed residential land are within the TPWD service area, equating to approximately two (2) persons per residential acre. Therefore, for every two (2) persons added to the TPWD

service area, one (1) acre of residential land will be developed. Approximately 86 percent of the existing developed residential acreage is single-family residential, and three (3) percent are multi-family residential.

Using average historical water deliveries by usage category from 2020 to 2025 (Table 2-1) with the existing developed land use data (Table 1-8), unit demand factors in AFY per acre (AFY/Ac) for each usage category were developed. Table 2-4 displays these unit demand factors. Since TPWD has no industrial customers, it was assumed that no future industrial demand would develop within the TPWD service area.

**Table 2-4: Unit Demand Factors[(a)]**

| Usage Type | AFY/Ac |
|---|---|
| Single Family Residential | 0.11 |
| Multi-Family Residential | 1.08 |
| Commercial[(b)] | 0.48 |
| Industrial | 0 |
| Landscape/Irrigation | 0.22 |

Notes:
(a) Based on 2020-2025 consumption and land use classifications.
(b) Includes Institutional usage.

Lastly, the land-use data of the remaining undeveloped parcels within the TPWD service area were analyzed to develop a ratio of undeveloped residential acreage to undeveloped commercial, industrial, and landscape acreage. Table 2-5 shows the remaining undeveloped parcel acreages by land use and the area ratios.

**Table 2-5: Acreage of Remaining Undeveloped Parcels within TPWD Service Area by Land Use**

| Usage Type | Acreage | Ratio to Residential Acreage |
|---|---|---|
| Single Family Residential | 26,697 | 1.00 |
| Multi-Family Residential | 506 | 1.00 |
| Commercial[(a)] | 1,276 | 0.05 |
| Industrial | 1,950 | 0.07 |
| Landscape/Irrigation | 858 | 0.03 |

Note:
(a) Includes Institutional usage.

Based on the land use classifications of the remaining undeveloped parcels within the TPWD service area, for every new acre of residential area developed, approximately 0.05 acres of commercial, 0.07 acres of industrial area, and 0.03 acres of landscape irrigation area will be created. Since no specific timelines are available for when the various commercial or landscape irrigation projects will be completed, this method assumes that acreages associated with each land use type will increase in parallel with one another from the year 2025 up to “Buildout” (when all of the area inside of the TPWD service area is assumed to be developed) at the ratios/rates identified above.

Given the projected population from Table 1-7, the calculated number of persons per residential acre, the unit demands from Table 2-4, and the area ratios for the remaining undeveloped parcels within the TPWD service area from Table 2-5, water delivery projections were developed through 2050. Table 2-6 presents the projected water deliveries, assuming a linear growth rate from 2025 to 2050. The anticipated total water demand in 2050 will be approximately 2,610 AFY. These water use estimates do not account for future savings from codes, standards, ordinances, or transportation and land-use plans or reductions from demand management practices. Figure 2-2 illustrates projected growth in demand in the TPWD service area by land-use category, with most growth expected to be in residential areas.

**Table 2-6: Projected Demands for Potable Water**

| Water Use Sector | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| Single Family Residential | 1,300 | 1,330 | 1,370 | 1,410 | 1,450 |
| Multi-Family Residential | 370 | 380 | 380 | 400 | 410 |
| Commercial[a] | 300 | 310 | 320 | 330 | 340 |
| Industrial | 0 | 0 | 0 | 0 | 0 |
| Landscape Irrigation | 120 | 120 | 130 | 130 | 130 |
| Other (Construction Use/ Non-potable) | 80 | 80 | 80 | 80 | 80 |
| **Total Water Deliveries** | **2,170** | **2,220** | **2,290** | **2,350** | **2,410** |
| Sales to Other Agencies[a] | 20 | 20 | 20 | 20 | 20 |
| Losses[b] | 170 | 170 | 170 | 180 | 180 |
| **Total Demand** | **2,360** | **2,410** | **2,480** | **2,550** | **2,610** |
| Assumed Conservation[d] | (280) | (360) | (400) | (400) | (400) |
| **Total Demand with Conservation[e]** | **2,070** | **2,050** | **2,080** | **2,150** | **2,210** |

Notes: Values are rounded. Adapted from DWR Table 4-2R.
(a) Includes Institutional.
(b) From Table 2-2.
(c) From Table 2-3. Future water losses are calculated using the average percent water loss from the past five (5) years of available data.
(d) Difference between the projected demand and UWUO standard (Section 2.6).
(e) Projected demand resulting from UWUO standards.

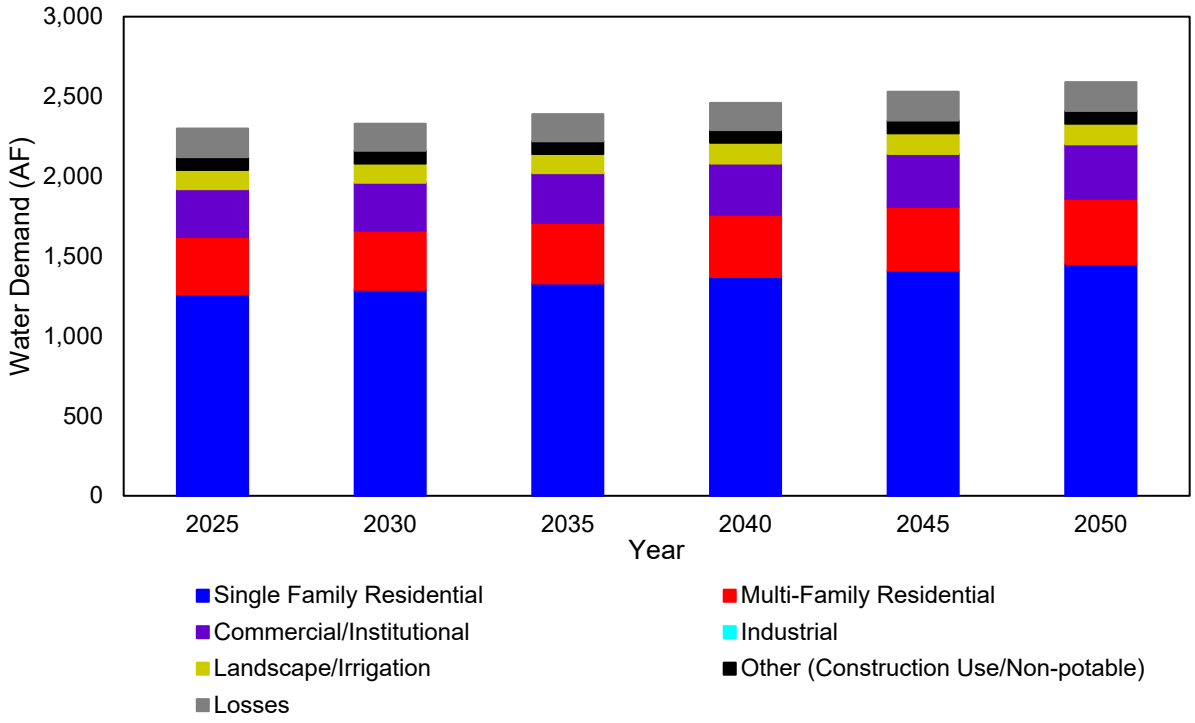



**Figure 2-2: Projected Water Demand by Land Use Category**

Recent legislation provides that "if available and applicable" to the TPWD, demand projections "may" display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area. If such information is reported, the assessment will cite the various codes, standards, ordinances, transportation plans, and land-use plans used in making the projections. This UWMP includes savings, which are discussed in subsection 2.4.2, as a separate line to demand projects in Table 2-6.

In addition, TPWD was asked to identify any changes in water demand expected to occur from the addition and conversion of residential, commercial, industrial, institutional, and landscape land use categories. As shown in Table 2-7, TPWD does not see any foreseeable changes in land use that will result in additional water demand. It should be noted that transportation plans were not accounted for in these demand projections.

**Table 2-7: Demands from Anticipated Future Developments (AF)**

| Development Name | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | 0 |
| **Total** | **0** | **0** | **0** | **0** | **0** |

Source: Personal Communication, Matthew Shragge, TPWD, 2025.

### 2.4.2 Effects of Codes, Standards, and Other Ordinances

Plans are in place at TPWD to continue implementing effective demand management measures, which are anticipated to impede major increases or rebounds in future per capita demand. Projected water demands based on the current population and existing land uses are therefore estimated to stay within the recent five (5)-year range.

Water savings resulting from the implementation of codes, standards, and other ordinances were considered. The State Water Resources Control Board adopted the regulation "Making Conservation a California Way of Life" in July 2024 to establish standards for efficient water use. For compliance, TPWD must develop a California Urban Water Use Objective (UWUO) that equals the sum of residential water use (indoor and outdoor), CII landscape use, real water loss, incentives for potable reuse, temporary provisions, and approved variances. In the reporting year 2024/2025, the UWUO for TPWD was 2,404 AFY, and TPWD met this with an actual water use of 1,937 AFY calculated using the UWUO methods. The 2025 UWMP overlaps with UWUO reporting beginning on January 1, 2025, and the UWUO standards become more stringent over time, as outlined in Appendix J, the TPWD 2025 Water Shortage Contingency Plan.

Demand projections based on population and land use alone do not allow TPWD to comply with the UWUO standards; therefore, demand projections include a minimum conservation amount necessary for compliance. Chapter 8 discusses current and planned water demand management measures to enable TPWD to adjust as required to come into compliance with the UWUO in the future.

In addition, the water-saving potential from codes and standards is expected to be limited based on the number of housing units and projected population growth. Approximately 62 percent of housing units within the City of Twentynine Palms were built before 1990.[3] Figure 2-3 shows how the number of housing units grew from 1990 to 2025, rising rapidly in the early 2000s before plateauing. While water fixtures and appliances have become significantly more efficient since then due to standards and codes, these homes are also more likely to have become more water efficient from natural replacement of old or malfunctioning fixtures or appliances, retrofit upon resale, or remodels in the past 30 years.

[3]State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011-2020. Sacramento, California, May 2020. Available at: https://www.dof.ca.gov/Forecasting/Demographics/Estimates/

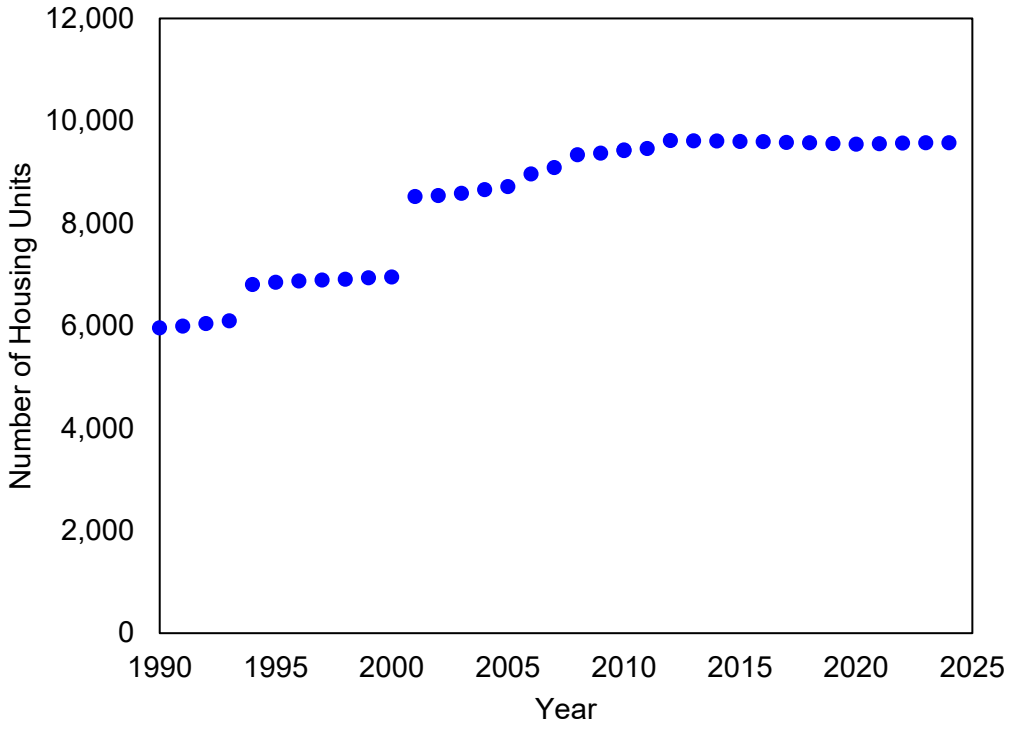



**Figure 2-3: City of Twentynine Palms Number Housing Units (1990 – 2025)**

Furthermore, there is minimal projected growth. New developments would have to meet the latest water-efficiency standards, presenting potential for water savings compared to the existing housing stock. However, the impact of potential water savings from the new housing stock in the TPWD service area would be limited due to the anticipated minor population growth. As such, the baseline water use calculated over the recent five (5)-year period is considered to reasonably reflect regular water conservation practices and water savings related to codes and standards implemented to date.

## 2.5 Characteristic Five-Year Water Use

The 2025 UWMP cycle requires the preparation of a five (5)-year Drought Risk Assessment (DRA), in which water suppliers compare available water supplies with projected water use for the drought period. The first step in preparing the DRA is to estimate the expected gross water use for the next five (5) years (2026 to 2030), excluding short-term demand-reduction actions and other drought effects.

Table 2-8 presents estimated normal-year water use over the next five (5) years, based on factors anticipated to affect water use during the planning period, as described above. Baseline water demands consider ongoing water conservation programs and permanent water conservation measures. Increases in demand above 2025 levels and through 2030 are driven by anticipated growth in the TPWD service area. No additional water use demands are expected during dry

periods. System losses are assumed to be seven (7) percent of total production, based on historical water-loss audit data.

**Table 2-8: Projected Five-Year Water Use (2026 – 2030)**

| Use Type | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|
| Single Family Residential | 1,270 | 1,280 | 1,280 | 1,290 | 1,300 |
| Multi-Family Residential | 360 | 360 | 370 | 370 | 370 |
| Commercial[a]) | 300 | 300 | 300 | 300 | 300 |
| Industrial | 0 | 0 | 0 | 0 | 0 |
| Landscape/Irrigation | 120 | 120 | 120 | 120 | 120 |
| Other | 80 | 80 | 80 | 80 | 80 |
| **Total Water Deliveries** | **2,130** | **2,140** | **2,150** | **2,160** | **2,170** |
| Sales to Other Water Agencies[b] | 20 | 20 | 20 | 20 | 20 |
| System Losses | 160 | 160 | 160 | 160 | 160 |
| **Total Demand** | **2,300** | **2,310** | **2,320** | **2,330** | **2,360** |
| Assumed Conservation[d] | - | - | (160) | (220) | (280) |
| **Total Demand with Conservation[e]** | **2,300** | **2,310** | **2,160** | **2,110** | **2,078** |

Notes: Linear interpolation of projected water use from 2025 to 2030. Based on historical demand data and projected land use demand data. Values are rounded.
(a) Includes Institutional.
(b) Projected sales to other agencies based on the average 2020-2025.
(c) Based on the average water loss from the past five (5) years of water audit reports.
(d) Difference between the projected demand and UWUO standard (Section 2.6).
(e) Projected demand resulting from UWUO standards.

### 2.5.1 Water Use Projections for Lower Income Households

The UWMP Act requires that water use projections include the projected water use for single-family and multi-family residential housing for lower-income households as identified in the housing element of any city, county, or city and county in the service area of the supplier.

Based on American Community Survey data (2018-2022), disadvantaged communities (DACs) comprise approximately 82 percent of the TPWD population. For purposes of estimating TPWD lower-income household water use projections, the proportion of lower-income households within the TPWD service area is assumed to be 82 percent through 2050. Related demands are presented in Table 2-9 and are accounted for in the total water demands described in Section 2.4.

**Table 2-9: Projections of Future Lower-Income Household Water Use**

| Water Use (AF) | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| Estimated Lower Income Water Use | 1,360 | 1,400 | 1,440 | 1,480 | 1,530 |

Source: Combined Single-Family and Multi-Family Residential projections from Table 2-8.

In addition, TPWD will not deny or condition approval of water services, or reduce the number of services applied for by a proposed development that includes housing units affordable to lower-income households, unless one of the following occurs:

- TPWD specifically finds that it does not have sufficient water supply.
- TPWD is subject to a compliance order issued by the SWRCB DDW that prohibits new water connections.
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services.

### 2.5.2 UWUO Compliance

The 2018 Making Water Conservation a California Way of Life legislation requires urban water suppliers to comply with the UWUO calculated by the State Water Resources Control Board. The UWUO is based on a sum of six (6) major elements:

- Residential Indoor Standard
- Residential Outdoor Standard
- CII Outdoor Standard
- Real Water Loss
- Bonus Incentive for Potable Reuse
- Limited Approval Variances

The Residential Indoor Standard is currently set at 47 gallons per capita per day (gpcd), decreasing to 42 gpcd in 2030 and beyond. The Residential Outdoor Standard is 0.8 through 2030, then decreases to 0.63 in 2035. This standard drops again to 0.55 from January 1, 2040, onwards. Additionally, the CII Outdoor Standard aligns with the actual water use until 2028, when it matches the Residential Outdoor Standard. In 2028 and 2030, the CII Outdoor Standard is 0.8, then decreases every five (5) years. Furthermore, the Real Water Loss Standard for TPWD is 26.6 gallons per service connection per day (gpscd) for all evaluated years. Based on the most recent 2024 Water Audit, the Real Water Loss for TPWD is 10.1 gpscd.

The UWUO from 2025 to 2050 was calculated using the Water Use Exploration Tool and data from the DWR. The Residential Indoor Water Use Budget was computed using the Residential Indoor Water Standard and 2025 population (eq. 1). The Residential Outdoor Water Use Budget was calculated using the Residential Outdoor Standard, anticipated residential landscape area, special landscape area, and net reference ETo. The net reference ETo for TPWD was 75.55 in from DWR data (eq. 2). The special landscape area includes pool area, spas, and similar water features, along with residential agriculture.

Next, the Water Loss Budget was calculated using the Real Water Loss Standard and the number of connections (eq. 3). In addition, a 20 percent of irrigable not irrigated (INI) area, which is residential area that is not currently being irrigated but was in the past or can be in the future, based on DWR data, can be included in the Residential Outdoor Water Use Budget, provided that the water supplier uses data from the DWR Landscape Area Measurements Project update released on December 6, 2023. This additional 20 percent INI is anticipated to be no longer

allowed following recent updates to the DWR landscape measurement. Therefore, a 20 percent INI addition was applied to all years prior to 2028.

It is also noted that the CII Water Use Budget only applies to CIIs with dedicated irrigation meters (DIMs). There is no available landscape area data on CIIs with DIMs for TPWD; therefore, for all years, the CII Water Use Budget was assumed to be equivalent to the reported actual water use for CII with DIMs (eq. 4). Finally, the UWUO is calculated as the sum of the Residential Indoor Water Use Budget, Residential Outdoor Water Use Budget, and the Water Loss Budget (eq. 5).

(1) Residential Indoor Water Use Budget (AFY) = Residential Indoor Water Standard (gpcd) x population x days in a year x 3.1

(2) Residential Outdoor Water Use Budget (AFY) = Residential Outdoor Water Standard (gpcd) x residential landscape area (sf) x net ETo (in) x 1.9

(3) Water Loss Budget (AFY) = Real Water Loss (gpscd) x number of connections x days in a year x 3.1

(4) CII Water Use Budget (AFY) = Actual Water Use for CII with DIMs (MG) x 3.1

(5) UWUO (AFY) = Residential Indoor Water Use Budget + Residential Outdoor Water Use Budget + CII Water Use Budget (excluded) + Water Loss Budget

Table 2-10 summarizes the calculated UWUO standards and compares them with current and projected water demands. The values were generated using the following assumptions for consistency with the report “Conservation as a Way of Life” Compliance Summary: Twentynine Palms Water District, prepared by the SWRCB (February 2026):

1. For all years, reported quantities such as population, irrigated residential landscapes, and residential and excluded demands remained constant.

2. For all years, the volume of variances remained the same as the volume stated in the 2024-2025 UWUO reporting form.

3. For all years, the CII with DIMs budget was assumed to be equivalent to the reported actual water use for CII with DIMs, since the landscape area data is not available. Variances for DII with DIMs are assumed to be zero (0).

4. The 20 percent INI was included for years prior to 2028 if the actual water use exceeded the pre-capped objective for the corresponding year.

Based on recent water-use trends, TPWD is on track to meet its UWUO through 2028. Beginning in 2028, projected standards are expected to require a 9 percent reduction in water use. Required water use reductions are expected to increase from 17 percent in 2030 to 23 percent in 2050. Chapter 8 outlines strategies and other actionable steps to manage water demand and continue compliance with UWUO standards. Recommended conservation strategies to ensure compliance through 2050 are to:

- Integrate a phased conservation plan to reduce water demand 9-23 percent throughout 2050 that considers customer outreach and targeted conservation programs.

- Coordinate with DWR to maintain updated landscape area data and improve outdoor use estimates.

- Monitor water loss and prepare for 2028 standards.

Additionally, an urban retail water supplier may petition DWR to use an approved indoor residential water-use incentive in its UWUO reporting, specifically regarding the use of evaporative water coolers. Evaporative water coolers are widely used within the TPWD service area, being in the high desert of California, where summer temperatures typically reach well above 100°F. The use of this approved variance can have a material effect on TPWD's water use and help TPWD achieve future objectives. Accordingly, TPWD is planning to petition the State Water Board for use of this variance in calculating its UWUO.

**Table 2-10: UWUO Standards, Compliance, and Water Savings Needed**

| Parameter (AFY) | 2025 | 2028 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| UWUO Standards[a] | 2,270 | 1,570 | 1,470 | 1,420 | 1,390 | 1,390 | 1,390 |
| Additional 20% INI to Residential Budget[b] | Yes | No | No | No | No | No | No |
| Anticipated Residential Water Use[c] | 1,715 | 1,715 | 1,715 | 1,715 | 1,715 | 1,715 | 1,715 |
| Is UWUO Standard Met?[d] | Yes | No | No | No | No | No | No |
| Water Savings Needed | 0 | (160) | (280) | (360) | (400) | (400) | (400) |

Notes: Values are rounded.
(a) The UWUO standards were calculated using equations 1-5, assuming constant population, landscape area, connections, and residential demand.
(b) The 20 percent INI addition to the Residential Outdoor Water Use Budget is included until 2028, when DWR is anticipated to provide updated landscape measurements.
(c) These values include the estimated single and multi-family residential water use and water loss. Demands are considered constant following the assumption of (a).
(d) UWUO standard includes the 20 percent INI addition before 2028.
(e) Difference between the UWUO standard and anticipated residential water use.

# Chapter 3: SBx7-7 Baseline and Targets

## 3.1 Introduction

The Water Conservation Act of 2009 (SBx7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Act of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20x2020 Water Conservation Plan (DWR, 2010). Consistent with SBx7-7, each water supplier must determine and report its existing baseline water consumption, establish water-use targets in gallons per capita per day (gpcd), and compare actual water use with the targets. Reporting began with the 2010 UWMP.

SBx7-7, which requires meeting a calculated water use target, as described below, did not sunset in 2020. Meaning, in this 2025 UWMP, water suppliers must still demonstrate that they are meeting their 2020 targets through 2025. There are different instructions for water suppliers that did not meet their 2020 target, as outlined in their 2020 UWMP, or for those that have undergone annexations to their service area. However, that is not the case with TPWD, which did meet its 2020 target. Therefore, this chapter of the UWMP demonstrates that, in 2025, TPWD continues to meet this legislative mandate.

## 3.2 Existing and Targeted Per Capita Water Use

Table 3-1 summarizes the primary calculations required by SBx7-7.

**Table 3-1: SBx7-7 Calculations Specific to TPWD**

| | 2010 UWMP | 2015 UWMP | 2020 UWMP | 2025 UWMP |
|---|---|---|---|---|
| Base Daily Water Use calculation (average gpcd used in past years) | First calculated and reported in the 2010 plan | May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation | Must use calculation from the 2015 plan | Must use calculation from the 2015 plan |
| Interim Water Use Target (target gpcd in 2015) | First calculated and reported in 2010 Plan | May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation | May be revised in 2020 Plan under special circumstances | No changes necessary |
| Compliance Water Use Target (target gpcd in 2020) | First calculated and reported in 2010 Plan | May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation | May be revised in 2020 Plan under special circumstances | No changes necessary |
| Actual 2015 Water Use (in gpcd) | NA | In 2015 Plan must compare actual 2015 gpcd against 2015 target | Reported in the 2015 UWMP | No changes necessary |
| Actual 2020 Water Use (in gpcd) | NA | NA | In 2020 Plan must compare actual 2020 gpcd against 2020 target | In 2025 Plan must compare actual 2025 gpcd against 2020 target |

### 3.2.1 Base Daily Per Capita Water Use

Table 3-2 and Table 3-3 summarize the Base Daily Water Use calculations for TPWD. As shown in these tables, TPWD is not eligible to use a 15-year base period. The years 1995 to 2004 have been selected for calculating the 10-year base period, while the years 2003 to 2007 have been selected for calculating the five (5)-year base period.

**Table 3-2: Baseline Period Ranges**

| Baseline | Parameter | Value | Units |
|---|---|---|---|
| 10 to 15-year baseline period | 2008 total water deliveries | 3,146 | AFY |
| | 2008 total volume of delivered recycled water | 0 | AFY |
| | 2008 recycled water as a percent of total deliveries | 0 | Percent |
| | Number of years in baseline period[(a)] | 10 | Years |
| | Year beginning baseline period range | 1995 | - |
| | Year ending baseline period range[(b)] | 2004 | - |
| 5-year baseline period | Number of years in baseline period | 5 | Years |
| | Year beginning baseline period range | 2003 | - |
| | Year ending baseline period range[(c)] | 2007 | - |

Notes:
(a) If the 2008 recycled water use is less than 10 percent of overall use, then the first baseline period is a contiguous 10-year period.
(b) The ending year must be between December 31, 2004, and December 31, 2010.
(c) The ending year must be between December 31, 2007, and December 31, 2010.

To calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for those years. The TPWD population was calculated for 1990, 2000, 2010, and 2015 using the DWR online population tool. This was accomplished using a GIS interface to derive population. By adding shapefiles for the entity service area boundaries or public water system boundaries in 1990, 2000, and 2010, the population is derived from the US Census Bureau census tract data for those years. Then, along with TPWD production and service connections, the DWR population tool derives a persons-per-connection number, which is used to determine water use (gpcd) in the intervening years between 1990 and 2010. As shown in Table 3-3, the 10-year and 5-year Baseline for TPWD is 178 gpcd and 171 gpcd, respectively.

**Table 3-3: Baseline Water Use**

| Year | | Service Area Population | Gross Water Use (AFY) | Daily Per Capita Water Use (gpcd) |
|---|---|---|---|---|
| 10 to 15-Year Baseline (gpcd) | | | | |
| 1 | 1995 | 15,908 | 3,013 | 169 |
| 2 | 1996 | 14,918 | 3,145 | 188 |
| 3 | 1997 | 15,179 | 2,927 | 172 |
| 4 | 1998 | 15,433 | 2,993 | 173 |
| 5 | 1999 | 15,634 | 3,013 | 172 |
| 6 | 2000 | 15,846 | 3,248 | 183 |
| 7 | 2001 | 15,858 | 3,105 | 175 |
| 8 | 2002 | 15,859 | 3,416 | 192 |
| 9 | 2003 | 15,865 | 3,200 | 180 |
| 10 | 2004 | 16,225 | 3,203 | 176 |
| **10 to 15-Year Average Baseline (gpcd)** | | | | **178** |
| 5-Year Baseline (gpcd) | | | | |
| **Year** | | **Service Area Population** | **Gross Water Use (AFY)** | **Daily Per Capita Water Use (gpcd)** |
| 1 | 2003 | 15,865 | 3,200 | 180 |
| 2 | 2004 | 16,225 | 3,203 | 176 |
| 3 | 2005 | 17,061 | 3,152 | 165 |
| 4 | 2006 | 17,662 | 3,340 | 169 |
| 5 | 2007 | 17,859 | 3,328 | 166 |
| **5-Year Average Baseline (gpcd)** | | | | **171** |
| 2015 Compliance Year (gpcd) | | | | |
| | 2015 | 14,985 | 2,404 | **143** |
| 2020 Compliance Year (gpcd) | | | | |
| | 2020 | 16,182 | 2,449 | **135** |

### 3.2.2 Compliance Water Use Targets

As explained above, SBx7-7 requires TPWD to identify its demand-reduction targets for 2015 and 2020 using one of four options.

Option 1. 80 percent of baseline gpcd water use (i.e., a 20 percent reduction).

Option 2. The sum of the following performance standards: indoor residential use (provisional standard set at 55 gpcd); plus, landscape use, including dedicated and residential meters or connections equivalent to the State Model Landscape Ordinance (80 percent ETo existing landscapes, 70 percent of ETo for future landscapes); plus 10 percent reduction in baseline commercial, industrial institutional use by 2020.

Option 3. 95 percent of the applicable state hydrologic region target as set in the DWR "20x2020 Water Conservation Plan" (DWR, 2010).

Option 4. The provisional target method for determining water use targets, developed by DWR pursuant to SBx7-7. This is not applicable to TPWD.

Options 2 and 4 were considered but not selected because they required data that are not currently collected within the TPWD service area. The TPWD service area is within the Colorado River Hydrologic Region, as defined by DWR, and this hydrologic region has been assigned a 2020 water-use target of 211 gpcd per the DWR 20x2020 Water Conservation Plan.

TPWD has selected Method 3, achieving 95 percent of the applicable Colorado Hydrologic Region target. The Colorado Hydrologic Region target is 211 gpcd; 95 percent of this target is 200 gpcd. However, the five (5)-year Baseline for TPWD is 171 gpcd. As described earlier, the Maximum Allowable Water Use is 95 percent of the five (5)-year Baseline or 163 gpcd. The Compliance Water Use Target under Method 3 (200 gpcd) exceeds the Maximum Allowable Water Use; the 2020 target must therefore be adjusted to the Maximum Allowable Water Use, 163 gpcd. The Interim Water Use Target is 170 gpcd. These calculations are summarized in Table 3-4.

**Table 3-4: Components of Target Daily per Capita Water Use**

| Period | Value | Unit |
|---|---|---|
| Selected 10-year Average Base Daily Water Use | 178 | GPCD |
| Selected 5-year Average Base Daily Water Use | 171 | GPCD |
| Compliance Water Use Target (95% of the DWR 20x2020 Water Conservation Plan hydrologic region) | 200 | GPCD |
| Maximum Allowable Water Use Target (5% Reduction on 5-year Baseline GPCD) | 163 | GPCD |
| **2020 Target** | **163** | GPCD |
| **2015 Target** | **170** | GPCD |
| **Methodology Used** | Option #3 | |

TPWD's 2020 water use was 135 gpcd (Table 3-3), which means that TPWD met and exceeded its 2020 target of 163 gpcd. For 2025, the water use TPWD was calculated to be 110 gpcd. As this is within the 2020 target of 163 gpcd, TPWD continues to demonstrate compliance with SBx7-7. TPWD plans to maintain progress toward meeting the 20x2020 water use targets by continuing existing conservation methods that have been successful to date and by implementing other methods discussed in Chapter 8, Demand Management Measures.

# Chapter 4: Water Resources

## 4.1 Overview

This chapter describes the water resources available to TPWD for the 25-year period covered by the UWMP. Both currently available and planned supplies are discussed. TPWD currently does not import water and relies solely on local groundwater to meet its demand. Although TPWD does not use, nor does it have immediate plans to use, imported water, surface water, storm water, or recycled water, these could be future supply sources.

TPWD has had 20 total groundwater production wells in its history. As of 2024, TPWD has eight (8) active production wells and pumps from four (4) groundwater subbasins (Indian Cove, Fortynine Palms, Eastern, and Mesquite Lake) (Figure 4-1). Increased pumping to meet the needs of an expanding resident population has led to groundwater overdraft in parts of the basin. Prior to 1954, the Twentynine Palms area was served by three (3) privately owned water companies: Abell Water Company, Condor Mutual Water Company, and Pacific Water Company. TPWD was formed in 1954 and immediately purchased the three (3) water companies; their wells, storage facilities, and piping served as the initial water system.

Since the formation of TPWD in the mid-1950s, historical pumping and water deliveries steadily increased until around 2010. Since 2010, pumping and water deliveries have generally leveled off and have even decreased in recent years due to increased precipitation and corresponding groundwater recharge, as well as conservation efforts. In the 2010s, annual pumping averaged around 928 million gallons or approximately 2,851 AFY. For the years 2020-2023, annual pumping averaged approximately 832 million gallons (2,554 AFY). Table 4-1 summarizes the TPWD wells and their construction details grouped by subbasin.

TPWD collects groundwater level (monthly), groundwater quality (annual), and groundwater production (monthly) data in the GMP management area as part of Phase 1 of the Groundwater Monitoring Implementation Plan – 2020 Protocols and Procedures (Appendix B), adopted in 2019 to address the first recommendation of the Salt and Nutrient Management Plan (SNMP) (Kennedy/Jenks 2019; Kennedy/Jenks 2014b). In addition, the United States Geological Survey (USGS) currently collects groundwater level data primarily associated with the Marine Base, including several wells in the Twentynine Palms area. These are posted on the DWR Water Data Library website at http://www.water.ca.gov/waterdatalibrary/. These data are also posted on the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) website and can be downloaded from fromhttps://casgem.water.ca.gov/. Table 4-2 provides an overview of existing and planned water supplies.

## Table 4-1: TPWD Production Well Summary

| Well Name | Total Well Depth (feet bgs) | Screened Interval (feet bgs) | Well Status | Year Drilled | Years of Operation |
|---|---|---|---|---|---|
| **Indian Cove** | | | | | |
| TPWD-6 | 406 | 195-403 | Inactive | 1956 | 1957-2010 |
| TPWD-7 | 407 | 258-403 | Destroyed | 1962 | 1963-2005 |
| TPWD-8 | 785 | 80-100, 140-160, 215-600 | Abandoned | 1965 | 1969-1993 |
| TPWD-9 | 530 | 318-510 | Inactive | 1968 | 1970-2016 |
| TPWD-10 | 400 | 145-213; 238-312; 326-335; 365-382 | Inactive | 1968 | 1969-2006 |
| TPWD-11 | 400 | 200-400 | Destroyed | 1978 | 1966-2017 |
| **TPWD-11B** | **555** | **340-390;405-500; 510-545** | **Active** | **2017** | **2017-ongoing** |
| **TPWD-12** | **410** | **310-330; 350-410** | **Active** | **1983** | **1983-ongoing** |
| **TPWD-15** | **352** | **250-350** | **Active** | **1987** | **1990-ongoing** |
| **Fortynine Palms Subbasin** | | | | | |
| TPWD-3 | 340 | 120-340 | Abandoned | - | 1953-1992 |
| TPWD-3B | 398 | 160-280; 300-320; 340-398 | Abandoned | 1992 | 1993-2006 |
| TPWD-4 | 283 | - | Inactive | 1935 | 1953-2013 |
| TPWD-5 | - | - | Abandoned | - | 1953-1996 |
| TPWD-13 | 337 | 152-337 | Abandoned | 1985 | 1985-2004 |
| **TPWD-14** | **430** | **220-420** | **Active** | **1993** | **1993-ongoing** |
| **TPWD-17** | **550** | **330-520** | **Active** | **2009** | **2010-ongoing** |
| **Eastern Subbasin** | | | | | |
| TPWD-1 | - | - | Abandoned | - | 1955-2011 |
| TPWD-1B | 520 | 250-500 | Inactive | 2011 | 2011-2021 |
| TPWD-2 | 275 | - | Inactive | - | 1953-1993 |
| **TPWD-16** | **320** | **0-320** | **Active** | **1988** | **1991-ongoing** |
| **Mesquite Subbasin** | | | | | |
| TPWD-18 | - | - | Abandoned | - | 2012 |
| **WTP-1** | **1,010** | **350-440; 460-620** | **Active** | **1993** | **2003-ongoing** |
| **WTP-2** | **700** | **210-300; 340-450; 560-680** | **Active** | **2019** | **2023-ongoing** |

Note: Data provided by TPWD. Active wells are bolded.

**Table 4-2: Available Water Supplies (AFY)[(a)]**

| Existing Water Supply Source | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supplier-Produced Groundwater | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| **Total Supplies** | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |

Notes:
(a) TPWD has a total pumping capacity of approximately 6,985 gallons-per-minute (gpm) (11,266 AFY); however, current pumping is limited by DWR's recommendations to prevent overdraft in the Indian Cove and Fortynine Palms Subbasins is to limit overall pumping capacity at 4,340 gpm (6,995 AF).

## 4.2 Wholesale (Imported) Water Supplies

TPWD currently has no access to imported water supplies. Imported water from either the Metropolitan Water District of Southern California (MWD) or the Mojave Water Agency (MWA), while historically not pursued by TPWD, may be considered in more detail in the future as TPWD assesses the supplies necessary to meet projected demands. TPWD is not within the service area of MWD or MWA, and the closest MWD facilities (Joshua Tree Basin) are 15 miles west of TPWD.

## 4.3 Groundwater

TPWD currently relies solely on local groundwater as its source. This section presents information on groundwater supplies for TPWD, including a summary of the adopted GWMP (Appendix G). TPWD overlies two (2) non-adjudicated groundwater basins, the Twentynine Palms Valley Basin and the Joshua Tree Basin. Within the Twentynine Palms Valley Basin are the Mesquite Lake and Mainside subbasins. Within the Joshua Tree Basin are three subbasins: the Indian Cove, Fortynine Palms, and Eastern subbasins. TPWD also overlies a portion of the Dale Valley Basin, but there is little to no pumping or historical data from this basin, and TPWD has no production wells in this basin.

Water provided by TPWD is derived solely from groundwater pumped from supply wells located along the southern limit of the service area. TPWD had 20 total groundwater production wells in its history. As of 2025, TPWD has eight (8) active production wells. The remaining wells are inactive and/or used for groundwater monitoring. Available information indicates that more than 400 private wells have also been constructed within the TPWD service area. Most of these wells are not currently operated.

TPWD collects groundwater level, water quality, and water production data for use in groundwater management and other reporting purposes. The geology and groundwater characteristics of the subbasins are similar, as they are contiguous. Table 4-3 provides a breakdown of well capacity by subbasin. Figure 4-1 shows the location of the subbasins. Figure 4-2 displays TPWD's infrastructure and well locations.

**Table 4-3: Active Production Well Capacity by Subbasin**

| Well Name | Pumping Capacity (gpm) | Potential Maximum Annual Extraction (AFY) [(a)] | 2025 Groundwater Extracted (AF) | 2025 Percent of Capacity |
|---|---|---|---|---|
| **Indian Cove Subbasin** | | | | |
| TPWD-11B | 400 | 645 | 0 | 0% |
| TPWD-12 | 385 | 621 | 135 | 35% |
| TPWD-15 | 100 | 161 | 16 | 16% |
| **Fortynine Palms Subbasin** | | | | |
| TPWD-14 | 700 | 1,129 | 232 | 33% |
| TPWD-17 | 700 | 1,129 | 507 | 72% |
| **Eastern Subbasin** | | | | |
| TPWD-16 | 500 | 807 | 150 | 30% |
| **Mesquite Lake Subbasin** | | | | |
| WTP-1 | 2,100 | 3,387 | 1,049 | 50% |
| WTP-2 | 2,100 | 3,387 | 230 | 11% |

Notes: Data provided by TPWD. Potential Maximum Annual Extraction assumes wells operating at their pumping capacity for 24 hours per day, 365 days per year.

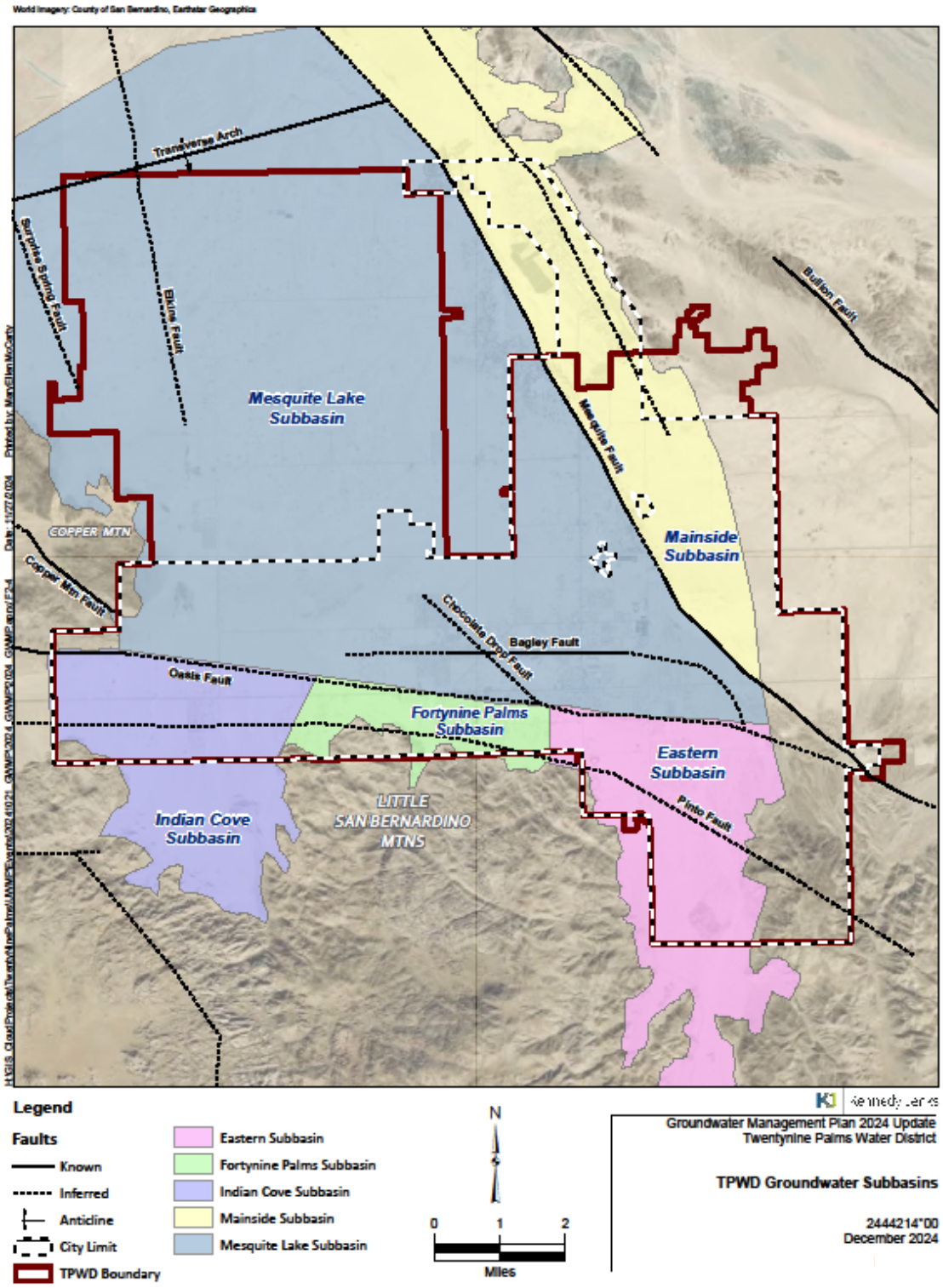



**Figure 4-1: Groundwater Subbasins in the TPWD Service Area**

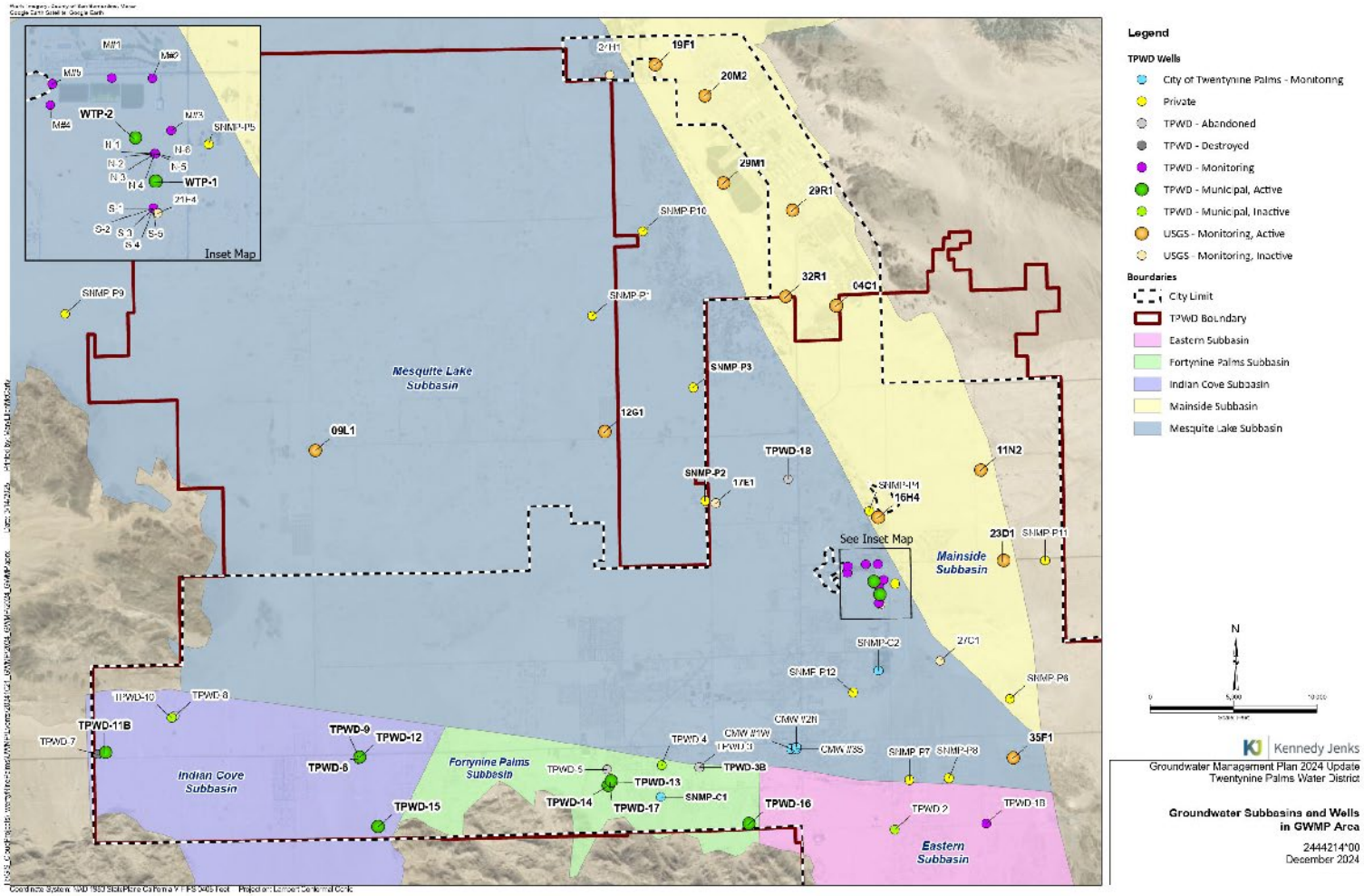



**Figure 4-2: Groundwater Subbasins and Wells in the TPWD Service Area**

### 4.3.1 Twentynine Palms Valley Basin

The Twentynine Palms Valley Groundwater Basin encompasses about 98 square miles and underlies most of the northern portion of the TPWD service area (Figure 4-1). It is bound to the south by the Pinto Mountain Fault, the north by the "transverse arch", the west by the Surprise Spring fault, and the east by the Mesquite Fault. The basin underlies an alluvial valley in the southern Mojave Desert below the dry Mesquite Lake and the town of Twentynine Palms.

The Twentynine Palms Valley Basin includes two (2) subbasins, the Mesquite Lake and Mainside subbasins. The following provides an overview of groundwater conditions and levels in these two subbasins.

#### 4.3.1.1 Mesquite Lake Subbasin

In the Mesquite Lake Subbasin, groundwater flows toward Mesquite Dry Lake from all directions. Riley and Worts (1952) noted that groundwater is confined by playa deposits along the western half of Mesquite Dry Lake. Within the Mesquite Lake Subbasin, several faults and a bedrock high create significant flow restrictions, further subdividing the subbasin into distinct groundwater zones. In the southwestern part of the subbasin, bedrock is at or near the land surface, so groundwater may flow around the southern part of this ridge. In the northwestern part of the subbasin, several faults, including the Elkins and Surprise Spring Faults, appear to form flow barriers that limit flow across this section of the subbasin. Small playas associated with these faults further support this observation, but there are few wells in this area.

TPWD has two (2) supply wells (WTP-1 and WTP-2) in this subbasin (Figure 4-2). WTP-1 came online in 2003 and has a capacity of approximately 3,387 AFY, having pumped between 523 and 1,465 AFY since then. WTP-2 came online in 2023 and has a capacity of approximately 3,387 AFY. Otherwise, groundwater pumping in this subbasin is limited by naturally occurring water-quality issues.

Static water levels in WTP-1 have dropped by about 10 feet over the 20-year period of record, as noted in the 2025 GMP. Groundwater elevation data for WTP-2 show an abrupt decline of almost 20 feet in static water level since its startup in 2020; it is unclear whether this decline is accurate or due to sampling discrepancies (e.g., change in datum, sampling procedure). Most water level measurements over the past 60 years are from the eastern and southern parts of the subbasin, with limited data from the western half. Most wells with long records show relatively steady groundwater levels over time, with total variations of five (5) feet or less.

#### 4.3.1.2 Mainside Subbasin

TPWD does not have production or monitoring wells in the Mainside Subbasin. However, there are USGS monitoring wells. Hydrographs of these monitoring wells show that groundwater levels have essentially been stable since about 1990, with some exceptions due to single or a few anomalous water levels. Pumping from the Marine Base golf course well is not measured but is estimated at approximately 540 AFY.

### 4.3.2 Joshua Tree Basin

The Joshua Tree Groundwater Basin includes the three (3) subbasins south of the Oasis Fault (Indian Cove, Fortynine Palms, and Eastern Subbasins). In general, groundwater flows north and east across the subbasins. The highest groundwater elevations are found along the mountain front of the Little San Bernardino Mountains to the south, which is the primary recharge area (Kennedy/Jenks 2025).

Flow between these subbasins is considered limited due to hydrologic barriers, such as faults or bedrock highs. For example, the groundwater elevation in the Indian Cove Subbasin is more than 250 feet above that in the Fortynine Palms Subbasin to the east, indicating that a barrier separates the subbasins, although its character is not defined (Kennedy/Jenks 2025). The groundwater elevation is approximately the same in the Fortynine Palms and Eastern Subbasins. Within the Joshua Tree Basin, long-term groundwater-level declines are evident south of the Pinto Mountain Fault in the Indian Cove and Fortynine Palms Subbasins.

There is also a fourth subbasin underlying the Joshua Tree Basin, the Joshua Tree subbasin, from which the neighboring Joshua Basin Water District (JBWD) pumps groundwater. The basin areas relied upon by the JBWD and TPWD are separated by an unnamed fault. The USGS treats these subbasins as separate and independent. For more information, refer to the USGS Report, “Evaluation of Geohydrologic Framework, Recharge Estimates, and Groundwater Flow of the Joshua Tree Area, San Bernardino County, California” (2004). Therefore, TPWD does not have access to the entire Joshua Tree Basin; it has access only to the three (3) subbasins overlain by the TPWD service area (Kennedy/Jenks 2025).

#### 4.3.2.1 Indian Cove Subbasin

The Indian Cove subbasin encompasses 20 square miles and is located southwest of the City of Twentynine Palms in the Joshua Tree Basin. It is bound on the north by the Pinto Mountain Fault, which separates it from the Valley Basin. Pumping records date back to 1957, and pumping varied from about 30 AFY initially to a peak of 2,075 AFY in 1985 (Kennedy/Jenks 2025). In 2025, total pumping was 151 AFY. The current production capacity of wells in this subbasin is approximately 1,427 AFY. Groundwater levels vary more widely in the Indian Cove Subbasin than in the other subbasins.

TPWD Wells 11 (no longer in service), 11B, 12, and 15 are located within this subbasin. In the northern part of the subbasin, groundwater elevations declined about two (2) feet per year on average from the late 1970s to around 2007. Between 1970-1990, groundwater elevations dropped most quickly, then decreased more slowly to the present. However, since 2007, groundwater levels have generally increased at an average rate of 2.4 feet per year. This coincides with a decline in groundwater pumping starting around the same time. TPWD Well 15, located south of the Pinto Fault, has not experienced a similar decline in groundwater levels, suggesting that the fault acts as a groundwater separation, dividing the subbasin into a northern and southern subarea (Kennedy/Jenks 2025).

Much of the groundwater flow through the Indian Cove subbasin occurs in its easternmost part, since 60 percent of the watershed drains into it. Water quality in the Indian Cove subbasin is

generally good. Typically, fluoride concentrations tend to increase with increasing groundwater temperature. Regional water temperatures decrease southward; associated higher fluoride concentrations also decrease.

#### 4.3.2.2 Eastern Subbasin

The Eastern subbasin has the largest watershed and sediment volume of the subbasins within the TPWD service areas. It is located south of the Twentynine Palms Valley Basin and east of the Fortynine Palms subbasin (Figure 4-1). One (1) of the TPWD active production wells is in this subbasin. Groundwater supplies in the Eastern subbasin appear limited, with most flow confined to a shallow zone above or within the bedrock.

Pumping records go back to 1952. Since then, pumping has varied from about 200 AFY in 1953 to a peak of 829 AFY in 2002. In 2025, total pumping in the subbasin was 150 AFY. The current production capacity of wells in this subbasin is approximately 807 AFY.

The basin includes TPWD Wells 1, 1B, 2 (no longer in service), and 16. Prior to the startup of Well 16 in 1988, Wells 1 and 2 showed groundwater elevation declines of 0.2 to 0.8 feet per year (Kennedy/Jenks 2025). Starting around 1988, water levels began declining more rapidly, at about 2.1 feet per year, coinciding with a significant increase in pumping at that time. Measured groundwater elevations have decreased up to 80 feet from the 1940s, including about 60 feet since 1988.

#### 4.3.2.3 Fortynine Palms Subbasin

The Fortynine Palms subbasin is the smallest of the subbasins within the TPWD service basin in volume and watershed (Figure 4-1). It is separated from the Twentynine Palms Valley Basin on the north by the Pinto Mountain Fault. The Indian Cove subbasin lies to the west and the Eastern subbasin to the east. Two of the TPWD active production wells are in this subbasin.

Pumping records go back to 1952, during which time pumping has varied from about 260 AFY in 1953 to a peak of 1,620 AFY in 2002. In 2025, total pumping in the subbasin was 739 AFY. The current production capacity of wells in this subbasin is approximately 2,258 AFY.

TPWD Wells 4 (not active), 14, and 17 are in this subbasin. From the 1940s to about 1970, groundwater levels declined by about one (1) foot per year, then leveled off until about 1990, coinciding with a decline in pumping in this basin (Kennedy/Jenks 2025). Starting around 1990, groundwater levels declined as pumping increased in the subbasin; until 2003, when pumping was reduced, the decline slowed to a steadier rate.

### 4.3.3 Adopted Groundwater Management Plan

As part of legislation authorizing TPWD to provide retail water service to municipal customers, Assembly Bill 134 (2001) requires TPWD to prepare a GMP in accordance with the provisions of Water Code Section 10753, originally enacted by Assembly Bill 3030 (AB 3030). AB 3030 declares that groundwater is a valuable resource that should be carefully managed to ensure its safe production and quality. The legislation also encourages local agencies to work cooperatively

to manage groundwater resources within their jurisdiction. Senate Bill 1938 (SB 1938) was passed by the Legislature on September 16, 2002, and made changes and additions to sections of the Water Code created by AB 3030.

The TPWD 2025 GMP addresses all relevant components of GMPs, including mandatory and voluntary components of SB 1938, AB 359, and AB 3030, as well as components suggested by DWR Bulletin 118. The GMP is intended to serve as a planning tool to assist the TPWD in maintaining safe, sustainable, and high-quality groundwater resources in the long term. A copy of the GMP is included as Appendix G.

#### 4.3.3.1 Basin Management Objectives

The overall goal of the TPWD GMP is to maintain quality and long-term availability of groundwater to meet the current and future demands without adversely affecting groundwater resources within the GMP area. The objective of the TPWD GMP is to address issues of aquifer health and groundwater sustainability. These key issues include:

- Sustainable long-term water supplies.
- Treatment of natural water quality constituents.
- Wastewater management, specifically septic tanks.
- Water supply for anticipated population growth.

To address key issues, TPWD established Basin Management Objectives (BMOs), specific, measurable accomplishments that must be completed to achieve the goals.

The BMOs proposed for TPWD and included in the 2025 GWMP are:

- BMO #1 - Manage Groundwater Levels to Maintain Water Supply Sustainability and Reliability.
- BMO #2 - Maintain and Protect Groundwater Quality.
- BMO #3 - Support Development of a Local Program for Septic Tank Management.
- BMO #4 - Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence.
- BMO #5 - Promote Public Participation and Coordination with Other Local Agencies.
- BMO #6 - Address Planned or Potential Future Water Supply Needs and Issues.
- BMO #7 - Identify and Obtain Funding Sources for Groundwater Projects.

TPWD maintains regular groundwater-level and quality monitoring to improve understanding of groundwater-level fluctuations, potential impacts on groundwater quality, and changes in

groundwater storage across the subbasins of interest. Changes to groundwater storage are accounted for by tracking groundwater levels. TPWD conducts water quality monitoring per DDW standards, which is sufficient to track changes in groundwater quality in the basins.

#### 4.3.3.2 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA), passed in 2014 and amended in 2015, creates a framework for sustainable, local groundwater management in California. SGMA directed DWR to identify priority groundwater basins for implementation. The SGMA requirements to create sustainable groundwater management agencies and groundwater sustainability plans (GSPs) no later than 2022 apply only to high and medium-priority basins. The TPWD basins are currently rated as very low priority basins (http://www.water.ca.gov/groundwater/casgem/pdfs/lists/StatewidePriority_Abridged_05262014.pdf). While not required to prepare an SGMA GSP, TPWD continues to take actions to protect its groundwater supply and to update its GMP to reflect the condition and quality of the groundwater supply. TPWD will also continue to cooperate with regional partners to manage the basins.

### 4.3.4 Groundwater Supply Reliability

Storage capacity of the Twentynine Palms Valley Basin, made up of the Mesquite Lake subbasin, is estimated in Bulletin 118 to be 1,420,000 AF. The total groundwater available in the basin was estimated at 132,000 AF in 1984 (DWR 1984). In the Mesquite Lake subbasin, most wells with long records show relatively steady water levels over time, with total variations in groundwater levels ranging within five (5) feet (TWPD 2014). Estimates of storage capacity for the Joshua Tree Basin range from 480,000 to 750,000 AF (Krieger and Stewart 1996), 975,000 AF (Whitt and Jonker 1998), and 1,010,000 AF (DWR 1984). Actual groundwater extractions in the Joshua Tree Basin are measured by the Joshua Basin Water District.

Overall, the hydrologic water balance results presented in the 2025 GMP indicate that more groundwater is being pumped than is being recharged during an average year. Results indicate that return flows, the return of water pumped from the basin, are the primary source of recharge. Natural recharge is limited because of the relatively low average rainfall in the area. Discharge is primarily pumping from wells. The net negative change in storage is reflected in the declining groundwater levels.

Overdraft is considered a challenge to TPWD supply reliability, but TPWD has been working to balance pumping across the four (4) groundwater subbasins to help reduce groundwater-level declines and enhance the long-term sustainability of existing water supplies. TPWD has increased groundwater production in the Mesquite Lake subbasin to reduce groundwater pumping in the Indian Cove, Fortynine Palms, and Eastern subbasins. The Mesquite Lake subbasin contains a large volume of groundwater, and the Fluoride Removal Water Treatment Plant can provide high-quality groundwater from that source. TPWD will continue to practice shifting groundwater production between subbasins to help stabilize declining groundwater levels.

Implementation of the proposed BMOs and related actions from TPWD, as discussed in the 2025 GWMP, is anticipated to help maintain water supply sustainability and reliability into the future.

TPWD does not have access to surface, imported, or recycled water sources; therefore, the options for mitigating overdraft conditions are limited. Should access to an alternative water source become available in the future, TPWD would initiate an assessment on how best to utilize these resources to reduce groundwater overdraft, including the use of "artificial recharge," "recycled water," or "conjunctive use" projects.

Planned actions and projects are discussed further in Section 4.8 below. In addition, current pumping accounts for only about 21 percent of the total pumping capacity for TPWD and about 34 percent of the capacity recommended by DWR. As a result, TPWD still has a supply buffer to meet growing demands and to adapt groundwater resource management activities to improve sustainability. Given the combination of current groundwater availability, proposed management measures, and pumping capacity, TPWD groundwater supplies are anticipated to be available in normal hydrologic conditions, a single-dry year, and multiple-dry years.

### 4.3.5 Historical Groundwater Pumping

As mentioned, TPWD had 20 total groundwater production wells in its history. As of 2025, TPDW has eight (8) active production wells and pump wells located in four (4) different groundwater subbasins (Indian Cove, Fortynine Palms, Eastern, and Mesquite Lake); TPWD does not currently pump water from the Mainside Subbasin. Figure 4-2 shows the locations of the active and historical supply wells in the TPWD service area. Table 4-4 lists total historical well production for the TPWD service area from 1990 through 2025.

Groundwater pumping by TPWD has increased steadily since its formation in the mid-1950s until about 2002. In the 1950s, groundwater pumping ranged from 500 to 1,000 AFY. By the 1990s, groundwater pumping ranged from 2,730 to 3,145 AFY, with an average daily delivery per service connection slightly under 400 gallons. Groundwater pumping was at an all-time high in the early 2000s, ranging from 2,871 to 3,569 AFY. The highest total annual groundwater pumping was 3,416 AF in 2002. Beginning in 2002, groundwater pumping has shown a consistent decline, not exceeding 3,000 AFY after 2011. Groundwater pumping decreased steadily, with the lowest pumped in 2015 at 2,221 AFY. Groundwater pumped in 2025 was 2,320 AFY. Since 2003, TPWD has worked to balance pumping across the four (4) groundwater subbasins to help reduce declines in groundwater levels.

**Table 4-4: Historical Water Production (1990-2024)**

| Year | AF |
|---|---|
| 1990 | 2,788 |
| 1991 | 2,728 |
| 1992 | 2,961 |
| 1993 | 3,013 |
| 1994 | 3,132 |
| 1995 | 3,013 |
| 1996 | 3,144 |
| 1997 | 2,983 |
| 1998 | 3,030 |
| 1999 | 3,077 |
| 2000 | 3,248 |
| 2001 | 3,105 |
| 2002 | 3,416 |
| 2003 | 3,200 |
| 2004 | 3,203 |
| 2005 | 3,152 |
| 2006 | 3,340 |
| 2007 | 3,328 |
| 2008 | 3,146 |
| 2009 | 3,123 |
| 2010 | 3,001 |
| 2011 | 3,005 |
| 2012 | 2,929 |
| 2013 | 2,842 |
| 2014 | 2,737 |
| 2015 | 2,221 |
| 2016 | 2,525 |
| 2017 | 2,550 |
| 2018 | 2,584 |
| 2019 | 2,409 |
| 2020 | 2,694 |
| 2021 | 2,715 |
| 2022 | 2,453 |
| 2023 | 2,351 |
| 2024 | 2,354 |
| 2025 | 2,320 |

Source: TPWD water production records.

Table 4-5 presents the historical groundwater pumping by basin for the past five (5) years. Current pumping is limited to DWR's recommendations to prevent overdraft in the Indian Cove and Fortynine Palms subbasins.

**Table 4-5: Historical Groundwater Pumped (2021-2025, AFY) *(DWR Table 6-1 R)***

| Basin Name | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| Mesquite Lake Basin | 1,425 | 1,343 | 1,243 | 1,307 | 1,280 |
| Joshua Tree Basin | | | | | |
| Fortynine Palms Subbasin | 284 | 227 | 231 | 250 | 150 |
| Eastern Subbasin | 886 | 761 | 783 | 602 | 739 |
| Indian Cove Subbasin | 129 | 134 | 90 | 180 | 151 |
| **Total** | **2,724** | **2,465** | **2,347** | **2,339** | **2,320** |

## 4.3.6 Projected Groundwater Pumping

Table 4-6 displays the groundwater pumping capacity for each basin and subbasin in the TPWD service area. TPWD has a total pumping capacity of approximately 6,985 gallons per minute (gpm) (11,266 AFY). In addition, DWR's recommendations to prevent overdraft in the Indian Cove and Fortynine Palms Subbasins limit overall pumping capacity to 4,340 gpm (6,995 AF). The total groundwater pumped in 2025 accounted for about 21 percent of the current pumping capacity.

**Table 4-6: Groundwater Pumping Capacity**

| Basin Name | Total Pumping Capacity[(a)] (gpm) | Total Pumping Capacity[(a)] (AFY) | Limited Pumping Capacity[(b)] (gpm) | Limited Pumping Capacity[(b)] (AFY) |
|---|---|---|---|---|
| Mesquite Lake Basin | 4,200 | 6,775 | 2,100 | 3,395 |
| Joshua Tree Basin | | | | |
| Fortynine Palms Subbasin | 1,400 | 2,258 | 870 | 1,400 |
| Eastern Subbasin | 500 | 807 | 500 | 800 |
| Indian Cove Subbasin[(c)] | 885 | 1,428 | 870 | 1,400 |
| **Total** | **6,985** | **11,267** | **4,340** | **6,995** |

Notes:
(a) From TPWD 2014 Groundwater Management Plan, Table 3-3 (Kennedy/Jenks 2014a), adjusted to reflect lost capacity as a result of taking Well No. 9 and Well No. 4 offline and putting Well No. 11-B in the Indian Cove Subbasin in service in 2020.
(b) DWR recommended pumping limit to prevent overdraft.
Well 11 was taken out of service in 2016 after the sampling event due to well casing failure and replaced with Well 11-B in 2018. Well 11-B was put into service in 2020.

Table 4-7 presents projections of groundwater pumping by the subbasin through 2050. The projected groundwater pumping is determined by the projected demand (Table 2-8) and then adjusted for water loss between production and consumption. Over the last five (5) years, total groundwater pumped has ranged between four (4) and 11 percent above the annual water demand, excluding losses. Based on historical groundwater pumping and production numbers from 2020 to 2024, the average nonrevenue water loss is seven (7) percent. Therefore, the estimated total groundwater volume to be extracted in 2050 to meet demand, using seven (7) percent above anticipated annual demand, would be about 2,610 AFY. This is approximately 25 percent of the current pumping capacity of TPWD. TPWD groundwater resources are expected to remain at the same levels during average/normal, single-dry, and multiple-dry years.

**Table 4-7: Projected Groundwater Pumping and Demands (AF)**

| | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|
| Mesquite Lake Basin[(a)] | 1,280 | 1,300 | 1,340 | 1,380 | 1,410 |
| Joshua Tree Basin | | | | | |
| Fortynine Palms Subbasin | 730 | 750 | 770 | 790 | 810 |
| Eastern Subbasin | 220 | 230 | 230 | 240 | 240 |
| Indian Cove Subbasin | 130 | 140 | 140 | 140 | 150 |
| **Total Groundwater Pumping** | **2,360** | **2,410** | **2,470** | **2,550** | **2,610** |
| **Percent of Total Supply** | **100%** | **100%** | **100%** | **100%** | **100%** |
| Potable Demands[(b)] | 2,090 | 2,140 | 2,200 | 2,270 | 2,330 |
| Non-potable Demands | 80 | 80 | 80 | 80 | 80 |
| Sales to Other Agencies | 20 | 20 | 20 | 20 | 20 |
| Losses[(c)] | 170 | 170 | 170 | 180 | 180 |
| **System Total Demands** | **2,360** | **2,410** | **2,470** | **2,550** | **2,610** |

Notes: Values are rounded.
(a) Based on the 2020-2025 groundwater pumping data and including seven (7) percent water loss based on the average of the past five (5) years of available water loss data.
(b) Demand values from Table 2-6.
(c) From Table 2-3. Future water losses are calculated using the average percent water loss from the past five (5) years of available data.

## 4.4 Potential Supply Inconsistency

Because TPWD relies solely on groundwater to meet its demand, TPWD does not have any inconsistent water sources that cause reduced deliveries to users within the service area. Localized groundwater quality impairments may limit the potable use of TPWD groundwater sources, as happened in 2016 with the removal of Wells 9 and 11 from service, for which TPWD is actively taking action. However, no substantial changes in water supply are anticipated due to water quality impacts, as described in more detail in Chapter 5.

Surface runoff from rain events is one of the primary sources of recharge to the groundwater basins used by TPWD. As a result, climatic factors, including more frequent and intense dry weather, can affect replenishment of supply. However, overall, the groundwater basins within the

TPWD service area have substantial storage capacity and volumes to allow continued water use during dry periods without significantly hindering the water supply. Management actions to improve the sustainable use and reliability of TPWD water supplies, including proposed actions related to the BMOs of the GMP, are necessary to maintain the consistency and reliability of this supply.

## 4.5 Transfers and Exchanges

TPWD is not within the service areas of either MWD or MWA to receive imported water, as described in Section 4.2. Currently, there are no other opportunities for TPWD to transfer or exchange water.

## 4.6 Recycled Water

There is no community sewage system. Wastewater is disposed of through individual septic tanks and tile field disposal systems. Septic return flows contribute to basin recharge and may affect the beneficial use of local groundwater resources. The City of Twentynine Palms (City) has recently been considering a project to move a portion of the downtown area from septic to a centralized sewer system, but the concept is still in preliminary discussions. If future actions by TPWD and the City include the implementation of a centralized sewer collection and treatment system, TPWD shall evaluate ways to utilize recycled water to help reduce groundwater demand or contribute to aquifer recharge. See Chapter 5 for more information on recycled water.

## 4.7 Water Energy Reporting

Reporting of energy information associated with sources of water used by urban water suppliers is required for the 2025 UWMP by Water Code Section 10631.2(a). For the purposes of the required water-energy reporting, urban water Suppliers are only expected to report energy-use information associated with water management processes under their operational control.

Southern California Edison (SCE) supplies energy to the TPWD service area, including the groundwater wells and booster stations (Appendix F). Since TPWD uses only retail potable deliveries, the Total Utility Approach was applicable for calculating water-related energy consumption data. Table 4-8 presents energy consumption data for 2025.

**Table 4-8: Energy Reporting – Total Utility Approach (2025)**

| Parameter | Total Utility | Units |
|---|---|---|
| Volume of Water Entering Process[(a)] | 2,320 | AF |
| Energy Consumed[(b)] | 2,875,174 | kWh |
| Self-Generated Renewable Energy | 0 | kWh |
| Energy Intensity[(c)] | 3,803 | kWh/MG |

Notes:
(a) Total volume of water supplied in 2020 (Table 1-1).
(b) Energy consumed determined by SCE in the 2025 Billing & Usage report.
(c) Calculated by total energy consumed divided by the volume of water entering the process. Volume converted to million gallons (MG).

## 4.8 Planned Water Supply Projects and Programs

As described in Section 4.3.6, future pumping capacity, which is limited by DWR's recommendations to prevent overdraft, is sufficient to meet the projected demand in 2040, assuming capacity lost by the shutdown of Wells 9 and 11 in 2016 is recovered. A new Well 11B has been drilled, and TPWD is looking to implement groundwater treatment for this well (discussed in Chapter 5) to bring it online.

TPWD has several reservoirs for storage, which enable them to provide adequate service during peak demands, as well as fire flow and emergency reserves. TPWD regularly evaluates its distribution and storage network. As part of this process, the need for new improvements, including additional storage capacity, is evaluated, and a capital improvement program is developed to construct the necessary improvements. There are no plans for any large-scale storage projects or conjunctive use/groundwater storage facilities at this time. In addition, the need for additional extraction facilities is evaluated, and wells are incorporated into the capital improvements program. However, TPWD continues to evaluate the potential to expand the infrastructure to meet future demands that exceed current projections, if that should occur.

Another future groundwater supply project may include maximizing the use of the only available recharge source (precipitation) by implementing recharge enhancement measures. However, recharge from precipitation percolating through the subbasin floor is not considered a major groundwater recharge source (DWR, 1984).

There is the potential to expand the Mesquite Lake subbasin facilities to include another well, if needed in the future, Well TP-2. This additional well would improve reliability by providing redundancy in the Mesquite Lake subbasin and by increasing pumping capacity. Also, as part of the GMP, recharge enhancement could further improve reliability and may lead to increased DWR pumping limit recommendations for the Fortynine Palms and Indian Cove subbasins. Other potential future projects could involve investigating the location of production wells in the portion of the Dale Valley Basin within the TPWD boundaries.

Lastly, TPWD recognizes that water conservation is an important means to augment demands on the basins. TPWD utilizes public outreach to promote conservation, specifically through water conservation brochures available through TPWD and distributed in new customer packages and

water bills, as well as through speakers and events at local schools and community events, including poster contests and participation in Earth Day activities. Additional water conservation measures are addressed in the GMPs BMOs, and the current and planned water management strategies targeting conservation and water savings are described in Chapter 8. TPWD will continue to evaluate whether additional demand management measures could be developed, as well as the potential new water sources.

## 4.9 Development of Desalination

The UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]). TPWD has evaluated opportunities for using desalinated water in future supply options. However, currently, none of the opportunities are practical or economically feasible, and TPWD has no current plans to pursue them. Therefore, desalinated supplies are not included in the supply summaries in this UWMP.

### 4.9.1 Opportunities for Brackish Water and/or Groundwater Desalination

Groundwater supplies in the existing TPWD service area are not brackish, and desalination is not required. In the future, however, the TPWD may investigate in greater detail the potential to extract high-total dissolved solids (TDS) groundwater from the nearby Dale Valley Basin.

### 4.9.2 Opportunities for Seawater Desalination

As TPWD is not in a coastal area, it is neither practical nor economically feasible for it to implement a seawater desalination program. However, TPWD and MWA, for example, could team up with imported water supply contractors and provide financial assistance for the construction of additional regional seawater desalination facilities in exchange for imported water, should imported water become a viable resource for TPWD in the future. This is not being discussed currently.

# Chapter 5: Recycled Water

## 5.1 Wastewater and Recycled Water

TPWD does not have a municipal sewer system or a wastewater treatment plant. Currently, all residential and non-residential accounts use septic tank systems for wastewater disposal. In 2014, TPWD and the City of Twentynine Palms prepared a Wastewater Master Plan (WWMP) (Kennedy/Jenks 2014b) to develop a conceptual sewer collection and treatment system that could serve both the City and TPWD. The WWMP was prepared in conjunction with an SNMP, which assessed the long-term potential impacts to groundwater quality from the continued use of septic systems (Kennedy/Jenks 2014c). Those studies found that the infrastructure costs of constructing centralized systems are prohibitively high in the near term.

If future actions by TPWD and the City include implementing a centralized sewer collection and treatment system, TPWD will evaluate ways to use recycled water to help reduce groundwater demand or support aquifer recharge. Septic tank return flows currently comprise a significant component of basin recharge; therefore, recycled water should be used for an appropriate beneficial purpose in lieu of groundwater if it becomes available. TPWD is actively pursuing work with the USGS to install additional monitoring wells within its service area to collect water-quality data to inform future water-supply decisions.

For the time being, due to the small size of the TPWD system, low annual demand, and the use of individual septic systems, a recycled water system is not feasible. Subsequently, as there is no source of recycled water, TPWD has not developed any plans for serving recycled water.

TPWD recognizes the important contribution recycled water can make to its supply portfolio and to supply efficiency and conservation efforts within the State. If and when a future recycled water delivery system is developed, methods to encourage recycled water use, such as financial incentives, will be analyzed.

# Chapter 6: Water Quality

The quality of any natural water is dynamic. This is true of local groundwater basins, where water quality changes over the course of a year. Depending on water depth, groundwater will pass through different layers of rock and sediment, leaching different materials from those strata. Water depth is a function of local rainfall and pumping. During droughts, the mineral content of groundwater increases. Water quality is not a static property; these dynamic variables must be recognized.

This chapter summarizes current groundwater quality conditions as supported by monitoring results and water quality management actions that have been taken. Data presented is from historical well data, including water quality data reported in the 2025 GMP (Kennedy/Jenks 2025).

## 6.1 Groundwater Quality

TPWD groundwater is typically of good quality. The historical and current use of septic systems for wastewater disposal affects groundwater quality. In addition, high levels of naturally occurring fluoride, arsenic, and hexavalent chromium are present in some water supply wells in certain areas.

Congress passed the Safe Drinking Water Act (SDWA) in 1974, along with amendments in 1986 and 1996. The SDWA is implemented by the US EPA at the federal level and by DDW at the state level. The state can enact regulations under the SDWA that are more stringent than required by the federal rule, but it cannot enact regulations that are less stringent. Compared to other states, California DDW frequently establishes regulations that are more stringent than federal regulations, though it has also accepted certain federal regulations by reference (as is). The regulatory thresholds for drinking water are defined as follows:

**Maximum Contaminant Levels (MCLs)** are enforceable drinking water standards for various contaminants (e.g., lead, arsenic) that public water systems must meet to ensure safe water quality. MCLs consider not only chemical health risks, but also technology-based factors such as analytical capabilities, available treatment technologies, benefits, and costs.

**Secondary MCLs (SMCLs)** are established for non-health-based effects such as taste, odor, or color.

**Public Health Goals (PHGs)** are levels of chemical contaminants in drinking water that do not pose a significant health risk. PHGs are not regulatory standards. State law requires the SWRCB to set drinking water standards (MCLs) for chemical contaminants as close to the corresponding PHG as is economically and technologically feasible.

**Notification Levels (NLs)** are health-based advisory levels for certain chemicals, established by DDW, that lack MCLs. NLs were created to provide early public warning of potential health effects before establishing a drinking water standard.

**Response Levels (RLs)** are established by DDW as advisory levels at which DDW recommends that the source be taken out of service.

## 6.2 Water Quality Constituents

All water purveyors are subject to drinking water standards set by the US EPA and DDW. TPWD is committed to providing its customers with high-quality water that meets all federal and state primary drinking water standards. Although TPWD supplies its customers with high-quality water, it recognizes that advances in technology and science will continue to shape the evolving nature of state and federal standards. PHGs are non-enforceable goals based solely on public health considerations, developed using the best available health effects data from current scientific literature.

The water quality of various drinking water sources, including rivers, lakes, streams, ponds, reservoirs, springs, and wells, is reported. Water near the mountain fronts, which has been recharged relatively recently, tends to be of high quality, with low concentrations of chemical constituents. Some contaminants are naturally occurring, such as minerals and radioactive materials, and, in some cases, the presence of animals or human activity can contribute to their presence in source waters. The minerals in groundwater may also be concentrated by evaporation when the water table is close to the ground surface. Listed below are constituents that summarize those reported in the TPWD 2025 GMP that may impact water supply reliability.

### 6.2.1 Fluoride

TPWD has been historically pumping from the Indian Cove, Fortynine Palms, and Eastern Subbasins in the south because of the generally good water quality in these areas. TPWD also pumps from the Mesquite Subbasin; however, they must treat water from certain wells for naturally occurring constituents, including fluoride and arsenic.

Elevated fluoride concentrations above the MCL are widespread across the TPWD service area. In 1993, TPWD was granted a variance from the California Primary MCL for fluoride, which states "the District shall not serve water containing fluoride levels in excess of 3.0 mg/L or 75 percent of the US EPA Primary Drinking Water Standard (currently at 4.0 mg/L), whichever is higher." TPWD made its request for the variance based on provisions outlined in SB 694 and AB 2681, which provide for the granting of a variance from the Primary Drinking Water Standard for fluoride by the DDW for a period of up to 30 years, provided that a review of the variance status is conducted every five (5) years. The variance was set to expire in 2023.

Fluoride concentrations in the Indian Cove, Fortynine Palms, and Eastern Subbasins generally average below two (2) mg/L, but several wells, especially in the Eastern Subbasin, average above three (3) mg/L. Several older wells with high fluoride concentrations were taken out of operation in the 1990s and replaced by newer wells located in areas with lower fluoride concentrations. Due to the variance, groundwater from these wells has been allowed for use without fluoride treatment. As fluoride concentrations in the Mesquite Lake subbasin are generally well above three (3) mg/L, groundwater from these subbasins cannot comply with the variance without treatment.

In 2003, TPWD began pumping from the Mesquite Lake subbasin; however, this groundwater has high levels of fluoride. Average fluoride concentrations range from 1.2 to 6.2 mg/L. For example, fluoride levels measured in 2024 at WTP-1 and WTP-2 hovered around 5.9 and 6.2 mg/L, respectively. Throughout the Mesquite Lake Subbasin, concentrations range from 5.9 to 8.6 mg/L. Water pumped from the Mesquite Lake subbasin is treated to reduce fluoride before being

distributed into the pipeline system via the Twentynine Palms Fluoride Removal Water Treatment Plant in the Twentynine Palms Valley Basin. The plant is designed to reduce fluoride concentrations in the groundwater to levels below the MCL of 2.0 mg/L. The treatment plant is currently producing approximately 1.2 million gallons per day (MGD) and has a maximum capacity of 3.0 MGD. During operation of the treatment plant, the long-term goal of TPWD is to maintain fluoride levels at or below 2.0 mg/L.

### 6.2.2 Arsenic

Arsenic is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic is less commonly associated with contaminant plumes. The primary MCL for arsenic is 10 micrograms per liter (µg/L). Arsenic occurs naturally in the Twentynine Palms area and has been detected in concentrations up to 13 µg/L. The average arsenic concentration is below 10 µg/L in most TPWD wells. Arsenic concentrations above the MCL are most prevalent in the Indian Cove Subbasin and in TPWD well WTP-2, in the Mesquite Lake Subbasin, with the highest concentration of 13 µg/L and the lowest concentration of 11 µg/L. Arsenic is below the MCL in the Eastern and Fortynine Palms Subbasins. Elevated arsenic concentrations require treatment at some TPWD wells.

### 6.2.3 Hexavalent Chromium

Hexavalent Chromium (Chromium-6 or Cr-6) is an element that both naturally occurs from the erosion of natural chromium deposits and is produced by industrial processes. The SWRCB adopted an MCL of 10 µg/L on April 17, 2024. The regulation was approved on July 24, 2024, with an effective date of October 1, 2024. Community and non-community, non-transient water systems must complete initial sampling by April 1, 2025. Systems must comply with the regulation as follows: October 1, 2024, for systems with 10,000 or more connections; October 1, 2027, for systems with 1,000 to 9,000 connections; and October 1, 2028, for systems with fewer than 1,000 connections.

Chromium-6 is produced from by-products of industrial applications and the manufacturing of stainless steel and other alloys, as well as having a natural component. Following the adoption of the more stringent MCL and in response to the hexavalent chromium concentrations present in the wells, TPWD shut down three (3) of its eight (8) production wells, reducing overall water production capacity by 15 percent. The wells are not operating, but two (2) remain physically connected to the distribution system.

A wellhead treatment system (or other alternatives such as blending) is necessary to reduce hexavalent chromium concentrations in the water supply before returning these wells to service and restoring water production capacity. TPWD is currently moving forward with providing wellhead treatment for Well 11B to reduce Chromium-6, arsenic, and fluoride levels. The well is anticipated to be brought back online by 2027.

### 6.2.4 Salts and Nutrients

The historic and current use of septic systems for wastewater disposal in the TPWD service area may affect groundwater quality. The key constituents considered for monitoring septic tank influence are nitrates and TDS.

**Nitrate** - For the TPWD production wells, nitrate (as $NO_3$-N) ranges from non-detect to 7.1 mg/L. Historical and current data are below the MCL of 10 mg/L for nitrate as $NO_3$-N.

**TDS** - The TDS content of groundwater ranges from about 120 to 410 mg/L in TPWD supply wells. TDS has an SMCL of 500 mg/L. Higher levels of TDS in the area are typically associated with naturally occurring, higher-salinity, shallow groundwater beneath playa deposits. Elevated TDS can also be associated with septic tank return flows.

In June 2014, the TPWD 2014 SNMP (Kennedy/Jenks 2014b) recognized the increased need to assess potential groundwater-quality impacts from salt and nutrient sources derived primarily from regional septic tanks and included recommendations to mitigate these impacts. The recommendations in the SNMP were:

1. Implement measures to improve the overall monitoring of the groundwater. This is being addressed through a Groundwater Monitoring Implementation Plan approved by the Colorado River Basin Regional Water Quality Control Board (RWQCB) on 10 December 2019 (Kennedy/Jenks 2017).

2. Implement a Septic System Management Program (SSMP) to limit further impacts on groundwater. Kennedy/Jenks began preparing a draft SSMP in November 2023 on behalf of the City and TPWD.

### 6.2.5 Uranium

Uranium is a naturally occurring radioactive groundwater contaminant formed by the erosion of natural deposits. Groundwater sampled in 2019 revealed an average Uranium level of 7.4 picocuries per liter (pCi/L), with a range of 3.05-13.2 pCi/L. The MCL for Uranium is 20 pCi/L, and current levels do not exceed the MCL limit and are therefore not a concern to drinking water in the TPWD service area.

### 6.2.6 Disinfection By-Products

Disinfection By-Products (DBPs), including Trihalomethanes (THMs) and Haloacetic Acids (HAA5), are formed when naturally occurring organic matter interacts with disinfectants such as chlorine and ozone. As TPWD relies on groundwater for its supply, DBPs should be minimal and not a concern, but TPWD will continue to monitor and report on these compounds.

### 6.2.7 Microbiological

Microbial contaminants, such as viruses and bacteria, can naturally occur or result from urban storm water runoff, sewage treatment plants, septic systems, agricultural livestock operations, and wildlife. Microbial testing has consistently been below the state and federal standards.

### 6.2.8 Radiological Tests

Radioactive compounds can be found in both ground and surface waters, whether naturally occurring or resulting from oil and gas production and mining activities. Testing is conducted for two

types of radioactivity: alpha and beta. Although naturally occurring radioactivity can be detected in the water supply, the levels, on average, meet federal and state MCL standards.

## 6.3 Water Quality Management Actions

TPWD undertakes several actions to protect the water quality of groundwater delivered to its customers. The following sections summarize several key management actions, including those of the voluntary 12 specific technical elements identified in the CWC that pertain to water quality.

### 6.3.1 Control of High-Salinity Waters

Areas near historical dry lakes, such as Mesquite and Shortz, tend to have higher salinity in both groundwater and surface water. The groundwater supplies for TPWD do not appear to be affected by this phenomenon, and no action is recommended at this time. Monitoring wells near WTP-1 and WTP-2, located in the vicinity of Mesquite Dry Lake, are periodically sampled for TDS to detect high-salinity water.

### 6.3.2 Regulation of the Migration of Contaminated Groundwater

No contaminated groundwater from industrial or commercial sources has been identified in the TPWD service area. The responsibility for regulating and controlling the migration and cleanup of contaminated groundwater from industrial or commercial sources rests with various County, State, and Federal agencies, including the County of San Bernardino and the Colorado River RWQCB (Region 7).

### 6.3.3 Wellhead Protection Areas and Recharge Areas

The purpose of a recharge and wellhead protection area is to establish a protective zone around wells, well fields, and recharge areas to prevent contamination of groundwater sources, eliminating the need for costly treatment to meet drinking water standards. The State has a formal wellhead and recharge protection program as part of the DDW Drinking Water Source Assessment and Protection (DWSAP) Program, which is being incorporated into the TPWD DWSAP Program. TPWD is active in efforts to protect groundwater sources. In the past, they have worked with a developer, the City, and the Colorado River RWQCB (Region 7) to condition a housing tract development to incorporate a packaged wastewater treatment plant to protect water resources.

The TPWD DWSAP was completed in 2002 and indicates that the area's geology places most TPWD wells in the moderate category (moderately vulnerable). This is because the TPWD wells are largely in unconfined aquifers. The TPWD DWSAP also indicates that very few potentially contaminating activities (PCAs) are located near the wells. PCAs that are located near the TPWD wells, including roads and streets, wells (drinking water and/or monitoring), and golf courses, which are lower risk uses than industrial facilities.

As part of developing a wellhead protection area program, it is essential that the designated wellhead protection areas are communicated to the local land use planning agencies, namely the City and San Bernardino County, and that the land use planning agencies agree to make the necessary modifications to their zoning and/or General Plans to prevent any potentially

contaminating activities from being sited within the wellhead protection areas. While the City of Twentynine Palms General Plan Update of 2012 identified actions to protect groundwater from development, it did not include wellhead protection policies.

### 6.3.4 Well Construction Policies

Improperly constructed wells can result in poor yields and contaminated groundwater. A properly constructed well can also minimize contaminant migration between aquifers. Sections 13700 through 13806 of the California Water Code require all water wells to meet certain minimum standards. DWR Bulletins 74-81 and 74-90 (DWR 1991) describe these minimum standards.

All TPWD groundwater extraction, injection, and monitoring wells will be constructed in accordance with applicable county and State regulations, including DDW regulations. Minimum state standards are specified in DWR Bulletin 74-90 (DWR 1991). TPWD well-drilling contractors will possess an active C57 (Water Well Drilling) Contractor's license, and construction activities will be observed and inspected by TPWD personnel.

The construction of private wells is not within the TPWD jurisdiction. The County of San Bernardino is responsible for enforcing well construction standards for these types of wells. However, outreach and coordination with private well owners are identified as important components of SSMP implementation. This includes working with private well owners to increase data collection to improve supply-source management and support water-quality management actions.

### 6.3.5 Well Abandonment and Destruction Program

The continued presence of unusable wells creates several concerns. Older wells are often screened or perforated over a long depth, allowing vertical communication between various water-bearing zones, which can lead to mixing of poor- and good-quality groundwater and/or interzonal movement of pollutants. Rusting, corrosion, and caving can compromise the integrity of the well casing, and older wells may lack the concrete sanitary seals that meet current standards. These wells are potential conduits for pollutants from the ground surface to enter groundwater, posing a surface hazard to people and animals.

California Well Standards, Bulletin 74-81 (DWR 1991), and its supplements, provide minimum standards for well abandonment and destruction. The County of San Bernardino Public Health Department determines how those standards are implemented within its jurisdiction. There are several methods of well abandonment and destruction in the Well Standards; the County of San Bernardino would determine which method is appropriate for the well. Additionally, the County of San Bernardino requires a permit for all well destruction activities within both incorporated and unincorporated areas.

TPWD currently adheres to these minimum well abandonment and destruction standards for its own wells. In addition to abandoning and destroying unusable wells, TPWD will strive to educate private well owners about the need for proper well abandonment and their legal responsibilities. Available information from the DWR, USGS, and TPWD indicates that more than 400 private wells have been constructed within the TPWD service area. Most of these wells are not currently operated. TPWD has field-located and inspected approximately 250 (60 percent) of the private wells.

California Well Standards, Bulletin 74-81 and its supplements, require at least 100 feet minimum horizontal separation of any septic tank or subsurface sewage leaching field from a well. In October 2009, a private well was tested and found to have an elevated nitrate concentration; however, subsequent investigation concluded that the well water was under the influence of wastewater from a septic system due to poor maintenance. This illustrates the need for proper septic tank maintenance, the destruction of private wells near septic systems, and the importance of educating private well owners about this.

## 6.4 Groundwater Monitoring

TPWD actively incorporates new constituents into its monitoring program in response to new regulatory actions or trends in water quality. The TPWD monitoring program consists of sampling both raw and treated water from production wells, monitoring shallow groundwater, and monitoring surface water in the region. TPWD also collects and analyzes samples for general minerals, physical characteristics, select metals, and organic chemicals often associated with industrial or commercial sites. There are discussions with the USGS and the City regarding water quality monitoring, but no agreements have been reached to date.

### 6.4.1 Groundwater Monitoring Implementation Plan

In 2014, TPWD prepared an SNMP (Kennedy/Jenks 2014) with the primary purpose of developing a strategy for TPWD and the City of Twentynine Palms to monitor and protect groundwater resources in the Twentynine Palms area. The SNMP recognizes and addresses the increased need to assess potential groundwater-quality impacts from salt and nutrient sources, primarily from regional septic tanks.

In 2020, TPWD prepared a Groundwater Monitoring Implementation Plan (Kennedy/Jenks 2020). The purpose of the Groundwater Monitoring Implementation Plan was to develop a detailed monitoring plan and time schedule for the proposed groundwater monitoring activities in accordance with the SNMP.

This groundwater monitoring plan is designed as part of the SNMP to provide water-quality data to help determine, in part, whether a sewer system would be required to protect public health and water quality in the TPWD service area. This may also reduce the significant hardship residents would face, given the prohibitive costs associated with designing, financing, and constructing a sanitary sewer system. The Groundwater Monitoring Implementation Plan was approved by the Regional Water Board in a letter dated 10 December 2019 and consists of four (4) phases:

- Phase 1 – Increase Sampling Frequency of the TPWD's Existing Production Wells.
- Phase 2 – Establish a Water Quality Monitoring Well Network Using Existing Wells.
- Phase 3 – Installation of New Monitoring Wells.
- Phase 4 – Conduct a One-Time Existing Conditions Sampling Event.

Although the well sampling efforts were conducted annually for Phase I, the Groundwater Monitoring Implementation Plan proposed that additional constituents be analyzed, which have not yet been included. Progress on Phases 2, 3, and 4 has been delayed in large part due to the disruptions and challenges posed by the COVID-19 pandemic.

It is anticipated that in 2021, the activities of TPWD will return to a more normal routine. The well-sampling protocols should be updated to include the additional constituents to fully implement Phase I. For Phase 2, the USGS can be contacted to inquire about additional well data, and the City can install the three (3) monitoring wells in the high-density housing areas. Phases 3 and 4 will likely remain delayed pending the funds needed for completion; however, efforts to identify and apply for funding should continue.

In general, groundwater conditions in the basins are stable and are not subject to significant seasonal variations. Therefore, once sufficient sampling has established the conditions in a well, long-term groundwater quality monitoring need not be adjusted for seasonality. Annual reports summarize monitoring data for each year and provide a brief assessment of groundwater conditions in each subbasin. The annual reports note any issues regarding the effectiveness of the monitoring plan. Revisions to the plan are reported to the Colorado River RWQCB as needed to adequately characterize the groundwater quality conditions in the basins.

## 6.5 TPWD Water Treatment

TPWD has historically pumped water from the Indian Cove, Fortynine Palms, and Eastern Subbasins in the south due to the generally good water quality in these areas. However, TPWD must treat water from certain wells for naturally occurring constituents, including fluoride and arsenic.

**Fluoride** - Elevated fluoride concentrations above the MCL have been detected in some TPWD production wells. TPWD was granted a variance in 1993 from the California Primary MCL for fluoride, which expired in 2023. Water from Wells WTP-1 and WTP-2 is treated for fluoride prior to distribution through the Twentynine Palms Fluoride Removal Water Treatment Plant. TPWD currently monitors fluoride levels in accordance with the SMCL of two (2) mg/L.

**Arsenic** - Well 11-B has wellhead treatment for arsenic removal. Arsenic is removed from wells WTP-1 and WTP-2 as part of the Twentynine Palms Fluoride Removal Water Treatment Plant process.

**Chromium-6** - Treatment for Cr-6 is considered for the future as follows:

1. Three production wells (Wells 4, 9, and 11A) became inactive due to concentrations greater than the MCL.

2. Well 11A was replaced with Well 11B in 2017.

3. A wellhead Cr-6 treatment system is being considered for Well 11B.

## 6.6 Wastewater Management

There are two (2) major categories of onsite wastewater treatment systems in the Twentynine Palms area – residential and non-residential. Single-family and multifamily households fall under the residential category. A variety of commercial (e.g., restaurants and hotels) and institutional (e.g., schools) establishments and facilities fall into the non-residential wastewater category.

There are eight (8) package treatment plants with leach fields that serve both residential and non-residential wastewater treatment needs within the City's boundary. Additionally, the City installed an onsite wastewater treatment system (OWTS) that has been in operation since 2021. The OWTS consists of a septic tank and nine (9) seepage pits as part of "Project Phoenix". This OWTS collects wastewater from existing commercial properties within a six (6)-block area of downtown Twentynine Palms. Wastewater from other sources within the TPWD service area is disposed of through individual septic tank and tile-field disposal systems.

To address the second recommendation of the 2014 SNMP, Kennedy/Jenks began preparing a draft SSMP in November 2023 on behalf of the City and TPWD. The main purpose of the SSMP is to develop a strategy to monitor and protect groundwater resources in the Twentynine Palms area from impacts from existing and future septic systems. The program is designed to reduce the loading of constituents of concern (COCs) at the source before they enter groundwater. The Program is defined as a series of Septic System Management Elements (SSMEs).

These SSMEs are grouped into four (4) areas: administrative elements, operational elements, site-specific studies, and program review (Kennedy/Jenks 2014b). The SSMP provides interim actions that can be initiated immediately as Twentynine Palms begins the process of developing or adopting a Local Agency Management Program that complies with Tier 2 of the SWRCB Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy), Resolution No. 2012-0032, which took effect on May 13, 2013 and was amended on April 18, 2023 (SWRCB 2023).

The OWTS Policy covers septic tanks and small package plants for individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal. The intent of the OWTS policy is to efficiently utilize local programs to manage OWTS systems, in coordination with the RWQCB Basin Plan and state guidelines.

## 6.7 Water Quality Impacts on Reliability

Groundwater availability depends on:

1. Sufficient source capacity (wells and pumps).
2. Sustainability of groundwater resources to meet pumping demand on a renewable basis.
3. Protection of groundwater sources (wells) from known contamination, or provisions for treatment in the event of contamination.

The first two of those factors are addressed in previous sections. The resolution of elevated fluoride levels has been addressed with an allowed variance. TPWD maintains acceptable levels of fluoride by using wells with lower fluoride levels, pumping them as much as possible when water demand on the system dictates. TPWD is evaluating adding an additional well to the fluoride treatment plant to provide redundancy in the system. TPWD is also evaluating treatment options for Cr-6. All other water quality constituents are not expected to affect reliability (Table 6-1).

Maintaining the quality of the groundwater supply increases the reliability of the source by ensuring that deliveries are not interrupted by water-quality concerns. A direct result of groundwater degradation is increased treatment costs before consumption. The poorer the quality of the source water, the greater the treatment cost. Water may degrade to the point that treatment becomes uneconomical. In this scenario, the degraded source water is taken offline. This, in turn, can decrease water supply reliability by reducing total supply and increasing demand for alternative water supplies.

Given current conditions and the availability of treatment, water quality is not expected to affect the quantity of the water supply for TPWD. However, water quality issues are constantly evolving, and TPWD will need to continue taking action to protect and treat water supplies as needed. It is recognized that water quality treatment can be costly.

**Table 6-1: Current and Projected Water Supply Changes[(a)]**

| Water source | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Mesquite Lake Basin | 0% | 0% | 0% | 0% | 0% |
| Joshua Tree Basin | | | | | |
| Indian Cove Subbasin[(b)] | 0% | 0% | 0% | 0% | 0% |
| Eastern Subbasin | 0% | 0% | 0% | 0% | 0% |
| Fortynine Palms Subbasin | 0% | 0% | 0% | 0% | 0% |

Notes:
(a) Reflects the percent change in supply because of water quality changes.
(b) In 2016, Wells No. 9 and 11 were either taken offline or shut down. As a result, the total capacity for the Indian Cove Subbasin was reduced by about 55 percent. As a new well (11B) was constructed to make up the lost capacity, a plan to provide well treatment to address Chromium-6, arsenic, and fluoride is currently underway. No reductions in water supply changes are projected in the table.

# Chapter 7: Reliability Planning

The UWMP Act requires urban water suppliers to assess water supply reliability by comparing total projected water use with the expected water supply over the next 20 years (this UWMP evaluates the next 25 years in five (5)-year increments. The UWMP Act also requires assessments for single-dry and multiple-dry years. This chapter presents the reliability assessment for the TPWD service area.

## 7.1 Reliability of Water Supplies

TPWD relies solely on groundwater to meet its water demands. A summary of the potential factors limiting TPWD supplies is presented in Table 7-1.

**Table 7-1: Factors Resulting in Inconsistency of Supply**

| Water Supply Source | Legal | Environmental | Water Quality | Climatic |
|---|---|---|---|---|
| Supplier produced groundwater | None identified | None identified | Beneficial uses may be impacted by elevated fluoride levels or other contaminants. | The basins are largely dependent on annual run-off, which may be highly variable. |

As described in Chapters 2 and 3, TPWD groundwater supplies are not anticipated to be susceptible to inconsistencies resulting from legal or environmental impacts. The combination of basin storage volumes, pumping capacity, treatment capacity, and management actions outlined in the TPWD GMP (Kennedy/Jenks 2024) minimizes potential water-quality and climatic constraints and ensures the consistency of TPWD supplies.

## 7.2 Supply and Demand Comparisons

The available supplies and water demand for the TPWD service area were analyzed to assess the ability of TPWD to meet demand during three scenarios: a normal water year, a single-dry year, and multiple-dry years. Table 7-2, Table 7-3, Table 7-4 present the supplies and demands under the various water-year scenarios for the 25-year planning period, in five (5)-year increments.

### 7.2.1 Normal Water Year

The normal water year is a year in the historical sequence that most closely represents median runoff levels and patterns. Table 7-2 summarizes TPWD water supplies available over the planning period in an average/normal year and compares them with demands for the same period. The numbers demonstrate that the TPWD anticipates adequate supplies for 2025 to 2050 under normal water conditions.

**Table 7-2: Supply and Demand Comparison-Normal Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Delivery Demands[(b)] | 2,320 | 2,360 | 2,410 | 2,470 | 2,550 | 2,610 |
| *Difference (Supply – Demand)* | *4,680* | *4,630* | *4,590* | *4,520* | *4,450* | *4,380* |

Notes: Values are rounded.
(a) From Table 4-2. DWR-recommended pumping limit to prevent overdraft.
(b) From Total Water Deliveries in Table 1-1 and Table 2-6.

### 7.2.2 Single-Dry Year

The water supply and demand for the TPWD service area over the 25-year planning period were analyzed for a single-dry year, similar to the droughts in California in 1977 or 2015. Table 7-3 summarizes the TPWD supplies available to meet demand during a single dry year. Demand during dry years was assumed to increase by 10 percent based on the highest single-dry-year increase in 2002. The numbers demonstrate that TPWD anticipates adequate supplies through 2050 under single-dry water conditions.

**Table 7-3: Supply and Demand Comparison – Single-Dry Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Delivery Demands[(b)] | 2,550 | 2,600 | 2,650 | 2,720 | 2,810 | 2,880 |
| *Difference (Supply – Demand)* | *4,440* | *4,400* | *4,340* | *4,270* | *4,190* | *4,120* |

Notes: Values are rounded.
(a) From Table 4-2. DWR-recommended pumping limit to prevent overdraft.
(b) Assumes a 10 percent increase in demand during a single-dry year, not including anticipated sales to other agencies. Based on the highest single-dry year increase (2002) in demand over the historical period 1990-2015.

### 7.2.3 Multiple-Dry Year

The water supply and demand for the TPWD service area over the 25-year planning period were analyzed in the event of a multi-year drought. Demand during multiple dry years was assumed to increase by 2.5 percent based on the five (5) highest consecutive dry periods of 1991-1993. Table 7-4 summarizes TPWD supplies available to meet demands during multiple dry years. The numbers demonstrate that TPWD anticipates adequate supplies through 2050 under multiple dry water conditions. To compensate for the deficiency, TPWD may temporarily stress the Mesquite or Joshua Tree Basins to meet demand. TPWD also plans to construct an additional well to increase capacity or implement other management activities (like treating supplies not currently used due to poor water quality) to reduce demand.

**Table 7-4: Supply and Demand Comparison – Multiple-Dry Year (AFY)**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Supply Totals[(a)] | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Estimated Demands[(b)] | 2,380 | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| *Difference (Supply – Demand)* | *4,620* | *4,580* | *4,530* | *4,460* | *4,380* | *4,320* |

Notes: Values are rounded.
(a) From Table 4-1. DWR-recommended pumping limit to prevent overdraft.
(b) Assumes a 2.5 percent increase in demand during a multiple-dry year, not including anticipated sales to other agencies. Based on the highest five (5)-year multiple-dry-year increase (2011-2015) in demand over the historical period 1990-2015.

### 7.2.4 Summary of Comparisons

As shown in the analyses above, TPWD has adequate supplies to meet demands during normal, single-dry, and multiple-dry years throughout the 25-year planning period. In addition, as shown in the tables above, there is sufficient production capacity planned to meet projected future demands with the actions TPWD is taking to maintain supply availability.

## 7.3 Drought Risk Assessment

The Water Code requires that every urban water supplier includes in its UWMP a drought risk assessment for its water service to customers. This is to inform and support the development of demand management measures, water supply projects, and programs to be included in the UWMP.

### 7.3.1 Data and Methodologies Used

#### 7.3.1.1 Water Demands

The water demands for this UWMP utilize a water demand forecast based on the projected population from Table 1-7, the calculated number of persons per residential acre, the unit demands from Table 2-4, and the area ratios for the remaining undeveloped parcels within the TPWD service area from Table 2-5. The water delivery projections were then developed through the year 2050 and are presented in Table 2-6. A linear growth rate for development was assumed between 2025 and 2050. More details on this methodology are found in Chapter 2, Section 2.4. Using this methodology, TPWD has estimated water demands from 2026 through 2030, shown in Table 7-5 below.

#### 7.3.1.2 Water Supplies

This Drought Risk Assessment examines all water supplies anticipated to be available from 2026 through 2030, including any limitations due to infrastructure and regulations, and assumes drought conditions.

### 7.3.2 Comparison of Total Water Supply Sources and Total Projected Water Use 2026 through 2030

As shown in Table 7-5, TPWD anticipates having adequate supplies to meet service area demands from 2026 to 2030, even if there is a drought during these years.

**Table 7-5: Five-Year Drought Risk Assessment 2026-2030 (AF)**
(Modified from DWR Table 7-5 R)

| | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|
| Total Water Use[(a)] | 2,300 | 2,310 | 2,320 | 2,330 | 2,360 |
| Total Supplies | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,700 | 4,690 | 4,680 | 4,670 | 4,640 |
| Planned WSCP Action | N/A | N/A | N/A | N/A | N/A |
| WSCP - Supply Augmentation Benefit | N/A | N/A | N/A | N/A | N/A |
| WSCP - Use Reduction Savings Benefit | N/A | N/A | N/A | N/A | N/A |
| Revised Surplus/Shortfall | N/A | N/A | N/A | N/A | N/A |
| Resulting % Use Reduction from WSCP Action | N/A | N/A | N/A | N/A | N/A |

Notes: Values are rounded.
(a) From Table 2-8.

# Chapter 8: Water Demand Management Measures

## 8.1 Demand Management

The purpose of the DMM chapter of this UWMP is to (a) provide a description of the past water conservation programs that TPWD has implemented to meet its urban water use reduction targets and (b) describe the activities and actions TPWD plans to use in the future to meet its urban water use reduction targets. DMMs that the UWMP Act and Water Code specifically mention are:

- Water waste prevention ordinances
- Metering
- Conservation pricing (TPWD has a flat rate and does not do conservation pricing)
- Public education and outreach
- Programs to assess and manage the distribution system real loss
- Water conservation program coordination and staffing support

### 8.1.1 Water Waste Prohibitions

TPWD supports water waste prevention activities and ordinances through both direct Board activities and in collaboration with the City of Twentynine Palms.

In May 2022, the Board of Directors enacted Resolution No. 22-08 (Appendix H), which mandates Stage II mandatory water-use restrictions. The resolution encourages residents and businesses to help protect water resources by practicing water-saving measures and becoming more aware of the need to save water. The water waste prohibitions of Resolution No. 22-08 that are in effect and associated with the resolution include:

1. Outdoor irrigation of ornamental landscape and turf between the hours of 9 AM and 6 PM.
2. Serving water at restaurants other than upon request.
3. Repairing controllable leaks within a reasonable period after notification.
4. A request will be made by hotels to place messaging in hotel rooms asking guests to conserve water.
5. Applying water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures.

6. Using a hose to wash an automobile except where the hose is equipped with a shut-off nozzle.

7. Applying water to any hard surface, including, but not limited to, driveways, sidewalks, and asphalt.

8. Using potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.

9. Use of water to wash down buildings or structures for purposes other than construction use.

10. Flushing gutters or permitting water to run or accumulate in any gutter or street.

11. The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall.

12. Limit outdoor irrigation of ornamental landscapes or turn with potable water to no more than three (3) days per week.

13. The irrigation with potable water of ornamental turf on public street medians.

14. The irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Buildings Standards Commission and the Department of Housing and Community Development.

15. Limit outdoor irrigation of ornamental landscapes or turn with potable water to no more than three (3) days per week.

16. The irrigation with potable water of ornamental turf on public street medians.

TPWD is also actively supporting the City in establishing terms of service for water-efficient fixtures and design as required by state law. The City has adopted AB 1881 by statute and is enforcing California Green Building Code requirements through building permits. In February 2011, TPWD adopted Resolution 11-02, which supported the Model Landscape Water Ordinance and the California Green Building Standards (Appendix H). TPWD has developed processes to ensure water service is provided only after proper approvals and permits have been issued and the City has notified that all water-efficiency-related requirements are met. TPWD also has a Water Shortage Contingency Plan that identifies six (6) stages of water shortage and TPWD's response; this is described in more detail in Appendix I.

### 8.1.2 Metering

TPWD customers are metered and billed by volume. As of March 2022, TPWD moved the AMI system to monthly billing from bi-monthly billing. The AMI system provides a tool to support water conservation, leak audits, and real-time data collection. AMI generates a continuous leak report

that alerts TPWD weekly on meters that are not shutting off. Customers, in turn, are being made aware of potential leaks before they escalate in their next billing cycle and are making the necessary repairs, helping to conserve water. Another advantage of AMI is its assistance with TPWD in leak audits. This consists of helping customers on their property with high water demands, usage issues, and billing issues. Collecting real-time hourly data is another important tool for the AMI system. Currently, the AMI system reads every meter in the district once an hour, and the data is being captured by the collectors and repeaters. Real-time data and water-use trends are very important for water conservation and for identifying unknown leaks on a customer's property.

From late 2023 to early 2024, TPWD staff completed the last phase of the larger water meter replacement program. TPWD remains dedicated to installing a customer portal that would allow customers to access their water consumption, leak alerts, and real-time data via the web. This is a priority for TPWD, and the hope is to begin implementation of the portal in 2026.

### 8.1.3 Conservation Pricing

TPWD has meters for each customer and charges a 1) fixed service charge based on meter size; a 2) flat water commodity charge; and a 3) fixed monthly fire meter service charge. TPWD also has a pay meter station that charges a fee based on the number of metered gallons of water pumped at the station. On February 26, 2026, TPWD approved Resolution 26-02 (provided in Appendix H), which sets the fees and rates for water service.

Ordinance 26-02 was approved setting forth rules and regulations for the provision of retail water service and providing among other things, that water service rates and charges and other water fees and charges may be set from time to time by TPWD in order to generate revenues sufficient to cover the ongoing costs of operations, maintenance, and capital facilities.

TPWD currently charges a flat-rate potable water quantity charge of $5.80 per 100 cubic feet of water consumed. There are also separate fixed monthly charges based on meter size. Pricing potable water is consistent regardless of consumption. Conservation pricing, charging progressively more expensive rates for higher consumption rates, is not currently implemented in TPWD. Should TPWD move to import water in the future, the ability to tier rates may be considered to reduce water use.

### 8.1.4 Public Education and Outreach

TPWD recognizes the importance of public education and outreach for water resource conservation and works to provide its customers with materials that inform them of ways to conserve water. It utilizes several different resources, including "Let's Go Native", "Water Leaks", "Groundwater Foundation", "GetWise", "Groundwater Guardians", and the Save Our Water campaign. These resources are made available on the district website (www.29palmswater.net) free of charge for the benefit of its customers. In 2012, TPWD completed a conservation observation garden showcasing drought-tolerant, native plants. The garden is open to the public Monday through Friday and is a self-guided tour. Additionally, TPWD supports and funds the Morongo Basin Conservation Association, which advocates for the environmental protection of the desert landscape.

TPWD had a school education program that offered support and materials to teachers in the Twentynine Palms area within TPWD boundaries, including lesson plans and classroom presentations. TPWD conducted elementary school presentations informing students about the local water supply and the importance of water conservation and protection. The presentations were designed to support grade-level state curriculum standards and to help students discover basic water concepts. The presentations consisted of lectures, short videos, discussion, and classroom activities. All classes covered grade-appropriate information on water sources, source protection, and conservation. In addition, individual grade level presentations addressed California water history, the earth's fresh water supply, the water cycle, drinking water treatment, and water as a material resource and how it is used to make common objects.

Classroom programs are conducted at no cost to participating schools within the TPWD service area. While requests for presentations and outreach from schools have diminished over the last ten years, likely due to other, more widely known conservation campaigns such as the Save Our Water campaign, TPWD continues to offer classroom instruction at no cost.

### 8.1.5 Programs to Assess and Manage Distribution System Real Loss

Consistent with Senate Bill 555, TPWD conducts an AWWA water-loss audit each year and reports water loss to DWR. In addition, TPWD guards against water loss by maintaining and replacing meters and pipelines when necessary.

TPWD has focused significant efforts on water loss control through the replacement of aging infrastructure and controlling water loss in the distribution system. Through the TPWD pipeline replacement program, which ran from 1991 through 2004, and other maintenance programs, all 200 miles of TPWD pipelines have been replaced and are being surveyed each year. TPWD reviews daily telemetry graphical data, showing well and pump run times and reservoir levels that can indicate leaks. TPWD uses the Water Audit Methodology, specifically AWWA M36, to conduct a system-wide audit to estimate both real and apparent water loss. The 12-month period used in the analysis is January to December. Copies of the Audit reporting worksheets are provided in Appendix E.

### 8.1.6 Water Conservation Program Coordination and Staffing Support

The TPWD conservation program is run by the Operations Manager, with support from meter reading and customer services staff. The Operations Manager and customer services staff hours devoted to the conservation program are equivalent to one half-time employee. Together, they coordinate conservation programs and their implementation and communicate and promote water conservation issues to the District Board and the community at large.

## 8.2 Other DMMs

Residential Assistance Program and Landscape Water Surveys

TPWD has a Residential Assistance Program that is initiated either at the customer's request or when TPWD staff identifies excessive or out-of-range usage at a particular meter. The newly

implemented AMI system helps staff determine whether a customer's account is using more water than normal by analyzing historical data. The account is then reviewed to confirm the "out of range" usage, and the customer is notified by telephone of the higher-than-normal water usage. The AMI system helps customers self-monitor their water use and adjust as needed, and TPWD provides audits to customers with questions or concerns.

Less than five (5) percent of TPWD water use is for irrigation. Residential customers typically have little to no landscaping, and only a small number of non-residential customers, including motels and the school district, have some landscaping. The City has adopted AB 1881, the State Landscape Model Ordinance, by statute, and TPWD supports its enforcement as appropriate. TPWD concurs with the conservation-related measures that are outlined in the Landscape Ordinance and continues to work with the City to identify efficiency opportunities.

A leak audit is a free service provided to the customer to help determine whether a leak is on the customer's side of the meter. This includes educating the customer on how to read their water meter and monitor the leak indicator. Typically, these leaks are indoors since most TPWD customers do not have irrigated landscaping.

Water Sense Specification for New Residential Development

TPWD does not have rule-making authority for developments; however, it works closely with the City to support its requirements for water efficiency in buildings and landscape design.

Non-Functional Turf

The District is currently drafting an ordinance for the prohibition on water use for non-functional turf pursuant to AB 1572. Potable water may continue to be used for:

- Irrigation required to sustain trees and perennial non-turf landscape plants;
- Health and safety purposes, including fire suppression and erosion control;
- Cemeteries, parks, sports fields, and other public assembly or recreation areas; and
- Agricultural irrigation.

## 8.3 Planned DMMs to Meet Water Use Targets

Over the next five (5) years, TPWD will continue to implement the DMMs as described in Section 8.1.1. In addition, TPWD staff will continue to offer residents educational programs and information, will continue leak detection and auditing, and will continue working with the City to implement efficiency measures as feasible and appropriate.

TPWD recognizes that conserving water is an integral component of a responsible water management strategy. TPWD has a uniquely low water use for a high desert area. At 110 gpcd, TPWD is significantly lower than the rest of the Colorado River region, which has a 10-year average baseline of 346 gpcd, and has met its 2020 SBx7-7 goal of 163 gpcd. TPWD has

achieved its goals largely by focusing on system performance, rate increases, and a conservation culture within the community and small landscapes. TPWD is committed to providing its customers with education and tools to maintain their low use.

### 8.3.1 Planned Implementation of DMMs to Achieve Water Use Targets

TPWD is currently exceeding water use targets set by SBx7-7. TPWD will continue to implement the DMMs described in this section. These programs, taken together, will assist TPWD in maintaining conservation levels to meet current and future water-use reduction targets pursuant to Making Water Conservation a California Water of Life. See Chapter 2, Section 2.6, for an evaluation of TPWD's current progress toward meeting this new legislation through 2050.

# Chapter 9: Seismic Risk Assessment

Per the Water Code Section 10632.5, Suppliers are required to assess seismic risk to water supplies as part of their WSCP. The UWMP must also include a seismic risk assessment and mitigation plan to assess the vulnerability of each facility in a water system and mitigate those vulnerabilities.

Pursuant to the Water Code, the seismic risk assessment must include a description of the vulnerability of each of its water system(s) facilities. Suppliers are encouraged to assess the vulnerability of external facilities or components that extend beyond the Supplier's service distribution area (e.g., transmission pipes, delivery canals, surface water diversion pumps), as failure of these would ultimately disrupt the Supplier's ability to serve their customers.

The LHMP for TPWD was developed and adopted in 2018 to identify potential hazards and formulate mitigation measures to protect critical infrastructure and the community's safety with respect to its facilities and services. The LHMP was completed with the coordination and involvement of the TPWD staff and local community representatives. The Planning Team reviewed the Federal Emergency Management Agency (FEMA) "Hazard Mitigation Plan Crosswalk", and the San Bernardino County Office of Emergency Services supplied information on past events that affected the service area.

The Planning Team reviewed the following plans:

- Bighorn Desert View LMHP
- Hi-Desert Water District, Draft LHMP
- San Bernardino County HMP
- USGS Golden Guardian 2008
- Twentynine Palms Water District Water Master Plan
- 2016 California Hazard Mitigation Plan
- San Bernardino County Flood Control
- FEMA Flood Insurance Study for San Bernardino County

TPWD has identified hazards in the community, assessed those posing the greatest risk, and identified projects to help reduce or eliminate those risks. After the hazards are identified, mitigation goals are set. Global measures that apply across all hazards include:

- Continually improve the community's understanding of potential impacts due to hazards and the measures needed to protect lives and critical infrastructure.

- Continually provide State and Local Agencies with updated information about hazards, vulnerabilities, and mitigation measures at TPWD.
- Review local codes and standards to verify that they protect human life and the TPWD facilities.
- Review and verify that the TPWD-owned and operated infrastructure meets minimum standards for safety.
- Review TPWD facilities and developments in high-risk areas to verify that these areas are appropriately protected from potential hazards.
- Identify and mitigate imminent threats to life safety and facility damage.

In addition to the 2018 LHMP, a desktop assessment of TPWD pipelines and storage tanks was conducted using available information. The purpose of the desktop assessment was to conduct a risk assessment and develop prioritized pipeline replacement and capital improvement programs.

The following were evaluated and recommended for the TPWD pipeline and storage tanks:

- Storage tanks to comply with seismic freeboard requirements.
- Modify the discharge elevation of the overflow pipe in the storage tanks.
- Modify the storage tank roof to facilitate water drainage to prevent ponding from rain events.
- Site drainage modifications to reduce erosion damage to the storage tank ring road.
- Replace and upsize existing pipelines, of any size, that are hydraulically deficient.
- Replace existing pipelines, of any size, that have a significant leak occurrence.
- Replace or modify existing pipelines that have a high-probability and high-consequence of failure based on their condition assessment analysis.
- Replace or modify existing pipelines that have a high-probability and low-consequence of failure based on their condition assessment analysis.

# References

California Department of Water Resources. 1984. Twentynine Palms Ground Water Study.

California Department of Water Resources. 2009. SB X7-7. https://water.ca.gov/programs/water-use-and-efficiency/sb-x7-7

California Department of Water Resources. 2010. 20x2020 Water Conservation Plan. February.

California Department of Water Resources. 2011a. Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, Urban Water Management Plan Guidebook. March.

California Department of Water Resources. 2011b. Climate Change Handbook for Regional Water Planning. November.

California Department of Water Resources. 2014. Final California Water Plan 2013 Update. October.

California Department of Water Resources. 2014b. Sustainable Groundwater Management Act. https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management

California Department of Water Resources. 2015. State Water Project Delivery Capability Report. July.

California Department of Water Resources. 2018. California Water Plan Update. July.

California Department of Water Resources. 2023. California Water Plan Update. September.

California Department of Water Resources. 2025. California's Groundwater: Bulletin 118 – Update 2025. October.

California Department of Water Resources. 2026. Bulletin 74-90 Introduction. https://water.ca.gov/Programs/Groundwater-Management/

California Irrigation Management System data provided from Station No. 233 in Joshua Tree, San Bernardino County, January 1, 2021, to September 31, 2025. http://wwwcimis.water.ca.gov/cimis/welcome.jsp

California Office of Land Use and Climate Innovation. 2023. California General Plan Land Use. California Open Data Portal. https://data.ca.gov/dataset/california-general-plan-land-use

California State Water Resources Control Board. 2016. Water Loss Control. Water Conservation Portal. https://www.waterboards.ca.gov/conservation/water_loss_control.html

California State Water Resources Control Board. 2025. "Conservation as a Way of Life" Compliance Summary: Twentynine Palms Water District (ORG ID 2530). April.

City of Twentynine Palms. 2012. Twentynine Palms General Plan Update. April.

Haley and Aldrich. 2000. Compilation of Groundwater and Wells Information within the Twentynine Palms Water District Service Area. December.

Kennedy/Jenks Consultants. 2011. 2010 Urban Water Management Plan Update for the Twentynine Palms Water District. June.

Kennedy/Jenks Consultants. 2014a. Groundwater Management Plan Update Final Report – 2014 Update. May.

Kennedy/Jenks Consultants. 2014b. Wastewater Master Plan for the Twentynine Palms Water District and City of Twentynine Palms. August.

Kennedy/Jenks Consultants. 2014c. Salt and Nutrient Management Plan for the Twentynine Palms Water District and City of Twentynine Palms. June.

Kennedy/Jenks Consultants. 2014d. Integrated Regional Water Management Plan for the Mojave Region. June.

Kennedy/Jenks Consultants. 2017. Groundwater Monitoring Implementation Plan for the Twentynine Palms Water District. December.

Kennedy/Jenks Consultants. 2019. Groundwater Monitoring Implementation Program for the Twentynine Palms Water District. December.

Kennedy/Jenks Consultants. 2021. 2020 Urban Water Management Plan Update for the Twentynine Palms Water District. June.

Kennedy/Jenks Consultants. 2025. Twentynine Palms Groundwater Management Plan 2024 Update. March.

Krieger and Stewart. 1996. Joshua Basin Water District Groundwater Management Plan, Joshua Basin Water District, Joshua Tree, California.

Legislative Counsel of California. California Legislative Information. Water Code - Division 6 - Part 2.6 Urban Water Management Planning. https://leginfo.legislature.ca.gov/

NBS. 2020. Draft Technical Memorandum, Water Rate Study and Findings for the Twentynine Palms Water District. October.

Nishikawa et al. 2004. Evaluation of Geohydrologic Framework, Recharge Estimates, and Ground-Water Flow of the Joshua Tree Area, San Bernardino County, California. United States Geological Survey.

San Bernardino County. 2025. San Bernardino County Parcel Dataset. San Bernardino County Open Data Portal. https://open.sbcounty.gov/datasets/san-bernardino-county-parcel-dataset/about

State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State — January 1, 2011-2020. Sacramento, California, May 2020. https://www.dof.ca.gov/Forecasting/Demographics/Estimates/

Southern California Association of Governments. 2024. Regional Growth Forecasting. https://scag.ca.gov/data-tools-forecasting

Southern California Association of Governments. 2020. 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy. January 2021.

Twentynine Palms Water District. 2003. A Codification of the Ordinances and Resolutions of the Twentynine Palms Water District, Code Publishing Company.

Twentynine Palms Water District. 2024. Consumer Confidence Report. June.

Twentynine Palms Water District. 2024. Local Hazard Mitigation Plan. October.

United States Census Bureau. City of Twentynine Palms Statistics. 2020-2025. https://www.census.gov/

Whitt, A. and K.L. Jonker. 1998. Groundwater survey of the Joshua Tree and Copper Mountain subbasins, Joshua Tree, California, Western Water Surveys report prepared for the Joshua Tree Water District.

# Appendix A: UWMP DWR Checklist

| Retail (x = required) | Order | 2025 Guidebook Location | Water Code Section | Summary as Applies to UWMP | Subject | Relevant Submittal Table | 2025 UWMP Location |
|---|---|---|---|---|---|---|---|
| x | 1 | Chapter 1 | 10615 | A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. | Introduction and overview | n/a | ES, Chapter 4, 5, 8 |
| x | 1 | Chapter 1 | 10630.5 | Each plan shall include a simple description of the Supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a Supplier may also choose to include a simple description at | Plan preparation | n/a | ES, every Chapter |
| x | 2.1 | Section 2.1 | 10620(b) | Every person that becomes a Supplier shall adopt UWMP within one year after it has become a Supplier. | Plan preparation | n/a | Section 1.3, Table 1-3 |
| x | 2.5 | Section 2.5 | 10644 | Supplier shall report the Public Water Systems number, volume of delivered water, and number of connections that are included in this UWMP. | Plan preparation | 2-1 | Section 1.4.1, Table 1-1 |
| x | 2.5 | Section 2.5 | 10644 | Supplier shall report if this UWMP is an individual UWMP and whether the Supplier belongs to a regional UWMP or regional alliance. | Plan preparation | 2-2 | Section 1.3 |
| x | 2.5 | Section 2.5 | 10644 | Supplier shall report whether the data is in fiscal or calendar years and the units of measure used for reporting water volumes. | Plan preparation | 2-3 | Section 1.4.2 |
| x | 2.4 | Section 2.4 | 10642 | Provide supporting documentation that the Supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan. | Plan preparation | n/a | Section 1.5 |
| x | 2.4 | Section 2.4.2 | 10620(d)(3) | Coordinate the preparation of its plan with other appropriate agencies in the area, including other Suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable. | Plan preparation | n/a | Section 1.5 |
| x | 2.4 | Section 2.4.1 | 10631(h) | Retail Suppliers will include documentation that they have provided their Wholesale Supplier(s)—if any—with water use projections from that source. | Plan preparation | 2-4 R | NA |
| n/a | 2.4 | Section 2.4.1 | 10631(h) | Wholesale Suppliers will provide their Suppliers with identification and quantification of the existing and planned sources of water available from the Wholesale Supplier to the Supplier during various water year types. | Plan preparation | 2-4 W | NA |
| x | 3 | Chapter 3.0 | 10631(a) | Describe the Supplier service area. | System description | n/a | Section 1.6 |
| x | 3.3 | Section 3.3 | 10631(a) | Describe the climate of the Supplier's service area. | System description | n/a | Section 1.10, 1.11, 1.12 |
| x | 3.4 | Section 3.4.1 | 10631(a) | Provide the current and projected service area populations for 2030, 2035, 2040, 2045 and optionally 2050. | System description | 3-1 | Section 1.8, Table 1-7 |
| x | 3.4 | Section 3.4.2 | 10631(a) | Describe other social, economic, and demographic factors affecting the Supplier's water management planning. | System description | n/a | Section 1.7, 1.8, 1.9 |
| x | 3.5 | Section 3.5 | 10631(a) | Describe the land uses within the service area… include the current and projected land uses within the existing or anticipated service area affecting the Supplier's water management planning. Describe the land uses within the service area. | System description and baselines | n/a | Section 1.9 |
| x | 4.2 | Sections 4.2.3 and 4.2.4 | 10631(d)(1) | Quantify past, current, and projected water use, identifying the uses among water use sectors. | System water use | 4-1 and 4-2 | Section 2.2, Fig 2-1, Table 2-1, Section 2.4, Table 2-6 |
| x | 4.3 | Section 4.3.1 | 10631(d)(3)(A) | Report the distribution system water loss for each of the five years preceding the plan update. | System water use | 4-5 | Section 2.3.2, Table 2-3 |
| x | 4.3 | Section 4.3.2 | 10631(d)(3)(C) | Retail Suppliers shall provide data to show the distribution loss standards were met. | System water use | 4-6 | Section 2.3.2, Table 2-3 |
| x | 4.2 | Section 4.2.5.4 | 10631.1(a) | Include projected water use needed for lower income housing projected in the service area of the Supplier. | System water use | 4-3 | Section 2.5.1, Table 2-9 |
| x | 4.2 | Section 4.2.5.3 | 10631(d)(4)(A) | In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws. | System water use | 4-3 | Section 2.4.2, Table 2-6 |
| x | 4.2 | Section 4.2.5.3 | 10631(d)(4)(B) | Provide citations of codes, standards, ordinances, or plans used to make water use projections. | System water use | 4-3 | Section 2.4.2 |
| x | 4.2 | Section 4.2.5.3 | 10631(d)(4)(B)(ii) | To the extent that a Supplier reports the information described in subparagraph (A), an urban water Supplier shall… Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact. | System water use | 4-3 | Section 2.4, Table 2-6 |
| x | 4.2 | Section 4.2.5.6 | 10635(b) | Demands under climate change considerations must be included as part of the drought risk assessment. | System water use | n/a | Section 7.3 |
| n/a | 5.1 | Section 5.1 | 10608.36 | Wholesale Suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their Retail Suppliers achieve targeted water | Baselines and targets | n/a | NA |
| x | 5.2 | Section 5.2 | 10608.4 | Retail Suppliers shall report on their compliance in meeting their water use targets.<br>Reporting requirements will vary depending on whether the Supplier:<br>- Was considered an urban retail water supplier in 2020,<br>- Met its 2020 target in 2020, or<br>- Was part of a merger or consolidation since 2020.<br>Chapter 5 Subsections 5.2.1, 5.2.2, and 5.2.3 address each of these situations. | Baselines and targets | 5-1 | Section 3 |
| x | 6.1 | Section 6.1 | 10631(b)(2) | When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies. | System supplies | n/a | Section 4 |
| x | 6.1 | Sections 6.1 and 6.2 | 10631(b)(1) | Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, including changes in supply due to climate change. | System supplies | n/a | Section 7 |

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| x | 6.2 | Section 6.2.2 | 10631(b)(4)(C) | Indicate whether groundwater is an existing or planned source of water available to the Supplier. If groundwater is identified as an existing or planned source of water… (include) a detailed description and analysis of the location, amount and sufficiency of groundwater pumped by the Supplier for the past five years. | Water supplies and recycled water | 6-1 | Section 4.3, 4.3.4, Table 4-4, Section 4.4 |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(A) | Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the Supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization. | System supplies | n/a | Section 4.3.3 |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(B) | Describe the groundwater basin. | System supplies | n/a | Section 4.3 |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(B) | Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the Supplier has the legal right to | System supplies | n/a | NA |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(B) | For unadjudicated basins… (include) information as to whether DWR has identified the basin as a high- or medium-priority basin in the most current official departmental | Water supplies and recycled water | n/a | Section 4.3.3.2 |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(B) | For unadjudicated basins… describe efforts by the Supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions. | Water supplies and recycled water | n/a | Section 4.3.3.3 |
| x | 6.2 | Section 6.2.2. | 10631(b)(4)(C) | If groundwater is identified as an existing or planned source of water… (include) a detailed description and analysis of the location, amount and sufficiency of groundwater pumped by the Supplier for the past five years. | System supplies | n/a | Section 4.3.4, 4.3.5, Table 4-4 |
| x | 6.2 | Section 6.2.2 | 10631(b)(4)(D) | Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped. | System supplies | 6-9 | Section 4.3.6, Table 4-6, Table 4-7 |
| x | 6.1 | Section 6.1 | 10631(b) | Identify and quantify the existing and planned sources of water available for 2025, 2030, 2035, 2040, 2045 and optionally 2050. | System supplies | 6-8 and 6-9 | Chapter 7, Table 7-2 |
| x | 6.2 | Section 6.2.7 | 10631(c) | Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis. | System supplies | n/a | Section 4.5 |
| x | 6.2 | Section 6.2.5 | 10633(a) | Describe the wastewater collection and treatment systems in the Supplier’s service area with quantified amount of collection and treatment and the disposal methods. | System supplies (recycled water) | 6-2 | Chapter 5 |
| x | 6.2 | Section 6.2.5 | 10633(b) | Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project. | System supplies (recycled water) | 6-3 | NA |
| x | 6.2 | Section 6.2.5 | 10633(c) | Describe the recycled water currently being used in the Supplier's service area. | System supplies (recycled water) | 6-4 | NA |
| x | 6.2 | Section 6.2.5 | 10633(d) | Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses. | System supplies (recycled water) | 6-4 | Section 4.6 |
| x | 6.2 | Section 6.2.5 | 10633(e) | Describe the projected use of recycled water within the Supplier's service area at the end of 5, 10, 15, and 20 years, and describe the actual use of recycled water in comparison to uses previously projected. | System supplies (recycled water) | 6-4 and 6-5 | NA |
| x | 6.2 | Section 6.2.5 | 10633(f) | Describe the actions that may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year. | System supplies (recycled water) | 6-6 | Chapter 5 |
| x | 6.2 | Section 6.2.5 | 10633(g) | Provide a plan for optimizing the use of recycled water in the Supplier's service area. | System supplies (recycled water) | n/a | NA |
| x | 6.2 | Section 6.2.6 | 10631(g) | Describe desalinated water project opportunities for long-term supply. | System supplies | 6-7 | Secton 4.9.2 |
| x | 6.2 | Section 6.2.10 | 10631(f) | Describe the expected future water supply projects and programs that may be undertaken by the water Supplier to address water supply reliability in average, single-dry, and for a period of drought lasting five consecutive water years. | System supplies | 6-7 | Chapter 7, Tables 7-2, 7-3, 7-4, Section 7.3.2, Table 7-5 |
| x | 6.3 | Section 6.3 and Appendix O | 10631.2(a) | The UWMP must include energy information, as stated in the code, that a Supplier can readily obtain. | System suppliers, energy intensity | O-1A, O-1B, O-1C, and O-2 | Section 4.7, Appendix I |
| x | 7.1 | Section 7.1 | 10634 | Provide information on the quality of existing sources of water available to the Supplier and the manner in which water quality affects water management strategies and supply | Water supply reliability assessment | n/a | Chapter 6, Section 6.7, Table 6-1 |
| x | 7.2 | Section 7.2 | 10635(a) | Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the Supplier with the total projected water use over the next 20 | Water supply reliability assessment | 7-2, 7-3, and 7-4 | Chapter 7, Tables 7-2, 7-3, 7-4 |
| x | 7.2 | Section 7.2.3 | 10620(f) | Describe water management tools and options to maximize resources and minimize the need to import water from other regions. | Water supply reliability assessment | n/a | Section 2.3.2, 8.3 |
| x | 7.3 | Section 7.3 | 10635(b) | Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects. | Water supply reliability assessment | n/a | Section 7.3 |
| x | 7.3 | Section 7.3 | 10635(b)(1) | Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive years. | Water supply reliability assessment | n/a | Section 7.3.1, 7.3.2, Table 7-5 |
| x | 7.3 | Section 7.3 | 10635(b)(2) | Include a determination of the reliability of each source of supply under a variety of water shortage conditions. | Water supply reliability assessment | n/a | Chapter 7, Tables 7-2, 7-3, 7-4 |
| x | 7.3 | Section 7.3 | 10635(b)(3) | Include a comparison of the total water supply sources available to the Supplier with the total projected water use for the drought period. | Water supply reliability assessment | 7-5 | Table 7-4, 7-5 |
| x | 7.3 | Section 7.3 | 10635(b)(4) | Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria. | Water supply reliability assessment | n/a | Section 7.3 |
| x | 8 | Chapter 8 | 10632(a) | Provide a water shortage contingency plan (WSCP) with specified elements below. | Water shortage contingency planning | n/a | WSCP, UWMP Appendix J |
| x | 8 | Chapter 8 | 10632(a)(1) | Provide an analysis of water supply reliability (from Guidebook Chapter 7) in the WSCP. | Water shortage contingency planning | n/a | WSCP Section 2.5 |

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| x | 8.2 | Section 8.2 | 10632(a)(2)(A) | Provide the written decision-making process and other methods that the Supplier will use each year to determine its water reliability. | Water shortage contingency planning | n/a | WSCP, Chapter 2, Section 2.1 |
| x | 8.2 | Section 8.2 | 10632(a)(2)(B) | Provide data and methodology to evaluate the Supplier's water reliability for the current year and one dry year pursuant to factors in the code. | Water shortage contingency planning | n/a | WSCP, Chapter 2, WSCP Appendix E |
| x | 8.3 | Section 8.3 | 10632(a)(3)(A) | Define six standard water shortage levels of 10%, 20%, 30%, 40%, 50% shortage, and greater than 50% shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic | Water shortage contingency planning | n/a | WSCP, Appendix J |
| x | 8.3 | Section 8.3 | 10632(a)(3)(B) | Suppliers with an existing WSCP that uses different water shortage levels must cross reference their categories with the six standard categories. | Water shortage contingency planning | 8-1 | NA |
| x | 8.4 | Section 8.4 | 10632(a)(4)(A) | Suppliers with WSCPs that align with the defined shortage levels must specify locally appropriate supply augmentation actions. | Water shortage contingency planning | 8-2 | NA |
| x | 8.4 | Section 8.4 | 10632(a)(4)(B) | Specify locally appropriate demand reduction actions to adequately respond to shortages. | Water shortage contingency planning | 8-3 | WSCP Chapter 5, Table 5-1, Section 5-2, Table 5-2 |
| x | 8.4 | Section 8.4 | 10632(a)(4)(C) | Specify locally appropriate operational changes. | Water shortage contingency planning | 8-2 | WSCP Section 5.4 |
| x | 8.4 | Section 8.4 | 10632(a)(4)(D) | Specify additional mandatory prohibitions against specific water use practices that are in addition to State-mandated prohibitions are appropriate to local conditions. | Water shortage contingency planning | Table 8-3 | WSCP Chapter 5, , Table 5-2, Section 5.5.4 |
| x | 8.4 | Section 8.4 | 10632(a)(4)(E) | Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action. | Water shortage contingency planning | 8-2 and 8-3 | WSCP Chapter 5, Table 5-4 |
| x | 8.4 | Section 8.4.6 | 10632.5 | The UWMP shall include a seismic risk assessment and mitigation plan. | Water shortage contingency plan | n/a | UWMP Chapter 9 |
| x | 8.5 | Section 8.5 | 10632(a)(5)(A) | Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages. | Water shortage contingency planning | n/a | WSCP Chapter 6 |
| x | 8.5 | Section 8.5 | 10632(a)(5)(B), 10632(a)(5)(C) | Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other | Water shortage contingency planning | n/a | WSCP Section 4.1, Table 4-2, WSCP Chapter 6, Table 6-1 |
| x | 8.6 | Section 8.6 | 10632(a)(6) | Retail Supplier must describe how it will ensure compliance with and enforce provisions of the WSCP. | Water shortage contingency planning | n/a | WSCP Chapter 8 |
| x | 8.7 | Section 8.7 | 10632(a)(7)(A) | Describe the legal authority that empowers the Supplier to enforce shortage response actions. | Water shortage contingency planning | n/a | WSCP Chapter 8 (intro), Section 4.2 |
| x | 8.7 | Section 8.7 | 10632(a)(7)(B) | Provide a statement that the Supplier will declare a water shortage emergency per Water Code Chapter 3. *Water Shortage Emergencies* . | Water shortage contingency planning | n/a | WSCP, Section 2.4 |
| x | 8.7 | Section 8.7 | 10632(a)(7)(C) | Provide a statement that the Supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency. | Water shortage contingency planning | n/a | WSCP, Section 2.4 |
| x | 8.8 | Section 8.8 | 10632(a)(8)(A) | Describe the potential revenue reductions and expense increases associated with activated shortage response actions. | Water shortage contingency planning | n/a | WSCP, Section 9.1 |
| x | 8.8 | Section 8.8 | 10632(a)(8)(B) | Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions. | Water shortage contingency planning | n/a | WSCP, Section 9.2 |
| x | 8.8 | Section 8.8 | 10632(a)(8)(C) | Retail Suppliers must describe the cost of compliance with Water Code Chapter 3.3, *Excessive Residential Water Use During Drought* . | Water shortage contingency planning | n/a | WSCP, Section 9.3 |
| x | 8.9 | Section 8.9 | 10632(a)(9) | Retail Suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data are collected, tracked, and analyzed for purposes of monitoring customer compliance. | Water shortage contingency planning | n/a | WSCP, Section 7 |
| x | 8.10 | Section 8.10 | 10632(a)(10) | Describe reevaluation and improvement procedures for monitoring and evaluation the WSCP to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented. | Water shortage contingency planning | n/a | WSCP, Section 7 |
| x | 8.11 | Section 8.11 | 10632(b) | Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas. | Water shortage contingency planning | n/a | WSCP, Section 5.3, Table 5-2 |
| x | 8.12 | Section 8.12 | 10632(c) | Make available the WSCP to customers and any city or county where it provides water within 30 days after adoption of the plan. | Water shortage contingency planning | n/a | WSCP, Section 1.4 |
| x | 9.1 | Sections 9.1 | 10631(e)(1) | Retail Suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code. | Demand management measures | n/a | Section 8.1, 8.1.1-8.1.6, 8.2 |
| n/a | 9.2 | Sections 9.2 | 10631(e)(2) | Wholesale Suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and Supplier assistance | Demand management measures | n/a | NA |
| x | 10 | Chapter 10 | 10608.26(a) | Retail Suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance). | Plan adoption, submittal, and | n/a | Section 1.5, and Appendix C |
| x | 10.2 | Section 10.2.1 | 10621(b) | Notify, at least 60 days prior to the public hearing, any city or county within which the Supplier provides water that the Supplier will be reviewing the UWMP and considering amendments or changes to the plan. | Plan adoption, submittal, and implementation | 10-1 | Section 1.5, and Appendix C |
| x | 10.4 | Section 10.4 | 10621(f) | Each urban water Supplier shall update and submit its 2025 plan to DWR by July 1, 2026. | Plan adoption, submittal, and | n/a | Section 1.5, and Appendix C |
| x | 10.2 | Sections 10.2.2, 10.3, and 10.5 | 10642 | Provide supporting documentation that the Supplier made the UWMP and WSCP available for public inspection, published notice of the public hearing, and held a public hearing about the UWMP and WSCP. | Plan adoption, submittal, and implementation | n/a | Section 1.5, and Appendix C |
| x | 10.2 | Section 10.2.2 | 10642 | The Supplier is to provide the time and place of the hearing to any city or county within which the Supplier provides water. | Plan adoption, submittal, and | 10-1 | Section 1.5, and Appendix C |
| x | 10.3 | Section 10.3.2 | 10642 | Provide supporting documentation that the UWMP and WSCP has been adopted as prepared or modified. | Plan adoption, submittal, and | n/a | Appendix B |

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| x | 10.4 | Section 10.4 | 10644(a) | Provide supporting documentation that the Supplier has submitted their UWMP to the California State Library. | Plan adoption, submittal, and | n/a | Section 1.5.1 and Appendix C |
| x | 10.4 | Section 10.4 | 10644(a)(1) | Provide supporting documentation that the Supplier has submitted their UWMP to any city or county within which the Supplier provides water no later than 30 days after | Plan adoption, submittal, and | n/a | Section 1.5.1 and Appendix C |
| x | 10.4 | Sections 10.4.1 and 10.4.2 | 10644(a)(2) | The UWMP, or amendments to the UWMP, submitted to DWR shall be submitted electronically. | Plan adoption, submittal, and | n/a | Appendix C |
| x | 10.7 | Section 10.7.2 | 10644(b) | If revised, submit a copy of the WSCP to DWR within 30 days of adoption. | Plan adoption, submittal, and | n/a | NA |
| x | 10.5 | Section 10.5 | 10645(a) | Provide supporting documentation that, not later than 30 days after filing a copy of its UWMP with DWR, the Supplier has or will make the plan available for public review during normal business hours. | Plan adoption, submittal, and implementation | n/a | Appendix C |
| x | 10.5 | Section 10.5 | 10645(b) | Provide supporting documentation that, not later than 30 days after filing a copy of its WSCP with DWR, the Supplier has or will make the plan available for public review during normal business hours. | Plan adoption, submittal, and implementation | n/a | Appendix C |
| x | 10.6 | Section 10.6 | 10621(c) | If Supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings. | Plan adoption, submittal, and | n/a | NA |

# Appendix B: Adoption Resolutions

TO BE PROVIDED WITH THE FINAL UWMP AND FINAL WSCP.

# Appendix C: Public Outreach Materials

TPWD
TWENTYNINE PALMS WATER DISTRICT

October 13, 2025

Sarah Johnson, General Manager
Joshua Basin Water District
61750 Chollita Road
Joshua Tree, CA 92252

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If your agency would like to learn more about the Urban Water Management Plan and Water Shortage Contingency Plan, please contact Lauren Everett Smith, Project Manager Kennedy/Jenks Consultants, (805) 973-5723, laureneverett@kennedyjenks.com, no later than November 16, 2025.

Sincerely,

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General Manager
Twentynine Palms Water District

TPWD
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October 13, 2025

H. Stone James, City Manager
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6136 Adobe Road
Twentynine Palms, CA 92277

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March 19, 2026

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Twentynine Palms Water District

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A 30-day public comment period will begin on April 1, 2026 and close on May 1, 2026 at 5:00 p.m. A copy of the Draft 2025 UWMP and draft 2025 WSCP will be available for public review on or before April 1, 2026, Monday through Friday, during normal business hours at TPWD located at 72401 Hatch Road, Twentynine Palms, CA. 92277. In addition, an electronic version of the plan will be accessible at https://29palmswater.com. Comments may be submitted by email to: mshragge@29palmswater.org.

On May 27, 2026, at 4:00 p.m., in the meeting room of the Board of Directors of Twentynine Palms Water District, the Board of Directors will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the 2025 UWMP, and the 2025 WSCP, serving as another opportunity for the public to provide input to the Board prior to their consideration of approving the plans.

Questions regarding the public hearing or the 2025 UWMP and 2025 WSCP for Twentynine Palms Water District, should be directed to Matt Shragge (760) 367-7546.

Sincerely,

Matthew Shragge
General Manager
Twentynine Palms Water District

# Appendix D: Climate Change Vulnerability Assessment

# Draft Climate Change Vulnerability Checklist

*Mojave Integrated Regional Water Management Plan*

Identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing the climate change vulnerabilities in the Region. In the context of this analysis, vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with and adapt to, the adverse effects of climate change, consistent with the definition in the recently issued Climate Change Handbook for Regional Water Planning and consistent with climate change requirements in the Proposition 84 IRWM Plan Guidelines (October 2012).

This Climate Change Vulnerability Checklist for the Mojave Region is a required element for an IRWM Plan and was provided by the Department of Water Resources (DWR) in its Climate Change Handbook found at http://www.water.ca.gov/climatechange/CCHandbook.cfm.

The questions found in the checklist are identified by number and are **bold** and italicized. This checklist is intended to be an appendix to the IRWM Plan. For the questions with no checks in the boxes, this indicates the answer being "no". A checked box means "yes". Therefore, the more boxes checked in a category indicates the more vulnerable the Region is to that category/element of climate change.

## I. Water Demand

☑ ***Are there major industries that require cooling/process water in your planning region?***

- As average temperatures increase, cooling water needs may also increase.
- Identify major industrial water users in your region and assess their current and projected needs for cooling and process water.

☑ ***Does water use vary by more than 50% seasonally in parts of your region?***

- Seasonal water use, which is primarily outdoor water use, is expected to increase as average temperatures increase and droughts become more frequent.
- Where water use records are available, look at total monthly water uses averaged over the last five years (if available). If maximum and minimum monthly water uses vary by more than 25%, then the answer to this question is "yes".
- Where no water use records exist, is crop irrigation responsible for a significant (say >50%) percentage of water demand in parts of your region?

☐ ***Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?***

- Fruit and nut crops are climate-sensitive and may require additional water as the climate warms.

☐ ***Do groundwater supplies in your region lack resiliency after drought events?***

- Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts and may become more dependent on groundwater pumping.

☑ ***Are water use curtailment measures effective in your region?***

- Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts.

☐ ***Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?***

- Changes in snowmelt patterns in the future may make it difficult to balance water demands. Vulnerabilities for ecosystems and municipal/agricultural water needs may be exacerbated by instream flow requirements that are:

1. not quantified,
2. not accurate for ecosystem needs under multiple environmental conditions including droughts, and
3. not met by regional water managers.

## II. Water Supply

☑ ***Does a portion of the water supply in your region come from snowmelt?***

- Snowmelt is expected to decrease as the climate warms. Water systems supplied by snowmelt are therefore potentially vulnerable to climate change.
- Where watershed planning documents are available, refer to these in identifying parts of your region that rely on surface water for supplies; if your region contains surface water supplies originating in watersheds where snowpack accumulates, the answer to this question is "Yes."
- Where planning documents are not available, identify major rivers in your region with large users. Identify whether the river's headwaters are fed by snowpack.

☑ ***Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?***

- Some imported or transferred water supplies are sources from climate-sensitive watersheds, such as water imported from the Delta and the Colorado River.

☐ ***Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?***

- Coastal aquifers are susceptible to salt intrusion as sea levels rise, and many have already observed salt intrusion due to over-extraction, such as the West Coast Basin in southern California.

☐ ***Would your region have difficulty in storing carryover supply surpluses from year to year?***

- Droughts are expected to become more severe in the future. Systems that can store more water may be more resilient to droughts.

☐ ***Has your region faced a drought in the past during which it failed to meet local water demands?***

- Droughts are expected to become more severe in the future. Systems that have already come close to their supply thresholds may be especially vulnerable to droughts in the future.

☑ ***Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?***

- As invasive species are expected to become more prevalent with climate change, existing invasive species issues may indicate an ecological vulnerability to climate change.

## III. Water Quality

? ***Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?***

- Some areas are expected to become more vulnerable to wildfires over time. To identify whether this is the case for parts of your region, the California Public Interest Energy Research (PIER) Program has posted wildfire susceptibility projections as a Google Earth application at: http://cal-adapt.org/fire/. These projections are only the results of a single study and are not intended for analysis, but can aid in qualitatively answering this question. Read the application's disclaimers carefully to be aware of its limitations.

☑ ***Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?***

- Warming temperatures will result in lower dissolved oxygen levels in water bodies, which are exacerbated by algal blooms and in turn enhance eutrophication. Changes in streamflows may alter pollutant concentrations in water bodies.

☐ ***Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?***

- In the future, low flow conditions are expected to be more extreme and last longer. This may result in higher pollutant concentrations where loadings increase or remain constant

☐ ***Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?***

- In the future, low flows are expected decrease, and to last longer. This may result in higher pollutant concentrations where loadings increase or remain constant.

☐ ***Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?***

- While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to increased erosion, which will increase turbidity in surface waters. Areas that already observe water quality responses to rainstorm intensity may be especially vulnerable.

## IV. Sea Level Rise

☐ ***Has coastal erosion already been observed in your region?***

- Coastal erosion is expected to occur over the next century as sea levels rise.

☐ ***Are there coastal structures, such as levees or breakwaters, in your region?***

- Coastal structures designed for a specific mean sea level may be impacted by sea level rise.

☐ ***Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?***

- Coastal flooding will become more common, and will impact a greater extent of property, as sea levels rise. Critical infrastructure in the coastal floodplain may be at risk.
- Digital elevation maps should be compared with locations of coastal infrastructure.

☐ ***Are there climate-sensitive low-lying coastal habitats in your region?***

- Low-lying coastal habitats that are particularly vulnerable to climate change include estuaries and coastal wetlands that rely on a delicate balance of freshwater and salt water.

☐ ***Are there areas in your region that currently flood during extreme high tides or storm surges?***

- Areas that are already experiencing flooding during storm surges and very high tides, are more likely to experience increased flooding as sea levels rise.

☐ ***Is there land subsidence in the coastal areas of your region?***

- Land subsidence may compound the impacts of sea level rise.

☐ ***Do tidal gauges along the coastal parts of your region show an increase over the past several decades?***

- Local sea level rise may be higher or lower than state, national, or continental projections.
- Planners can find information on local tidal gauges at http://tidesandcurrents.noaa.gov/sltrends/sltrends_states.shtml?region=ca.

## V. Flooding

☑ ***Does critical infrastructure in your region lie within the 200-year floodplain? DWR's best available floodplain maps are available at:*** *http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/.*

- While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to higher peak flows and more severe floods.
- Refer to FEMA floodplain maps and any recent FEMA, US Army Corps of Engineers, or DWR studies that might help identify specific local vulnerabilities for your region. Other follow-up questions that might help answer this question:

1. What public safety issues could be affected by increased flooding events or intensity? For example, evacuation routes, emergency personnel access, hospitals, water treatment and wastewater treatment plants, power generation plants and fire stations should be considered.
2. Could key regional or economic functions be impacted from more frequent and/or intense flooding?

☐ ***Does part of your region lie within the Sacramento-San Joaquin Drainage District?***

- The SSJDD contains lands that are susceptible to overflows from the Sacramento and San Joaquin Rivers, and are a key focus of the Central Valley Flood Protection Plan. (http://www.water.ca.gov/cvfmp/program.cfm).

☐ ***Does aging critical flood protection infrastructure exist in your region?***

- Levees and other flood protection facilities across the state of California are aging and in need of repair. Due to their overall lowered resiliency, these facilities may be particularly vulnerable to climate change impacts.
- DWR is evaluating more than 300 miles of levees in the San Joaquin and Sacramento Rivers Valleys and the Delta (http://www.water.ca.gov/levees/).

☑ ***Have flood control facilities (such as impoundment structures) been insufficient in the past?***

- Reservoirs and other facilities with impoundment capacity may be insufficient for severe storms in the future. Facilities that have been insufficient in the past may be particularly vulnerable.

☑ ***Are wildfires a concern in parts of your region?***

- Wildfires alter the landscape and soil conditions, increasing the risk of flooding within the burn and downstream areas. Some areas are expected to become more vulnerable to wildfires over time. To identify whether this is the case for parts of your region, the California Public Interest Energy Research Program (PIER) has posted wildfire susceptibility projections as a Google Earth application at: http://cal-adapt.org/fire/. These projections are the results of only a single study and are not intended for analysis, but can aid in qualitatively answering this question. Read the application's disclaimers carefully to be aware of its limitations.

## VI. Ecosystem and Habitat Vulnerability

☑ ***Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?***

- Erosion is expected to increase with climate change, and sedimentation is expected to shift. Habitats sensitive to these events may be particularly vulnerable to climate change.

☐ ***Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?***

- Seasonal high and low flows, especially those originating from snowmelt, are already shifting in many locations.

☑ ***Do climate-sensitive fauna or flora populations live in your region?***

- Some specific species are more sensitive to climate variations than others.

☑ ***Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?***

- Species that are already threatened or endangered may have a lowered capacity to adapt to climate change.

☐ ***Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?***

- Economic values associated with natural habitat can influence prioritization.

☐ ***Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?***

- Constrained water quality and quantity requirements may be difficult to meet in the future.

☐ ***Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?***

- Storm surges are expected to result in greater damage in the future due to sea level rise. This makes fragile coastal ecosystems vulnerable.

☑ ***Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change*** *(http://www.itsgettinghotoutthere.org/)?*

- These ecosystems are particularly vulnerable to climate change.

☐ ***Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?***

- These ecosystems are particularly vulnerable to climate change.

# Appendix E: AWWA Water Loss Audits

# AWWA Free Water Audit Software:
## Reporting Worksheet

WAS v5.0

American Water Works Association
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? Click to access definition
+ Click to add a comment

**Water Audit Report for:** Twentynine Palms Water District (CA3610049)
**Reporting Year:** 2020 1/2020 - 12/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

### WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

| | | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|---|
| Volume from own sources: | 7 | 2,694.020 | acre-ft/yr | 3 | | | acre-ft/yr |
| Water imported: | n/a | 0.000 | acre-ft/yr | | | | acre-ft/yr |
| Water exported: | n/a | 0.000 | acre-ft/yr | | | | acre-ft/yr |
| **WATER SUPPLIED:** | | **2,694.020** | acre-ft/yr | | | | |

Enter negative % or value for under-registration
Enter positive % or value for over-registration

### AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

| | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|
| Billed metered: | 8 | 2,366.550 | acre-ft/yr | | | |
| Billed unmetered: | n/a | 0.000 | acre-ft/yr | | | |
| Unbilled metered: | 9 | 30.380 | acre-ft/yr | | | |
| Unbilled unmetered: | 5 | 6.735 | acre-ft/yr | | 6.735 | acre-ft/yr |
| **AUTHORIZED CONSUMPTION:** | | **2,403.665** | acre-ft/yr | | | |

Use buttons to select percentage of water supplied **OR** value

**WATER LOSSES (Water Supplied - Authorized Consumption)** **290.355** acre-ft/yr

**Apparent Losses**

| | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|
| Unauthorized consumption: | | 6.735 | acre-ft/yr | 0.25% | | acre-ft/yr |

**Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed**

| | | | | | | |
|---|---|---|---|---|---|---|
| Customer metering inaccuracies: | 3 | 24.211 | acre-ft/yr | 1.00% | | acre-ft/yr |
| Systematic data handling errors: | | 5.916 | acre-ft/yr | 0.25% | | acre-ft/yr |

**Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed**

**Apparent Losses:** **36.863** acre-ft/yr

**Real Losses (Current Annual Real Losses or CARL)**

**Real Losses = Water Losses - Apparent Losses:** **253.492** acre-ft/yr

**WATER LOSSES:** **290.355** acre-ft/yr

### NON-REVENUE WATER

**NON-REVENUE WATER:** **327.470** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

### SYSTEM DATA

| | | | |
|---|---|---|---|
| Length of mains: | 5 | 213.0 | miles |
| Number of active AND inactive service connections: | 9 | 8,543 | |
| Service connection density: | | 40 | conn./mile main |

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

**Average length of customer service line has been set to zero and a data grading score of 10 has been applied**

Average operating pressure: 9 85.0 psi

### COST DATA

| | | | | |
|---|---|---|---|---|
| Total annual cost of operating water system: | 10 | $ 4,084,185.00 | $/Year | |
| Customer retail unit cost (applied to Apparent Losses): | 10 | $3.33 | $/100 cubic feet (ccf) | |
| Variable production cost (applied to Real Losses): | 5 | $235.92 | $/acre-ft | ☐ Use Customer Retail Unit Cost to value real losses |

### WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Variable production cost (applied to Real Losses)

# AWWA Free Water Audit Software:
## Reporting Worksheet

WAS v5.0

American Water Works Association
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? Click to access definition
+ Click to add a comment

**Water Audit Report for:** Twentynine Palms Water District (CA3610049)
**Reporting Year:** 2021 | 1/2021 - 12/2021

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

### WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

| | | | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|---|---|
| Volume from own sources: | 5 | 2,715.600 | acre-ft/yr | 3 | | | 44.943 | acre-ft/yr |
| Water imported: | n/a | 0.000 | acre-ft/yr | | | | | acre-ft/yr |
| Water exported: | n/a | 0.000 | acre-ft/yr | | | | | acre-ft/yr |

Enter negative % or value for under-registration
Enter positive % or value for over-registration

**WATER SUPPLIED:** 2,670.657 acre-ft/yr

### AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

| | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|
| Billed metered: | 5 | 2,425.830 | acre-ft/yr | | | |
| Billed unmetered: | n/a | 0.000 | acre-ft/yr | | | |
| Unbilled metered: | 9 | 25.017 | acre-ft/yr | | | |
| Unbilled unmetered: | 5 | 6.677 | acre-ft/yr | | 6.677 | acre-ft/yr |

Use buttons to select percentage of water supplied **OR** value

**AUTHORIZED CONSUMPTION:** ? 2,457.524 acre-ft/yr

**WATER LOSSES (Water Supplied - Authorized Consumption)** 213.134 acre-ft/yr

#### Apparent Losses

| | | | | Pcnt: | Value: | |
|---|---|---|---|---|---|---|
| Unauthorized consumption: | | 6.677 | acre-ft/yr | 0.25% | | acre-ft/yr |

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

| | | | | | | |
|---|---|---|---|---|---|---|
| Customer metering inaccuracies: | 3 | 24.756 | acre-ft/yr | 1.00% | | acre-ft/yr |
| Systematic data handling errors: | | 6.065 | acre-ft/yr | 0.25% | | acre-ft/yr |

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

**Apparent Losses:** ? 37.497 acre-ft/yr

#### Real Losses (Current Annual Real Losses or CARL)

**Real Losses = Water Losses - Apparent Losses:** ? 175.636 acre-ft/yr

**WATER LOSSES:** 213.134 acre-ft/yr

### NON-REVENUE WATER

**NON-REVENUE WATER:** ? 244.827 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

### SYSTEM DATA

| | | | |
|---|---|---|---|
| Length of mains: | 5 | 213.0 | miles |
| Number of active AND inactive service connections: | 9 | 8,543 | |
| Service connection density: | | 40 | conn./mile main |

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

**Average length of customer service line has been set to zero and a data grading score of 10 has been applied**

Average operating pressure: 5 85.0 psi

### COST DATA

| | | | |
|---|---|---|---|
| Total annual cost of operating water system: | 10 | $ 4,484,725.00 | $/Year |
| Customer retail unit cost (applied to Apparent Losses): | 10 | $3.58 | $/100 cubic feet (ccf) |
| Variable production cost (applied to Real Losses): | 5 | $254.67 | $/acre-ft |

☑ Use Customer Retail Unit Cost to value real losses

### WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 60 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Billed metered

# AWWA Free Water Audit Software: Worksheet

FWAS v6.0

American Water Works Association.
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**Water Audit Report for:** Twentynine Palms Water District
**Audit Year:** 2022 | Jan 01 2022 - Dec 31 2022 | Calendar

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: ACRE-FEET PER YEAR

Water Supplied Error Adjustments

## WATER SUPPLIED

choose entry option:

| | | n | g | | | | n | g | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOS | Volume from Own Sources: | n | g | 6 | 2,452.550 | Acre-ft/Yr | n | g | 9 | volume 6.200 | acre-ft/yr | under-registration | VOSEA |
| WI | Water Imported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | | WIEA |
| WE | Water Exported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | | WEEA |
| | WATER SUPPLIED: | | | | 2,458.750 | Acre-ft/Yr | | | | | | | |

## AUTHORIZED CONSUMPTION

choose entry option:

| | | n | g | | | | | |
|---|---|---|---|---|---|---|---|---|
| BMAC | Billed Metered: | n | g | 8 | 2,339.510 | Acre-ft/Yr | | |
| BUAC | Billed Unmetered: | n | g | n/a | 0.000 | Acre-ft/Yr | | |
| UMAC | Unbilled Metered: | n | g | 8 | 26.280 | Acre-ft/Yr | | |
| UUAC | Unbilled Unmetered: | n | g | 3 | 5.849 | Acre-ft/Yr | 0.25% | default |

Default option selected for Unbilled Unmetered, with automatic data grading of 3

AUTHORIZED CONSUMPTION: 2,371.639 Acre-ft/Yr

## WATER LOSSES

87.111 Acre-ft/Yr

### Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

choose entry option:

| | | n | g | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SDHE | Systematic Data Handling Errors: | n | g | 3 | 5.849 | Acre-ft/Yr | 0.25% | default | |
| CMI | Customer Metering Inaccuracies: | n | g | 3 | 23.897 | Acre-ft/Yr | 1.00% | percent | under-registration |
| UC | Unauthorized Consumption: | n | g | 3 | 5.849 | Acre-ft/Yr | 0.25% | default | |

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 35.594 Acre-ft/Yr

### Real Losses

Real Losses: 51.517 Acre-ft/Yr

WATER LOSSES: 87.111 Acre-ft/Yr

## NON-REVENUE WATER

NON-REVENUE WATER: 119.240 Acre-ft/Yr

## SYSTEM DATA

| | | n | g | | | | |
|---|---|---|---|---|---|---|---|
| Lm | Length of mains: | n | g | 10 | 361.0 | miles | (including fire hydrant lead lengths) |
| Nc | Number of service connections: | n | g | 8 | 8,543 | | (active *and* inactive) |
| | Service connection density: | | | | 24 | conn./mile main | |

Are customer meters typically located at the curbstop/property line? Yes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lp | | n | g | 10 | | | |

Average length of customer service line has been set to zero and a data grading of 10 has been applied

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AOP | Average Operating Pressure: | n | g | 7 | 85.0 | psi | |

## COST DATA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CRUC | Customer Retail Unit Charge: | n | g | 10 | $4.35 | $/100 cubic feet (ccf) | Total Annual Operating Cost | |
| VPC | Variable Production Cost: | n | g | 8 | $346.41 | $/acre-ft | $4,661,723 | $/yr (optional input) |

## WATER AUDIT DATA VALIDITY TIER:

***** The Water Audit Data Validity Score is in Tier III (51-70). See Dashboard tab for additional outputs. *****

go to dashboard

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

| |
|---|
| 1: Volume from Own Sources (VOS) |
| 2: Customer Metering Inaccuracies (CMI) |
| 3: Billed Metered (BMAC) |

### KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

| | | |
|---|---|---|
| Unit Total Losses: | | gal/conn/day |
| Unit Apparent Losses: | | gal/conn/day |
| Unit Real Losses[A]: | 26.6 | gal/conn/day |
| Unit Real Losses[B]: | | gal/mile/day |

If entered above by user, targets will display on KPI gauges (see Dashboard)

# AWWA Free Water Audit Software: Worksheet

FWAS v6.0

American Water Works Association.
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**Water Audit Report for:** Twentynine Palms Water District
**Audit Year:** 2023 | Jan 01 2023 - Dec 31 2023 | Calendar

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: ACRE-FEET PER YEAR

Water Supplied Error Adjustments

## WATER SUPPLIED

choose entry option:

| | | n | g | | | | n | g | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOS | Volume from Own Sources: | n | g | 6 | 2,350.910 | Acre-ft/Yr | n | g | 9 | volume 0.480 | acre-ft/yr | over-registration | VOSEA |
| WI | Water Imported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | | WIEA |
| WE | Water Exported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | | WEEA |
| | WATER SUPPLIED: | | | | 2,350.430 | Acre-ft/Yr | | | | | | | |

## AUTHORIZED CONSUMPTION

choose entry option:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BMAC | Billed Metered: | n | g | 8 | 2,132.180 | Acre-ft/Yr | | |
| BUAC | Billed Unmetered: | n | g | n/a | 0.000 | Acre-ft/Yr | | |
| UMAC | Unbilled Metered: | n | g | 8 | 30.210 | Acre-ft/Yr | | |
| UUAC | Unbilled Unmetered: | n | g | 3 | 5.330 | Acre-ft/Yr | 0.25% | default |

Default option selected for Unbilled Unmetered, with automatic data grading of 3

AUTHORIZED CONSUMPTION: 2,167.720 Acre-ft/Yr

## WATER LOSSES

182.710 Acre-ft/Yr

### Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

choose entry option:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SDHE | Systematic Data Handling Errors: | n | g | 3 | 5.330 | Acre-ft/Yr | 0.25% | default | |
| CMI | Customer Metering Inaccuracies: | n | g | 3 | 21.842 | Acre-ft/Yr | 1.00% | percent | under-registration |
| UC | Unauthorized Consumption: | n | g | 3 | 5.330 | Acre-ft/Yr | 0.25% | default | |

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 32.503 Acre-ft/Yr

### Real Losses

Real Losses: 150.206 Acre-ft/Yr

WATER LOSSES: 182.710 Acre-ft/Yr

## NON-REVENUE WATER

NON-REVENUE WATER: 218.250 Acre-ft/Yr

## SYSTEM DATA

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lm | Length of mains: | n | g | 10 | 361.0 | miles | (including fire hydrant lead lengths) |
| Nc | Number of service connections: | n | g | 8 | 8,543 | | (active *and* inactive) |
| | Service connection density: | | | | 24 | conn./mile main | |

Are customer meters typically located at the curbstop/property line? Yes

Lp: n g 10

Average length of customer service line has been set to zero and a data grading of 10 has been applied

AOP: Average Operating Pressure: n g 7 85.0 psi

## COST DATA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CRUC | Customer Retail Unit Charge: | n | g | 10 | $4.33 | $/100 cubic feet (ccf) | Total Annual Operating Cost | |
| VPC | Variable Production Cost: | n | g | 8 | $393.51 | $/acre-ft | $4,851,180 | $/yr (optional input) |

## WATER AUDIT DATA VALIDITY TIER:

***** The Water Audit Data Validity Score is in Tier III (51-70). See Dashboard tab for additional outputs. *****

go to dashboard

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

1: Volume from Own Sources (VOS)
2: Customer Metering Inaccuracies (CMI)
3: Billed Metered (BMAC)

### KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

| | | |
|---|---|---|
| Unit Total Losses: | | gal/conn/day |
| Unit Apparent Losses: | | gal/conn/day |
| Unit Real Losses[A]: | 26.6 | gal/conn/day |
| Unit Real Losses[B]: | | gal/mile/day |

If entered above by user, targets will display on KPI gauges (see Dashboard)

# AWWA Free Water Audit Software: Worksheet

FWAS v6.0

American Water Works Association.
Copyright © 2020, All Rights Reserved.

**Water Audit Report for:** Twentynine Palms Water District
**Audit Year:** 2024 | Jan 01 2024 - Dec 31 2024 | Calendar

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: ACRE-FEET PER YEAR

Water Supplied Error Adjustments

## WATER SUPPLIED

choose entry option:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOS | Volume from Own Sources: | n | g | 6 | 2,353.650 | Acre-ft/Yr | n g 9 | volume | 0.480 | acre-ft/yr | over-registration | VOSEA |
| WI | Water Imported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | WIEA |
| WE | Water Exported: | n | g | n/a | 0.000 | Acre-ft/Yr | | | | | | WEEA |
| | WATER SUPPLIED: | | | | 2,353.170 | Acre-ft/Yr | | | | | | |

## AUTHORIZED CONSUMPTION

choose entry option:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| BMAC | Billed Metered: | n | g | 8 | 2,195.900 | Acre-ft/Yr | | | |
| BUAC | Billed Unmetered: | n | g | n/a | 0.000 | Acre-ft/Yr | | | |
| UMAC | Unbilled Metered: | n | g | 8 | 33.950 | Acre-ft/Yr | | | |
| UUAC | Unbilled Unmetered: | n | g | 3 | 5.490 | Acre-ft/Yr | 0.25% | default | |

Default option selected for Unbilled Unmetered, with automatic data grading of 3

AUTHORIZED CONSUMPTION: 2,235.340 Acre-ft/Yr

## WATER LOSSES

117.830 Acre-ft/Yr

### Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

choose entry option:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SDHE | Systematic Data Handling Errors: | n | g | 3 | 5.490 | Acre-ft/Yr | 0.25% | default | |
| CMI | Customer Metering Inaccuracies: | n | g | 3 | 22.524 | Acre-ft/Yr | 1.00% | percent | under-registration |
| UC | Unauthorized Consumption: | n | g | 3 | 5.490 | Acre-ft/Yr | 0.25% | default | |

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 33.503 Acre-ft/Yr

### Real Losses

Real Losses: 84.327 Acre-ft/Yr

WATER LOSSES: 117.830 Acre-ft/Yr

## NON-REVENUE WATER

NON-REVENUE WATER: 157.270 Acre-ft/Yr

## SYSTEM DATA

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lm | Length of mains: | n | g | 10 | 361.0 | miles | (including fire hydrant lead lengths) |
| Nc | Number of service connections: | n | g | 8 | 7,423 | | (active *and* inactive) |
| | Service connection density: | | | | 21 | conn./mile main | |

Are customer meters typically located at the curbstop/property line? Yes

Lp n g 10

Average length of customer service line has been set to zero and a data grading of 10 has been applied

| | | | | | | |
|---|---|---|---|---|---|---|
| AOP | Average Operating Pressure: | n | g | 7 | 85.0 | psi |

## COST DATA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CRUC | Customer Retail Unit Charge: | n | g | 10 | $4.76 | $/100 cubic feet (ccf) | Total Annual Operating Cost | |
| VPC | Variable Production Cost: | n | g | 8 | $387.25 | $/acre-ft | $5,280,512 | $/yr (optional input) |

## WATER AUDIT DATA VALIDITY TIER:

***** The Water Audit Data Validity Score is in Tier III (51-70). See Dashboard tab for additional outputs. *****

go to dashboard

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

1: Volume from Own Sources (VOS)
2: Customer Metering Inaccuracies (CMI)
3: Billed Metered (BMAC)

### KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

| | | |
|---|---|---|
| Unit Total Losses: | | gal/conn/day |
| Unit Apparent Losses: | | gal/conn/day |
| Unit Real Losses[A]: | | gal/conn/day |
| Unit Real Losses[B]: | | gal/mile/day |

If entered above by user, targets will display on KPI gauges (see Dashboard)

# Appendix F: DWR Submittal Tables

# Templates of Submittal Tables for the Urban Water Management Plan 2025

**Workbook Contents:** This workbook contains the templates for Submittal Tables that Suppliers use to organize information as part of their Urban Water Management Plans 2025 (due July 1, 2026). Table numbers correspond to the chapter number where they are described in the UWMP Guidebook. If the table name is followed by a letter, the letter corresponds to whether the table is specific for Wholesale Suppliers or Retail Suppliers only (W and R, respectively). For those table names that are not followed by a letter, these are Submittal Tables for all Suppliers.

**Where to submit?** Suppliers submit the completed table data and UWMPs (including the Water Shortage Contingency Plan) electronically through the WUEdata Portal (https://wuedata.water.ca.gov/). The portal will be updated and will be announced to the Urban Suppliers listserv, DWR webpage and WUEdata Portal opening page when it is available for plan and table submittals.

**Unlocked templates (use with caution):** The templates provided in this workbook are formated to mirror the structure of information that is submitted through the WUEdata Portal for the electronic submission of Submittal Tables in the UWMP. The tables are offered in a unprotected (unlocked) version. If needed, Suppliers may adjust the tables for their own planning needs beyond the Submittal Tables. However, preparers will still need to submit the information using the original template structure provided for their UWMP. Make changes to the tables with caution, as there are formulas, automatically filled cells, and drop-downs present throughout. To redownload the templates in their original format, visit https://wuedata.water.ca.gov in the Resources button of the Urban Water Management Plan section (no login necessary).

## NOTES FOR REGIONAL URBAN WATER MANAGEMENT PLANS (RUWMPs)

RUWMPs will report data for each agency in the RUWMP, requiring duplicates of the submittal tables. The supplier will copy the needed tables and notate each of the copies with the name of the agency, or some other designation, identifying the table with the corresponding agency.

**WUEdata upload tool for RUWMPs**

RUWMPs will submit data to the WUEdata upload tool on an individual agency basis.

| Submittal Table 2-1 Retail: Public Water Systems | | | |
|---|---|---|---|
| Public Water System Number | Public Water System Name | Number of Municipal Connections 2025 | Volume of Water Supplied 2025 (AF) |
| Add additional rows as needed | | | |
| CA3610049 | Twentynine Palms Water District | 8,362 | 2,320 |
| | | | |
| | | | |
| | | | |
| | **Total** | 8,362 | 2,320 |

**DWR NOTES:**

**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.

**NOTES:**

| Submittal Table 2-2: Plan Identification | | |
|---|---|---|
| **Select One** | **Type of Plan** | **Name of Regional Alliance or RUWMP** (Drop Down List) |
| ☑ | **Individual UWMP** | |
| | If Water Supplier is also a member of a SB X7-7 Regional Alliance, select name from the drop-down. | |
| ☐ | **Regional Urban Water Management Plan (RUWMP)** | |
| | If Supplier selected RUWMP, select name from the drop-down. | |
| **NOTES:** | | |

| Submittal Table 2-3: Supplier Identification | |
|---|---|
| Type of Supplier (select one or both) | |
| ☐ | Supplier is a wholesale supplier |
| ☑ | Supplier is a retail supplier |
| Fiscal or Calendar Year (select one) | |
| ☑ | UWMP Tables are in calendar years |
| ☐ | UWMP Tables are in fiscal years |
| If using fiscal years provide month and date that the fiscal year begins (mm/dd) | |
| | |
| Units of measure used in UWMP<br>(Select from the drop down list). | |
| Unit | AF |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | |
| **NOTES:** | |

| **Submittal Table 2-4 Retail: Water Supplier Information Exchange**<br>**Water Code Section 10631(h)** |
|---|
| The retail Supplier has informed the following wholesale supplier(s) of projected water use. |
| Wholesale Water Supplier Name |
| Add additional rows as needed |
| |
| |
| NOTES: The District neither recieves water from a wholesaler nor supplies water to retail water purveyors. |

10631(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available.

| Submittal Table 2-4 Wholesale: Water Supplier Information Exchange<br>Water Code Section 10631(h) | |
|---|---|
| ☐ | Check the box if the Supplier has informed more than 10 other water suppliers of water supplies available.<br>**Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.** |
| | Provide page number for location of the list. |
| ☐ | Check the box if the Supplier has informed 10 or fewer other water suppliers of water supplies available.<br>**Complete the table below.** |
| Water Supplier Name | |
| Add additional rows as needed | |
| | |
| | |
| **NOTES:** | |

10631(h) ... The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five year increments, and during various water-year types in accordance with subdivision (f).

| Submittal Table 3-1 Retail: Population - Current and Projected<br>Water Code Section 10631(a) | | | | | | |
|---|---|---|---|---|---|---|
| Population Served | 2025 | 2030 | 2035 | 2040 | 2045 | 2050(opt) |
| | 17,373 | 17,794 | 18,225 | 18,747 | 19,284 | 19,837 |

**NOTES:** The 2025 population was estimated using projecting Census Redistricting Block Geographic Information System (GIS) data for San Bernardino County from the 2020 Decennial Census as reported by the United States (US) Census Bureau for the State of California. The GIS data was projected onto the TPWD service area using an area-weighted approach to estimate populations within the service area. Population Density (people/area) was calculated for each Census Block prior to clipping to the Service Area. Clipped Census Blocks were recalculated using population (population density multiplied by the clipped area). The projected populations were derived by applying growth percentages from the SCAG 2020 Regional Transportation Plan onto the 2025 population estimate.

CWC 10631(a) describe the current and projected population of the service area including current and projected population…

| Submittal Table 3-1 Wholesale: Population - Current and Projected<br>Water Code Section 10631(a) | | | | | | |
|---|---|---|---|---|---|---|
| Population Served | 2025 | 2030 | 2035 | 2040 | 2045 | 2050(opt) |
| | | | | | | |
| **NOTES:** | | | | | | |

CWC 10631(a) describe the current and projected population of the service area…

| Submittal Table 4-1 Retail: Total Uses for Potable and Non-Potable Water — Actual<br>Water Code Section 10631(d)(1) | | | |
|---|---|---|---|
| Use Type | Additional Description (as needed) | 2025 Actual Water Use | |
| **Drop down list**<br>May select each use multiple times<br>These are the only use types that will be recognized by the WUEdata online submittal tool | | **Potable or Non-Potable**<br>(OPTIONAL)<br>Drop down list | Volume (AF) |
| Add additional rows as needed | | | |
| Single Family | | Potable | 1,263 |
| Multi-Family | | Potable | 360 |
| Commercial | | Potable | 296 |
| Industrial | | Potable | 0 |
| Landscape | | Potable | 119 |
| Other (optional) | Construction Use / Non-potable | Non-Potable | 80 |
| Sales/Transfers/Exchanges to other | | Potable | 23 |
| Distribution System Water Loss | | Potable | 178 |
| | | Subtotal Potable | 2239 |
| | | Subtotal Non-Potable | 80 |
| | | **Total** | 2,319 |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. | | | |
| **NOTES:** TPWD Billed Metered Authorized Consumption, 2025. See Table 2-1**.** Water loss is the average of 2020 to 2024 sum of real and apparent losses based on AWWA water audit software output (provided in Appendix E) | | | |

**CWC 10631(d)(1)** For an urban retail water supplier, quantify, to the extent records are available, past and current water use…identifying the uses among water use sectors including but not limited to:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(J) Distribution system water loss

| ***Optional*** **Submittal Table 4-1 Wholesale: Total Uses for Potable and Non-Potable Water — Actual**<br>**Water Code Section 10631(d)(1)** | | | |
|---|---|---|---|
| Use Type | Additional Description (as needed) | 2025 Actual Water Use | |
| **Drop down list**<br>May select each use multiple times<br>These are the only use types that will be recognized by the WUEdata online submittal tool | | **Potable or Non-Potable**<br>(OPTIONAL)<br>Drop down list | Volume (AF) |
| Add additional rows as needed | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | Subtotal Potable | 0 |
| | | Subtotal Non-Potable | 0 |
| | | **Total** | 0 |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. | | | |
| **NOTES:** | | | |

10631(d) (1) for an urban retail water supplier, quantify to the extent records are available, past and current water use...

**Submittal Table 4-2 Retail: Total Uses for Potable, and Non-Potable Water — Projected**
**Water Code Section 10631(d)(1)**

| Use Type | Additional Description (as needed) | Projected Water Use (Report To the Extent that Records are Available) | | | | | |
|---|---|---|---|---|---|---|---|
| **Drop down list** May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool | | **Potable or Non-Potable** (OPTIONAL) Drop down list | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 opt (AF)** |
| Add additional rows as needed. | | | | | | | |
| Single Family | | Potable | 1,300 | 1,330 | 1,370 | 1,410 | 1,450 |
| Multi-Family | | Potable | 370 | 380 | 380 | 400 | 410 |
| Commercial | | Potable | 300 | 310 | 320 | 330 | 340 |
| Industrial | | Potable | 0 | 0 | 0 | 0 | 0 |
| Landscape | | Potable | 120 | 120 | 130 | 130 | 130 |
| Other (optional) | Construction Use | Non-Potable | 80 | 80 | 80 | 80 | 80 |
| Sales/Transfers/Exchanges to other Suppliers | | Potable | 20 | 20 | 20 | 20 | 20 |
| Distribution System Water Loss | | Potable | 170 | 170 | 170 | 180 | 180 |
| | | Subtotal Potable | 2,280 | 2,330 | 2,390 | 2,470 | 2,530 |
| | | Subtotal Non-Potable | 80 | 80 | 80 | 80 | 80 |
| | | **Total** | 2,360 | 2,410 | 2,470 | 2,550 | 2,610 |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.

**NOTES: Projected demands based on 2020-2025 historical demand data and projected land use demand data.**

CWC 10631(d)(1) For an urban retail water supplier, quantify, to the extent records are available... projected water use…identifying the uses among water use sectors…

| *Optional* **Submittal Table 4-2 Wholesale: Total Uses for Potable and Non-Potable Water — Projected**<br>**Water Code Section 10631(d)(1)** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Use Type** | | **Projected Water Use** (Report To the Extent that Records are Available) | | | | | |
| **Drop down list**<br>May select each use multiple times<br>These are the only Use Types that will be recognized by the WUEdata online submittal tool. | Additional Description<br>(as needed) | **Potable or Non-Potable**<br>(OPTIONAL)<br>Drop down list | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 opt (AF)** |
| Add additional rows as needed | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Subtotal Potable | | | 0 | 0 | 0 | 0 | 0 |
| Subtotal Non-Potable | | | 0 | 0 | 0 | 0 | 0 |
| **Total** | | | 0 | 0 | 0 | 0 | 0 |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. | | | | | | | |
| **NOTES:** | | | | | | | |

10631(d) (1) for an urban retail water supplier, quantify to the extent records are available, past and current water use...

| Submittal Table 4-3 Retail: Inclusion in Water Use Projections<br>Water Code Section 10631 (a), 10631 (d)(4)(A), and 10631 (d)(4)(B) | |
|---|---|
| **Are Future Water Savings Included in Projections?**<br>**Drop down list (y/n)** | No |
| If "Yes" to above, **state the section or page number**, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.<br>***Optional*** Suppliers may complete Optional Submittal Table 4-4 R to quantify the expected savings. | Table 4-4 R |
| **Are Lower Income Residential Demands Included In Projections?**<br>**Drop down list (y/n)** | Yes |
| ***Optional*** If the method for accounting Lower Income Residential Demands has been included, provide page number where this accounting can be found. | Page 2-11 |
| **DWR NOTES:** Additional guidance is provided in Appendix K. | |
| **NOTES:** Water Savings are shown in UWMP Section 2.4.1 Table 2-6 on page 2-7 | |

CWC10631 (d) (4) (A) Water use projections, where available, shall display and account for water savings estimated to result from adopted codes, standards, ordinances, or transpotation and land use plans identified by the urban water supplier, as applicable to the service area.

CWC 10631 (d) (4) (B) to the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following: (i) Provide citations of the various codes, standards, ordinances or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.
CWC 10631(a) Water use projections required by section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county, in the service area of the supplier .

| *Optional* Submittal Table 4-4 Retail: Passive Water Savings Projections<br>Water Code Section 10631(d)(4)(A) | | | | | |
|---|---|---|---|---|---|
| **Description**<br>(Codes, Standards, Ordinances, or Plans) | Passive savings | | | | |
| | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 opt (AF)** |
| Add additional rows as needed | | | | | |
| Making Water Conservation a California Way of Life (UWUO) | 280 | 360 | 400 | 400 | 400 |
| | | | | | |
| | | | | | |
| | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. | | | | | |
| **NOTES:** | | | | | |

Water Code Section 10631(d)(4)(A) Water use projections, where available, shall display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

| Submittal Table 4-5 Retail: Water Loss Audit Reporting<br>Water Code Section 10631(d)(3)(A) | | |
|---|---|---|
| **Public Water System ID # Reported in Table 2-1 R** | Reporting Period | Submitted to DWR Water Loss Audit Program (yes/no) |
| **Report submittal status for all five years for each Public Water System as available. Add rows as needed** | | |
| CA3610049 | **2020** | Yes |
| | **2021** | Yes |
| | **2022** | Yes |
| | **2023** | Yes |
| | **2024** | Yes |
| **DWR NOTES:** Suppliers will provide a link to the WUEdata submittals of their Water Loss Audit Reports. | | |
| **NOTES:** | | |

CWC 10631(d)(3) (A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34.

2024 Twentynine Palms Water District CY2024 - Validated Water Audit.xlsx
2023 Twentynine Palms Water District CY2023 - Validated Water Audit.xlsx
2022 Twentynine Palms Water District CY2022 Water Audit Validated.xlsx
2021 2021 Twentynine Palms Water District - Validated Water Audit.xls
2020 2020 Twentynine Palms Water District - Validated Water Audit.xls

| *Optional* Submittal Table 4-5 Wholesale: Water Loss Audit Reporting<br>Water Code Section 10631(d)(3)(A) | | |
|---|---|---|
| **Public Water System ID #** | Reporting Period | Submitted to DWR Water Loss Audit Program (yes/no) |
| **Report submittal status for all five years for each Public Water System as available. Add rows as needed** | | |
| | **2020** | |
| | **2021** | |
| | **2022** | |
| | **2023** | |
| | **2024** | |
| **DWR NOTES:** Suppliers will provide a link to the WUEdata submittals of their Water Loss Audit Reports. | | |
| **NOTES:** | | |

CWC 10631(d)(3) (A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34.

**Submittal Table 4-6 Retail: Progress Towards 2028 Water Loss Standard**
**Water Code Section 10631(d)(3)(C)**

| Public Water System ID # Reported in Submittal Table 2-1 R | Did the Water Board Calculate a Water Loss Standard for this Public Water System? (y/n) If no, Supplier will not complete this row. | Real Water Loss | | | | | Apparent Water Loss | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | State Water Board Standard | | Most Recent AWWA Water Loss Audit | | | State Water Board Standard | | Most Recent AWWA Water Loss Audit | | |
| | | 2028 Real Water Loss Standard per Unit per day | Units for Real Water Loss Drop down list | Number of Units (Connections or Miles corresponding with units selected) | Volume of Total Real Loss (from AWWA Water Loss Audit) (AF) | Real Water Loss Per Unit per Day | 2028 Apparent Water Loss Standard per Unit per Day | Units for Apparent Water Loss | Number of Connections | Volume of Total Apparent Loss (from AWWA Water Loss Audit) (AF) | Apparent Water Loss Per Unit per Day |
| Add additional rows as needed. | | | | | | | | | | | |
| CA3610049 | Yes | 26.6 | Gallons per Service Connection per Day (GPSCD) | 7423 | 84.327 | 10.1 | 3.7 | Gallons per Service Connection per Day (GPSCD) | 7423 | 33.503 | 4.0 |
| | | | | | | | | Gallons per Service Connection per Day (GPSCD) | | | |
| | | | | | | | | Gallons per Service Connection per Day (GPSCD) | | | |

Water Board's Calculated Water Loss Standards

**DWR NOTES: Units of measure (AF, CCF, MG)** for Water Loss **MUST** remain consistent with units reported in Submittal Table 2-3. The units reported in Submittal Table 2-3 are used in this table's calculations.

**NOTES:** 2024 AWWA Water Loss Audit

CWC 10631(d)(3)(C) In the plan due July 1, 2021, and in each update thereafter, data shall be included to show whether the urban retail water supplier met the distribution loss standards enacted by the board pursuant to Section 10608.34.

| Submittal Table 5-1 Retail: SB X7-7 2020 Target Progress<br>Water Code Section 10608.40 | | | | | | |
|---|---|---|---|---|---|---|
| ☐ | **Check the box if the Supplier was not an Urban Water Supplier during or before the 2020 UWMP reporting cycle. Proceed to the next table.** | | | | | |
| Was Supplier part of a merger or consolidation since 2020? | Regional Alliance Target or Individual Target?<br>Drop down list | 2020 Target | Actual 2020 GPCD | Did Supplier Achieve Targeted Reduction for 2020? | **Only for suppliers that did not meet the Target in 2020**<br>**See DWR NOTES below.** | |
| | | | | | Actual 2025 GPCD<br>(From SB X7-7 Compliance Form) | Did Supplier meet the 2020 Target in 2025? |
| No | Individual Target | 163 | 135 | Yes | | NA |
| **DWR NOTES:**<br>**Suppliers calculating a 2025 GPCD** will need to complete and submit SB X 7-7 Compliance Tables to verify the use of SB X7-7 Methodologies.<br>**Suppliers that were part of a merger or consolidation since 2020** see Chapter 5 and Appendix P for guidance.<br>NA=Not Applicable | | | | | | |
| **NOTES:** | | | | | | |

10608.40 Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631.

| Submittal Table 6-1 Retail: Groundwater Volume Pumped<br>Water Code Section 10631(4) and 10631(4)(c) | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | Check the box if the Supplier does not pump groundwater.<br>Proceed to the next table. | | | | | | |
| ☐ | Check the box if all or part of the groundwater described below is desalinated. (OPTIONAL) | | | | | | |
| Groundwater Type<br>**Drop Down List**<br>May use each category multiple times | Potable or Non-Potable<br>(OPTIONAL)<br>**Drop down list** | Location or Basin Name | 2021 (AF) | 2022 (AF) | 2023 (AF) | 2024 (AF) | 2025 (AF) |
| **Add additional rows as needed** | | | | | | | |
| Alluvial Basin | Potable | Mesquite Springs Basin | 1,425 | 1,343 | 1,243 | 1,307 | 1,280 |
| Alluvial Basin | Potable | Fortynine Palms Subbasin | 284 | 227 | 231 | 250 | 150 |
| Alluvial Basin | Potable | Eastern Subbasin | 886 | 761 | 783 | 602 | 739 |
| Alluvial Basin | Potable | Indian Cove Subbasin | 129 | 134 | 90 | 180 | 151 |
| | | | | | | | |
| | | | | | | | |
| | | **Total** | 2,724 | 2,465 | 2,347 | 2,339 | 2,320 |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. | | | | | | | |
| **NOTES:** Historical groundwater pumping by basin for the last 5 years, not including backwash loss. | | | | | | | |

10631(4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information:

(C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

| Submittal Table 6-1 Wholesale: Groundwater Volume Pumped | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | Check the box if the Supplier does not pump groundwater. | | | | | | |
| ☐ | Check the box if all or part of the groundwater described below is desalinated. (OPTIONAL) | | | | | | |
| Groundwater Type<br>**Drop Down List**<br>May use each category multiple times | Potable or Non-Potable (OPTIONAL)<br>Drop down list | Location or Basin Name | 2021 (AF) | 2022 (AF) | 2023 (AF) | 2024 (AF) | 2025 (AF) |
| **Add additional rows as needed** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | **Total** | 0 | 0 | 0 | 0 | 0 |
| **DWR NOTES:** | | | | | | | |
| **NOTES:** | | | | | | | |

10631(4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information:
(C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

| Submittal Table 6-2 Retail: Wastewater Collected Within Service Area<br>Water Code Section 10633(a) | | | | |
|---|---|---|---|---|
| ☑ | Check the box if there is no wastewater collection system.<br>Proceed to the next table. | | | |
| | Percentage of 2025 service area served by wastewater collection system (OPTIONAL) | | | |
| | Percentage of 2025 service area population served by wastewater collection system (OPTIONAL) | | | |
| **Wastewater Collection** | | | **Recipient of Collected Wastewater** | |
| Name of Wastewater Collection Agency | Wastewater Volume Metered or Estimated?<br>OPTIONAL<br>**Drop Down List** | Volume of Wastewater Collected from UWMP Service Area 2025 (AF) | Name of Wastewater Treatment Plant (WWTP) and Place ID Number<br>**Drop down list** | Is WWTP Located Within UWMP Area?<br>**Drop Down List** |
| Add additional rows as needed | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Total Wastewater Received from UWMP Service Area in 2025:** | | 0 | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.<br>**Additional Guidance**: See Appendix M, Section M.21 for detailed guidance on this table. | | | | |
| **NOTES:** | | | | |

CWC 10633(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

**Submittal Table 6-3 Retail: Wastewater Treatment and Outcomes Within UWMP Service Area**
**Water Code Section 10633(b)**

☑ **Check the box if no wastewater is treated or disposed of within the UWMP service area.**
Proceed to the next table.

| Wastewater Treatment Plant Name and Place ID Number **Drop down list** | Does This Plant Treat Wastewater Generated Outside the UWMP Service Area? (OPTIONAL) **Drop down list** | 2025 Volume of Wastewater Received from UWMP Service Area (As Reported in Submittal Table 6-2 R) (AF) | Total 2025 Volume of Water Treated (AF) | 2025 Outcomes of Treated Wastewater | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Water Recycled Within UWMP Service Area** (enter data as applicable) | | **Water Recycled Outside of UWMP Service Area** (enter data as applicable) | | **Effluent Discharge that is not a Permitted Recycled Water Use** (enter data as applicable) | | **Required Discharge for Instream Flow** (enter data as applicable) | | **Delivered to Another Entity for Additional Treatment** (enter data as applicable) | | |
| | | | | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Name of other entity |
| Add additional rows as needed | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Total** | | 0 | - | | 0 | | 0 | | 0 | | 0 | | 0 | |

**DWR NOTES:**
**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
**IPR:** Indirect Potable Reuse would have the treatment level of its end use requirement in the Level of Treatment drop-down.
**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.

**NOTES:**

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier...and shall include all of the following:
**(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.**

**Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area**
**Water Code Section 10633(b)**

☐ Check the box if the Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water. Proceed to the next table.

| Wastewater Treatment Plant Name and Place ID Number **Drop down list** | Does This Plant Treat Wastewater Generated Outside the UWMP Service Area? (OPTIONAL) **Drop down list** | 2025 Volume of Wastewater Received from UWMP Service Area (AF) | Total 2025 Volume of Water Treated (AF) | 2025 Outcomes of Treated Wastewater | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Water Recycled Within UWMP Service Area** (enter data as applicable) | | **Water Recycled Outside of UWMP Service Area** (enter data as applicable) | | **Effluent Discharge that is not a Permitted Recycled Water Use** (enter data as applicable) | | **Required Discharge for Instream Flow** (enter data as applicable) | | **Delivered to Another Entity for Additional Treatment** (enter data as applicable) | | |
| | | | | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Treatment Level **Drop down list** | Volume (AF) | Name of other entity |
| Add additional rows as needed. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Total** | | 0 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |

**DWR NOTES:**
**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
**IPR:** Indirect Potable Reuse would have the treatment level of its end use requirement in the Level of Treatment drop-down.
**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.

**NOTES:**

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. ...and shall include all of the following:
**(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.**

**Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area**
**Water Code Section 10633 (c),(d),(e)**

| ☑ | Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled Water Use" and submit an accompanying narrative on the feasibility of that potential recycled water use. |
|---|---|

| | |
|---|---|
| Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) : | |
| Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) : | |
| Volume of Supplemental Water Added in 2025 (OPTIONAL) : | |
| Source of 2025 Supplemental Water (OPTIONAL) : | |

| Use Type<br>**Drop down list** | **Potable or Non-Potable**<br>(after treatment if treated)<br>(OPTIONAL)<br>Drop down list | Additional Information<br>(as needed) | 2025 (AF) | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) | **Potential Recycled Water Use** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Volume | Narrative page number (OPTIONAL) |
| Add additional rows as needed | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | Subtotal Potable | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | Subtotal Non-Potable | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | **Total** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.
**Potential recycled water use:** a description of the feasibility of these uses must be included in the narrative.
**Multiple Producers:** If you have multiple recycled water producers, submit a separate table for each.

**NOTES:**

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier... and shall include...
(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use
d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

**Submittal Table 6-4 Wholesale: Current and Projected Recycled Water Uses**
**Water Code Section 10633(c),(d),(e)**

| | |
|---|---|
| ☐ | Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled Water Use" and submit an accompanying narrative on the feasibility of that potential recycled water use. |
| Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) : | |
| Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) : | |
| Volume of Supplemental Water Added in 2025 (OPTIONAL) : | |
| Source of 2025 Supplemental Water (OPTIONAL) : | |

| Name of Receiving Supplier or Direct Use by Wholesale Supplier | Potable or Non-Potable (after treatment if treated) (OPTIONAL) Drop down list | Additional Information (as needed) | 2025 (AF) | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) | Potential Recycled Water Use | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Volume (AF) | Narrative page number (OPTIONAL) |
| Add additional rows as needed | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | Subtotal Potable | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | Subtotal Non-Potable | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | **Total** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**DWR NOTES:**
**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the unit of measure selected in Submittal Table 2-3.
**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.
**Potential recycled water use:** a description of the feasibility of these uses must be included in the narrative.
**Multiple Producers:** If you have multiple recycled water producers, submit a separate table for each.

**NOTES:**

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier... and shall include...
(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use
d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

**Submittal Table 6-5 Retail: 2020 UWMP Recycled Water Use Projection Compared to 2025 Actual**
**Water Code Section 10633(e)**

| ☑ | Check the box if recycled water was not used in 2025 nor previously projected for use in 2020.<br>Proceed to the next table. |
|---|---|

| **Use Type**<br>Drop Down list | 2020 Projection for 2025 (AF) | 2025 Actual Use (AF) |
|---|---|---|
| Add additional rows as needed | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| **Total** | 0 | 0 |

**DWR NOTES:**
**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3
**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.

**NOTES:**

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following: (e) ...a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision

| Submittal Table 6-5 Wholesale: 2020 UWMP Recycled Water Use Projection Compared to 2025 Actual<br>Water Code Section 10633(e) | | |
|---|---|---|
| ☐ | Check the box if recycled water was not used or distributed by the supplier in 2025, nor projected for use or distribution in 2020.<br>Proceed to the next table. | |
| **Name of Receiving Supplier or Direct Use by Wholesale Supplier** | 2020 Projection for 2025 (AF) | 2025 Actual Use (AF) |
| Add additional rows as needed | | |
| | | |
| | | |
| | | |
| | | |
| **Total** | 0 | 0 |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.<br>**Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table. | | |
| **NOTES:** | | |

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the serv`ice area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following: (e) ...a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision

| Submittal Table 6-6 Retail: Methods to Encourage Future Recycled Water Use<br>Water Code Section 10633(f) | | | |
|---|---|---|---|
| ☑ | Check the box if the Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation. | | |
| | Provide page location of narrative in the UWMP | | |
| Name of Action | Description | Planned Implementation Year | Expected Increase in Recycled Water Use (AF) |
| Add additional rows as needed | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | **Total (AF)** | 0 |
| | | **Unit Conversion to AF** | 0 |
| **DWR NOTES:**<br>**Units of measure** (AF, CCF, MG) MUST remain consistent with units reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.<br>**The unit conversion to Acre Feet** addresses the Water Code's requirement that this value be provided in acre-feet. | | | |
| **NOTES:** | | | |

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:
(f) a description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre feet of recycled water used per year.

| Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs<br>Water Code Section 10631(f) | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☑ | Check the box if there are no expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Proceed to the next table. | | | | | | |
| ☐ | Check the box if some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format. | | | | | | |
| | Provide page location of narrative in the UWMP | | | | | | |
| Name of Future Projects or Programs | Joint Project with other suppliers? | | Additional Description (as needed) | **Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list | Planned Implementation Year | Planned for Use in Year Type **Drop Down List** | Expected Increase in Water Supply to Supplier (This may be a range) (AF) |
| | **Drop Down List (yes/no)** | If Yes, Supplier Name | | | | | |
| Add additional rows as needed | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3. | | | | | | | |
| **NOTES:** | | | | | | | |

10631 (f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

| Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs<br>Water Code Section 10631(f) | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | Check the box if there are no expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply.<br>Proceed to the next table. | | | | | | |
| ☐ | Check the box if some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format. | | | | | | |
| | Provide page location of narrative in the UWMP | | | | | | |
| Name of Future Projects or Programs | Joint Project with other suppliers? | | Additional Description (as needed) | Potable or Non-Potable (after treatment if treated) (OPTIONAL) Drop down list | Planned Implementation Year | Planned for Use in Year Type **Drop Down list** | Expected Increase in Water Supply to Supplier (This may be a range) (AF) |
| | **Drop Down List (yes/no)** | If Yes, Supplier Name | | | | | |
| **Add additional rows as needed** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3. | | | | | | | |
| **NOTES:** | | | | | | | |

10631 (f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

| Submittal Table 6-8 Retail: Water Supplies — Actual<br>Water Code Section 10631(b) | | | | |
|---|---|---|---|---|
| **Water Supply** | | **2025** | | |
| **Drop down list**<br>May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool | Additional Description<br>(as needed) | **Potable or Non-Potable**<br>(after treatment if treated)<br>(OPTIONAL)<br>Drop Down list | Actual Volume<br>(AF) | Total Entitlement<br>(OPTIONAL)<br>See 'DWR Notes' below<br>(AF) |
| Add additional rows as needed | | | | |
| Groundwater (not desalinated) | Supplier Produced | Potable | 2,320 | |
| | | | | |
| | | | | |
| | | | | |
| | | Subtotal Potable | 2,320 | 0 |
| | | Subtotal Non-Potable | 0 | 0 |
| | | **Total** | 2,320 | 0 |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.<br>**Total Entitlement:** e.g. Water Right, Groundwater Allocation, Contracted Amount. | | | | |
| **NOTES:Total volume of water supplied in 2025** | | | | |

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information...

| Submittal Table 6-8 Wholesale: Water Supplies — Actual<br>Water Code Section 10631(b) | | | | |
|---|---|---|---|---|
| Water Supply | Additional Description (as needed) | 2025 | | |
| **Drop down list**<br>May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool | | **Potable or Non-Potable**<br>(after treatment if treated)<br>(OPTIONAL)<br>Drop Down list | Actual Volume (AF) | Total Entitlement (OPTIONAL)<br>See 'DWR Notes' below (AF) |
| Add additional rows as needed | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | Subtotal Potable | 0 | 0 |
| | | Subtotal Non-Potable | 0 | 0 |
| | | **Total** | 0 | 0 |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.<br>**Total Entitlement**: e.g. Water Right, Groundwater Allocation, Contracted Amount. | | | | |
| **NOTES:** | | | | |

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information

| *Optional* **Table 6-8DS: Source Water Desalination by Urban Water Supplier** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | Check the box if the Supplier does not reduce salinity in either groundwater or surface water prior to distribution. | | | | | | | | | | |
| Desalination Facility **Drop Down list** | Plant Capacity | Intake Type **Drop down list** | Source Water Type **Drop down list** | Influent TDS | Brine Discharge **Drop down list** | Volume of Water Desalinated | | | | | Name(s) of Agencies that Receive this Water |
| | | | | | | **2021 (AF)** | **2022 (AF)** | **2023 (AF)** | **2024 (AF)** | **2025 (AF)** | |
| **Add additional rows as needed** | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | **Total** | 0 | 0 | 0 | 0 | 0 | |
| **DWR NOTES:**<br>**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submital Table 2-3. This table identifies the units of measure reported in Submittal Table 2-3. | | | | | | | | | | | |
| **NOTES:** | | | | | | | | | | | |

**Submittal Table 6-9 Retail: Water Supplies — Projected**
**Water Code Section 10631 (b)**

| Water Supply | | | Projected Water Supply (Report to the Extent Practicable) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2030 | | 2035 | | 2040 | | 2045 | | 2050 (opt) | |
| **Drop down list** May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool | Additional Detail on Water Supply | **Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) |
| Add additional rows as needed | | | | | | | | | | | | |
| Groundwater (not desalinated) | Mesquite and Joshua Tree Basin | Potable | 6,995 | | 6,995 | | 6,995 | | 6,995 | | 6,995 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Subtotal Potable | | | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 |
| Subtotal Non-Potable | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | | | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 | 6,995 | 0 |

**DWR NOTES:**
**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.
**Total Entitlement:** e.g. Water Right, Groundwater Allocation, Contracted Amount.
**NOTES:** DWR Recommned pumping limit to prevent overdraft, See UWMP Table 4-6

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year

**Submittal Table 6-9 Wholesale: Water Supplies — Projected**
**Water Code Section 10631 (b)**

| Water Supply | | | Projected Water Supply (Report to the Extent Practicable) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2030 | | 2035 | | 2040 | | 2045 | | 2050 (opt) | |
| **Drop down list** May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool | Additional Detail on Water Supply | **Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) | Reasonably Available Volume (AF) | Total Entitlement (OPTIONAL) See 'DWR Notes' below (AF) |
| Add additional rows as needed | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Subtotal Potable | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Non-Potable | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**DWR NOTES:**

**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in a Submittal Table 2-3.

**Total Entitlement:** e.g. Water Right, Groundwater Allocation, Contracted Amount.

**NOTES:**

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year

## *Optional* Submittal Table O-1A: Recommended Energy Reporting - SINGLE DELIVERY PRODUCT - WATER SUPPLY PROCESS APPROACH

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Water Delivery Product** drop down list (If delivering more than one type of product recommend using Table O-1C) | | **Only for Water Delivery Products Under the Urban Water Supplier's Operational Control** | | | | | | | | |
| Start Date of Reporting Period | | **Water Management Process** | | | | | | | **Non-Consequential Hydropower (if applicable)** | |
| End Date of Reporting Period | | | | | | | | | | |
| Is upstream embedded energy included in the values reported? | | | | | | | | | | |
| | | Units for Water Volume | Extract and Divert | Place into Storage | Conveyance | Treatment | Distribution | **Total Utility** See DWR NOTES | Hydropower | Net Utility |
| Volume of Water Entering Process | | | | | | | | | | 0 |
| Energy Consumed (kWh) | | N/A | | | | | | 0 | | 0 |
| Energy Intensity (kWh/vol. converted to MG) | | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 |

**DWR NOTES: Total Utility:** The volume of water entered in the "Total Utility" column should equal the volume of water entering the distribution system (excluding recycled water); in most cases, this is the total volume calculated in UWMP Table 4-1: 2025 Actual Total Uses for Potable and Non-Potable Water. Note if recycled water is included in your Submittal Table 4-1, you must exclude it from your volume in this table.

**Quantity of Self-Generated Renewable Energy**

0 kWh

**Data Quality** (Estimate, Metered Data, Combination of Estimates and Metered Data)

**Data Quality Narrative:**

**Narrative:**

**NOTES:**

**10631.2.** (a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:

(1) An estimate of the amount of energy used to extract or divert water supplies.
(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.

(3) An estimate of the amount of energy used to treat water supplies.
(4) An estimate of the amount of energy used to distribute water supplies though its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

10631.2 (b) The Department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems.

## *Optional* Submittal Table O-1B: Recommended Energy Reporting - SINGLE DELIVERY PRODUCT - TOTAL UTILITY APPROACH

| | | | | |
|---|---|---|---|---|
| **Water Delivery Product** drop down list (If delivering more than one type of product recommend using Table O-1C) | Retail Potable Deliveries | **Only for Water Delivery Products Under the Urban Water Supplier's Operational Control** | | |
| Start Date of Reporting Period | 1/27/2025 | **Sum of All Water Management Processes** | **Non-Consequential Hydropower** | |
| End Date of Reporting Period | 12/19/2025 | | | |
| Is upstream embedded energy in the values reported? | No | | | |
| Units of Measure for Water | AF | **Total Utility** See DWR NOTES | **Hydropower** | **Net Utility** |
| Volume of Water Entering Process | | 2,320 | - | 2,320 |
| Energy Consumed (kWh) | | 2,875,174 | - | 2,875,174 |
| Energy Intensity (kWh/vol. converted to MG) | | 3,803 | - | 3,803 |

**DWR NOTES:**

**Total Utility:**The volume of water entered in the "Total Utility" column should equal the volume of water entering the distribution system (excluding recycled water); in most cases, this is the total volume calculated in UWMP Table 4-1: 2025 Actual Total Uses for Potable and Non-Potable Water. Note if recycled water is included in your Submittal Table 4-1, you must exclude it from your volume in this table.

**Quantity of Self-Generated Renewable Energy**

0 kWh

**Data Quality** (Estimate, Metered Data, Combination of Estimates and Metered Data)

Metered Data

**Data Quality Narrative:**

Energy consumed determined by Southern California Edison 2025 Billing & Usage report.
Volumes of Water delivered by District's 2025 Public Water System Statistics

**Narrative:**

The District's energy usage includes groundwater wells, booster stations, the district's office, paymeter, and a treatment plant.

**NOTES:**

**10631.2.** (a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier

(1) An estimate of the amount of energy used to extract or divert water supplies.
(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.
(3) An estimate of the amount of energy used to treat water supplies.
(4) An estimate of the amount of energy used to distribute water supplies though its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

10631.2 (b) The Department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems.

## Optional Submittal Table O-1C: Recommended Energy Reporting - MULTIPLE WATER DELIVERY PRODUCTS - WATER PROCESS APPROACH

| | |
|---|---|
| Start Date of Reporting Period | |
| End Date of Reporting Period | |
| Is upstream embedded energy in the values reported? | |
| Units of Measure for Water | |

**Only for Water Delivery Products Under the Urban Water Supplier's Operational Control**

| | Water Management Processes | | | | | | Non-Consequential Hydropower (if applicable) | |
|---|---|---|---|---|---|---|---|---|
| | Extract and Divert | Place into Storage | Conveyance | Treatment | Distribution | **Total Utility See DWR NOTES** | **Hydropower** | **Net Utility** |
| **Total Volume of Water Entering Each Process for All Product Types** | | | | | | | | N/A |
| Retail Potable Deliveries (%) | | | | | | Enter in Column C of table below | | |
| Retail Non-Potable Deliveries (%) | | | | | | | | |
| Wholesale Potable Deliveries(%) | | | | | | | | |
| Wholesale Non-Potable Deliveries (%) | | | | | | | | |
| Agricultural Deliveries (%) | | | | | | | | |
| Environmental Deliveries (%) | | | | | | | | |
| Other (%) | | | | | | | | |
| Total Percentage [must equal 100%] | 0% | 0% | 0% | 0% | 0% | N/A | 0% | N/A |
| **Total Energy Consumed by Each Process for All Product Types (kWh)** | | | | | | 0 | | 0 |
| **Energy Intensity (kWh/vol. converted to MG)** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A | 0.0 | N/A |

**DWR NOTES:** The volume of water entered in the "Total Utility" column should equal the volume of water entering the distribution system (excluding recycled water); in most cases, this is the total volume calculated in UWMP Table 4-1: 2025 Actual Total Uses for Potable and Non-Potable Water. Note if recycled water is included in your Submittal Table 4-1, you must exclude it from your volume in this table.

| **Product Type** | Delivery Volume by Product (volume units defined above) | Total Energy Intensity (kWh/volume) | Net Energy Intensity (kWh/volume) |
|---|---|---|---|
| Retail Potable | | - | - |
| Retail Non-Potable | | - | - |
| Wholesale Potable | | - | - |
| Wholesale Non-Potable | | - | - |
| Agricultural | | - | - |
| Environmental | | - | - |
| Other | | - | - |
| **Total of All Products** | **0** | **0.0** | **-** |

**DWR NOTES:** The volume of water entered in the "Total Utility" column should equal the volume of water entering the distribution system (excluding recycled water); in most cases, this is the total volume calculated in UWMP Table 4-1: 2025 Actual Total Uses for Potable and Non-Potable Water. Note if recycled water is included in your Submittal Table 4-1, you must exclude it from the volume reported in Table O1-C..

**Quantity of Self-Generated Renewable Energy**

kWh

**Data Quality** (drop down)

**Data Quality Narrative:**

**Narrative:**

**NOTES:**

| *Optional* Submittal Table O-2: Recommended Energy Reporting - WASTEWATER AND RECYCLED WATER | | | | | |
|---|---|---|---|---|---|
| Start Date of Reporting Period | | Only for Water Delivery Products Under the Urban Water Supplier's Operational Control | | | |
| End Date of Reporting Period | | | | | |
| Is upstream embedded energy in the values reported? | | Water Management Process | | | |
| Units of Measure for Water | | Collection / Conveyance | Treatment | Discharge / Distribution | Total |
| Volume of Wastewater Entering Process (volume units selected above) | | | | | 0 |
| Wastewater Energy Consumed (kWh) | | | | | 0 |
| Wastewater Energy Intensity (kWh/volume converted to MG) | | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume of Recycled Water Entering Process (volume units selected above) | | | | | 0 |
| Recycled Water Energy Consumed (kWh) | | | | | 0 |
| Recycled Water Energy Intensity (kWh/volume converted to MG) | | 0.0 | 0.0 | 0.0 | 0.0 |

**Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations**

kWh

**Data Quality** (drop down)

**Data Quality Narrative:**

**Narrative:**

**NOTES:**

## *Optional* Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)

| Year Type | Base Year<br>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2024-2025, use 2025 | Available Supplies if Year Type Repeats | |
|---|---|---|---|
| | | ☐ Check the box if quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.<br>**Location:** [insert location from UWMP] | |
| | | Quantification of available supplies is provided in this table as either volume only, percent only, or both. | |
| | | **Volume Available (AF)** | **% of Average Supply** |
| Average Year | | | 100% |
| Single-Dry Year | 2025 | 6995 | |
| Consecutive Dry Years 1st Year | 2030 | 6995 | |
| Consecutive Dry Years 2nd Year | 2035 | 6995 | |
| Consecutive Dry Years 3rd Year | 2040 | 6995 | |
| Consecutive Dry Years 4th Year | 2045 | 6995 | |
| Consecutive Dry Years 5th Year | 2050 | 6995 | |

**DWR NOTES:** Supplier may use multiple versions of Submittal Table 7-1 R if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Submittal Table 7-1 R, in the "Note" section of each submittal table, state that multiple versions of Submittal Table 7-1 R are being used and identify the particular water source that is being reported in each submittal table.
**Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the units of measure reported in Submittal Table 2-3.

**NOTES:** DWR recommended pumping limit to prevent overdraft, See Table 4-2.

## OPTIONAL Submittal Table 7-1 Wholesale: Basis of Water Year Data (Reliability Assessment)

| Year Type | Base Year<br>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2024-2025, use 2025 | Available Supplies if Year Type Repeats | |
|---|---|---|---|
| | | ☐ Check the box if quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.<br>**Location:** [insert location from UWMP] | |
| | | Quantification of available supplies is provided in this table as either volume only, percent only, or both. | |
| | | **Volume Available (AF)** | **% of Average Supply** |
| Average Year | | | 100% |
| Single-Dry Year | | | |
| Consecutive Dry Years 1st Year | | | |
| Consecutive Dry Years 2nd Year | | | |
| Consecutive Dry Years 3rd Year | | | |
| Consecutive Dry Years 4th Year | | | |
| Consecutive Dry Years 5th Year | | | |

**DWR NOTES:** Supplier may use multiple versions of Submittal Table 7-1 W if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Submittal Table 7-1 W, in the "Note" section of each submittal table, state that multiple versions of Submittal Table 7-1 W are being used and identify the particular water source that is being reported in each submittal table.
**Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the unit of measure selected in Submittal Table 2-3.

**NOTES:**

| Submittal Table 7-2 Retail: Normal Year Supply and Use Comparison<br>Water Code Section 10635 (a) | | | | | |
|---|---|---|---|---|---|
| | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 (AF)** |
| Supply totals<br>(autofill from Submittal Table 6-9 R) | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Use totals<br>(autofill from Submittal Table 4-2 R) | 2,360 | 2,410 | 2,470 | 2,550 | 2,610 |
| Surplus/(shortfall) | 4,635 | 4,585 | 4,525 | 4,445 | 4,385 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES : Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| **NOTES:** | | | | | |

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a **normal**

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-2 Retail: Normal Year Supply and Use Comparison - POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals (autofill from Submittal Table 6-9 R) | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Use totals (autofill from Submittal Table 4-2 R) | 2,280 | 2,330 | 2,390 | 2,470 | 2,530 |
| Surplus/(shortfall) | 4,715 | 4,665 | 4,605 | 4,525 | 4,465 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfa | | | | | |
| NOTES: | | | | | |

| OPTIONAL Submittal Table 7-2 Retail: Normal Year Supply and Use Comparison - NON-POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals (autofill from Submittal Table 6-9 R) | 0 | 0 | 0 | 0 | 0 |
| Use totals (autofill from Submittal Table 4-2 R) | 80 | 80 | 80 | 80 | 80 |
| Surplus/(shortfall) | (80) | (80) | (80) | (80) | (80) |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| NOTES: | | | | | |

| Submittal Table 7-2 Wholesale: Normal Year Supply and Use Comparison<br>Water Code Section 10635 (a) | | | | | |
|---|---|---|---|---|---|
| | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 (AF)** |
| Supply totals<br>(autofill from Submittal Table 6-9 W) | 0 | 0 | 0 | 0 | 0 |
| Use totals<br>(see OPTIONAL Submittal Table 4-2 W) | | | | | |
| Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES : Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: | | | | | |

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-2 Wholesale: Normal Year Supply and Use Comparison - POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals (autofill from Submittal Table 6-9 W) | 0 | 0 | 0 | 0 | 0 |
| Use totals (see OPTIONAL Submittal Table 4-2 W) | | | | | |
| Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| NOTES | | | | | |

| OPTIONAL Submittal Table 7-2 Wholesale: Normal Year Supply and Use Comparison - NON-POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals (autofill from Submittal Table 6-9 W) | 0 | 0 | 0 | 0 | 0 |
| Use totals (see OPTIONAL Submittal Table 4-2 W) | | | | | |
| Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| NOTES | | | | | |

| Submittal Table 7-3 Retail: Single Dry Year Supply and Use Comparison<br>Water Code Section 10635(a) | | | | | |
|---|---|---|---|---|---|
| | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 (AF)** |
| Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| Use totals | 2,600 | 2,650 | 2,720 | 2,810 | 2,880 |
| Surplus/(shortfall) | 4,395 | 4,345 | 4,275 | 4,185 | 4,115 |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES : Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: Estimated detmand totals assumes a 10% increase in demands in a single-dry year. Based on the highest single-dry year increase (2002) in demands over the historical period 1990-2015, See Table 7-3. | | | | | |

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a normal water year, a **single dry water year**, and a drought lasting five consecutive water years.

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-3 Retail: Single Dry Year Supply and Use Comparison - POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals | | | | | |
| Use totals | | | | | |
| Surplus/(shortfall) | | | | | |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES : Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES | | | | | |

| OPTIONAL Submittal Table 7-3 Retail: Single Dry Year Supply and Use Comparison - NON-POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals | | | | | |
| Use totals | | | | | |
| Surplus/(shortfall) | | | | | |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES : Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES | | | | | |

| Submittal Table 7-3 Wholesale: Single Dry Year Supply and Use Comparison<br>Water Code Section 10635(a) | | | | | |
|---|---|---|---|---|---|
| | **2030 (AF)** | **2035 (AF)** | **2040 (AF)** | **2045 (AF)** | **2050 (AF)** |
| Supply totals | | | | | |
| Use totals | | | | | |
| Surplus/(shortfall) | | | | | |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: | | | | | |

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-3 Wholesale: Single Dry Year Supply and Use Comparison - POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals | | | | | |
| Use totals | | | | | |
| Surplus/(shortfall) | | | | | |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: | | | | | |

| OPTIONAL Submittal Table 7-3 Wholesale: Single Dry Year Supply and Use Comparison - NON-POTABLE | | | | | |
|---|---|---|---|---|---|
| | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| Supply totals | | | | | |
| Use totals | | | | | |
| Surplus/(shortfall) | | | | | |
| **OPTIONAL Planned WSCP Actions** | | | | | |
| WSCP - supply augmentation benefit | | | | | |
| WSCP - use reduction savings benefit | | | | | |
| Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: | | | | | |

| Submittal Table 7-4 Retail: Multiple Dry Years Supply and Use Comparison<br>Water Code Section 10635(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| First year | Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| | Use totals | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| | Surplus/(shortfall) | 4,575 | 4,525 | 4,455 | 4,385 | 4,315 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| | Use totals | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| | Surplus/(shortfall) | 4,575 | 4,525 | 4,455 | 4,385 | 4,315 |
| | **OPTIONAL WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| | Use totals | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| | Surplus/(shortfall) | 4,575 | 4,525 | 4,455 | 4,385 | 4,315 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| | Use totals | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| | Surplus/(shortfall) | 4,575 | 4,525 | 4,455 | 4,385 | 4,315 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| | Use totals | 2,420 | 2,470 | 2,540 | 2,610 | 2,680 |
| | Surplus/(shortfall) | 4,575 | 4,525 | 4,455 | 4,385 | 4,315 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | | |
| **NOTES:** Assumes a 2.5% increase in demands during a multiple-dry year. Based on the highest five year multiple-dry year increase (2011-2015) in demands over the historical period 1990-2015, See Table 7-4. | | | | | | |

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a normal

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

**OPTIONAL Submittal Table 7-4 Retail: Multiple Dry Years Supply and Use Comparison - POTABLE**

| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
|---|---|---|---|---|---|---|
| First year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.

NOTES:

**OPTIONAL Submittal Table 7-4 Retail: Multiple Dry Years Supply and Use Comparison - NON-POTABLE**

| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
|---|---|---|---|---|---|---|
| First year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.

NOTES:

| Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Use Comparison<br>Water Code Section 10635(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
| First year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | | |
| NOTES: | | | | | | |

If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.

**OPTIONAL Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Use Comparison - POTABLE**

| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
|---|---|---|---|---|---|---|
| First year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.

NOTES:

**OPTIONAL Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Use Comparison - NON-POTABLE**

| | | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) | 2050 (AF) |
|---|---|---|---|---|---|---|
| First year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Second year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Third year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fourth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |
| Fifth year | Supply totals | | | | | |
| | Use totals | | | | | |
| | Surplus/(shortfall) | 0 | 0 | 0 | 0 | 0 |
| | **OPTIONAL Planned WSCP Actions** | | | | | |
| | WSCP - supply augmentation benefit | | | | | |
| | WSCP - use reduction savings benefit | | | | | |
| | Revised Surplus/(shortfall) | | | | | |

**DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.

NOTES:

| Submittal Table 7-5 Retail: Five-Year Drought Risk Assessment | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | 2,300 |
| Total Supplies (AF) | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,695 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | 2,310 |
| Total Supplies (AF) | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,685 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | 2,320 |
| Total Supplies (AF) | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,675 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | 2,330 |
| Total Supplies (AF) | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,665 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | 2,360 |
| Total Supplies (AF) | 6,995 |
| Surplus/Shortfall w/o WSCP Action | 4,635 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | |
| **NOTES:** Values are rounded | |

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-5 Retail: Five-Year Drought Risk Assessment - | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | |
| NOTES: | |

| OPTIONAL Submittal Table 7-5 Retail: Five-Year Drought Risk Assessment - NON- | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | |
| NOTES: | |

10635 (b) Every urban water supplier shall include, as part of its urban water management plan, a **drought risk assessment** for its water service... The drought risk assessment shall include each of the following:

(1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.
(2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.
(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.
(4) Considerations of the historical drought hydrology, ...

| Submittal Table 7-5 Wholesale: Five-Year Drought Risk Assessment<br>Water Code Section 10635(b)(3) | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | |
| NOTES: | |

**If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.**

| OPTIONAL Submittal Table 7-5 Wholesale: Five-Year Drought Risk | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout | |
| NOTES: | |

| OPTIONAL Submittal Table 7-5 Wholesale: Five-Year Drought Risk | |
|---|---|
| **2026** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2027** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2028** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2029** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **2030** | **Total** |
| Total Water Use (AF) | |
| Total Supplies (AF) | |
| Surplus/Shortfall w/o WSCP Action | 0 |
| **OPTIONAL Planned WSCP Actions** (use reduction and supply augmentation) | |
| WSCP - supply augmentation benefit (AF) | |
| WSCP - use reduction savings benefit (AF) | |
| Revised Surplus/(shortfall) | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout | |
| NOTES: | |

10635 (b) Every urban water supplier shall include, as part of its urban water management plan, a **drought risk assessment** for its water service... The drought risk assessment shall include each of the following:

(1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.

(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.

(4) Considerations of the historical drought hydrology, ...

(2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.

**(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.**

| Submittal Table 8-1: Cross-reference for Standard vs Supplier Shortage Levels<br>Water Code Section 10632(a)(3)(B) | | | |
|---|---|---|---|
| ☑ | Check the box if the Supplier uses the Standard six levels of water shortage.<br>Proceed to the next table. | | |
| **Standard Shortage Levels** | **Percent Shortage Range** | **Suppliers Shortage Levels** | **Percent Shortage Range** |
| 1 | Up to 10% | | |
| 2 | Up to 20% | | |
| 3 | Up to 30% | | |
| 4 | Up to 40% | | |
| 5 | Up to 50% | | |
| 6 | >50% | | |
| **NOTES:** | | | |

10632 (a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:

(3)(A)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. **Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use.** Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.

(B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagaph (A) by developing and including a cross-reference relating its existing categores to the six standard water shortage levels.

| Submittal Table 8-2 Retail: Supply Augmentation and Other Actions<br>Water Code Section 10632(a)(4)(A),(C) and (E) | | | | |
|---|---|---|---|---|
| Yes | Is the Supplier completing this table using the standard six levels? (yes/no) | | | |
| Shortage Level | Supply Augmentation Methods and Other Actions by Water Supplier<br>**Drop down list**<br>These are the only categories that will be accepted by the WUEdata online submittal tool | How much is this going to reduce the shortage gap? | | Additional Explanation or Reference (OPTIONAL) |
| | | Volume or Percentage<br>Drop down | Shortage Gap Reduction Value (May be a range) (AF) | |
| Add additional rows as needed | | | | |
| 3 | Other Actions (describe) | Volume | 780 | Pump Additional Groundwater |
| 4 | Other Actions (describe) | Volume | 1,050 | Pump Additional Groundwater |
| 5 | Other Actions (describe) | Volume | 1,310 | Pump Additional Groundwater |
| 6 | Other Actions (describe) | Volume | 1,570 | Pump Additional Groundwater |
| | | | | |
| | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | |
| NOTES: | | | | |

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:

(A) Locally appropriate supply augmentation actions.

(C) Locally appropriate operational changes.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

| Submittal Table 8-2 Wholesale: Supply Augmentation and Other Actions<br>Water Code Section 10632(a)(4)(A),(C) and (E) | | | | |
|---|---|---|---|---|
| | Is the Supplier completing this table using the standard six levels? (yes/no) | | | |
| Shortage Level | Supply Augmentation Methods and Other Actions by Water Supplier<br>**Drop down list**<br>These are the only categories that will be accepted by the WUEdata online submittal tool | How much is this going to reduce the shortage gap? | | Additional Explanation or Reference (OPTIONAL) |
| | | Volume or Percentage<br>Drop down | Shortage Gap Reduction Value<br>(May be a range) (AF) | |
| Add additional rows as needed | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | |
| NOTES: | | | | |

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:

(A) Locally appropriate supply augmentation actions.

(C) Locally appropriate operational changes.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

| Submittal Table 8-3 Retail: Demand Reduction Actions<br>Water Code Section 10632(a)(4)(B),(D), and (E) | | | | | |
|---|---|---|---|---|---|
| Yes | Is the Supplier completing this table using the standard six levels? (yes/no) | | | | |
| Shortage Level | Demand Reduction Actions<br>**Drop down list**<br>These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply. | How much is this going to reduce the shortage gap? | | Additional Explanation or Reference (OPTIONAL) | Penalty, Charge, or Other Enforcement?<br>**For Retail Suppliers Only**<br>Drop Down List |
| | | Volume or Percentage<br>Drop down | Shortage Gap Reduction Value (May be a range) (AF) | | |
| Add additional rows as needed | | | | | |
| 1 | Expand Public Information Campaign | Percentage | 7 | Based on AWWA 2008 assumes savings of 7% | No |
| 2 | Landscape - Other landscape restriction or prohibition | Percentage | 2 | Outdoor water limited to 3 days a week. Based on AWWA 2011 | Yes |
| 3 | Implement or Modify Drought Rate Structure or Surcharge | Percentage | 10 | Based on AWWA 2011 assumes savings of 10% | Yes |
| 4 | Expand Public Information Campaign | Percentage | 22 | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 5 | Implement or Modify Drought Rate Structure or Surcharge | Percentage | 15 | Based on AWWA 2011 assumes savings of 15% | Yes |
| 6 | Landscape - Other landscape restriction or prohibition | Percentage | 18 | Outdoor water use prohibited | Yes |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | | |
| NOTES: WSCP Table 5-5 | | | | | |

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
(B) Locally appropriate demand reduction actions to adequately respond to shortages.
(D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.
(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

| Submittal Table 8-3 Wholesale: Demand Reduction Actions<br>Water Code Section 10632(a)(4)(B) and (E) | | | | |
|---|---|---|---|---|
| | Is the Supplier completing this table using the standard six levels? (yes/no) | | | |
| Shortage Level | Demand Reduction Actions<br>**Drop down list**<br>These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply. | How much is this going to reduce the shortage gap? | | Additional Explanation or Reference (OPTIONAL) |
| | | Volume or Percentage<br>Drop down | Shortage Gap Reduction Value (May be a range) (AF) | |
| Add additional rows as needed | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| **DWR NOTES: Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. | | | | |
| NOTES: | | | | |

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
(B) Locally appropriate demand reduction actions to adequately respond to shortages.
(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

| Submittal Table 10-1 Retail: Notification to Cities and Counties<br>Water Code Section 10621(b) and 10642 | | |
|---|---|---|
| City Name | 60 Day Notice<br>**Drop Down (yes/no)** | Notice of Public Hearing<br>**Drop Down (yes/no)** |
| Add additional rows as needed | | |
| City of Twentynine Palms | Yes | Yes |
| | | |
| | | |
| County Name<br>**Drop Down List** | 60 Day Notice<br>**Drop Down (yes/no)** | Notice of Public Hearing<br>**Drop Down (yes/no)** |
| Add additional rows as needed | | |
| San Bernardino County | Yes | Yes |
| | | |
| **NOTES:** District also sent to entites noted in UWMP Table 1-2. | | |

CWC 10621 (b)Notify at least 60 days prior to the public hearing any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.
CWC 10642 The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.

| Submittal Table 10-1 Wholesale: Notification to Cities and Counties<br>Water Code Section 10621(b) and 10642 | | |
|---|---|---|
| ☐ | Check the box if the Supplier has notified more than 10 cities or counties.<br>**Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.** | |
| | Provide the page or location of this list in the UWMP. | |
| ☐ | Check the box if the Supplier has notified 10 or fewer cities or counties.<br>**Complete the table below.** | |
| City Name | 60 Day Notice<br>**Drop Down (yes/no)** | Notice of Public Hearing<br>**Drop Down (yes/no)** |
| Add additional rows as needed | | |
| | | |
| | | |
| | | |
| County Name<br>**Drop Down List** | 60 Day Notice<br>**Drop Down (yes/no)** | Notice of Public Hearing<br>**Drop Down (yes/no)** |
| Add additional rows as needed | | |
| | | |
| | | |
| NOTES: | | |

CWC 10621 (b)Notify at least 60 days prior to the public hearing any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

CWC 10642 The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.

# Appendix G: Groundwater Management Plan

Kennedy Jenks

35 N. Lake Avenue, Suite 550
Pasadena, CA 91101
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# Twentynine Palms Groundwater Management Plan 2024 Update

30 July 2025



Prepared for

**Twentynine Palms Water District**
72401 Hatch Road
Twentynine Palms, California 92277-2935

KJ Project No. 2444214*00

# Table of Contents

*List of Tables* ..... *iv*

*List of Figures (provided at the end of the GWMP)* ..... *iv*

*List of Appendices* ..... *v*

*List of Abbreviations* ..... *vi*

*Executive Summary* ..... *1*

**Section 1: Introduction ..... 1-1**

1.1 Plan Objectives ..... 1-1
1.2 Plan Requirements and Organization ..... 1-1
1.3 Plan Preparation and Adoption Process ..... 1-4
1.4 Plan Sections ..... 1-4

**Section 2: GWMP Management Area ..... 2-1**

2.1 Twentynine Palms Water District ..... 2-1
2.2 Regional Water Purveyors ..... 2-2
2.3 Delineation of DWR Groundwater Basins and Subbasins ..... 2-3
2.4 Geology ..... 2-4
2.4.1 Geologic Units ..... 2-4
2.4.2 Faults and Folding ..... 2-5
2.5 Hydrology ..... 2-6

**Section 3: Groundwater Usage ..... 3-1**

3.1 Historical Groundwater Pumpage by TPWD ..... 3-1
3.2 TPWD Water Use Assessment ..... 3-3
3.3 Groundwater Pumping Capacity ..... 3-3

**Section 4: Groundwater Supply Assessment ..... 4-1**

4.1 Aquifers ..... 4-1
4.2 Groundwater Conditions ..... 4-1
4.2.1 Joshua Tree Basin ..... 4-1
*4.2.1.1* Indian Cove Subbasin ..... 4-2
4.2.1.2 Fortynine Palms Subbasin ..... 4-2
4.2.1.3 Eastern Subbasin ..... 4-3
4.2.2 Twentynine Palms Valley Basin ..... 4-3
4.2.2.1 Mesquite Lake Subbasin ..... 4-3
4.2.2.2 Mainside Subbasin ..... 4-4
4.3 DWR Definition of Recharge Areas ..... 4-4

4.4 Hydrologic Water Budget ..... 4-4
4.5 Long-Term Groundwater Sustainability ..... 4-6
4.5.1 Hydrologic Water Budget - 2045 Projected Conditions ..... 4-6
4.5.2 Long-Term Supply Sustainability Actions ..... 4-7
4.5.2.1 Mitigation of Overdraft Conditions ..... 4-7
4.5.2.2 Groundwater Model Analysis of Potential Future Conditions ..... 4-8
4.5.3 Groundwater Recharge and Storage Projects ..... 4-8
4.5.4 Potential of Land Subsidence ..... 4-9

**Section 5: Groundwater Quality Conditions .....5-1**

5.1 Water Quality ..... 5-1
5.1.1 Salts and Nutrients ..... 5-2
5.1.2 Natural Constituents ..... 5-2
5.1.2.1 Fluoride ..... 5-2
5.1.2.2 Arsenic ..... 5-3
5.1.2.3 Chromium-6 ..... 5-3
5.2 Groundwater Quality Trends ..... 5-3
5.3 TPWD Water Treatment ..... 5-7
5.4 Wastewater Management ..... 5-8
5.5 Water Quality Management Actions ..... 5-8
5.5.1 Control of High-Salinity Waters ..... 5-9
5.5.2 Regulation of the Migration of Contaminated Groundwater ..... 5-9
5.5.3 Wellhead Protection Areas and Recharge Areas ..... 5-9
5.5.4 Well Construction Policies ..... 5-9
5.5.5 Well Abandonment and Destruction Program ..... 5-10

**Section 6: Basin Management Objectives and Implementation Plan.....6-1**

6.1 Basin Management Objectives ..... 6-1
6.1.1 BMO #1 – Manage Groundwater Levels to Maintain Water Supply Sustainability and Reliability ..... 6-2
6.1.2 BMO #2 – Maintain and Protect Groundwater Quality ..... 6-3
6.1.3 BMO #3 – Support Development of a Local Program for Septic Tank Management ..... 6-4
6.1.4 BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence ..... 6-5
6.1.5 BMO #5 – Promote Public Participation and Coordination with Other Local Agencies ..... 6-7
6.1.6 BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues ..... 6-8
6.1.7 BMO #7 – Identify and Obtain Funding Sources for Groundwater Projects ..... 6-10
6.2 Implementation Plan ..... 6-10

*References ..... 1*

## List of Tables

Table 1-1. Legislative Requirements Summary ..... 1-3
Table 3-1. TPWD Production Well Summary ..... 3-2
Table 3-2. Estimated Annual Water Demand 2010 to 2045 ..... 3-4
Table 3-3. TPWD Active Production Well Capacity and Use Summary ..... 3-5
Table 4-1. Hydrologic Water Budget Summary: 2024 Conditions ..... 4-5
Table 4-2. Hydrologic Water Budget Summary: Project 2045 Conditions ..... 4-7
Table 5-1. Nitrates and TDS Summary for TPWD Production Wells ..... 5-4
Table 5-2. Fluoride and Arsenic Summary for TPWD Production Wells ..... 5-5
Table 5-3. Chromium Summary for TPWD Production Wells ..... 5-6
Table 6-1. GWMP Implementation Plan Summary ..... 6-11

## List of Figures *(provided at the end of the GWMP)*

Figure 2-1 Twentynine Palms Area Map
Figure 2-2 Regional Water Districts
Figure 2-3 DWR Groundwater Basins
Figure 2-4 TPWD Groundwater Subbasins
Figure 2-5 Geologic Map
Figure 2-6 Physiographic Map
Figure 3-1 Groundwater Subbasins and Wells in GWMP Area
Figure 3-2 Annual Pumping from TPWD Wells by Subbasin
Figure 4-1 Spring Groundwater Elevation Map
Figure 4-2 Fall Groundwater Elevation Map
Figure 4-3 Hydrograph Showing Groundwater Elevation History for Indian Cove Subbasin
Figure 4-4 Hydrograph Showing Groundwater Elevation History for 49 Palms Subbasin
Figure 4-5 Hydrograph Showing Groundwater Elevation History for Eastern Subbasin
Figure 4-6 Hydrograph Showing Groundwater Elevation History for Mesquite Lake Subbasin
Figure 4-7 Hydrograph Showing Groundwater Elevation History for Mainside Subbasin
Figure 4-8 DWR Groundwater Recharge Areas
Figure 4-9 Subsidence Indicators

## List of Appendices

A Resolution and Ordinance for GWMP Adoption
B TPWD Groundwater Monitoring Implementation Plan (2020)
C GWMP Area Geologic Cross Sections (Kennedy Jenks, 2010)
D Hydrologic Water Balance

## List of Abbreviations

| | |
|---|---|
| AB | Assembly Bill |
| AF | Acre-feet |
| AFY | Acre-Feet per Year |
| As | Arsenic |
| bgs | Below Ground Surface |
| BMOs | Best Management Objectives |
| CASGEM | Statewide Groundwater Elevation Monitoring |
| CECs | Contaminants of Emerging Concern |
| City | City of Twentynine Palms |
| COC | Constituent of Concern |
| County | San Bernardino County |
| Cr-6 | Hexavalent Chromium |
| CWSA | Community Water Systems Alliance |
| DDW | Division of Drinking Water |
| District | Twentynine Palms Water District |
| DWR | California Department of Water Resources |
| DWSAP | Drinking Water Source Assessment and Protection |
| EPA | US Environmental Protection Agency |
| ET | Evapotranspiration |
| F | Fluoride |
| GPCD | Gallons per capita per day |
| gpm | Gallons per minute |
| GWMP | Groundwater Management Plan |
| IRWMP | Integrated Regional Water Management Plan |
| JBWD | Joshua Basin Water District |
| LAMP | Local Agency Management Program |
| Marine Base | Marine Air Ground Task Force Training Command Center |
| MCL | Maximum Contaminant Level |
| mg/L | Milligrams per liter |
| MGD | Million gallons per day |
| MWA | Mojave Water Agency |

| | |
|---|---|
| NGS | National Geodetic Survey |
| NL | Notification Level |
| NOAA | National Oceanic and Atmospheric Administration |
| O&M | Operations and Maintenance |
| OWTS | Onsite Wastewater Treatment System |
| PCAs | Potentially Contaminating Activities |
| PHG | Public Health Goal |
| PHG | Public Health Goal |
| QTf | Tertiary-Quaternary Age |
| RL | Response Level |
| RWQCB | Regional Water Quality Control Board |
| SB | Senate Bill |
| SDWA | Safe Drinking Water Act |
| SGMA | Sustainable Groundwater Management Act |
| SMCL | Secondary Maximum Contaminant Level |
| SNMP | Salt and Nutrient Management Plan |
| SSME | Septic System Management Elements |
| SSMP | Septic System Management Program |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| TDS | Total Dissolved Solids |
| TPWD | Twentynine Palms Water District |
| Ts | Tertiary Age |
| ug/L | Micrograms per liter |
| USGS | United States Geological Survey |
| UWMP | Urban Water Management Plan |
| WMP | Water Management Plan |
| WSA | Water Supply Assessment |

# Executive Summary

The **2024 Groundwater Management Plan (GWMP)** Update is intended to provide the Twentynine Palms Water District (TPWD or District) with a planning tool to protect the quantity and quality of groundwater within its service area. The 2024 GWMP update leverages information from:

- **2014 Groundwater Management Plan** – The 2014 characterized groundwater conditions at the time and identified best management objectives for managing the resource. The 2024 GWMP updates the 2014 plan with more current data and information.
- **2020 Urban Water Management Plan** – The 2020 UWMP is a mandated planning document that guides the actions of urban water suppliers, providing managers and the public with a broad perspective of water supply issues.
- **Ongoing Data Collection by the District** – the GWMP incorporates pumping and water quality data through 2023 and water level monitoring data up to August 2024.

The following 10 points provide an overview of the 2024 GWMP Update.

## ES-1 Purpose

The **purpose** of the 2024 GWMP is to serve as a planning tool to assist the District to maintain safe, sustainable, and high-quality groundwater resources in the long term. Groundwater management is planned and coordinated locally to ensure a sustainable groundwater basin to meet future water supply needs. The **objectives** of the updated GWMP are to address issues of **groundwater sustainability, water supply reliability, aquifer health, and water quality**.

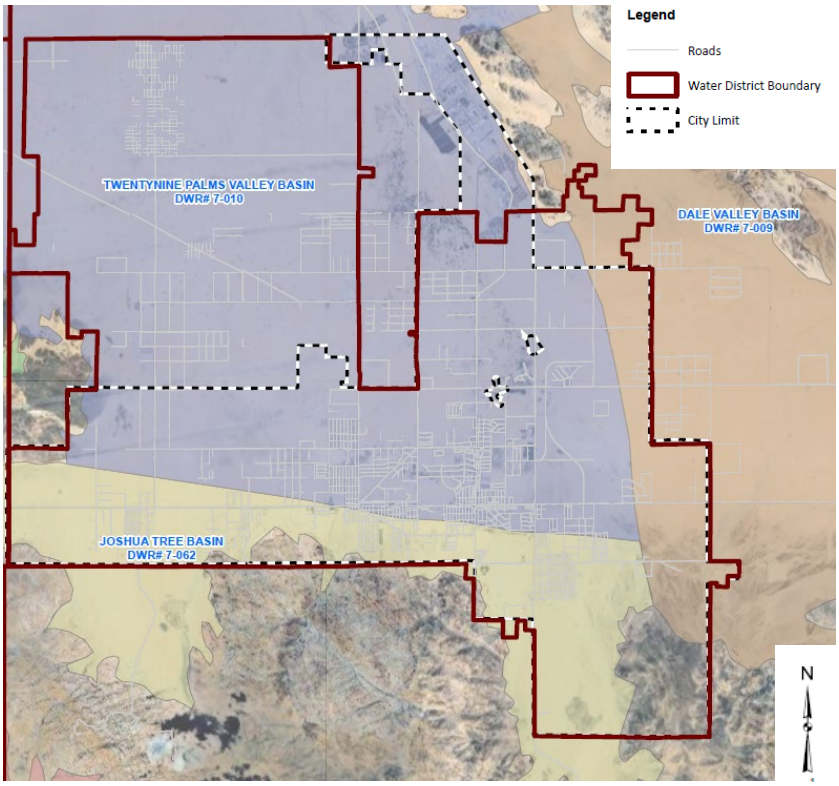
Strategic Priorities:
- Groundwater Sustainability
- Water Supply Reliability
- Aquifer Health
- Water Quality

The GWMP is considered a "living document" that the District intends to update periodically to report on the progress made in managing groundwater resources.

## ES-2 Overview of the District

The District encompasses approximately 87 square miles and includes the City of Twentynine Palms and a portion of the areas outside the City (Figure ES-1). Groundwater is the primary source of water, with groundwater overdraft in parts of the basins due to pumping. Since 2010, pumping and water deliveries have generally leveled off, and have even decreased in recent years due to increased precipitation and groundwater recharge, as well as conservation efforts.

**Figure ES-1 – Map Showing TPWD District, City Boundaries, and Groundwater Basins**




## ES-3 Groundwater Basins and Setting

TPWD is located within the Morongo Basin region, which has been divided into multiple groundwater basins, including three within the TPWD area (Joshua Tree, Twentynine Palms Valley, and Dale Valley) (Figure ES-1). The management area for this GWMP includes the groundwater basins and subbasins underlying the TPWD service area, which are more or less separated from one another by hydrologic barriers, including bedrock ridges, faults, and folds. Groundwater subbasins in the TPWD area are shown on Figure ES-2. The relationship between subbasins and basins is illustrated in Table ES-1.

**Figure ES-2 – Groundwater Subbasins in the GWMP Management Area**

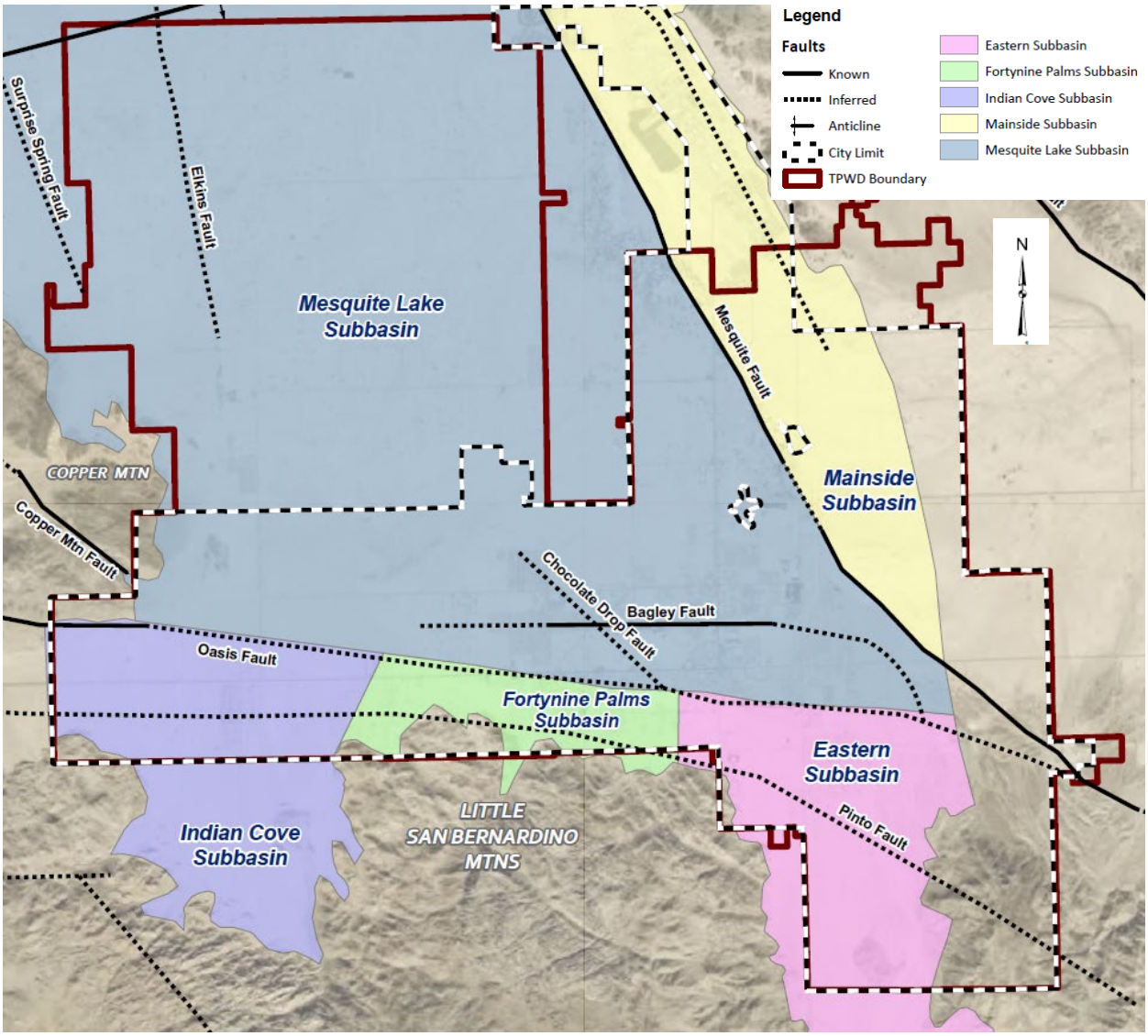
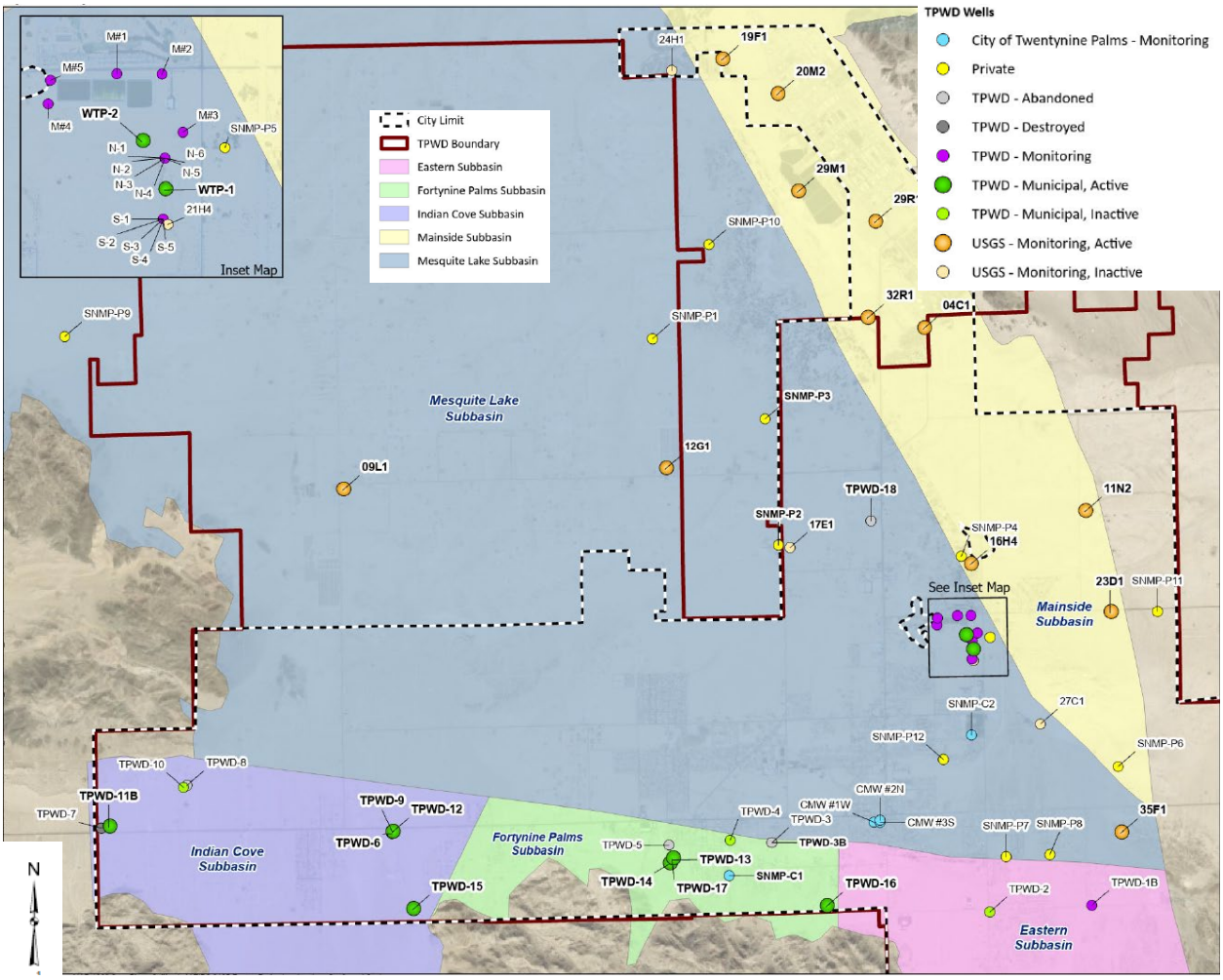



**Table ES-1: Relationship Between Groundwater Basins and Subbasins in the GWMP Management Area**

| Groundwater Basin: | Joshua Tree Basin | Twentynine Palms Valley Basin | Dale Valley Basin |
|---|---|---|---|
| **Subbasin** | Indian Cove | Mesquite | Little to no pumping or historical data; not considered part of management area |
| | Eastern | Mainside | |
| | Fortynine Palms | | |

The District collects groundwater level, water quality, and production data in the GMWP area. In addition, the United States Geological Survey also collects groundwater level monitoring data. Production and monitoring well locations are shown on Figure ES-3. As shown, most TPWD water supply wells are located along the southern limit of the service area in the Indian Cove, Eastern, and Fortynine Palms Subbasins because of the superior water quality compared to that in the Mesquite Lake Subbasin, where fluoride concentrations are of concern.

**Figures ES-3 – Wells in the GWMP Area**



## ES-4 Groundwater Use

Groundwater is the sole source of water supply for TPWD, thus, groundwater pumping by the District is a good indication of water use in the service area. The District has had 20 total groundwater production wells in its history. As of 2024, the District has eight active production wells and pumps from four groundwater subbasins (Indian Cove, Fortynine Palms, Eastern, and Mesquite Lake); TPWD does not currently pump groundwater from the Mainside Subbasin.

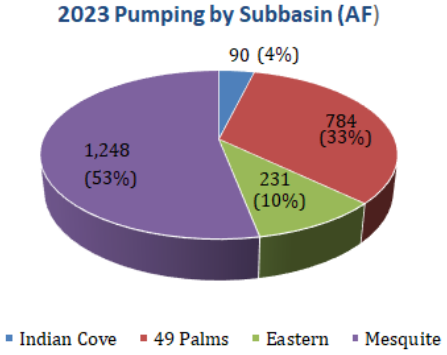



Figure ES-4 shows the annual groundwater pumping by subbasin. Groundwater pumping in 2023 was 2,352 acre-feet (AF), with 53% of the supply coming from Mesquite Subbasin; 33% from Fortynine Palms Subbasin, 10% from Eastern Subbasin; and 4% from Indian Cove Subbasin. It is noted that current pumping is limited to prevent overdraft in the Indian Cove and Fortynine Palms Subbasins. Active production wells, capacities, and pumping are summarized in Table ES-2.

**Figure ES-4 – Annual Pumping by Subbasin**

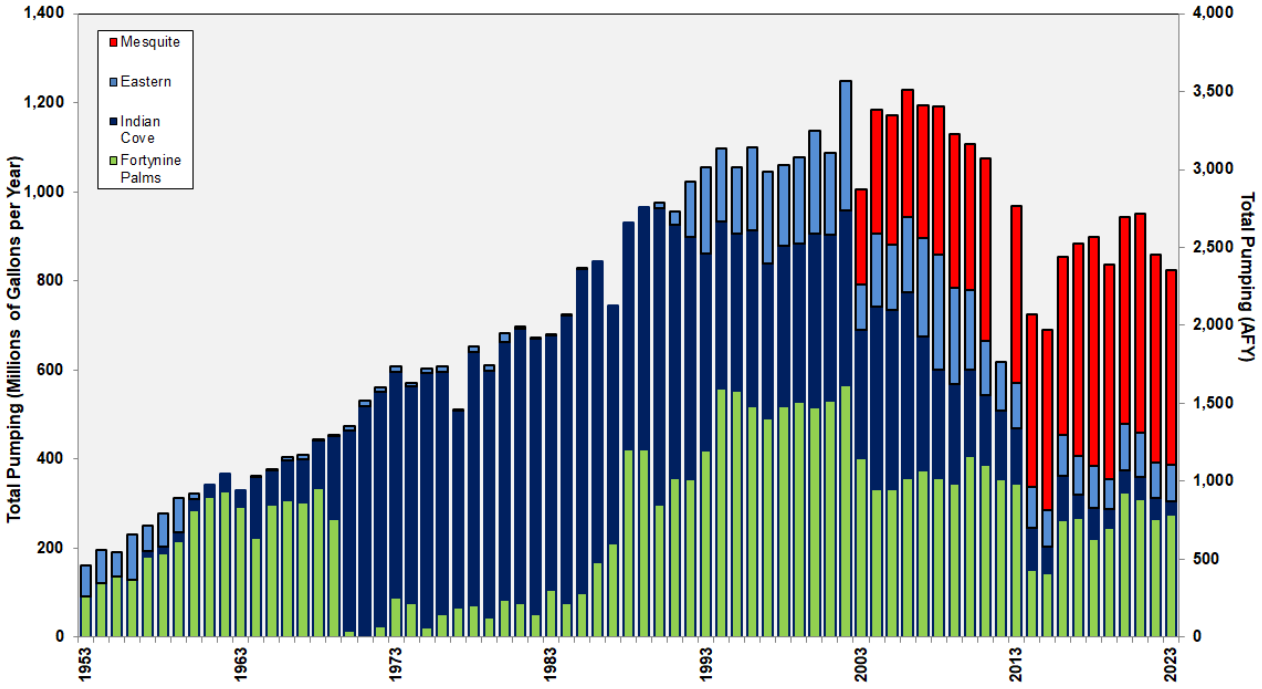


**Table ES-2 - TPWD Active Production Well Capacity and Use Summary**

| Well Name | Pumping Capacity (gpm) | Potential Maximum Annual Extraction (AFY) | 2023 Groundwater Pumped (AF) | 2023 Percent of Capacity |
|---|---|---|---|---|
| **Indian Cove Subbasin** | | | | |
| TPWD-11B | 400 | 645 | 15 | 2% |
| TPWD-12 | 385 | 621 | 75 | 12% |
| TPWD-15 | 100 | 161 | 0 | 0% |
| **Fortynine Palms Subbasin** | | | | |
| TPWD-14 | 700 | 1,129 | 313 | 28% |
| TPWD-17 | 700 | 1,129 | 470 | 42% |
| **Eastern Subbasin** | | | | |
| TPWD-16 | 500 | 807 | 231 | 29% |
| **Mesquite Lake Subbasin** | | | | |
| WTP-1 | 2,100 | 3,387 | 523 | 15% |
| WTP-2 | 2,100 | 3,387 | 725 | 21% |

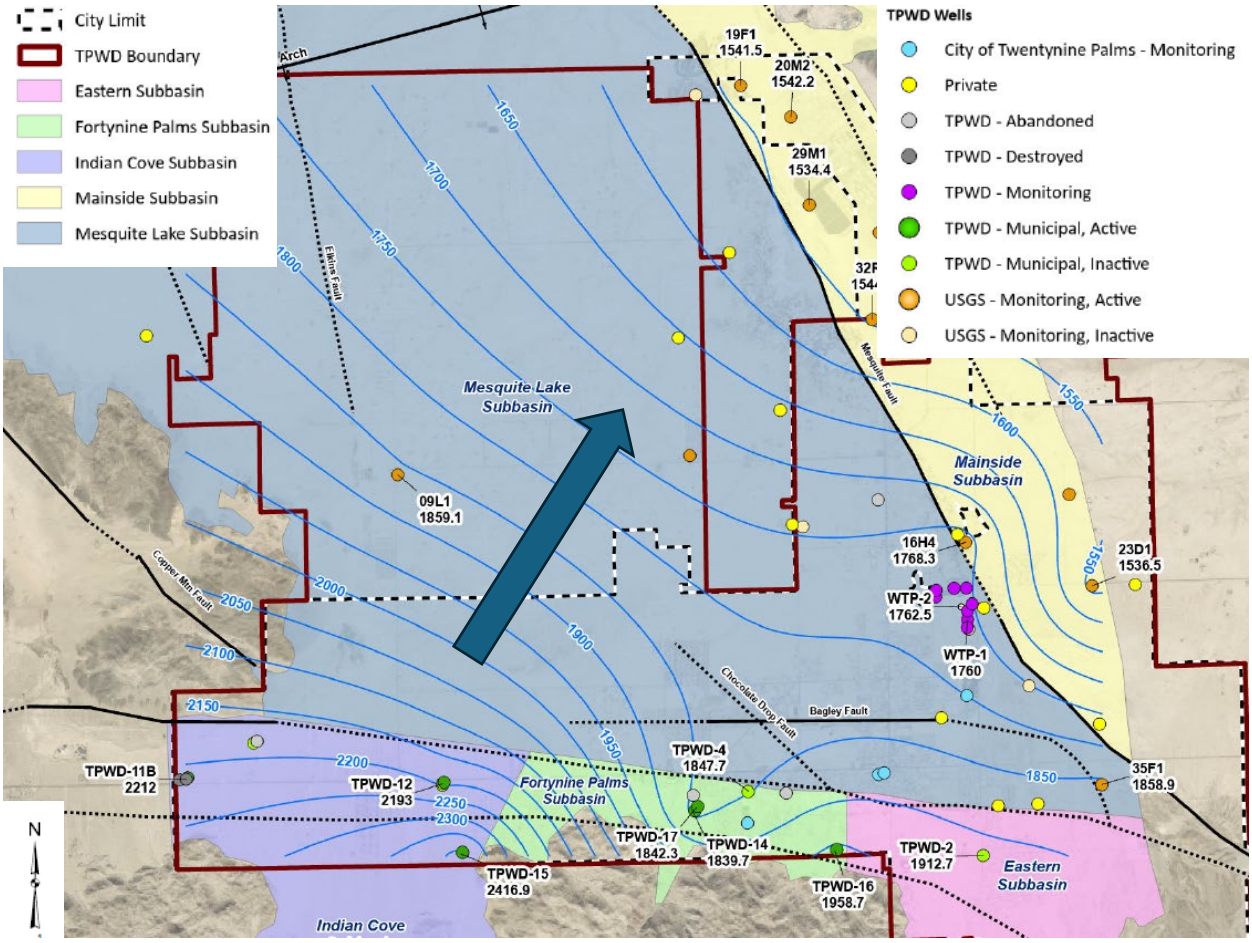
## ED-5 Water Use Assessment

Water demand is anticipated to increase in response to population growth, and groundwater will continue to be the sole source for meeting demand. As reported in the District's 2020 UWMP, the 2020 population was 16,182, with a water demand of 2,449 AF; the projected population in 2045 is 24,038, with a projected water demand of 3,200 AF.

## ES-6 Groundwater Conditions

Figure ES-5 presents current groundwater elevation contours across the five subbasins for "Spring"" conditions (averaged for years 2022 – 2024). Groundwater generally flows toward the northeast across the GWMP area, as shown by the blue arrow. Composite hydrographs were prepared for each subbasin to show groundwater trends through time, and these are included in the report.

**Figures ES-5 – Spring (2022 – 2024) Groundwater Elevation Map**




## ES-7 Water Budget

A water budget is used to evaluate the health of a groundwater basin.

- **Inflows** consist of total return flow (irrigation return flow and septic return flow), groundwater inflow, and natural recharge (precipitation recharge, streamflow infiltration, mountain front recharge, and mountain block recharge).

- **Outflows** consist of groundwater pumping, natural discharge (evapotranspiration and spring flow, and groundwater outflow.

The hydrologic water balance for current conditions is shown in Table ES-3 showing an annual change in storage range of -2,484 to +1,029 AFY. **Results indicate that more groundwater is being removed from the groundwater basins** (between 2,773 to 4,422 AFY) than is entering (between 1,938 to 3,801 AFY) during an average year.

**Table ES-3 Hydrologic Water Budget Summary: 2024 Conditions**

| | Groundwater Inflow (AFY) | | | Groundwater Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|
| **Subbasin** | **Total Return Flow** | **GW Inflow** | **Natural Recharge** | **GW Pumping** | **Natural Discharge** | **GW Outflow** | **Change in Storage** |
| Indian Cove | 143 | 36 to 75 | 3 to 111 | 112 | 0 | 10 to 30 | +40 to +207 |
| Fortynine Palms | 146 | 0 to 140 | 7 to 280 | 772 | 0 | 0 to 120 | -739 to -206 |
| Eastern | 186 | 0 to 50 | 2 to 240 | 229 | 20 to 75 | 0 to 50 | -166 to +227 |
| Mesquite Lake | 1,285 | 105 to 808 | 0 to 179 | 1,290 | 340 to 1630 | 0 to 114 | -1,644 to +642 |
| Mainside | 25 | 0 to 115 | 0 to 21 | 0 | 0 | 0 | +25 to +161 |
| **Total** | **1,785** | **141 to 1,188** | **141 to 1,188** | **2,403** | **360 to 1,705** | **10 to 314** | **-2,484 to +1,029*** |
| | **Range = 1,938 – 3,801** | | | **Range = 2,773 – 4,422** | | | |

Note - * The lower bound of the annual change in storage range (-2,484 AFY) is equal to the sum of the minimum inflows minus the sum of the maximum outflows (1,938 AFY – 4,422 AFY). The upper bound of the annual change in storage range (1,029 AFY) is equal to the sum of the maximum inflows minus the sum of the minimum outflows (3,801 AFY – 2,773 AFY).

Long-term groundwater sustainability considers the hydrologic water balance under projected conditions in 2045. The hydrologic water balance for 2045 projected conditions shows a projected annual change in storage range of -2,893 to 620 AFY. Projections indicate that more groundwater will be removed from the groundwater basins (3,781 to 5,430 AFY) than is expected to enter (2,537 to 4,401 AFY) during an average year.

**Results of this hydrologic water balance indicate potentially declining storage conditions (i.e., more groundwater pumping than groundwater recharge, than present). Under these conditions, it is anticipated that groundwater levels will continue to decline.**

## ES-8 Groundwater Quality

District groundwater is typically of good quality. Septic systems may affect groundwater quality, and naturally-occurring fluoride and arsenic are present in some supply wells in certain areas. Below is an overview of conditions through 2023.

## Salts and Nutrients

The historic and current use of septic systems has the potential to affect groundwater quality. The key constituents considered for monitoring septic tank influence are nitrates and total dissolved solids (TDS).

**Nitrate** - For the TPWD wells, nitrate (as $NO_3$-N) ranges from non-detect to 7.1 mg/L; all are below the MCL of 10 mg/L for nitrate.

**TDS** - The TDS content of groundwater ranges from about 120 to 410 mg/L in District supply wells, below the SMCL of 500 mg/L.

A maximum contaminant level (MCL) is an enforceable drinking water standard for a public water system; a secondary MCL (SMCL) is for non-health based effects such as taste, odor, or color

- Nitrate as N MCL = 10 mg/L
- TDS SMCL = 500 mg/L
- Flouride MCL = 4 mg/L; SMCL = 2 mg/L
- Arsenic MCL = 10 µg/L
- Chromium-6 MCL = 10 µg/L

## Fluoride

**Fluoride** naturally occurs in local groundwater and is a constituent of concern. Fluoride is relatively low in the Indian Cove, Fortynine Palms, and Eastern Subbasins. Several samples exceed the MCL and SMCL in the Mesquite Lake Subbasin where groundwater has a different chemical character with substantially higher fluoride concentrations. Average fluoride concentrations range from 1.2 to 6.2 mg/L. Throughout the Mesquite Lake Subbasin, concentrations vary between 5.9 and 8.6 mg/L.

## Arsenic

**Arsenic** is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic is less commonly associated with contaminant plumes. Arsenic occurs naturally in the Twentynine Palms area and has been detected in concentrations up to 13 µg/L. However, the average arsenic concentration is below 10 µg/L in most District wells. Arsenic concentrations above the MCL are most prevalent in the Indian Cove Subbasin, in the Mesquite Lake Subbasin, with the highest concentration of 13 µg/L and the lowest concentration of 11 µg/. Arsenic is below the MCL in the Eastern and Fortynine Palms Subbasins. Elevated arsenic concentrations require treatment at some District wells.

## Chromium-6

**Hexavalent Chromium (Chromium-6)** is an element that both naturally occurs from the erosion of natural chromium deposits and is produced by industrial processes. Chromum-6 above the MCL has not been detected since sampling began in 2015. Although concentrations reached within 1% of the MCL in the Indian Cove Subbasin, the average Chromium-6 concentration is below 7.7 µg/L in all of the District wells (as of 2023).

## ES-9 Best Management Objectives

Basin Management Objectives or BMOs are required under the California Water Code to provide flexible guidelines for the management of groundwater resources. They describe specific actions to be taken by stakeholders to meet locally developed objectives at the basin or sub-area scale. The seven BMOs identified are listed below. Each has corresponding action items proposed in the GWMP.

- **BMO #1 – Manage Groundwater Levels to Maintain Water Supply Sustainability and Reliability**
- **BMO #2 – Maintain and Protect Groundwater Quality**
- **BMO #3 – Support Development of a Local Program for Septic Tank Management**
- **BMO #4 – Monitor and Track Groundwater Supply, Water Quality and Land Subsidence**
- **BMO #5 – Promote Public Participation and Coordination with Other Local Agencies**
- **BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues**
- **BMO #7 – Identify and Obtain Funding Sources for Groundwater Projects**

## ES-10 Sustainability Actions and Mitigation of Overdraft Conditions

The District employs several different practices to further enhance the long-term sustainability of water supplies for Twentynine Palms.

**Shifting Groundwater Production**. The District has used the practice of shifting groundwater production between subbasins to help stabilize declining groundwater levels. This process helps to provide intervals for groundwater levels to stabilize and recover, especially in the Indian Cove and Fortynine Palms Subbasins. The District has increased groundwater production in the Mesquite Lake Subbasin to reduce the amount of groundwater pumped in the Indian Cove, Fortynine Palms, and Eastern Subbasins. The Mesquite Lake Subbasin contains a large volume of groundwater, but groundwater requires treatment primarily for fluoride. The current Fluoride Removal Water Treatment Plant has a capacity of 3 MGD, but currently treats 1.2 MGD, operating at 40 percent capacity. The District plans to expand the operation of the treatment plant up its design capacity of 3.0 MGD. This will allow further pumping reductions in the other basins and provide additional capacity for the practice of shifting groundwater production between subbasins.

**Water Conservation.** Water conservation is an important method to reduce overdraft (ie, drought tolerant landscaping). The District utilizes public outreach to promote conservation, specifically water conservation brochures distributed in new customer packages and water bills, as well as speakers and events conducted at local schools and community events, which include poster contests and involvement in earth day activities. Additional water conservation measures are described in the 2020 UWMP.



**Water Supply Assessment.** In evaluating potential future growth, SB 610 and SB 221 amended state law to improve the link between information on water supply availability and certain land use decisions made by cities and counties for defined project types and thresholds. To comply, the District will continue to prepare SB 610 Water Supply Assessments for the Twentynine Palms area to assess future water supplies and control overdraft.

# Section 1: Introduction

This updated Groundwater Management Plan (GWMP) was prepared in accordance with Assembly Bill 3030 (AB 3030), also called the Groundwater Management Act (Section 10750 et. seq. of the California Water Code) for the Twentynine Palms Water District (TPWD or District) to protect the quantity and quality of groundwater within its service area.

## 1.1 Plan Objectives

The GWMP serves as a planning tool to assist the District to maintain safe, sustainable, and high-quality groundwater resources in the long term. Groundwater management is planned and coordinated locally to ensure a sustainable groundwater basin to meet future water supply needs. The objective of the updated GWMP is to address issues of "aquifer health" and "groundwater sustainability". These issues include:

- Maintain sustainable long-term water supplies,
- Treatment of natural water quality constituents,
- Wastewater management especially of septic tanks, and
- Providing water supply for anticipated population growth.

The GWMP is considered a "living document" that the District intends to update periodically to report on the progress made in managing groundwater resources and to reflect amendments to the California Water Code. This GWMP Update was prepared to expand further on the role of the District in the management of the local groundwater resources and water quality based on the substantial work that has been completed since the 2014 Update (Kennedy Jenks, 2014a).

## 1.2 Plan Requirements and Organization

The Sustainable Groundwater Management Act (SGMA) created a statutory framework for groundwater management in California, requiring government and water agencies of high- and medium-priority basins designated by the California Department of Water Resources (DWR) to bring groundwater basins to a sustainable level of pumping and recharge to mitigate overdraft. To do this, high- and medium-priority basins were required to from Groundwater Sustainability Agencies and develop Groundwater Sustainability Plans that identify how basin will reach sustainability within 20 years of plan implementation.

TPWD overlies the Dale Valley (7-009), Joshua Tree (7-062), and Twentynine Palms Valley (7-010) groundwater basins (see Section 2.3), all of which are considered very low priority by the DWR. Therefore, groundwater management of these basins is not subject to SGMA. Accordingly, this GWMP has been prepared per Assembly Bill (AB) 359 standards (DWR, 2014, 2024a).

In 1992, the State enacted AB 3030, which was intended to provide local public agencies increased management authority over groundwater resources. Any local public agency that provides water service to all or a portion of its service area and whose service area includes all or a portion of a groundwater basin may adopt a GWMP. AB 3030 was amended in 2002 with the passage of Senate Bill (SB) 1938, which required public agencies seeking groundwater-related grant funding to prepare a GWMP with additional required components. SB 1938 was then superseded in 2011 with the passage of AB 359, which directed local agencies to 1) identify and define groundwater recharge areas, and 2) submit GWMPs to DWR where they are required to be publicly available. This GWMP includes three types of components:

1) SB 1938 and AB 359 mandatory components,

2) AB 3030 and SB 1938 voluntary components, and

3) DWR Bulletin 118-2003 suggested components (DWR, 2003).

**Table 1-1** identifies where in this GWMP the information addressing each of these components can be found. A GWMP is a required “baseline” document for agencies seeking State grant funding opportunities. SB 1938 requires that for an agency to be eligible for state funding from the DWR, the GWMP must incorporate the SB 1938 Mandatory Components listed in Table 1-1 (DWR, 2003).

**Table 1-1. Legislative Requirements Summary**

| Components Section | Section |
|---|---|
| ***SB 1938 and AB 359 Mandatory Components*** | |
| 1. Documentation of public involvement statement | Sec. 1.3, App. A |
| 2. Basin Management Objectives (BMOs) | Sec. 6 |
| 3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality or are caused by pumping | Sec. 4,5.4 and 6.5, App. B |
| 4. Plan to involve other agencies located in the groundwater basin | Sec. 6.6 |
| 5. Adoption of monitoring protocols | Sec. 6.5, App. B |
| 6. Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with agency boundaries that are subject to GWMP | Sec. 2.3 |
| 7. For agencies not overlying groundwater basins, prepare the GWMP using appropriate geologic and hydrogeologic principles | Not Applicable |
| 8. Map identifying the substantial recharge areas to be provided to local planning agencies | Sec. 5.5 |
| ***AB 3030 and SB 1938 Voluntary Components*** | |
| 1. Control of saline water intrusion | Sec. 5.6.1 |
| 2. Identify and manage well protection and recharge areas | Sec 5.6.3 |
| 3. Regulate the migration of contaminated groundwater | Sec 5.6.2 |
| 4. Administer well abandonment and destruction program | Sec. 5.6.5 |
| 5. Control and mitigate groundwater overdraft | Sec. 4.5.1 |
| 6. Replenish groundwater | Sec. 4.5.3 and 6.7 |
| 7. Monitor groundwater levels | Sec. 6.5, App. B |
| 8. Develop and operate conjunctive use projects | Sec. 4.5.3 and 6.7 |
| 9. Identify well-construction policies | Sec. 5.6.4 |
| 10. Develop and operate groundwater contamination cleanup, recharge, storage, | Sec 4.5.3 |
| 11. Develop relationships with State and federal regulatory agencies | Sec. 6.6 |
| 12. Review land use plans and coordinate with land use planning agencies to assess activities that create reasonable risk of groundwater contamination | Sec. 6.6 |
| ***DWR Bulletin 118-2003 Suggested Components*** | |
| 1. Manage with guidance of advisory committee | Sec. 6.6 |
| 2. Describe area to be managed under GWMP | Sec. 2 |
| 3. Create links between BMOs and goals and actions of GWMP | Sec. 6 |
| 4. Describe GWMP monitoring programs | Sec. 6.5, App. B |
| 5. Describe integrated water management planning efforts | Sec. 6.6 |
| 6. Report of implementation of GWMP | Sec. 6.5 |
| 7. Evaluate GWMP periodically | Sec. 6.7 |

## 1.3 Plan Preparation and Adoption Process

The District Board of Directors invited public comment by publishing a summary of the proposed amendments in the Desert Trail on March 12 and March 19, 2025, and holding a public hearing on March 26, 2025 to consider adopting the intent to prepare the GWMP. The item was included on the Board agenda and was published in local media outlets in the area. After the public hearing, the Board passed Resolution 25-02 declaring the District's intention to amend the District Groundwater Management Plan. The March 26, 2025 Board agenda, minutes and Resolution 25-02 are included in **Appendix A**. For those who could not attend, the District provides a meeting link on their website where viewers can see the meeting via a YouTube Channel.

The GWMP was adopted by the District Board of Directors by passing Ordinance 104 on May 28, 2025. Ordinance 104 is presented in **Appendix A**.

## 1.4 Plan Sections

This GWMP is organized into six sections as follows:

- **Section 1 - Introduction** – provides an introduction to the plan and describes the plan objectives, requirements and preparation & adoption process.
- **Section 2 – GWMP Management Area** – describes the GWMP management area, including a description of the District, other regional purveyors, and groundwater basins. It also reviews the geology and hydrology of the plan area.
- **Section 3 – Groundwater Usage** – presents groundwater usage information.
- **Section 4 – Groundwater Supply Assessment** – provides a groundwater supply assessment with a focus on current conditions and long-term sustainability.
- **Section 5 – Groundwater Quality Conditions** – characterizes groundwater quality conditions and trends. It also includes a summary of management actions in the plan area.
- **Section 6 – Basin Management Objectives and Implementation Plan** – concludes with an updated list of Basin Management Objectives (BMOs) and implementation plan to achieve the BMOs.

# Section 2: GWMP Management Area

This section identifies the GWMP management area and, as required, a map showing the DWR groundwater basins within and adjacent to the GWMP area, as defined by DWR Bulletin 118, along with a description of the physical structure. A more detailed description of the local groundwater conditions in the TPWD area is presented in Sections 3 and 4.

## 2.1 Twentynine Palms Water District

The District encompasses approximately 87 square miles and includes the City of Twentynine Palms (City) and a portion of the areas outside the City (Figure 2-1). Other local and regional entities located immediately adjacent or in the vicinity of the GWMP area are shown in Figure 2-2 and described in Section 2.2.

The management area for this GWMP includes the groundwater basins and subbasins underlying the TPWD service area (Figures 2-3 and 2-4). Within the GWMP management area, the groundwater basins are compartmentalized into a number of smaller subbasins (Figure 2-4) that are more or less separated from one another by hydrologic barriers, including bedrock ridges, faults, and folds. The degree of separation between these subbasins is dependent upon the character of the barriers separating them.

Groundwater is the primary source of water in the GWMP management area. Increased pumping to meet the needs of an increasing resident population has resulted in groundwater overdraft in parts of the basin. Prior to 1954, the Twentynine Palms area was served by three privately owned water companies: Abell Water Company, Condor Mutual Water Company, and Pacific Water Company. TPWD was formed in 1954 and immediately purchased the three water companies; their wells, storage facilities, and piping served as the initial water system for the District. Since the District's formation in the mid-1950s, historical pumping and water deliveries steadily increased until around 2010. Since 2010, pumping and water deliveries have generally leveled off, and have even decreased in recent years due to increased precipitation and corresponding groundwater recharge, as well as and conservation efforts. In the 2010s, annual pumping was on average around 928 million gallons [approximately 2,851 acre-feet per year (AFY)]. For the years 2020-2023, annual pumping was on average around 832 million gallons (approximately 2,554 AFY).

The District collects groundwater level (monthly), groundwater quality (annual), and groundwater production (monthly) data in the GWMP management area as part of Phase 1 of the District's Groundwater Monitoring Implementation Plan – 2020 Protocols and Procedures (**Appendix B**), adopted in 2019 to address the first recommendation of the Salt and Nutrient Management Plan (SNMP) (Kennedy Jenks, 2019; Kennedy Jenks, 2014b). In addition, the United States Geological Survey (USGS) currently collects groundwater level monitoring primarily associated with the Marine Base that includes several wells in the Twentynine Palms area. These are posted on the DWR Water Data Library web site at http://www.water.ca.gov/waterdatalibrary/. These data are also posted on the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) web site and can be downloaded from https://casgem.water.ca.gov/.

## 2.2 Regional Water Purveyors

The Twentynine Palms area map, **Figure 2-1**, includes areas from the Town of Yucca Valley to Twentynine Palms where groundwater management is covered by several entities in addition to TPWD. Other local and regional entities located immediately adjacent or in the vicinity of the GWMP area are shown in **Figure 2-2**. **Figure 2-3** and **Figure 2-4** show the underlying DWR Groundwater Basins and Subbasins. Neighboring water purveyors include:

- **Mojave Water Agency** (MWA) is a regional wholesale water provider to retail water purveyors that serve a large area of the Mojave River Valley and the Morongo Basin. MWA was found in 1960 due to concerns over declining groundwater levels. MWA is one of the State Water Project (SWP) contractors and serves an area of approximately 4,900 square miles of the High Desert in San Bernardino County. Through MWA, imported water has become available for groundwater recharge in the Town of Yucca Valley and Joshua Tree.

- **Joshua Basin Water District** (JBWD) is part of MWA and lies on the western boundary of TPWD. Its service area covers a 96-square mile area between Yucca Valley, Twentynine Palms, Joshua Tree National Park, and the Marine Base. JBWD serves 5,600 connections in 2024 with local groundwater from the Joshua Tree (DWR Number 7-62) and Copper Valley Groundwater Basins (DWR Number 7-11) to the west of TPWD. The JBWD Recharge Project will create a mechanism for JBWD to use 1,000 AFY of imported SWP water for local groundwater recharge. The JBWD Recharge Project's purpose is to provide supply water while preventing nitrate and mineral concentrations from increasing beyond state or federal allowable levels. Recharge will also prevent the need for deeper well drilling at high costs.

- **The Marine Corps Air Ground Combat Center** (Marine Base) is a United States Marine Corps base that lies along the northern boundary of TPWD. The developed portion of the base covers 1.4 square miles in the Morongo Basin and had a total population of 19,711 in 2021 (DENIX, 2021). The developed portion is included within the City. The Marine Base provides its own water supply from groundwater primarily from near Surprise Springs in the Deadman Valley Groundwater Basin (DWR Number 7-13), located north of the Twentynine Palms Valley Groundwater Basin (**Figure 2-2**). The Marine Base golf course operates an irrigation well in the Twentynine Palms Valley Basin; however, no groundwater pumping records are kept, but the volume is considered small (Li and Martin, 2011).

- **Unincorporated areas** outside the District to the east are covered by the San Bernardino County Desert Groundwater Management Ordinance adopted October 29, 2002, which gives the San Bernardino County (County) jurisdiction over the management of groundwater in the unincorporated, unadjudicated desert region of the County for areas of the County east of TPWD, MWA and the Marine Base.

- **Joshua Tree National Park** lies on the southern boundary of TPWD. As a national park, much of the area is undeveloped natural space. Water supply is provided at park facilities (i.e., visitor centers, exhibits and campgrounds) and is produced locally within

the park from the Joshua Tree Groundwater Basin and is not derived from within the GWMP area.

## 2.3 Delineation of DWR Groundwater Basins and Subbasins

TPWD is located within the geographic Morongo Basin region, which covers about 1,000-square-miles of several alluvium-filled valleys or basins surrounded by mountains. Previous investigators have divided the Morongo Basin into multiple groundwater basins. A required element of the GWMP, **Figure 2-3** shows the groundwater basin boundaries covered by this GWMP, as defined by DWR Bulletin 118, along with the basins and agencies adjacent to this GWMP management area. **Figure 2-4** shows the subbasins in the TPWD area.

This GWMP addresses the portions of groundwater basins and subbasins that underlie or are immediately adjacent to TPWD but are outside the jurisdiction of other managing agencies such as JBWD. The GWMP covers the Indian Cove, Eastern, and Fortynine Palms Subbasins of the Joshua Tree Basin, but does not cover the Joshua Tree Subbasin, which underlies JBWD (**Figure 2-3** and **Figure 2-4**). TPWD overlies large portions of the Mesquite Lake and Mainside Subbasins in the Twentynine Palms Valley Basin, and the GWMP covers both subbasins (**Figure 2-3** and **Figure 2-4**). The District overlies a portion of the Dale Valley Groundwater Basin, but there is little to no pumping or historical data from this basin. Therefore, the GWMP includes some discussion of the Dale Valley Groundwater Basin but does not consider it a part of the management area.

The Twentynine Palms Valley Groundwater Basin (Number 7-10) underlies Mesquite Lake (dry) and the City of Twentynine Palms covering a surface area of 62,400 acres (97.5 square miles) (**Figure 2-3**). The basin is bounded on the north by a structural barrier named the “transverse arch” (Schaefer, 1978; Mendez and Christensen, 1997) and on the south by the Pinto Mountain fault. The basin is bounded on the east by the southern Bullion Mountains and extends west to the flank of Copper Mountain. The basin is subdivided into the Mesquite Lake and Mainside Subbasins (**Figure 2-4**). The deposits in the region are interpreted to range to 10,000 feet in thickness (Moyle, 1984). However, in the Twentynine Palms Valley, wells have been drilled to a depth of 1,250 feet below ground surface (bgs) without encountering bedrock. Total storage capacity of the basin is estimated to be 1,420,000 acre-feet (AF) (DWR, 1984). Groundwater in storage was estimated for a 100-foot thickness of saturated sediments to be about 132,000 AF (DWR, 1984).

Most of the Joshua Tree Basin (Number 7-62), is in San Bernardino County, with small portions of the basin extending into Riverside County. The Joshua Tree Basin (Number 7-62) includes the water-bearing sediments south of the Pinto Mountain Fault and Copper Mountain beneath Joshua Tree, eastward to immediately south of the town of Twentynine Palms, which is outside the boundaries of the basin (**Figure 2-3**). The basin is bounded by crystalline basement rocks on the south, at the Little San Bernardino Mountains. The basin boundary on the east is a line extending extends from the southern tip of Mesquite Fault to an outcrop of consolidated basement rocks of the Little San Bernardino Mountains. The western boundary of the basin is coincident with a basement constriction named the Yucca Barrier that causes a change in the groundwater level gradient (DWR, 2024b). The basin is subdivided into four subbasins that include the Joshua Tree, Indian Cove, Fortynine Palms, and Eastern Subbasins (**Figure 2-4**). Estimates of storage capacity of the Joshua Tree Basin have a wide range from 480,000 to

750,000 AF (Krieger and Stewart, 1996), 975,000 AF (Whitt and Jonker, 1998), and 1,010,000 AF (DWR, 1984).

The Dale Valley Basin is located immediately to the east of the Mesquite Lake Subbasin (**Figure 2-3**). Little work has been done on the hydrogeology of the Dale Basin, as it is not a host to significant population, nor does it contain many wells. Its western boundary is the Mesquite Fault, which separates it from the Mesquite Lake Subbasin. The northern boundary is the Bullion Mountains. The southern boundary is the Pinto Mountains. The depth to bedrock in this basin is unknown. Groundwater levels within this basin have been stable since the 1960's. The District has no production wells in this basin.

The Copper Mountain Valley (DWR #7-11), Warren Valley (#7-12), Deadman Valley (DWR #7-13), and Ames Valley (DWR #7-16) Groundwater Basins lie outside of management area for this GWMP and are shown on **Figure 2-3** for reference in demonstrating that the adjoining water districts obtain water from groundwater basins separate from those used by TPWD.

## 2.4 Geology

The geology in the Twentynine Palms area primarily consists of Tertiary to Quaternary alluvium deposits in the basins enclosed by bedrock materials in the surrounding hills and mountains (Riley and Worts, 1953). The geology of the region is complex due to the tectonic forces that created the Morongo Basin and surrounding mountains.

### 2.4.1 Geologic Units

The geology of the GWMP area is typical of many extensional basins throughout the western United States. Basin-bounding ranges are fronted by normal faults along which they have risen relative to the basin floor (Riley and Worts, 1952). Over time, the basin has filled with highly heterogeneous deposits. The sediments within the basin have been buried progressively deeper as later sediments have been laid down on top of them; those at the greatest depth are more compacted than are those near the ground surface.

The geological materials in the region are grouped into stratigraphic units based on their geologic characteristics (**Figure 2-5**). The following brief description of the geologic units is summarized from earlier reports by Riley and Worts (1953), Rogers (1967), Londquist and Martin (1991), Nishikawa *et al. (*2004) and Li and Martin (2011):

- The **Bedrock units** are exposed in the mountain ranges but also underlie the groundwater basin. These units consist of Precambrian igneous and metamorphic rocks and Mesozoic-aged granitic and metamorphic rocks. The Mesozoic-aged rocks are primarily granite that intruded into the pre-existing Precambrian rocks.

- The **Tertiary alluvium** directly overlies the bedrock and is only found in the subsurface. It consists of interbedded layers of clayey sand and sandy gravel, and it is commonly consolidated with interstitial clay and calcium-carbonate cement.

- The **Quaternary alluvium** overlies the Tertiary alluvium and is mostly made up of beds of coarse sand with little clay, with the rest composed of finer-grained beds made up of very fine silty sand to clay. This unit is divided into two subunits based on their characteristics. In general, the upper subunit is more permeable than the lower because of the predominance of the coarser-grained deposits and the lack of cementation. The upper Quaternary alluvium is the primary aquifer for the region.

- **Playa lake deposits** are typically composed of very clay rich sediments formed at the playa lakes. These deposits are as much as 45 to 50 feet thick beneath the Mesquite Dry Lake.

The alluvium is highly variable both vertically and horizontally. The coarsest alluvium tends to occur along the mountain fronts and progressively finer-grained sediments are found with distance away from the mountain fronts. The sediment size grades progressively to fine sand at the lower ends of the washes and eventually to silt and clay at the playas (Riley and Worts, 1952).

### 2.4.2 Faults and Folding

Structural features are very important to the hydrogeology of the Twentynine Palms area, as they act as barriers that limit groundwater flow, separating the groundwater subbasins from one another. Faults crisscross this area due to an intense tectonic history (**Figure 2-5**). There are three sets of faults running through the region (Riley and Worts, 1952). Several other unnamed faults do not fall into the three fault sets described herein, but are visible on geologic maps and may be important to the hydrogeology.

1) The first set consists of normal faults that cross the basin in a generally north-northwest to northwest direction. The easternmost is the Mesquite Fault (Riley and Worts, 1952). Deadman and Mesquite Dry Lakes are located directly on top of this fault (**Figure 2-5**).

2) The second set of faults includes the Elkins and Sand Hill Faults (**Figure 2-5**) that run generally north-south, with faults most important in the southern end of the basin and dying out toward the north (Riley and Worts, 1953).

3) The third set of faults runs east-west along the southern end of the basin and includes the Oasis, Bagley, and Pinto Faults (**Figure 2-5**). The Oasis Fault (also known as the Pinto Mountain Fault in many references) was reported by Thompson (1929) as having a scarp 15 to 30 feet high next to the Oasis of Mara. The Bagley Fault is about half a mile north of the Oasis Fault in the area of Twentynine Palms, and intersects with the Oasis Fault west of the City of Twentynine Palms.

Faults make effective barriers for several possible reasons (Riley and Worts, 1952). With movement along the fault, beds of differing permeability can be juxtaposed across the fault. Groundwater flow across the fault may be reduced due to fault gouge consisting of clay or very fine particles or precipitation of calcium carbonate cement within the fault zone. The effectiveness of a fault as a barrier to groundwater flow does not require a great deal of movement along the fault (Riley and Worts, 1952). The fact that faults do act as barriers can be seen by the presence of significant areas of historical groundwater discharge as springs on the

upgradient sides of some faults (e.g., Surprise Spring on the Surprise Spring Fault, Oasis of Mara on the Oasis Fault, and Mesquite Spring on the Mesquite Fault) as shown on **Figure 2-5**.

The area is seismically active as evidenced by the 7.3 magnitude Landers Earthquake in 1992, which was centered on several faults about 20 miles west of Twentynine Palms. Earthquakes have been known to change the location and character of springs, change the flow character of wells, and cause fluctuations in groundwater levels (Roeloffs *et al*., 1995). However, the groundwater characteristics of the faults bounding the groundwater subbasins in the Twentynine Palms area have experienced numerous seismic events over their geologic history. It is these events that have defined the hydrogeologic characteristics of the faults that are observed today. Therefore, it is considered unlikely that a single seismic event in the future would significantly change the hydrologic characteristics of the groundwater subbasins.

In addition to the faulting in the area, folding has played a significant role in the geology and hydrology of the region. The USGS conducted a gravity survey to better understand the structure and thickness of subsurface fill by mapping the depth to the granitic or volcanic bedrock material (Roberts *et al*., 2002, Moyle, 1984). The estimated depth to bedrock is variable across the region. Beneath Mesquite Lake area, depth to bedrock is estimated to be more than 16,000 feet deep (Roberts *et al*., 2002). In other areas of the basin, bedrock highs bring bedrock units nearer to the surface. The Transverse Arch is bedrock high that brings bedrock to within 500 feet of land surface (Londquist and Martin, 1991) and forms the northern boundary of the Twentynine Palms Valley Basin (**Figure 2-5**). A second bedrock high exists in the southern part of the Mesquite Lake Subbasin that extends under the City of Twentynine Palms. This area likely represents an extension of Copper Mountain uplift which is composed of Precambrian and Mesozoic rocks (**Figure 2-4** and **Figure 2-5**) along the western margin of the Twentynine Palms Valley Basin.

## 2.5 Hydrology

In the arid to semiarid environment of the Twentynine Palms area, surface water is generally rare, localized, and short-lived. The climate in the Twentynine Palms area is classified as arid, upland desert climate, with hot summers and mild winters. The Twentynine Palms area is quite dry, with average annual precipitation of approximately 3.6 inches (DWR, 2024c). Most of the annual precipitation falls either during the summer monsoon or the winter wet season.

There are no perennial streams in the region, but there are several ephemeral streams that flow during high rainfall events. The largest of these is Fortynine Palms Creek (**Figure 2-6**). When runoff is generated by a storm, streamflow typically percolates into the alluvial soils in the stream channels (Kennedy Jenks, 2008). Some areas contain caliche (layers of concentrated mineral salts), which can limit the downward movement of water, (Riley and Worts, 1953, USDA, 1994, Nishikawa *et al*., 2004).

Playa lakes (i.e., Mesquite, Coyote, Shortz Deadman) form at the lowest elevations in a number of the surface drainage basins in the region (**Figure 2-6**). These dry lakes represent topographic low points where surface water ends up if runoff is high enough. The playa lakes are typically dry; however, a playa may represent an area of groundwater discharge that is typically lost to evaporation or taken up by vegetation. Playas with discharging groundwater are typified by rough surfaces with accumulations of alkali and other mineral salts (Thompson, 1929; USDA,

1994, Nishikawa et al., 2004). Among the playa lakes, the Mesquite Dry Lake is the largest in the area and is the lowest point in the area. South of Mesquite Dry Lake is a small unnamed playa that some older maps refer to as Shortz Lake (**Figure 2-6**). Due to erosion, ephemeral streams that formerly drained into Shortz Lake now bypass the lake so that the playa area is now largely covered with sand dunes. Two smaller playas occur just east of Copper Mountain.

Springs have historically been an important hydrologic feature as the only easily available source of water in this desert region. The Oasis of Mara is a mile long line of springs that form along the Oasis Fault. Mesquite Spring (**Figure 2-6**) once consisted of at least two pools, each 3 to 4 feet across and 2 feet deep, supporting a discharge of water that flowed about 200 feet into the desert (Thompson, 1929). However, Riley and Worts (1953) noted that by 1952 there was no water at the surface at the Oasis of Mara or flowing at Mesquite Springs.

# Section 3: Groundwater Usage

This section provides the required GWMP summary of historical groundwater usage data, historical and future water demands, and supplies for the TWPD service area. Local groundwater basin conditions for the GWMP area are presented in Section 4.

## 3.1 Historical Groundwater Pumpage by TPWD

Groundwater is the sole source of water supply for TPWD, thus, groundwater pumping by the District is a good indication of water use in the service area. The District has had 20 total groundwater production wells in its history. As of 2024, the District has eight (8) active production wells and pumps wells located in four (4) different groundwater subbasins (Indian Cove, Fortynine Palms, Eastern, and Mesquite Lake); TPWD does not currently pump water from the Mainside Subbasin. **Figure 3-1** shows the locations of the District's active and historical supply wells, as well as other known wells within the five subbasins of the GWMP management area. **Table 3-1** presents a summary of the District's wells and their construction details grouped by subbasin.

Groundwater pumping by the District increased steadily since its formation in the mid-1950s until about 2002 (**Figure 3-2**). In the 1950's, groundwater pumping ranged from 500 to 1,000 AFY. By the 1990s, groundwater pumping ranged from 2,730 to 3,145 AFY, with an average daily delivery per service connection slightly under 400 gallons. Groundwater pumping was at an all-time high in the 2000's until 2011, wherein groundwater pumping ranged from 2,871 to 3,569 AFY. Since then, groundwater pumping has not exceeded 2,767 AFY (in 2013), and has decreased steadily, with 2,352 AFY pumped in 2023.

The highest total annual groundwater pumping was 3,569 AF in 2002. Since 2002, groundwater pumping has shown a fairly consistent decline. In 2012, total groundwater pumping was 1,761 AF, which represents the lowest annual pumping volume since 2003.

Most TPWD water supply wells are located along the southern limit of the service area in the Indian Cove, Eastern, and Fortynine Palms Subbasins because of the superior water quality compared to that in the Mesquite Lake Subbasin, where fluoride concentrations are of concern. **Figure 3-2** also shows the annual groundwater pumping by subbasin. In the 1950s and 1960s, groundwater pumping was primarily in the Fortynine Palms Subbasin; in the 1970s and 1980s, pumping shifted to be primarily in the Indian Cove Subbasin; and, in the mid-1980s, groundwater pumping in the Fortynine Palms Subbasin increased in response to decreasing groundwater levels in the Indian Cove Subbasin. In 1993, groundwater pumping in the Eastern Subbasin also increased.

**Table 3-1. TPWD Production Well Summary**

| Well Name | Total Well Depth (feet bgs) | Screened Interval (feet bgs) | Well Status | Year Drilled | Years of Operation |
|---|---|---|---|---|---|
| **Indian Cove** | | | | | |
| TPWD-6 | 406 | 195-403 | Inactive | 1956 | 1957-2010 |
| TPWD-7 | 407 | 258-403 | Destroyed | 1962 | 1963-2005 |
| TPWD-8 | 785 | 80-100, 140-160, 215-600 | Abandoned | 1965 | 1969-1993 |
| TPWD-9 | 530 | 318-510 | Inactive | 1968 | 1970-2016 |
| TPWD-10 | 400 | 145-213; 238-312; 326-335; 365-382 | Inactive | 1968 | 1969-2006 |
| TPWD-11 | 400 | 200-400 | Destroyed | 1978 | 1966-2017 |
| **TPWD-11B** | **555** | **340-390;405-500; 510-545** | **Active** | **2017** | **2017-ongoing** |
| **TPWD-12** | **410** | **310-330; 350-410** | **Active** | **1983** | **1983-ongoing** |
| **TPWD-15** | **352** | **250-350** | **Active** | **1987** | **1990-ongoing** |
| **Fortynine Palms Subbasin** | | | | | |
| TPWD-3 | 340 | 120-340 | Abandoned | - | 1953-1992 |
| TPWD-3B | 398 | 160-280; 300-320; 340-398 | Abandoned | 1992 | 1993-2006 |
| TPWD-4 | 283 | - | Inactive | 1935 | 1953-2013 |
| TPWD-5 | - | - | Abandoned | - | 1953-1996 |
| TPWD-13 | 337 | 152-337 | Abandoned | 1985 | 1985-2004 |
| **TPWD-14** | **430** | **220-420** | **Active** | **1993** | **1993-ongoing** |
| **TPWD-17** | **550** | **330-520** | **Active** | **2009** | **2010-ongoing** |
| **Eastern Subbasin** | | | | | |
| TPWD-1 | - | - | Abandoned | - | 1955-2011 |
| TPWD-1B | 520 | 250-500 | Inactive | 2011 | 2011-2021 |
| TPWD-2 | 275 | - | Inactive | - | 1953-1993 |
| **TPWD-16** | **320** | **0-320** | **Active** | **1988** | **1991-ongoing** |
| **Mesquite Subbasin** | | | | | |
| TPWD-18 | - | - | Abandoned | - | 2012 |
| **WTP-1** | **1,010** | **350-440; 460-620** | **Active** | **1993** | **2003-ongoing** |
| **WTP-2** | **700** | **210-300; 340-450; 560-680** | **Active** | **2019** | **2023-ongoing** |

Note: Data provided by TPWD. Blue indicates an active well.

In 2003, the first production well in the Mesquite Lake Subbasin (WTP-1) began providing water to TPWD, with pumped groundwater now passing through the Twentynine Palms Fluoride Removal Water Treatment Plant. In 2023, TPWD brought a second production well online (WTP-2). TPWD considered increasing groundwater pumping in the Mesquite Lake Subbasin to 3.0 million gallons per day (MGD), with a concomitant decrease in pumping in the Indian Cove, Fortynine Palms, and Eastern Subbasins (**Figure 3-2**). Pumping from the Mesquite Subbasin

steadily increased since 2002 up until 2022, with zero pumping in 2012. Groundwater pumping in the Mesquite Subbasin dropped to 1,247 AFY in 2023 and looks to be similar in 2024.

Since 2003, the District has worked to balance the pumping amongst the four (4) groundwater subbasins to help reduce groundwater level declines. A more detailed discussion of groundwater levels and conditions are discussed in Section 4.

## 3.2 TPWD Water Use Assessment

Currently, the District serves the area solely by groundwater pumping. Water demand is anticipated to increase in response to population growth, and groundwater will continue to be the sole source for meeting demand. Population trends and water demand for the District's service area are described below for the current (2020-2024) and 2045 conditions.

The majority of land use is designated for residential development and open space residential, with a small portion made up by commercial, institutional, and industrial. Residential development is currently the single largest land use in the area served by the District. Approximately 83 percent of the residential development is single-family homes. The remaining 17 percent of land use is made up of some multi-family residential units and commercial property. Industrial property makes up a minor amount of the land use. There is no large-scale agricultural development in the management area.

As reported in the District's 2020 Urban Water Management Plan (UWMP), the population served by the District in 2020 was 16,182, and the projected population in 2045 is 24,038 (Kennedy Jenks, 2021).

Based on the 2020 UWMP, the 2020 District water demand was 2,449 AF. Based on the most recent water usage data available from the District for August 1, 2022 through August 1, 2024, total annual water use is estimated to be 2,127 AFY. While this is slightly lower than the 2010 water use of 2,449 AF presented in the 2020 UWMP, it is more representative of current conditions.

The population for 2045 is projected to be 24,038 with water use projected to increase to 3,200 AF by 2045 (Kennedy Jenks, 2021). Total residential water demand is projected to be 2,150 AF for single family and 560 AF for multi-family residential. The base daily per capita water use in 2020 was estimated to be 135 gallons per capita per day (GPCD). The District's future projected per capita water use is estimated to be 119 GPCD, for compliance with the SBX7-7 required water reduction by 2020 (Kennedy Jenks, 2021).

## 3.3 Groundwater Pumping Capacity

The District has a total pumping capacity of approximately 6,985 gallons per minute (gpm) (11,266 AFY). **Table 3-3** provides a breakdown of well capacity by subbasin. The 2023 total groundwater pumped utilizes about 21 percent of the current pumping capacity. Historically, total groundwater pumped has been about 18 percent higher than the annual water demand. Therefore, the estimated 2045 total groundwater volume to be extracted in order to meet demand, using the same ratio, would be about 3,776 AFY. This is approximately 34% of the District's current pumping capacity.

**Table 3-2. Estimated Annual Water Demand 2010 to 2045**

| | Annual Water Use (AFY) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **2010[a]** | **2015[a]** | **2020[a]** | **2025[b]** | **2035[b]** | **2040[b]** | **2045[b]** |
| Single family | 1,729 | 1,429 | 1,608 | 1,780 | 1,970 | 2,060 | 2,150 |
| Multifamily | 442 | 335 | 420 | 460 | 510 | 560 | 560 |
| Commercial/institutional | 278 | 232 | 186 | 240 | 260 | 260 | 270 |
| Industrial | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Landscape irrigation | 125 | 114 | 133 | 160 | 180 | 190 | 200 |
| Other (construction use/non-potable) | 102 | 1 | 102 | 20 | 20 | 20 | 20 |
| **Total** | **2,676** | **2,111** | **2,449** | **2,660** | **2,940** | **3,060** | **3,200** |

Notes: (a) Historical water delivery data (Kennedy Jenks, 2021).
(b) Projected potable water demand data (Kennedy Jenks, 2021).

In addition, current pumping is limited by DWR's recommendations to prevent overdraft in the Indian Cove and Fortynine Palms Subbasins, as discussed further in Section 4. The District's current source capacity is 10 MGD, which adequately meets the maximum daily demand. The maximum daily demand is assumed to be 2.7 million gallons based on monthly water usage data for August 1, 2022 through August 1, 2024, as provided by the District. For reliability, the California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) recommends that a water system be able to meet its maximum daily demand with the highest capacity source offline, which is either of the wells at the fluoride treatment plant (WTP-1 and WTP-2). With one of those wells offline, the capacity reduces to 7.1 MGD, which would meet the maximum daily demand.

**Table 3-3. TPWD Active Production Well Capacity and Use Summary**

| Well Name | Pumping Capacity (gpm) | Potential Maximum Annual Extraction (AFY) [(a)] | 2023 Groundwater Extracted (AF) | 2023 Percent of Capacity |
|---|---|---|---|---|
| **Indian Cove Subbasin** | | | | |
| TPWD-11B | 400 | 645 | 15 | 2% |
| TPWD-12 | 385 | 621 | 75 | 12% |
| TPWD-15 | 100 | 161 | 0 | 0% |
| **Fortynine Palms Subbasin** | | | | |
| TPWD-14 | 700 | 1,129 | 313 | 28% |
| TPWD-17 | 700 | 1,129 | 470 | 42% |
| **Eastern Subbasin** | | | | |
| TPWD-16 | 500 | 807 | 231 | 29% |
| **Mesquite Lake Subbasin** | | | | |
| WTP-1 | 2,100 | 3,387 | 523 | 15% |
| WTP-2 | 2,100 | 3,387 | 725 | 21% |

Notes: Data provided by TPWD.

(a) Potential Maximum Annual Extraction assumes the well operating at the pumping capacity for 24 hours per day for 365 days per year.

# Section 4: Groundwater Supply Assessment

This section summarizes the aquifers, groundwater basin conditions, recharge areas, hydrologic water budget, and long-term groundwater sustainability. It includes an assessment of current basin conditions as supported by monitoring results.

## 4.1 Aquifers

The alluvial fan deposits are the principal water-bearing unit in the region. Li and Martin (2011) divide the upper alluvial fan deposits into two subunits based on their characteristics. In general, the upper subunit is more permeable than the lower subunit because of the predominance of the coarser-grained deposits and the lack of cementation. The thickness of the upper alluvial fan deposits reaches about 400 feet in the Joshua Tree Subbasin, with a saturated thickness of 300 feet. The thickness of the lower Quaternary alluvium varies from zero along the basin margins to a maximum of 400 feet in the western Indian Cove and eastern Mesquite Lake Subbasins and throughout much of the Joshua Tree Subbasin. The maximum saturated thickness of the Tertiary alluvium in the Twentynine Palms area is about 1,700 feet along the western edge of the Indian Cove Subbasin and reaches up to 3,000 feet, according to Nishikawa *et al.* (2004). Sediments that have become deeply buried tend to be more consolidated, compacted, and cemented with depth. Therefore, the deepest sediments tend to be less transmissive than the upper sediments.

In addition to Nishikawa *et al.* (2004) and Li and Martin (2011), Kennedy Jenks (2010) contains six geologic cross sections across the GWMP area (provided as **Appendix C)**. The upper and middle aquifers shown on the cross sections correlate to subdivisions of the alluvial fan deposits of Tertiary-Quaternary age (QTf) and the Lower Aquifer correlates to the older sedimentary deposits of Tertiary age (Ts). The cross sections show the complex geology, including faulting and depth to bedrock.

## 4.2 Groundwater Conditions

As discussed in Section 2.3, the GWMP focuses on five (5) groundwater subbasins, which are contained within the Joshua Tree and Twentynine Palms Valley Basins. **Figure 4-1** and **Figure 4-2** present current groundwater elevation contours across the five subbasins for “Spring” and “Fall” conditions, respectively. In order to develop groundwater contours representative of the GWMP area, the most recent static groundwater elevations were used from the time period of 2022 to 2024 to collectively characterize “Spring” and “Fall” conditions. Groundwater generally flows toward the northeast across the GWMP area. Basin-specific conditions are described next.

### 4.2.1 Joshua Tree Basin

The Joshua Tree Groundwater Basin includes the three (3) subbasins south of the Oasis Fault (Indian Cove, Fortynine Palms, and Eastern Subbasins).

In general, groundwater flows north and east across the subbasins (**Figure 4-1** and **Figure 4-2**). The highest groundwater elevations are found along the mountain front of the Little San Bernardino Mountains to the south, which is the primary recharge area. Flow between these subbasins is considered limited due to the presence of hydrologic barriers that may consist of faults or bedrock highs. For example, the groundwater elevation in the Indian Cove Subbasin is more than 250 feet above the groundwater elevation in the Fortynine Palms Subbasin to the east, indicating that there is some barrier between the two subbasins, although its character is not defined. The groundwater elevation is approximately the same in the Fortynine Palms and Eastern Subbasins. Within the Joshua Tree Basin, long-term groundwater level declines are evident south of the Pinto Mountain Fault throughout the Indian Cove and Fortynine Palms Subbasins primarily near pumping centers. The following discussion provides additional details on groundwater level changes by subbasin.

#### *4.2.1.1* Indian Cove Subbasin

The Indian Cove Subbasin is located directly west of the Fortynine Palms Subbasin (**Figure 3-1**). Depth to bedrock ranges from 100 to 1,200 feet bgs and generally slopes northward (Kennedy Jenks, 2010).

Pumping records date back to 1957, and pumping varied from about 30 AFY initially to a peak of 2,075 AFY in 1985. In 2023, total pumping was 90 AFY. The current production capacity for wells located within this subbasin is approximately 1,427 AFY (**Table 3-3**). Groundwater levels vary more widely in the Indian Cove Subbasin than the other subbasins.

Hydrographs for TPWD wells TPWD-11, -11B, -12, and -15) are presented on **Figure 4-3**. In the northern part of the subbasin (TPWD-11, -11B, and -12), groundwater elevations declined about 2 feet/year on average from the late 1970s to around 2007. Between 1970-1990, groundwater elevations dropped most quickly before decreasing more slowly up to the present time. However, since 2007, groundwater levels have been generally increasing at a rate of 2.4 feet/year on average. This coincides with a decline in groundwater pumping starting around the same time. TPWD-15, located south of the Pinto Fault, has not experienced similar decline in groundwater levels, suggesting fault acts as a groundwater separating the subbasin into a northern and southern subarea (**Figure 4-3**).

#### 4.2.1.2 Fortynine Palms Subbasin

The Fortynine Palms Subbasin is located directly east of the Indian Cove Subbasin (**Figure 3-1**). Depth to bedrock is between 170 and 430 feet bgs, making this the shallowest among the subbasins (Kennedy Jenks, 2010). The Pinto Fault also traverses the southern part of this basin; however, there are no existing wells south of the fault. No other significant faults are known within this subbasin.

Pumping records go back to 1952, whereby pumping has varied from about 260 AFY in 1953 to a peak of 1,620 AFY in 2002. In 2023, total pumping in the subbasin was 784 AFY. The current production capacity for wells located within this subbasin is approximately 2,258 AFY (**Table 3-3**).

Hydrographs for TPWD wells TPWD-4, -14, and -17 are presented on **Figure 4-4**. From the 1940s to about 1970, groundwater levels declined by about 1 foot/year before leveling off until

about 1990, coinciding with a pumping decline in this basin. Starting around 1990, groundwater levels declined as pumping increased in the subbasin; until 2003, when pumping was reduced and groundwater level decline decreased to a steadier rate.

#### 4.2.1.3 Eastern Subbasin

The Eastern Subbasin is located immediately to the east of the Fortynine Palms Subbasin (**Figure 3-1**). Woodward-Clyde (1985) noted that groundwater supplies in the Eastern Subbasin appear limited due to most of the flow being confined to a shallow zone above or in the bedrock. The depth to bedrock varies from 160 to 750 feet bgs (Kennedy Jenks, 2010). Test wells drilled in 1987 encountered bedrock at depths ranging from 327 to 415 feet bgs, and the water table was inferred at depths ranging from160 to 170 feet bgs (BCI, 1988).

Pumping records go back to 1952. Since then, pumping has varied from about 200 AFY in 1953 to a peak of 829 AFY in 2002. In 2023, total pumping in the subbasin was 231 AFY. The current production capacity for wells located within this subbasin is approximately 807 AFY (**Table 3-3**).

Hydrographs of TPWD wells TPWD-1, -1B, -2, and -16 are presented on **Figure 4-5**. Prior to the startup of TPWD-16 in 1988, TPWD-1 and -2 showed groundwater elevation declines of between 0.2 and 0.8 feet/ year. Starting around 1988, water levels began declining more rapidly, at around 2.1 feet/ year, coinciding with a significant increase in pumping around this time. Measured groundwater elevations have decreased up to 80 feet from the 1940s, including about 60 feet since 1988.

### 4.2.2 Twentynine Palms Valley Basin

The Twentynine Palms Valley Groundwater Basin includes the Mesquite Lake and Mainside subbasins. This groundwater basin underlies much of the City of Twentynine Palms.

#### 4.2.2.1 Mesquite Lake Subbasin

In the Mesquite Lake Subbasin, groundwater flows toward Mesquite Dry Lake from all directions (**Figure 4-1** and **Figure 4-2**). Riley and Worts (1952) noted that groundwater is confined by playa deposits along the western half of Mesquite Dry Lake. Within the Mesquite Lake Subbasin, several faults and a bedrock high form significant flow restrictions that further subdivide this subbasin into distinct groundwater zones. In the southwestern part of the subbasin, bedrock is at or near the land surface, so groundwater may flow around the southern part of this ridge. In the northwestern part of the subbasin, several faults, including the Elkins and Surprise Spring Faults, appear to form flow barriers that limit flow across this section of the subbasin. Small playas associated with these faults further support this observation, but there are few wells in this area.

TPWD has two high-capacity supply wells (WTP-1 and -2) in this subbasin (**Figure 3-1**). WTP-1 came online in 2003 and has a capacity of approximately 3,387 AFY and has pumped between 523 and 1,465 AFY since then. WTP-2 came online in 2023 and has a capacity of approximately 3,387 AFY. Otherwise, groundwater pumping in this subbasin is limited due to naturally occurring water quality issues.

Hydrographs of TPWD wells WTP-1 and -2) are presented on **Figure 4-6**. The static water level in WTP-1 has dropped by about 10 feet over the 20-year period of record. Groundwater elevation data for WTP-2 shows an almost 20-foot abrupt decline in static water level since its startup in 2020; it is unclear if this abrupt decline is accurate, or attributed to sampling discrepancies (e.g., change in datum, sampling procedure). **Figure 4-6** also presents a significant amount of historical data from various USGS monitoring wells. Most water level measurements through the past 60 years are from the eastern and southern parts of the subbasin, with limited data from the western half of the subbasin. Most wells with long records show relatively steady groundwater levels over time with total variations in ranging within 5 feet.

#### 4.2.2.2 Mainside Subbasin

TPWD does not have production or monitoring wells in the Mainside Subbasin. However, there are USGS monitoring wells; hydrographs of these wells are presented in **Figure 4-7**. Groundwater levels have essentially been stable since about 1990, with some exceptions due to single or few anomalous water levels. Estimated pumping from the Marine Base golf course well in not measured but has been estimated to be approximately 540 AFY.

## 4.3 DWR Definition of Recharge Areas

As of January 1, 2013, DWR requires that the GWMP include a map identifying the recharge areas for the groundwater basins that substantially contribute to their replenishment. This map shall be provided to local planning agencies after the adoption of the GWMP.

As discussed in Section 4, natural recharge is primarily associated with storm water runoff from the Little San Bernardino Mountains that lie along the southern margin of the Joshua Tree Basin. During large summer storms, runoff in Fortynine Palms Creek can flow out across the highway toward the Twentynine Palms Valley Basin towards the Mesquite Dry Lake. The distribution of natural surface recharge shown on **Figure 4-8** reflects this pattern.

Other areas of the basin are not considered to have substantial recharge from natural surface sources. However, the highly permeable soils underlying most of the basin are susceptible to urban recharge from human activity. Urban recharge associated with return flows from septic tank leach fields, leaking water pipes, and irrigation of lawns occurs in the developed areas of the District. These return flows account for a large volume of the annual recharge in the Basin. **Figure 4-8** shows the current distribution pattern of urban recharge for the area.

## 4.4 Hydrologic Water Budget

The hydrologic water budget is a conservative measure of available groundwater. This Section presents a summary of the hydrologic water balance under current (2022 to 2024) conditions. It is noted that this calculation can vary based on the input data and methodology.

In this 2024 GWMP Update, the hydrologic water budget is calculated using the same methodology and assumptions as the 2014 GWMP, with the only changed parameters being septic return flow and well discharge (Kennedy Jenks, 2014a). A more detailed discussion on the data and assumptions used for each water balance component and approach used is provided in **Appendix D**, with an overview of inflows and outflows discussed next.

- **Inflows** consist of total return flow (irrigation return flow and septic return flow), groundwater inflow, and natural recharge (precipitation recharge, streamflow infiltration, mountain front recharge, and mountain block recharge). Water usage data for August 2022 – August 2024 was used to determine an average annual septic return flow (August 2022 – August 2023 and August 2023 – August 2024). The remaining inflow parameters were carried over from the 2014 GWMP based on hydrogeologic studies (see **Appendix D**).

- **Outflows** consist of groundwater pumping, natural discharge (evapotranspiration and spring flow), and groundwater outflow. Pumping data for 2022-2023 was used to determine an average annual well discharge. The remaining outflow parameters were carried over from the 2014 GWMP based on hydrogeologic studies (see **Appendix D**).

The hydrologic water balance for current conditions is shown in **Table 4-1**, showing an annual change in storage range of -2,484 to 1,029 AFY. Results indicate that more groundwater is being removed from the groundwater basins (between 2,773 to 4,422 AFY) than is entering (between 1,938 to 3,801 AFY) during an average year.

Return flows, which are a return of groundwater pumped from the basin, are the primary source of recharge. Natural recharge is limited because of the relatively low average rainfall in the area. Discharge (groundwater outflow) is primarily a result of groundwater pumping. Natural outflows include evapotranspiration (ET), groundwater outflow, and spring flow. These components vary and are affected by changes in groundwater levels due to pumping (i.e., decrease in spring flows). The net effect is that outflows exceed inflows, which is reflected in declining groundwater levels as discussed in Section 4.2.

**Table 4-1. Hydrologic Water Budget Summary: 2024 Conditions**

| | Groundwater Inflow (AFY) | | | Groundwater Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|
| **Subbasin** | **Total Return Flow** | **GW Inflow** | **Natural Recharge** | **GW Pumping** | **Natural Discharge** | **GW Outflow** | **Change in Storage** |
| Indian Cove | 143 | 36 to 75 | 3 to 111 | 112 | 0 | 10 to 30 | +40 to +207 |
| Fortynine Palms | 146 | 0 to 140 | 7 to 280 | 772 | 0 | 0 to 120 | -739 to -206 |
| Eastern | 186 | 0 to 50 | 2 to 240 | 229 | 20 to 75 | 0 to 50 | -166 to +227 |
| Mesquite Lake | 1,285 | 105 to 808 | 0 to 179 | 1,290 | 340 to 1630 | 0 to 114 | -1,644 to +642 |
| Mainside | 25 | 0 to 115 | 0 to 21 | 0 | 0 | 0 | +25 to +161 |
| **Total** | **1,785** | **141 to 1,188** | **141 to 1,188** | **2,403** | **360 to 1,705** | **10 to 314** | **-2,484 to +1,029*** |
| | **Range = 1,938 – 3,801** | | | **Range = 2,773 – 4,422** | | | |

Note - * The lower bound of the annual change in storage range (-2,484 AFY) is equal to the sum of the minimum inflows minus the sum of the maximum outflows (1,938 AFY – 4,422 AFY). The upper bound of the annual change in storage range (1,029 AFY) is equal to the sum of the maximum inflows minus the sum of the minimum outflows (3,801 AFY – 2,773 AFY).

## 4.5 Long-Term Groundwater Sustainability

This section describes the long-term sustainability of the groundwater supply.

### 4.5.1 Hydrologic Water Budget - 2045 Projected Conditions

This section presents a summary of the hydrologic water balance under projected conditions in 2045. Projections were prepared using 2045 projected data from the District's 2020 UWMP (Kennedy Jenks, 2021). A more detailed discussion on the data and assumptions used for each water balance component and approach used is provided in **Appendix D**.

- **Inflows** in the hydrologic water balance consist of total return flow (irrigation return flow and septic return flow), groundwater inflow, and natural recharge (precipitation recharge, streamflow infiltration, mountain front recharge, and mountain block recharge). 2020 UWMP water usage projections for 2045 were used to estimate an average annual septic return flow (Kennedy Jenks, 2021). The remaining inflow parameters were carried over from the 2014 GWMP based on hydrogeologic studies (see **Appendix D**).

- **Outflows** in the hydrologic water balance consist of groundwater pumping, natural discharge (evapotranspiration and spring flow, and groundwater outflow. 2020 UWMP well pumping projections for 2045 were used to estimate an average annual well discharge volume. The remaining outflow parameters were carried over from the 2014 GWMP based on hydrogeologic studies (see **Appendix D**).

The hydrologic water balance for 2045 projected conditions is shown in **Table 4-2**, showing a projected annual change in storage range of -2,893 to 620 AFY. Projections indicate that more groundwater will be removed from the groundwater basins (3,781 to 5,430 AFY) than is expected to enter (2,537 to 4,401 AFY) during an average year.

While natural recharge and outflows are not expected to change significantly from current values, population and water use is anticipated to increase. Increased water use will be supplied by increased groundwater pumping (3,411 AFY). Consequently, the results of this hydrologic water balance indicate potentially declining storage conditions (i.e., more groundwater pumping than groundwater recharge, than present). Under these conditions, it is anticipated that groundwater levels will continue to decline.

**Table 4-2. Hydrologic Water Budget Summary: Project 2045 Conditions**

| | Groundwater Inflow (AFY) | | | Groundwater Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|
| **Subbasin** | **Total Return Flow** | **GW Inflow** | **Natural Recharge** | **GW Pumping** | **Natural Discharge** | **GW Outflow** | **Change in Storage** |
| Indian Cove | 191 | 36 to 75 | 3 to 111 | 284 | 0 | 10 to 30 | -84 to +83 |
| Fortynine Palms | 195 | 0 to 140 | 7 to 280 | 993 | 0 | 0 to 120 | -911 to -378 |
| Eastern | 248 | 0 to 50 | 2 to 240 | 328 | 20 to 75 | 0 to 50 | -203 to +190 |
| Mesquite Lake | 1,716 | 105 to 808 | 0 to 179 | 1,806 | 340 to 1,630 | 0 to 114 | -1,729 to +557 |
| Mainside | 33 | 0 to 115 | 0 to 21 | 0 | 0 | 0 | +33 to +169 |
| **Total** | **2,384** | **141 to 1,188** | **141 to 1,188** | **3,411** | **360 to 1,705** | **10 to 314** | **-2,893 to +620*** |
| | **Range = 2,537 – 4,401** | | | **Range = 3,781 – 5,430** | | | |

Note - * The lower bound of the annual change in storage range (-2,893 AFY) is equal to the sum of the minimum projected inflows minus the sum of the maximum projected outflow (2,537 AFY – 5,430 AFY). The upper bound of the projected annual change in storage range (620 AFY) is equal to the sum of the maximum projected inflows minus the sum of the minimum projected outflows (4,401 AFY – 3,781 AFY).

## 4.5.2 Long-Term Supply Sustainability Actions

The District has employed several different practices to further enhance the long-term sustainability of water supplies for Twentynine Palms. The following summarizes several key management actions to address these issues including those of the voluntary 12 specific technical elements identified in the California Water Code that pertain to groundwater levels.

### 4.5.2.1 Mitigation of Overdraft Conditions

**Shifting Groundwater Production**. The District has used the practice of shifting groundwater production between subbasins to help stabilize declining groundwater levels to provide intervals for groundwater levels to stabilize and recover, especially in the Indian Cove and Fortynine Palms Subbasins. The District has increased groundwater production in the Mesquite Lake Subbasin to reduce the amount of groundwater pumped in the Indian Cove, Fortynine Palms, and Eastern Subbasins. The Mesquite Lake Subbasin contains a large volume of groundwater, but groundwater requires treatment primarily for fluoride. The current Fluoride Removal Water Treatment Plant has a capacity of 3 MGD, but currently treats 1.2 MGD, operating at 40 percent capacity. The District plans to expand the operation of the treatment plant up its design capacity of 3.0 MGD. This will allow further pumping reductions in the other basins and provide additional capacity for the practice of shifting groundwater production between subbasins.

**Water Conservation**. Water conservation is an important method to reduce overdraft. The District utilizes public outreach to promote conservation, specifically water conservation brochures distributed in new customer packages and water bills, as well as speakers and events conducted at local schools and community events, which include poster contests and involvement in earth day activities. Additional water conservation measures are addressed in

the BMOs and the current and planned water management strategies targeting conservation and water savings are described in the 2020 UWMP.

**Water Supply Assessment**. In evaluating potential future growth, SB 610 and SB 221 amended state law to improve the link between information on water supply availability and certain land use decisions made by cities and counties for defined project types and thresholds. These statutes require detailed information regarding water availability to be provided to city and county decision-makers prior to approval of specified large development projects. To provide that information, the governing body of the water agency that will serve the development must adopt an SB 610 Water Supply Assessment (WSA). Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. The District will continue to prepare SB 610 WSAs for the Twentynine Palms area to assess future water supplies and control overdraft.

#### 4.5.2.2 Groundwater Model Analysis of Potential Future Conditions

The 2010 Mesquite Lake Groundwater Study (Kennedy Jenks, 2010) included development of a hydrogeological conceptual model and a numerical groundwater model. The model was developed to help support informed decisions in future management of groundwater resources in a sustainable manner while meeting increased water demand. The 2010 groundwater model has not been updated since 2010; therefore, it was not used to evaluate potential future conditions. Instead, the hydrologic water budgets described previously were used to evaluate current (2022-2024) and projected (2045) conditions, respectively. It is recommended that the District update the 2010 model to provide them with a management tool that can be used to simulate and predict future groundwater conditions. This recommendation is presented in Section 6.5 BMO #4.

### 4.5.3 Groundwater Recharge and Storage Projects

The District does not have access to surface, imported, or recycled water sources; therefore, the options for mitigating overdraft conditions are limited. Should access to an alternative water source become available in the future, the District would initiate an assessment on how best to utilize these resources (i.e., groundwater recharge, recycled water, or conjunctive use projects).

The only source of water currently available for replenishment is the impoundment or collection of stormwater runoff. Therefore, groundwater replenishment should be increased by stormwater capture for groundwater recharge, and it is recommended that the District investigate the feasibility of implementing a stormwater capture/recharge enhancement program. For instance, this program could involve the construction of berms to capture and allow increased percolation of stormwater into the aquifer.

The District has several reservoirs for system storage, which enable the District to provide adequate service for peak demands plus fire flow and emergency reserve. TPWD regularly evaluates its distribution and storage network. As part of this process, the need for new improvements, including additional storage capacity is evaluated, and a capital improvement program is developed in order to construct the necessary improvements. Existing storage facilities are operated and maintained by District staff. There are no plans for any large-scale storage projects or conjunctive use/groundwater storage facilities at this time. In addition, the

need for additional extraction facilities is evaluated and wells are incorporated into the capital improvements program. District staff operates and maintain the wells.

### 4.5.4 Potential of Land Subsidence

Land subsidence can occur as a result of declining groundwater levels if a compressible sediment layer is present. In certain types of geologic formations, declining groundwater levels cause water to move out of the pore space causing the sediment to compress into a smaller volume. This typically occurs in fine-grained sediments (i.e., clays, silts, and fine sands). For example, playa lake deposits, such as those found in the Mesquite Lake and Mainside Subbasins, have been noted as sources of land subsidence in Antelope Valley and other similar areas. Granular sediments, typical of the alluvial filled basins in the Twentynine Palms area, are generally not considered compressible.

Land subsidence has not been identified as an issue within the Twentynine Palms area. Nevertheless, National Geodetic Survey (NGS) Benchmarks were obtained from the National Oceanic and Atmospheric Administration (NOAA) web site. These are plotted on **Figure 4-9** along with their stability rating to show available benchmarks in the plan area.

Although not a known hazard given the underlying lithology, the District might consider using available benchmarks to establish a baseline for evaluating potential future land subsidence. This is discussed further in Section 6.5 BMO #4.

# Section 5: Groundwater Quality Conditions

This section summarizes current groundwater quality conditions as supported by monitoring results and water quality management actions that have been taken. Data presented is from historical well data, including water quality data reported in the SNMP 2023 Groundwater Monitoring Report (Kennedy Jenks, 2024).

## 5.1 Water Quality

District groundwater is typically of good quality. The historical and current use of septic systems for wastewater disposal has an effect on groundwater quality. In addition, high levels of naturally occurring fluoride and arsenic are present in some water supply wells in certain areas.

Congress passed the Safe Drinking Water Act (SDWA) in 1974 and passed amendments to it in 1986 and 1996. The SDWA is implemented by the US Environmental Protection Agency (EPA) at the federal level and by DDW at the state level. The state can enact regulations under the SDWA that are more stringent than required by the federal rule, but they cannot enact regulations that are less stringent. Compared to other states, California DDW frequently establishes regulations that are more stringent than federal regulations, though they have accepted certain federal regulations by reference (as is) as well. The regulatory thresholds for drinking water are defined below:

- **Maximum Contaminant Levels (MCLs)** are enforceable drinking water standards for various contaminants (e.g., lead, arsenic) to be met by public water systems and ensure safe water quality. MCLs take into account not only chemical health risks, but also technologically-based factors such as analytical capabilities, available treatment technologies, benefits, and costs.

- **Secondary MCLs (SMCLs)** are established for non-health based effects such as taste, odor, or color.

- **Public Health Goals (PHGs)** are levels of chemical contaminants in drinking water that do not pose a significant risk to health. PHGs are not regulatory standards. State law requires the SWRCB set drinking water standards (MCLs) for chemical contaminants as close to the corresponding PHG as is economically and technologically feasible.

- **Notification Levels (NLs)** are health-based advisory levels for certain chemicals without MCLs established by DDW. NLs were created with the intent of providing early warning to the public of potential health effects prior to establishing of a drinking water standard.

- **Response Levels (RLs)** are established by DDW and is an advisory level at which DDW recommends the source be taken out of service.

### 5.1.1 Salts and Nutrients

The historic and current use of septic systems for wastewater disposal in the District service area has the potential to affect groundwater quality. The key constituents considered for monitoring septic tank influence are nitrates and total dissolved solids (TDS). The MCL is 45 milligrams per liter (mg/L) for nitrate as $NO_3$ or 10 mg/L for nitrate as N.

- **Nitrate** - For the TPWD production wells, nitrate (as $NO_3$-N) ranges from non-detect to 7.1 mg/L, as summarized in **Table 5-1**. Historical and current data are below the MCL of 10 mg/L for nitrate.

- **TDS** - The TDS content of groundwater ranges from about 120 to 410 mg/L in District supply wells, as summarized in **Table 5-1**. TDS has a SMCL of 500 mg/L. Higher levels of TDS noted in the area are typically associated with naturally occurring, higher-salinity, and shallow groundwater associated with playa deposits. Elevated TDS can also be associated with septic tank return flows.

In June 2014, the District's 2014 SNMP (Kennedy Jenks, 2014b) recognized the increased need to assess potential groundwater quality impacts from salt and nutrient sources that are derived primarily from regional septic tanks and included recommendations for mitigation of these impacts. The two recommendations in the SNMP were:

1) Implement measures to improve the overall monitoring of the groundwater. This is being addressed via a Groundwater Monitoring Implementation Plan that was approved by the Colorado River Basin Regional Water Quality Control Board (RWQCB) on 10 December 2019 (Kennedy Jenks, 2017).

2) Implement a Septic System Management Program (SSMP) to limit the further impacts to groundwater. Kennedy Jenks began preparing a draft SSMP in November 2023 on behalf of the City and District; additional information is provided in Section 5.4.

### 5.1.2 Natural Constituents

Naturally occurring constituents include fluoride, arsenic, and chromium.

#### 5.1.2.1 Fluoride

Fluoride (F) naturally occurs in local groundwater and is a constituent of concern in the District service area. The Primary MCL for fluoride in drinking water is 4.0 mg/L, with a SMCL of 2.0 mg/L. Fluoride is relatively low in the Indian Cove, Fortynine Palms, and Eastern Subbasins.

However, several samples exceed the MCL and SMCL in the Mesquite Lake Subbasin (**Table 5-2**), where groundwater has a different chemical character with substantially higher fluoride concentrations. Average fluoride concentrations range from 1.2 to 6.2 mg/L. For example, fluoride measured in 2024 at WTP-1 and WTP-2 hovered around 5.9 mg/L and 6.2 mg/L, respectively. Throughout the Mesquite Lake Subbasin, concentrations vary between 5.9 and 8.6 mg/L (**Table 5-2**).

#### 5.1.2.2 Arsenic

Arsenic (As) is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic is less commonly associated with contaminant plumes. The primary MCL for arsenic is 10 micrograms per liter (μg/L). Arsenic occurs naturally in the Twentynine Palms area and has been detected in concentrations up to 13 μg/L. However, the average arsenic concentration is below 10 μg/L in most District wells (**Table 5-2**). Arsenic concentrations above the MCL are most prevalent in the Indian Cove Subbasin and in WTP-2, in the Mesquite Lake Subbasin, with the highest concentration of 13 μg/L and the lowest concentration of 11 μg/. Arsenic is below the MCL in the Eastern and Fortynine Palms Subbasins. Elevated arsenic concentrations require treatment at some District wells.

#### 5.1.2.3 Chromium-6

Hexavalent Chromium (Chromium-6 or Cr-6) is an element that both naturally occurs from the erosion of natural chromium deposits and is produced by industrial processes. The SWRCB adopted an MCL of 10 μg/L on April 17, 2024. The regulation was approved on July 24, 2024, with an effective date of October 1, 2024. Community and non-community, non-transient water systems must complete initial sampling by April 1, 2025. Systems must be in compliance with the regulation as follows: October 1, 2024 for systems with 10,000 or greater connections, October 1, 2027 for systems with 1,000 to 9,000 connections, and October 1, 2028 for systems with fewer than 1,000 connections.

Cr-6 above the MCL has not been detected since sampling began in 2015. Although Cr-6 concentrations reached within 1% of the MCL in the Indian Cove Subbasin, the current average Cr-6 concentration is below 7.7 μg/L in all of the District wells (**Table 5-3**).

## 5.2 Groundwater Quality Trends

Water may take thousands of years to migrate from the recharge area to its discharge point. Nishikawa *et al*. (2004) used carbon-14 dating methods to determine that groundwater in the Copper Mountain Subbasin is likely to have been in the aquifer for approximately 10,000 years. This relationship can be complicated by the environment within the aquifer; groundwater that experiences elevated temperatures dissolves aquifer minerals more readily, and additional chemicals can be added from other aquifers or the ground surface. The minerals in groundwater may also be concentrated by evaporation when the water table is close to the ground surface.

**Table 5-1. Nitrates and TDS Summary for TPWD Production Wells**

| Well | *Nitrate (as NO3-N) (mg/L)* | | | *Total Dissolved Solids (TDS) (mg/L)* | | | *Years of Well Sampling History* | |
|---|---|---|---|---|---|---|---|---|
| | Primary MCL = 10 mg/L | | | Secondary MCL = 500 mg/L | | | | |
| | Most Recent Measurement[a] | Maximum | Minimum | Most Recent Measurement[a] | Maximum | Minimum | Year first sampled[b] | Year last sampled[c] |
| **Indian Cove Subbasin** | | | | | | | | |
| TPWD-9 | 2.5 | 3.3 | 0.5 | 140 | 257 | 120 | 1968 | 2016 |
| TPWD-11B | 2.2 | 2.8 | 1.8 | 250 | 260 | 170 | 2020 | 2024 |
| TPWD-12 | 2.0 | 3.2 | 2.0 | 160 | 180 | 129 | 1983 | 2024 |
| TPWD-15 | 7.1 | 7.1 | 2.6 | 210 | 220 | 110 | 1987 | 2024 |
| **Summary[d]** | **3.5** | **7.1** | **0.5** | **190** | **260** | **120** | | |
| **Fortynine Palms Subbasin** | | | | | | | | |
| TPWD-14 | 3.2 | 3.2 | 1.9 | 220 | 290 | 160 | 1993 | 2024 |
| TPWD-17 | 2.0 | 2.0 | 1.1 | 140 | 330 | 130 | 2011 | 2024 |
| **Summary[d]** | **2.6** | **3.2** | **1.1** | **180** | **330** | **130** | | |
| **Eastern Subbasin** | | | | | | | | |
| TPWD-16 | 1.5 | 1.9 | 1.5 | 220 | 280 | 145 | 1991 | 2024 |
| **Summary[d]** | **1.5** | **1.9** | **1.5** | **220** | **280** | **145** | | |
| **Mesquite Lake Subbasin** | | | | | | | | |
| WTP-1 | 1.5 | 1.5 | ND | 400 | 410 | 320 | 2006 | 2024 |
| WTP-2 | 0.68 | 0.7 | 0.56 | 280 | 280 | 250 | 2023 | 2024 |
| **Summary[d]** | **1.1** | **1.5** | **ND** | **340** | **410** | **320** | | |

Notes: MCL – maximum contaminant level; red text = MCL exceedance; ND: non-detect; n/s: not sampled.
(a) Last available data is based on TPWD records made available to Kennedy Jenks
(b) Year first sampled is based on TPWD records made available to Kennedy Jenks.
(c) Year last sampled is based on TPWD records made available to Kennedy Jenks.
(d) Summary provides the average of the most recent measurements as well as the maximum and minimum of all samples in each subbasin.

## Table 5-2. Fluoride and Arsenic Summary for TPWD Production Wells

| Well | *Fluoride (mg/L)* Secondary MCL = 2 mg/L | | | *Arsenic (µg/L)* Primary MCL = 10 µg/L | | | *Years of Well Sampling History* | |
|---|---|---|---|---|---|---|---|---|
| | Most Recent Measurement[a] | Maximum | Minimum | Most Recent Measurement[a] | Maximum | Minimum | Year first sampled[b] | Year last sampled[c] |
| **Indian Cove Subbasin** | | | | | | | | |
| TPWD-9 | 1.9 | 4.0 | 0.8 | 9.8 | 10.8 | ND | 1968 | 2016 |
| TPWD-11B | 1.4 | 2.0 | 1.2 | 4.8 | 8.8 | 4.7 | 2020 | 2024 |
| TPWD-12 | 1.7 | 2.6 | 0.4 | 7.0 | 11.0 | ND | 1983 | 2024 |
| TPWD-15 | 0.3 | 1.1 | 0.2 | ND | ND | ND | 1987 | 2024 |
| **Summary[d]** | **1.3** | **4.0** | **0.2** | **5.9** | **11.0** | **ND** | | |
| **Fortynine Palms Subbasin** | | | | | | | | |
| TPWD-14 | 0.74 | 1.5 | 0.4 | ND | 3.2 | ND | 1993 | 2024 |
| TPWD-17 | 0.70 | 1.9 | 0.68 | 2.5 | 3.3 | 2.1 | 2011 | 2024 |
| **Summary[d]** | **0.72** | **1.9** | **0.4** | **2.3** | **3.3** | **ND** | | |
| **Eastern Subbasin** | | | | | | | | |
| TPWD-16 | 1.7 | 2.1 | 0.4 | ND | 2.7 | ND | 1991 | 2024 |
| **Summary[d]** | **1.7** | **2.1** | **0.4** | **ND** | **2.7** | **ND** | | |
| **Mesquite Lake Subbasin** | | | | | | | | |
| WTP-1 | 5.9[e] | 8.6 | 5.1 | 4.6 | 5.8 | ND | 2006 | 2024 |
| WTP-2 | 6.4[e] | 6.6 | 6.4 | 11[e] | 13 | 11 | 2023 | 2024 |
| **Summary[d]** | **6.2**[e] | **8.6** | **6.4** | **7.8** | **13** | **ND** | | |

Notes: MCL – maximum contaminant level; ND: non-detect; n/s: not sampled.
(a) Last available data is based on TPWD records made available to Kennedy Jenks
(b) Year first sampled is based on TPWD records made available to Kennedy Jenks.
(c) Year last sampled is based on TPWD records made available to Kennedy Jenks.
(d) Summary provides the average of the most recent measurements as well as the maximum and minimum of all samples in each subbasin.
(e) Data appears to be an MCL exceedance, however, groundwater pumped from WTP-1 and WTP-2 receive treatment at the Fluoride Treatment Plant. Water delivered to consumers is below the MCL.

## Table 5-3. Chromium Summary for TPWD Production Wells

| Well | Chromium (+6) (µg/L) Primary MCL = 10 µg/L | | | Years of Well Sampling History | |
|---|---|---|---|---|---|
| | Most Recent Measurement[(a)] | Maximum | Minimum | Year first sampled[(b)] | Year last sampled[(c)] |
| **Indian Cove Subbasin** | | | | | |
| TPWD-9 | ND | ND | ND | 2015 | 2016 |
| TPWD-11B | 8.5 | 8.5 | 4.3 | 2020 | 2024 |
| TPWD-12 | 8.3 | 9.9 | 4.0 | 2017 | 2024 |
| TPWD-15 | ND | ND | ND | 2017 | 2024 |
| **Summary[(d)]** | **4.7** | **9.9** | **ND** | | |
| **Fortynine Palms Subbasin** | | | | | |
| TPWD-14 | 4.5 | 5.2 | 3.9 | 2017 | 2024 |
| TPWD-17 | 5.4 | 6.6 | 5.1 | 2017 | 2024 |
| **Summary[(d)]** | **5.0** | **6.6** | **3.9** | | |
| **Eastern Subbasin** | | | | | |
| TPWD-16 | 5.3 | 6.1 | 4.6 | 2017 | 2024 |
| **Summary[(d)]** | **5.3** | **6.1** | **4.6** | | |
| **Mesquite Lake Subbasin** | | | | | |
| WTP-1 | 6.1 | 6.7 | ND | 2016 | 2024 |
| WTP-2 | 9.2 | 9.4 | 9.2 | 2023 | 2024 |
| **Summary[(d)]** | **7.7** | **9.4** | **ND** | | |

Notes: MCL – maximum contaminant level; red text = MCL exceedance; ND: non-detect; n/s: not sampled.
(a) Last available data is based on TPWD records made available to Kennedy Jenks
(b) Year first sampled is based on TPWD records made available to Kennedy Jenks.
(c) Year last sampled is based on TPWD records made available to Kennedy Jenks.
(d) Summary provides the average of the most recent measurements as well as the maximum and minimum of all samples in each subbasin.

Groundwater quality in the region is quite variable. Minerals are added to the groundwater as it flows through the aquifer; water that spends more time in the aquifer tends to have higher concentrations of chemical constituents than does water with a low residence time. Water near the mountain fronts, which has been recharged relatively recently, tends to be of high quality, with low concentrations of chemical constituents. This is the case in the Indian Cove, Fortynine Palms, and Eastern Subbasins, where groundwater is close to its source area. In the Mesquite Lake Subbasin, groundwater has had a longer residence time and, therefore, tends to have higher concentrations of minerals. A general summary of the spatial trends in groundwater quality are summarized below:

- The groundwater in the Mesquite Lake Subbasin is predominantly sodium sulfate character. Locally elevated levels of TDS can be found associated with the playas, but is not present in high concentrations in the District's water supply wells. TDS content ranges from about 300 to 1,300 milligrams per liter (mg/L), but reaches 3,100 mg/L (DWR, 1984). Some wells in the basin exceed the recommended levels for drinking water in fluoride, arsenic, and sulfate concentrations. Thermal waters or hot springs are also known to occur in this basin (DWR, 1984).

- The groundwater in the Indian Cove, Fortynine Palms, and Eastern Subbasins is predominantly sodium bicarbonate in character (DWR, 1984) or sodium calcium bicarbonate in character (Krieger and Stewart, 1996). TDS content ranged from 139 to 164 mg/L for water in production wells in 1994 (Krieger and Stewart, 1996). Data from 14 public supply wells show an average TDS content of 159 mg/L and a range of 117 to 185 mg/L. Fluoride concentration in water from some wells has reached 9.0 mg/L, exceeding recommended maximum concentration levels of 2.0 mg/L (DWR, 1984).

## 5.3 TPWD Water Treatment

The District has historically pumped water from the Indian Cove, Fortynine Palms, and Eastern Subbasins in the south due to the generally good water quality in these areas. However, the District does have to treat water from certain wells for naturally occurring constituents, including fluoride and arsenic.

- **Fluoride** - Elevated fluoride concentrations above the MCL have historically been detected in some of the District's production wells. The District was granted a variance in 1993 from the California Primary MCL for fluoride, which expired in 2023. Water from Wells WTP-1 and WTP-2 is treated for fluoride prior to distribution through the Twentynine Palms Fluoride Removal Water Treatment Plant. The District currently monitors fluoride levels per the SMCL of 2 mg/L.

- **Arsenic** - Well 11-B has wellhead treatment for arsenic removal. Arsenic is removed from wells WTP-1 and WTP-2 as part of the Twentynine Palms Fluoride Removal Water Treatment Plant process.

- **Chromium-6** - Treatment for Cr-6 is considered for the future as follows:

    1) Three production wells (Wells 4, 9, and 11A) became inactive due to concentrations greater than the MCL,

2) Well 11A was replaced with Well 11B in 2017, and

3) A wellhead Cr-6 treatment system is being considered for Well 11B.

## 5.4 Wastewater Management

There are two major categories of onsite wastewater treatment systems in the Twentynine Palms area – residential and non-residential. Single family and multifamily households fall under the residential category. A variety of commercial (e.g., restaurants and hotels) and institutional (e.g., school) establishments and facilities fall into the non-residential wastewater category.

There are six (6) package treatment plants with leach fields that serve both residential and non-residential wastewater treatment needs within the City's boundary. Additionally, the City installed an onsite wastewater treatment system (OWTS) that has been in operation since 2021. The OWTS consists of a septic tank and nine seepage pits as part of "Project Phoenix". This OWTS collects wastewater flows from existing commercial properties within a six-block downtown area in Twentynine Palms. Wastewater disposal from other sources within the District service area is disposed of through individual septic tank and tile field disposal systems.

To address the second recommendation of the 2014 SNMP, Kennedy Jenks began preparing a draft SSMP in November 2023 on behalf of the City and District. The main purpose of the SSMP is to develop a strategy to monitor and protect groundwater resources in the Twentynine Palms area from impacts from existing and future septic systems. The program is designed to reduce constituent of concern (COC) loading at the source before entering groundwater. The Program is defined as a series of Septic System Management Elements (SSMEs).

These SSMEs are grouped into (4) four areas that include administrative elements, operational elements, site-specific studies, and program review (Kennedy Jenks, 2014b). The SSMP provides interim actions that can be initiated immediately as Twentynine Palms begins the process of developing or adopting a Local Agency Management Program that complies with Tier 2 of the SWRCB Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy), Resolution No. 2012-0032, which took effect on May 13, 2013 and was amended on April 18, 2023 (SWRCB, 2023).

The OWTS Policy covers septic tanks and small package plants for individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal. The intent of the OWTS policy is to efficiently utilize local programs for the management of OWTS systems through coordination with the RWQCB Basin Plan and state guidelines.

## 5.5 Water Quality Management Actions

The District undertakes several actions for the protection of the water quality of groundwater delivered to its customers. The following sections summarize several key management actions, including those of the voluntary 12 specific technical elements identified in the California Water Code that pertain to water quality.

### 5.5.1 Control of High-Salinity Waters

Areas near historical dry lakes, such as Mesquite and Shortz dry lakes, tend to have higher salinity contents in both the groundwater and surface water. The District's groundwater supplies do not appear affected from this phenomenon, and no action is recommended at this time. Monitoring wells near WTP-1 and WTP-2 production wells, which are located in the vicinity of the Mesquite Dry Lake, are periodically sampled for TDS to monitor for high salinity water.

### 5.5.2 Regulation of the Migration of Contaminated Groundwater

No contaminated groundwater from industrial or commercial sources has been identified in the District's service area. The responsibility for regulating and controlling the migration and cleanup of contaminated groundwater from industrial or commercial sources rests with various County, State, and Federal agencies, including the County of San Bernardino and the Colorado River RWQCB (Region 7).

### 5.5.3 Wellhead Protection Areas and Recharge Areas

The purpose of a recharge and wellhead protection area is to establish a protective zone around wells, well fields, and recharge areas to protect groundwater sources from contamination, eliminating the need for costly treatment to meet drinking water standards. The State has a formal wellhead and recharge protection program as part of the DDW Drinking Water Source Assessment and Protection (DWSAP) Program, which is being incorporated into the District's own DWSAP Program. The District is active in efforts to protect groundwater sources. In the past, they have worked with a developer, the City, and the Colorado River RWQCB (Region 7) to condition a housing tract development to incorporate a package wastewater treatment plant in an effort to protect water resources.

The District's DWSAP was completed in 2002 and indicates that the geology of the area places most of the District's wells in the moderate category (moderately vulnerable). This is because the District's wells are largely in unconfined aquifers. The DWSAP also indicates that very few potentially contaminating activities (PCAs) are located near the District's wells. PCAs that are located near the District's wells including roads and streets, wells (drinking water and/or monitoring), and golf courses, which are lower risk uses than industrial facilities.

As part of developing a wellhead protection area program, it is essential that the designated wellhead protection areas are communicated to the local land use planning agencies, namely the City and San Bernardino County, and that the land use planning agencies agree to make the necessary modifications to their zoning and/or General Plans to prevent any potentially contaminating activities from being sited within the wellhead protection areas. While the City of Twentynine Palms General Plan Update of 2012 identified actions for the general protection of groundwater from development, no wellhead protection policies were included.

### 5.5.4 Well Construction Policies

Improperly constructed wells can result in poor yields and contaminated groundwater. A properly constructed well can also minimize contaminant migration between aquifers. Sections 13700 through 13806 of the California Water Code require all water wells to meet

certain minimum standards. DWR Bulletins 74-81 and 74-90 (DWR, 1991) describe these minimum standards.

All District groundwater extraction, injection, and monitoring wells will be constructed according to applicable county and State, including DDW regulations. Minimum state standards are specified in DWR Bulletin 74-90 (DWR, 1991). District well drilling contractors will possess an active C57 (Water Well Drilling) Contractor's license. District well construction activities will be observed and inspected by District personnel.

The construction of private wells in the District is not within the District's jurisdiction. The County is responsible for enforcing well construction standards for these types of wells. However, outreach and coordination with private well owners are identified as an important component of the SSMP implementation. This includes working with private well owners to increase data collection efforts for better supply source management and management actions related to water quality.

### 5.5.5 Well Abandonment and Destruction Program

The continued presence of unusable wells creates several concerns. Older wells are often screened or perforated over a long depth, allowing vertical communication between various water bearing zones, which could lead to mixing of poor and good quality groundwater and/or interzonal movement of pollutants. Rusting, corrosion, and caving can compromise the integrity of the well casing, and older wells may lack the concrete sanitary seals that meet current standards. These wells are potential conduits for ground surface pollutants to enter groundwater and create a surface hazard to people and animals.

California Well Standards, Bulletin 74-81 (DWR, 1991), and its supplements, provide minimum standards for well abandonment and destruction. The County of San Bernardino Public Health Department determines how those standards are implemented within the County. There are several methods of well abandonment and destruction in the Well Standards; the County would make a determination which method is appropriate for the particular well. Additionally, the County does require a permit for all well destruction activities. These permits are required for activities within both incorporated and unincorporated areas of the County.

The District currently adheres to these minimum well abandonment and destruction standards for its own wells. In addition to abandoning and destroying unusable wells, the District will also strive to educate private well owners of the need for proper well abandonment and their responsibility under the law. Available information from the DWR, USGS, and DWR, and the District indicate that more than 400 private wells have been constructed within the District's service area. Most of these wells are not currently operated. The District has field located and inspected approximately 250 (60 percent) of the private wells.

California Well Standards, Bulletin 74-81 and its supplements, require at least a 100 feet minimum horizontal separation of any septic tank or subsurface sewage leaching field from a well. In October 2009, a private well was tested and had an elevated nitrate concentration; however, subsequent investigation concluded that the water in the well was under the influence of wastewater from a septic system due to poor maintenance. This illustrates the need for both proper septic tank maintenance and destruction of private wells located close to septic systems, as well as the importance of educating private well owners on the matter.

# Section 6: Basin Management Objectives and Implementation Plan

Basin Management Objectives (BMOs) are required under California Water Code §10753.7(a)(1) to provide flexible guidelines for the management of groundwater resources that describe specific actions to be taken by stakeholders to meet locally developed objectives at the basin or sub-area scale. SB 1938 amended existing law related to groundwater management plans requiring a public agency seeking State funds administered through DWR to prepare and implement a groundwater management plan that includes BMOs. This section establishes BMOs that are intended to help the District plan for a more reliable water supply for long-term beneficial uses in the plan area, and describes the existing or planned management actions to achieve the BMOs.

## 6.1 Basin Management Objectives

The overall goal of this GWMP is to maintain the quality and long-term availability of groundwater to meet the current and future demands without adversely affecting groundwater resources within the GWMP area. The objective of the updated GWMP is to address issues of "aquifer health" and "groundwater sustainability". These key issues include:

- Sustainable long-term water supplies
- Treatment of natural water quality constituents
- Wastewater management, specifically septic tanks
- Water supply for anticipated population growth

The BMO method of groundwater management is intended to provide a flexible approach that can be adapted to changing local conditions and increased understanding of the groundwater resource as better monitoring data are collected. The more traditional way of managing groundwater basins typically focused on often difficult to define concepts such as safe yield, replenishment, and overdraft. To meet the stated goal of addressing the key issues for the District, the following BMOs are proposed for the TPWD.

- BMO #1 – Manage Groundwater Levels to Maintain Water Supply Sustainability and Reliability
- BMO #2 – Maintain and Protect Groundwater Quality
- BMO #3 – Support Development of a Local Program for Septic Tank Management
- BMO #4 – Monitor and Track Groundwater Supply, Water Quality and Land Subsidence
- BMO #5 – Promote Public Participation and Coordination with Other Local Agencies

- BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues
- BMO #7 – Identify and Obtain Funding Sources for Groundwater Projects

This section presents the seven (7) District BMOs and identifies the actions necessary for BMO implementation.

### 6.1.1 BMO #1 – Manage Groundwater Levels to Maintain Water Supply Sustainability and Reliability

Of the two groundwater basins that underlie the District, most of the groundwater production has been from the Joshua Tree Basin because of higher groundwater quality, but this has led to long term declines in groundwater levels. The purpose of BMO #1 is to implement measures to manage the groundwater levels in a manner to increase the long-term sustainability and reliability of the water supply for TPWD in the Indian Cove, Fortynine Palms, Eastern, and Mesquite Lake Subbasins. For BMO #1, the following actions are proposed:

- **Continue adaptive management by balancing pumping between subbasins** – The District will continue the practice of shifting groundwater production between subbasins to help stabilize declining groundwater levels. This includes scheduling rest periods for groundwater wells, especially in the Indian Cove and Fortynine Palms Subbasins, to provide intervals for groundwater levels to stabilize and recover.

- **Expand groundwater production in the Mesquite Lake Subbasin** – The Mesquite Lake Subbasin contains a large volume of groundwater, but that groundwater requires water treatment primarily for fluoride. Because the fluoride is naturally occurring, treatment is the most practical and effective means to achieve drinking water quality standards. The current Fluoride Removal Water Treatment Plant is designed to handle 3.0 MGD, but currently treats 2.5 MGD, so it is operating at 83% of capacity for 4 days of the week.

  The District will plan to bring the operation of the Fluoride Removal Water Treatment Plant up to the 3.0 MGD capacity. The District installed an additional production well at the Fluoride Removal Water Treatment Plant (WTP-2) and brought it online in 2023. It is located approximately 800 feet south-southeast of WTP-1, an appropriate well spacing to minimize drawdown effects.

- **Continue and expand water conservation measures** – Water conservation reduces the overall demand for groundwater, and thus helps to sustain groundwater levels and long-term groundwater production. The District will continue to implement water conservation policies and practices to promote water conservation among customers through public outreach activities. In addition, the District will continue implementing conservation management practices including water usage audits to customers, ongoing pipeline replacement and prompt leak repairs. The District has been discussing new legislation for “Making Conservation a California Way of Life” and how they can get that word out to the public.

- **Continue assessment for future infrastructure improvements** – To better manage groundwater resources, the District will continue to assess infrastructure improvements that provide greater flexibility in operating wells to manage water quantity and quality issues. The District will assess if sufficient source capacity is available to provide adequate redundancy in the system to cover possible future system failures and to allow flexibility for adaptive management practices that shift groundwater production between the various subbasins. The District will continue to monitor aging infrastructure and develop cost-effective schedules for replacing pipeline and aging infrastructure to reduce system water loss.

  The District is in the process of constructing a Redundant Treated Water Reservoir at the Fluoride Removal Water Treatment Plant and expects it to be put into operation by 3rd or 4th Quarter 2025.

### 6.1.2 BMO #2 – Maintain and Protect Groundwater Quality

Groundwater in the District is typically of good quality; however, groundwater in some District wells requires treatment for fluoride and arsenic. There is no known contamination in the District, yet the use of septic systems for wastewater disposal in certain areas of the District could potentially introduce nitrate to groundwater. The purpose of BMO #2 is to implement measures that maintain and protect groundwater quality in the District in a manner so as not to impact the beneficial use of the groundwater resources. For BMO #2, the following actions are proposed:

- **Continue measures to control spread of highly saline groundwater** – Highly saline groundwater is primarily limited to the vicinity of the existing or historic playa lakes in the Mesquite Lake and Mainside Subbasins. The District will continue to employ practices to control spreading of highly saline groundwater by locating wells away from the playa lakes areas if possible and minimizing drawdown to avoid its migration into areas of higher water quality. New production wells will be designed to avoid depth intervals with highly saline groundwater near the playa lakes. The monitoring program will include monitoring wells in these areas to monitor for changes in water quality trends.

- **Continue wellhead protection measures** – California's DWSAP Program was developed to protect the State's public water systems and includes both a source water assessment and wellhead protection program. The District will continue to complete these assessments for new production wells, and also consider updating the source assessments for older wells if there has been a significant change in the land use in the vicinity of these wells. The District will also work with the City to ensure that land use policies protect critical wellhead areas.

- **Evaluate** wellhead treatment - The District is evaluating additional wellhead treatment for Well 11B due to the revised MCL for hexavalent chromium.

- **Monitor activities at environmental investigation and remediation sites** – The only environmental investigation and remediation sites that are currently being conducted are located at the Marine Base. The District will coordinate with the Colorado River RWQCB

(Region 7) to be notified if any new environmental investigation and remediation sites are opened within the District boundaries.

The District has been following the latest remediation efforts at the Building 1077 site located at the intersection of Delvalle Rd and Agate Rd at the Marine Base.

- **Continue the District's well abandonment policy** – Abandoned wells provide a conduit for migration of contaminants and poor-quality water through the aquifer. The District will continue to adhere to the requirements for well abandonment and destruction for all District-owned wells. These actions will be conducted according to County of San Bernardino Public Health Department requirements and California Well Standards, Bulletin 7481 and its supplements. Information for private well owners on proper well abandonment procedures will be available at public outreach activities and the District Office. The District may also pursue outside funding sources to assist with private well abandonment if appropriate. Since 2014,

    - The District has abandoned Well 4 due to Cr-6 but more recently discovered that it is collapsing at the bottom;

    - Well 9 was also abandoned due to Cr-6 in the last decade; and

    - The District is considering blending the water at Well 9 with Well 12 and/or Well 6.

- **Conduct groundwater quality studies** – Vertical water quality profiling involves chemically profiling periodic samples from a new well being drilled. With the information gained through profiling, wells can be better designed to block off the source of poor-quality water by sealing selected intervals during drilling, plugging the bottom of a hole, or building better surface seals. Vertical profiling on new wells will be undertaken when feasible and cost-effective including the pursuit of outside funding sources when appropriate.

    Such profiling was conducted when WTP-2 was drilled in 2022. Zone testing was conducted to support information about the water quality.

### 6.1.3 BMO #3 – Support Development of a Local Program for Septic Tank Management

Wastewater disposal within the District is principally through septic tanks, which are currently regulated by San Bernardino County. Septic tank return flows are a significant component of groundwater recharge; however, these return flows can add nitrate, salts, and possibly other contaminants to the groundwater. If properly managed, septic tanks return flows may not affect the beneficial use of the groundwater. The new state OWTS Policy issued in 2012 provides a mechanism for local management of septic tanks. The District and City will assess the potential for the development of a local management program for regulation of septic tanks in Twentynine Palms. For BMO#3, the following actions are proposed:

- **Implementation of the SNMP and WMP** – The District and City prepared the SNMP and Wastewater Master Plan (WMP) in 2014 to evaluate potential groundwater quality issues from existing septic tanks and whether the continued discharges from septic systems would unreasonably degrade groundwater quality and result in widespread groundwater pollution. The documents were approved by the Colorado River RWQCB (Region 7). The SNMP has been implemented, along with the Groundwater Implementation Plan that became part of it, since 2019. The District will work with the City to update the SNMP and WMP as appropriate.

- **Continue to work with City on developing a plan to address septic tank use** – The District and the City have developed the SNMP and WMP to specifically address water quality issues associated with septic tanks within the District service area. The District is a co-sponsor and will continue to participate in the development and implementation of the GWMP. The District will continue to participate in meetings and discussions regarding the septic tank issue.

- **Support development of a Local Area Management Plan** – The SNMP and WMP are intended to lead up to the possible development of a Local Agency Management Program (LAMP) under Tier 2 of the OWTS Policy for Twentynine Palms. Local regulation would provide a means to help address potential high-risk areas of nitrate loading from septic tanks and allow for continued septic tank operation in low-risk areas. The District will continue to support efforts of cooperation with the City toward development of a LAMP for Twentynine Palms.

- **Pursue outside funding sources to support abandonment of private wells** – The District service area contains hundreds of unused private wells that may act as conduits for migration of contaminants to the aquifer. Jurisdiction for well abandonment lies with the County; however, the District can provide information to private property and well owners about the need to properly destroy wells that are no longer in use. This would especially include information on wells within 100 feet of a septic tank or leach field that can be distributed to customers and/or made available at local public meetings. This proposed action is dependent on the District obtaining outside funding, preferably through a grant, to support local property owners in well abandonment. The District is unaware of any private wells being abandoned since 2014.

- **Assess methods for recycled water use** – Septic tank system return flows currently comprise a large component of recharge to the basin; therefore, recycled water should be put to an appropriate beneficial use in-lieu of groundwater if available. The District will continue to support and collaborate with the City to evaluate ways of utilizing recycled water to help reduce groundwater demand or to provide for aquifer recharge.

### 6.1.4 BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence

A key element of a GWMP is monitoring groundwater conditions. The District will maintain regular groundwater level and quality monitoring to improve the understanding of groundwater level fluctuations, potential impacts to groundwater quality and subsidence across the District.

Changes to groundwater storage will be accounted for by tracking groundwater levels. The District currently conducts water quality monitoring per the District's Implementation Plan (**Appendix B**), which is sufficient for the purpose of tracking changes in the quality of the groundwater basin. For BMO #4, the following actions are proposed:

- **Collect groundwater supply monitoring data** – The District will collect data necessary to evaluate the change in the quantity of groundwater, including the volume of groundwater pumped by the District and others, static and pumping groundwater levels from the production wells, groundwater levels from monitoring wells, and climatic data. Data will be collected according to the GWMP Monitoring Plan with appropriate field record keeping that will be maintained. Relevant data will be kept in an electronic database so that the data can be readily used to support District decision-making needs. The District will continue to coordinate with the USGS on monitoring of groundwater levels in the region and will include these data into the District's monitoring database and the DWR CASGEM Program records.

- **Collect Groundwater quality monitoring data** – The District will collect water quality samples from production wells and selected monitoring wells according to the 2014 SNMP. Emphasis will be on monitoring for regulated drinking water constituents following the DDW and EPA guidelines. Appropriate record keeping will be maintained for field records and lab reports. Relevant data will be kept in an electronic database so that the data can be readily used to support District decision-making needs.

- **Incorporate SNMP water quality monitoring data into monitoring database update** – The objective of the SNMP monitoring is focused on defining spatial and temporal trends in nitrate, TDS and contaminants of emerging concern (CECs) associated with wastewater effluent from septic tanks. The data gathered as part of the SNMP monitoring activities is being incorporated into the District database.

- **Assess change in groundwater storage** – The District will include a regular assessment of the change in groundwater storage. The results of the 2010 groundwater model provide a historical assessment of the change in groundwater storage calibrated to measured changes in groundwater levels. The District will work to bring the groundwater model up-to-date and then incorporate annual updates as part of their annual reporting activities. In turn, the groundwater model can be used as a predictive tool for groundwater management.

- **Prepare annual report and monitoring database update** – The District will produce a concise annual report of groundwater conditions based on the monitoring data. The format of the annual report will be a brief management-level summary that contains up-to-date monitoring data, a brief analysis of the data, and description of groundwater conditions in each of the subbasins in order to track progress on the groundwater management process. The results will be presented at least once a year at a public meeting to the Board of Directors, keeping them up to date on groundwater issues.

- **Establish a baseline elevation assessment for potential future land subsidence** – Land subsidence has not been identified as an issue within the Twentynine Palms area; however, playa lake deposits, such as those found in the Mesquite Lake and Mainside

Subbasins, have been noted as sources of land subsidence in Antelope Valley and other similar areas. The District will continue to employ practices to control subsidence in the Mesquite Lake Subbasin by locating wells away from the playa lakes areas when possible and minimizing drawdown to avoid the loss of aquifer storage. Therefore, the District will establish a baseline elevation assessment with historical US Geodetic Survey benchmark surveying data. Future assessments will be done periodically to verify whether land subsidence is occurring or not.

- **Expand monitoring well network to evaluate recharge and other effects of pumping on groundwater** – The District will expand its groundwater monitoring well network to include additional monitoring wells that improve the ability to track changes in groundwater storage in each of the groundwater subbasins. The various purposes of these monitoring wells would include defining drawdown effects near active pumping wells, understanding groundwater recharge potential in key recharge areas, and providing better spatial coverage to define groundwater flow. The proposed action for the installation of additional monitoring wells is dependent on the District's obtaining outside grant funding.

### 6.1.5 BMO #5 – Promote Public Participation and Coordination with Other Local Agencies

The District will look to continue and expand communication and coordination with local, state, and federal agencies to discuss regional water issues. The District is also committed to keeping customers up to date on groundwater issues. The GWMP process encourages coordination with other local agencies and stakeholders. For BMO #5, the following actions are proposed:

- **Coordinate with the City of Twentynine Palms, Marine Base, neighboring water districts and other local water purveyors** – The District coordinates with these agencies to discuss local water issues. Local Water Districts have gotten together to collaborate on messaging for water conservation through local radio stations and social media. Legislation issues have commonalities as well, so those topics are also discussed, and the local Water Districts are part of the Community Water Systems Alliance (CWSA). The local Water Districts have monthly CSWA meetings to discuss issues that districts are facing.

- **Participate in Integrated Regional Water Management Plan (IRWMP) Process** – The District will continue to participate in the IRWMP process within the Mojave region to coordinate with other regional water managers and to support obtaining outside funding to meet District needs. The Mojave Region IRWMP was completed in 2018. The IRWMP provides a road map for a long-term, balanced water supply in the region and evaluates potential water supply projects and programs that provide regional benefit through collaboration with local stakeholders, such as water and wastewater agencies. The IRWMP also fulfills a requirement for acquiring State and federal funding for local water supply and management projects. The District has incorporated projects into the IRWMP, such as monitoring wells for the SNMP and an Automated Meter Infrastructure project.

- **Continue coordination with local land use planning agencies** – Land use in the City is governed by the City of Twentynine Palms General Plan under the Community Development Department. One of the policies of the City's General Plan is to "maintain a consistent level of quality water service by working with the TPWD while minimizing any impacts of land development on the existing system". Land use in the unincorporated portions of the District is governed by the County of San Bernardino General Plan. The County's General Plan addresses water supply issues and recognizes the jurisdiction and authority of all agencies providing water service within the County with consideration given to the County's diverse geographic region. The District coordinates with both the City and County by using General Plan information to provide the foundation for land use and population projections for planning purposes.

- **Maintain a working relationship with local and state regulatory agencies** – The District will continue to report to and communicate with these agencies, as required by law and to support mutual goals in the region. In addition, the District will continue and expand communication and coordination with local and state regulatory agencies to discuss groundwater issues especially pertaining to water quality. The management of District groundwater resources requires establishing and maintaining communication with the following state and federal regulatory agencies:

    - State Water Resources Control Board
    - California Division of Drinking Water
    - Colorado River Regional Water Quality Control Board - Region 7
    - California Department of Water Resources
    - United States Environmental Protection Agency

- **Provide for regular public outreach opportunities** – The District provides for regular public outreach and participation through one or more public meetings. Potential public outreach includes new customer information packages and an annual presentation summarizing the annual report at a public meeting to keep the Board of Directors and public up to date on the management of the groundwater basin. The District is working on a quarterly newsletter to be distributed to the media and the City. The District will continue to provide information on water issues and water conservation through brochures, speaking at public events, and providing educational materials at local schools.

### 6.1.6 BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues

Water supply needs and issues for the District could change due to future growth in the region, changes in regulations, or other outside factors. The District will take measures to plan for these contingencies. For BMO #6, the following actions are proposed:

- **Monitor changes to drinking water standards** – Water quality regulations are subject to change, which may include lowering an existing MCL or adding a new compound to the list of regulated compounds. This can have a significant impact on the District customers if these changes in the water quality regulation result in the addition of new water treatment in order to continue serving water from existing wells. If new treatment is required, this may result in significant capital and O&M costs to upgrade and maintain the additional water treatment.

  The 2008 change in the arsenic MCL resulted in changes in use of groundwater production wells and treatment that required capital expenditures to address. With the recently adopted CR-6 MCL, the District is currently evaluating cost-effective solutions for treatment where needed. The District will continue to monitor changes in state and federal drinking water standards and evaluate how best to address these with respect to both providing a safe water supply to customers and maintaining cost-effective District operations.

- **Review criteria for assessing water supply availability for large developments** – The District will review and update its policy on meeting the long-term water supply needs for large developments. The goal is to establish internal guidelines for consistency of evaluating SB610/SB221 requests for water supply and to assess the availability of total water supply within the District. This will include developing potential mitigation measures for developers that may include water conservation or other measures to offset the costs of increasing the water supply. No new large developments have come in since 2014.

- **Evaluate the feasibility of groundwater replenishment projects** – The desert environment limits the potential for groundwater recharge in the region; therefore, measures to maximize the use of existing local water resources are necessary, such as stormwater runoff. Stormwater capture and groundwater recharge could be achieved by construction designated recharge facilities (i.e., with berms). Groundwater recharge is most viable in the Indian Cove and Fortynine Palms Subbasins and could potentially increase the yield and/or reduce overdraft in these basins. The District will pursue grant funding to identify alternatives and evaluate the feasibility of groundwater recharge projects.

- **Evaluate the feasibility of potential new water sources** – If future growth in the Twentynine Palms area increases significantly as it has in other nearby areas in Southern California, water demand may potentially exceed the ability of the groundwater basin to provide adequate water supply without causing basin overdraft. Therefore, the District will evaluate whether there are other potential new water sources that could be developed. Potential sources may include further development of low-quality groundwater resources requiring treatment, water conservation, water reuse, groundwater storage and recovery, or imported water.

  Development of new water sources is anticipated to be more expensive than the use of current water sources; therefore, it is important to begin planning. The proposed action is dependent on the District's obtaining outside funding preferably through a grant, which the District will pursue.

- **Update the GWMP periodically to address changing needs or conditions** – The DWR guidelines include a provision for regular review and update of the GWMP to keep the BMOs, actions, and implementation plan up to date. The District practice has been to update the plan every five years with the original plan developed in 2003, with updates in 2008 and 2014. Although the previous five-year cycle was skipped, the District will continue the practice of updating the GWMP about every five years.

### 6.1.7 BMO #7 – Identify and Obtain Funding Sources for Groundwater Projects

BMO #7 recommends an evaluation to identify potential funding sources for future groundwater projects. For BMO #7, the following actions are proposed:

- **Define projects that could be eligible for outside funding** – Some funding opportunities require that the project be "shovel ready", which would require existing designs, CEQA and other work already be prepared. The District will evaluate the priority of projects that could be designed and put on a shelf until funding is available.

- **Develop background and supporting materials** – Many grants have a short turnaround time. The District will develop background and supporting materials to respond quickly and successfully to grant funding opportunities.

- **Identify potential funding sources** – The District will identify potential outside funding sources. The District will work through the IRWMP process and also keep track of funding opportunities through State agencies. When applicable, the District will also contact the Marine Base to determine the potential of federal grants for any joint projects to be undertaken with the Marine Base.

## 6.2 Implementation Plan

This section outlines a schedule to assist with the implementation and assessment of this GWMP. An important aspect of this section is the identification of the BMOs and actions that will be implemented by the District over time. The actions under these BMOs will focus on managing, maintaining, and monitoring groundwater quantity, quality, and land subsidence, coordinating with other local agencies, and addressing planned or potential future water supply options. The schedule for the implementation plan for the BMOs, plan components, and actions is presented in Table 6-1 and categorized as follows:

- **The short-term implementation** plan lists those actions that the District will plan to implement over the next five years. This includes several proposed actions under the BMOs #1, #2, #4, and #6. These BMOs and actions will focus on activities related to managing and maintaining groundwater quantity and quality, coordinating with other local agencies, and seeking funding opportunities for groundwater projects.
- **The long-term implementation plan** lists those actions that the District will plan to initiate within the next five years, but full implementation is anticipated to extend beyond the next five years. The long-term implementation plan includes several proposed actions as part of the BMOs #2, #3, and #5. These actions will focus on maintaining and

protecting groundwater quality, coordinating with other local agencies, and seeking funding opportunities for groundwater projects.

- **Projects dependent upon outside grant funding** envision that implementation of the GWMP, as well as many other groundwater management related activities, will be funded from a variety of sources, including State and Federal grant programs. This is a list of actions the District has identified that would be best accomplished through an outside funding source. This includes several proposed actions as part of the BMOs #1, #2, #3, and #5.

The GWMP is intended to be a living document, and it will be important to evaluate actions and objectives over time to determine how well they are meeting the overall goal of the GWMP. The District intends to evaluate and update the GWMP on a regular basis.

**Table 6-1. GWMP Implementation Plan Summary**

| | |
|---|---|
| **Standing Procedures and Ongoing Practices** | |
| **BMO #1 – Manage Groundwater Levels to Maintain Water Supply and Reliability** | Continue adaptive management of balancing pumping between subbasins |
| | Continue and expand water conservation measures |
| | Continue assessment for future infrastructure improvements |
| **BMO #2 – Maintain and Protect Groundwater Quality** | Continue measures to control spread of highly saline groundwater |
| | Continue wellhead protection measures |
| | Continue the District's well abandonment policy |
| **BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence** | Collect groundwater supply monitoring data |
| | Collect groundwater quality monitoring data |
| **BMO #5 – Promote Public Participation and Coordination with Other Local Agencies** | Continue Coordination with local land use planning agencies |
| | Maintain a working relationship with local and state regulatory agencies |
| **BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues** | Update the GWMP periodically to address changing needs or conditions |
| **Short-Term Implementation Plan (<5 years)** | |
| **BMO #3 – Support Development of a Local Program for Septic Tank Management** | Implement the SNMP and WMP |
| | Explore development of a Local Area Management Plan |
| | Continue to work with City on developing a plan to address septic tank use |
| **BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence** | Assess change in groundwater storage; update groundwater model and incorporate annual updates |
| | Prepare annual report and monitoring database update |
| | Establish a baseline elevation assessment for potential future land subsidence |
| **BMO #5 – Promote Public Participation and Coordination with Other Local Agencies** | Coordinate with the City of Twentynine Palms, neighboring water districts and local land use planning |
| | Participate in Integrated Regional Water Management Plan (IRWMP) Process |
| | Provide for regular public outreach opportunities |

| | |
|---|---|
| **BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues** | Monitor changes to drinking water standards |
| | Review criteria for assessing water supply availability for large developments |
| **BMO #7 – Identify and Obtain Funding Sources for Groundwater Projects** | Define projects that could be eligible for outside funding |
| | Develop background and supporting materials |
| | Identify potential funding sources |
| **Long-Term Implementation Plan (>5 years)** | |
| **BMO #2 – Maintain and Protect Groundwater Quality** | Monitor activities at environmental investigation and remediation sites |
| **BMO #3 – Support Local Regulation of Septic Tanks** | Assess methods for recycled water use |
| **BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence** | Incorporate Groundwater Protection Plan water quality monitoring data into monitoring database update |
| | Establish a baseline for evaluating potential future land subsidence |
| **BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues** | Evaluate the feasibility of groundwater replenishment projects |
| | Evaluate the feasibility of potential new water sources |
| | Develop plan for addressing the expiration of the fluoride variance in 2023 |
| | Update the groundwater management plan periodically to address changing needs or conditions |
| **Projects Dependent Upon Obtaining Outside Funding** | |
| **BMO #2 – Maintain and Protect Groundwater Quality** | Conduct groundwater quality studies |
| **BMO #3 – Support Local Regulation of Septic Tanks** | Obtain funding to support abandonment of private wells |
| **BMO #4 – Monitor and Track Groundwater Supply, Water Quality, and Land Subsidence** | Expand monitoring well network to evaluate recharge and other key areas |
| | Obtain funding to support bringing groundwater model up to date |
| **BMO #6 – Address Planned or Potential Future Water Supply Needs and Issues** | Evaluate feasibility of groundwater replenishment projects |

## References


BCI Genetics, Inc. (BCI), 1990, Determination of Active Recharge to the Twentynine Palms Water District, Twentynine Palms, California, report prepared for Twentynine Palms Water District, dated November 1990, BCI Genetics, Inc., Santa Barbara, CA.

California Department of Water Resources (DWR). Southern District. 1984. *Twentynine Palms ground water study.* District Report. 109 pp.

California Department of Water Resources (DWR), California Well Standards, Bulletin 74-90, June 1991.

California Department of Water Resources (DWR), 2003. *California's Groundwater Update 2003*, California Department of Water Resources, Sacramento, CA.

California's Department of Water Resources (DWR), 2013. *California's Groundwater Update 2013*, California Department of Water Resources, Sacramento, CA.

California Department of Water Resources (DWR), Sustainable Groundwater Management Act (SGMA), 2014.

California's Department of Water Resources (DWR), 2016. *California's Groundwater Interim Update 2016*, California Department of Water Resources, Sacramento, CA.

California Department of Water Resources (DWR), 2021. *California's Groundwater Update 2020,* California Department of Water Resources, Sacramento, CA.

California Department of Water Resources (DWR), *Non-SGMA Groundwater Management*. Accessed October, 2024a. https://water.ca.gov/Programs/Groundwater-Management/Non-SGMA-Groundwater-Management

California Department of Water Resources (DWR), 2024b. SGMA Basin Prioritization Dashboard [Online Web Map]. Accessed March 20th, 2024. https://gis.water.ca.gov/app/bp-dashboard/final/

California Department of Water Resources (DWR), 2024v. 7-062 Joshua Tree Basin Boundary Description. https://data.cnra.ca.gov/dataset/fb8dff8c-6bf7-4757-b3e9-c1bf4d38a414/resource/7dd1cfa3-017d-41b7-923e-0ccfa4b356d3/download/7-062_joshua-tree_basinboundarydescription.pdf

California Department of Water Resources (DWR), 2024d. California Irrigation Management Information Systems Station No. 233 Joshua Tree. https://cimis.water.ca.gov/WSNReportCriteria.aspx

California Regional Water Quality Control Board Colorado River Region 7 (RWQCB), 2006, Water Quality Control Plan Colorado River Basin – Region 7. http://www.waterboards.ca.gov/rwqcb7/publications_forms/publications/docs/basinplan_2006.pdf.

California State Water Resources Control Board (SWRCB), 2023. Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems. April 18, 2023.

Haley and Aldrich, Baseline Report, 2000, Compilation of Groundwater and Wells Information within the Twentynine Palms Water District Service Area, December 2000.

Kennedy Jenks, 2008. Groundwater Management Plan Update, report prepared for Twentynine Palms Water District, Kennedy Jenks, Los Angeles, CA, 126pp.

Kennedy Jenks, 2009. Shallow Groundwater Investigation- Twentynine Palms Water Treatment Plant Revised Report of Waste Discharge, letter report prepared for Twentynine Palms Water District, dated 22 October 2009, Kennedy Jenks, Irvine, CA, 10pp.

Kennedy Jenks, 2010. Groundwater Study for the Mesquite Lake Subbasin, report prepared for Twentynine Palms Water District, dated March 2010, Kennedy Jenks, San Francisco, CA, 328 pp.

Kennedy Jenks, 2014a. Twentynine Palms Groundwater Management Plan 2014 Update, report prepared for Twentynine Palms Water District, dated 28 May 2014, Kennedy Jenks, San Francisco, CA, 107 pp.

Kennedy Jenks, 2014b. Twentynine Palms Salt and Nutrient Management Plan, prepared for City of Twentynine Palms and Twentynine Palms Water District, dated June 2014, Kennedy Jenks, Irvine, CA, 149 pp.

Kennedy Jenks, 2019. Groundwater Monitoring Implementation Program, report prepared for Twentynine Palms Water District, dated 31 December 2019, Kennedy Jenks, Murrieta, CA, 44 pp.

Kennedy Jenks, 2021. 2020 Urban Water Management Plan, report prepared for Twentynine Palms Water District, dated June 2021, Kennedy Jenks, Oxnard, CA, 433 pp.

Kennedy Jenks, 2024. SNMP 2023 Groundwater Monitoring Report, report prepared for Twentynine Palms Water District, dated 31 May 2024, Kennedy Jenks, Rancho Cordova, CA.

Krieger and Stewart, 1996, Joshua Basin Water District Groundwater Management Plan, Joshua Basin Water District, Joshua Tree, California.

Li and Martin, 2011, Geohydrology, simulation of regional groundwater flow, and assessment of water management strategies, Twentynine Palms area, California, USGS Scientific Investigations Report: 2010-5249.

Londquist, C.J. and P.R. Martin, 1991. Geohydrology and ground-water-flow simulation of the Surprise Spring basin aquifer system, San Bernardino County, California, *U.S. Geological Survey Water-Resources Investigations Report 89-4099*, U.S. Geological Survey, Sacramento, CA, 48pp.

Mendez, G.O. and A.H. Christensen. 1997. *Regional water table (1996) and water-level changes in the Mojave River, the Morongo, and the Fort Irwin ground-water basins, San Bernardino County, California.* U.S. Geological Survey Water-Resources Investigations Report 97-4160. 34 p.

MWH, 2009a. High-Desert Water District Sewer Master Plan Final Report. January 2009.

MWH, 2009b. High-Desert Water District Water Reclamation Facility Preliminary Design Report. Volume 1, January 2009.

Moyle, W.R., Jr. 1984. *Bouguer gravity anomaly map of the Twentynine Palms Marine Corps Base and vicinity, California.* U.S. Geological Survey Water-Resources Investigations Report 84-4005.

Nishikawa, T., J.A. Izbicki, J.A. Hevesi, C.L. Stamos, and P. Martin, 2004. Evaluation of geohydrologic framework, recharge estimates, and ground-water flow of the Joshua Tree area, San Bernardino County, California, *U.S. Geological Survey Science Investigations Report 2004-5267*, U.S. Geological Survey, Reston, VA, 127pp.

Riley, F.S. and G.F. Worts, Jr., 1952 [Retyped 2001]. Geologic reconnaissance and test-well drilling program, Marine Corps Training Center, Twentynine Palms, California, *U.S. Geological Survey Open-File Report 98-166*, U.S. Geological Survey, Long Beach, CA, 71pp.

Riley, F.S. and G.F. Worts, Jr., 1953 [Retyped 2001]. Geology and ground-water appraisal of the Twentynine Palms Marine Corps Training Center, California, *U.S. Geological Survey Open-File Report 98-167*, U.S. Geological Survey, Long Beach, CA, 131pp.

Roberts, C., R. Jachens, A. Katzenstein, G. Smith, and R. Johnson, 2002. Gravity map and data of the eastern half of the Big Bear Lake, 100,000 scale quadrangle, California and analysis of the depths of several basins*, U.S. Geological Survey Open-File Report 02-353*, U.S. Geological Survey, Reston, VA, 1 map.

Schaefer, D.H. 1978. *Ground-water resources of the Marine Corps Base, Twentynine Palms, San Bernardino County, California.* U.S. Geological Survey Water-Resources Investigations Report 77-37. 29 p.

Troxell, H.C. and others, 1954. Hydrology of the San Bernardino and eastern San Gabriel Mountains, California, U.S. Geological Survey Hydrologic Atlas HA 1, *U.S. Geological Survey*, Washington, D.C., 30pp.

Thompson, D.G., 1929. The Mohave Desert Region, California: a geographic, geologic, and hydrologic reconnaissance, U*.S. Geological Survey Water-Supply Paper 578*, U.S. Government Printing Office, Washington, D.C., 817pp.

U.S. Department of Agriculture (USDA), 1970. Report and General Soil Map of the Southwestern Desert Area of San Bernardino County, California, U.S. Department of Agriculture, Fort Worth, TX.

U.S. Department of Agriculture (USDA), 1994. State Soil Geographic (STATSGO) Data Base – Data Use Information, *Miscellaneous Publication No. 1492*, U.S. Department of Agriculture, Fort Worth, TX.

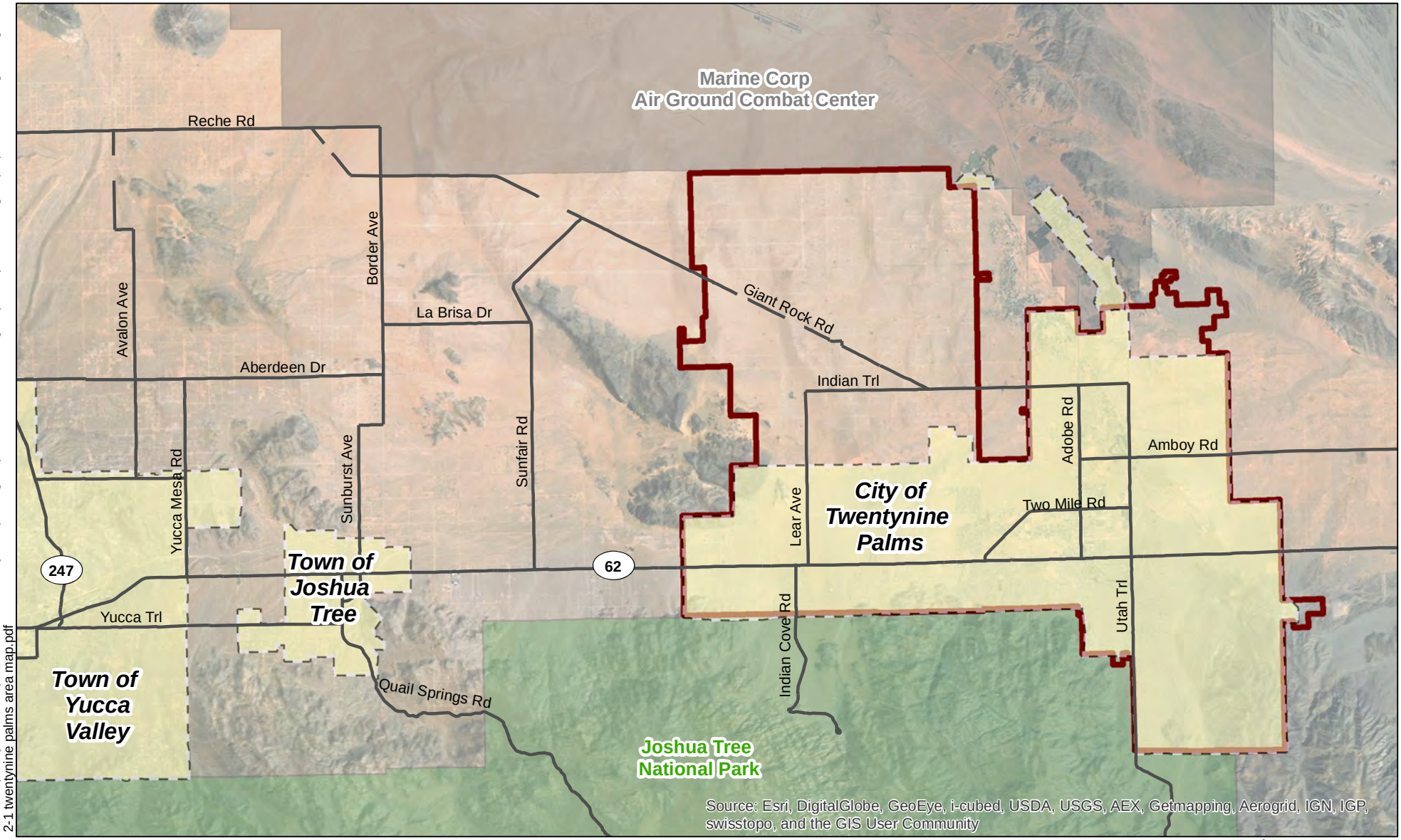
US Department of Commerce, National Oceanic and Atmospheric Administration. “National Geodetic Survey.” Accessed December 9th 2024. https://geodesy.noaa.gov/datasheets/

U.S Department of Defense Environment, Safety & Occupational Health Network and Information Exchange (DENIX), 2021. 2-Nomination Narrative-USMC-S-NCII-Twentynine-Palms_508C

Whitt, A. and K.L. Jonker, 1998. Groundwater survey of the Joshua Tree and Copper Mountain subbasins, Joshua Tree, California, Western Water Surveys report prepared for the Joshua Tree Water District.

Woodward-Clyde Consultants, 1985, Twentynine Palms Groundwater Study Final Report, report prepared for Twentynine Palms Water District, dated 6 May 1985, Woodward-Clyde Consultants, Santa Ana, CA.

# Figures




Path: https://kjcnet.sharepoint.com/sites/twenty-ninepalmsgwmp/shared documents/gwmp - 29 palms wd/! gwmp update 2024/figures/figure 2-1 twentynine palms area map.pdf

**Legend**

- Road
- City Limit
- Water District Boundary
- Marine Corps Base
- National Park

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Scale: Miles

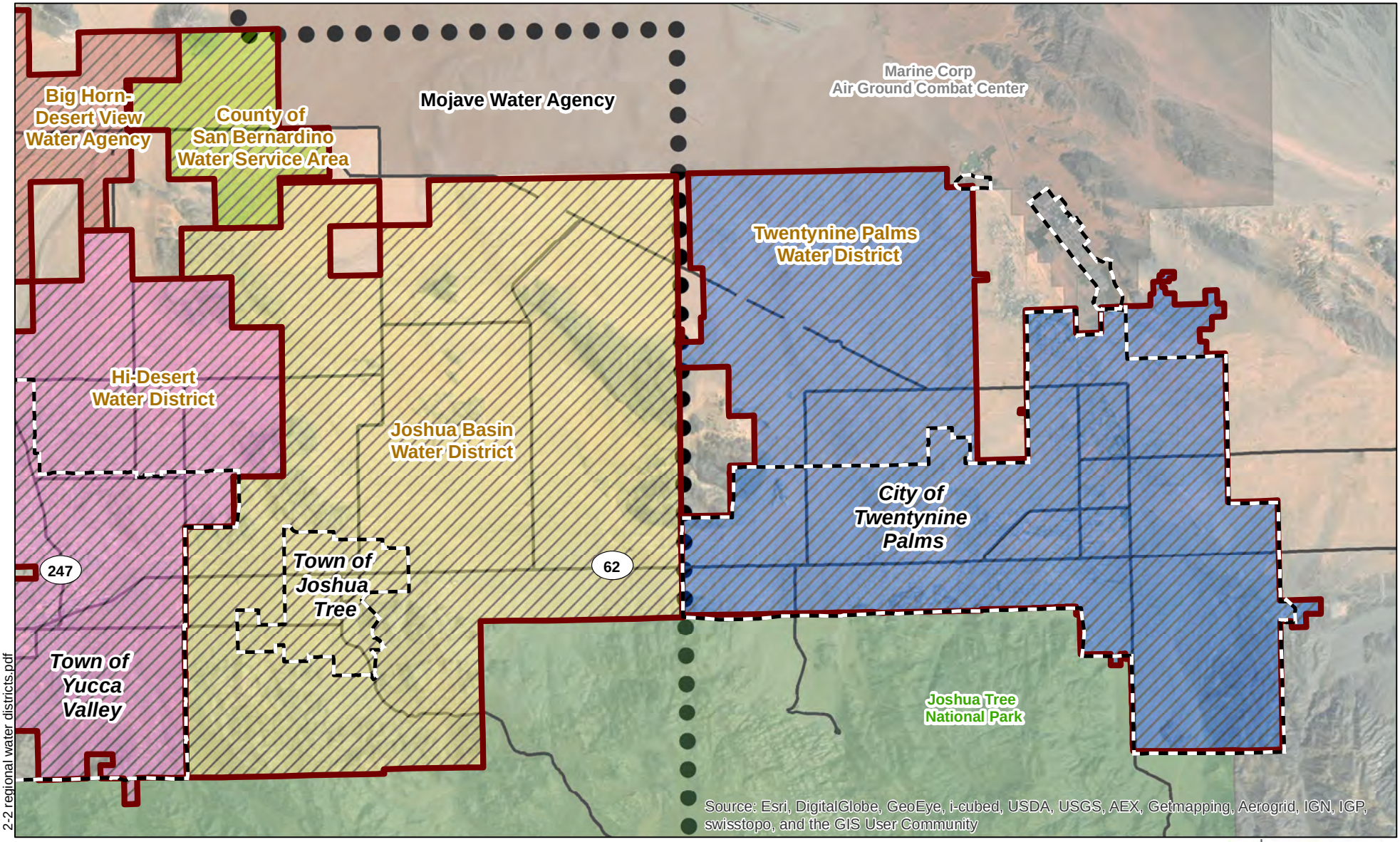
Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Twentynine Palms Area Map**

KJ 2444214*00
December 2024

**Figure 2-1**




Path: https://kjcnet.sharepoint.com/sites/twenty-ninepalmsgwmp/shared documents/gwmp - 29 palms wd/! gwmp update 2024/figures/figure 2-2 regional water districts.pdf

## Legend

- Road
- City Limit
- Water District Boundary
- Mojave Water Agency
- Marine Corps Base
- National Park

N

0 1 2

Scale: Miles

Kennedy Jenks

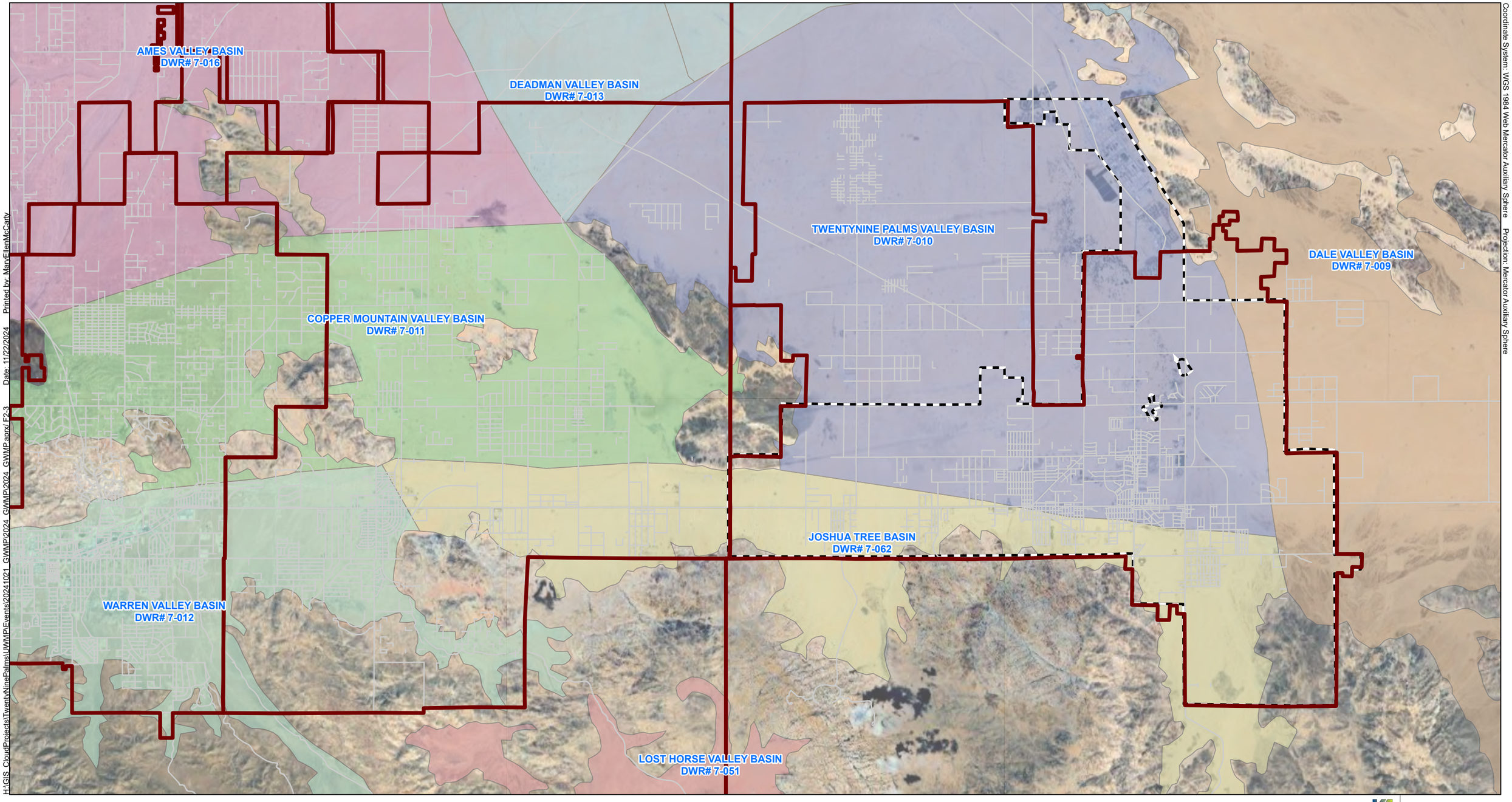
Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Regional Water Districts**

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December 2024

**Figure 2-2**

Google Earth Satellite: Google Earth




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Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere Projection: Mercator Auxiliary Sphere

**Legend**

- Roads
- Water District Boundary
- City Limit

N

0 1 2
Miles

Kennedy Jenks

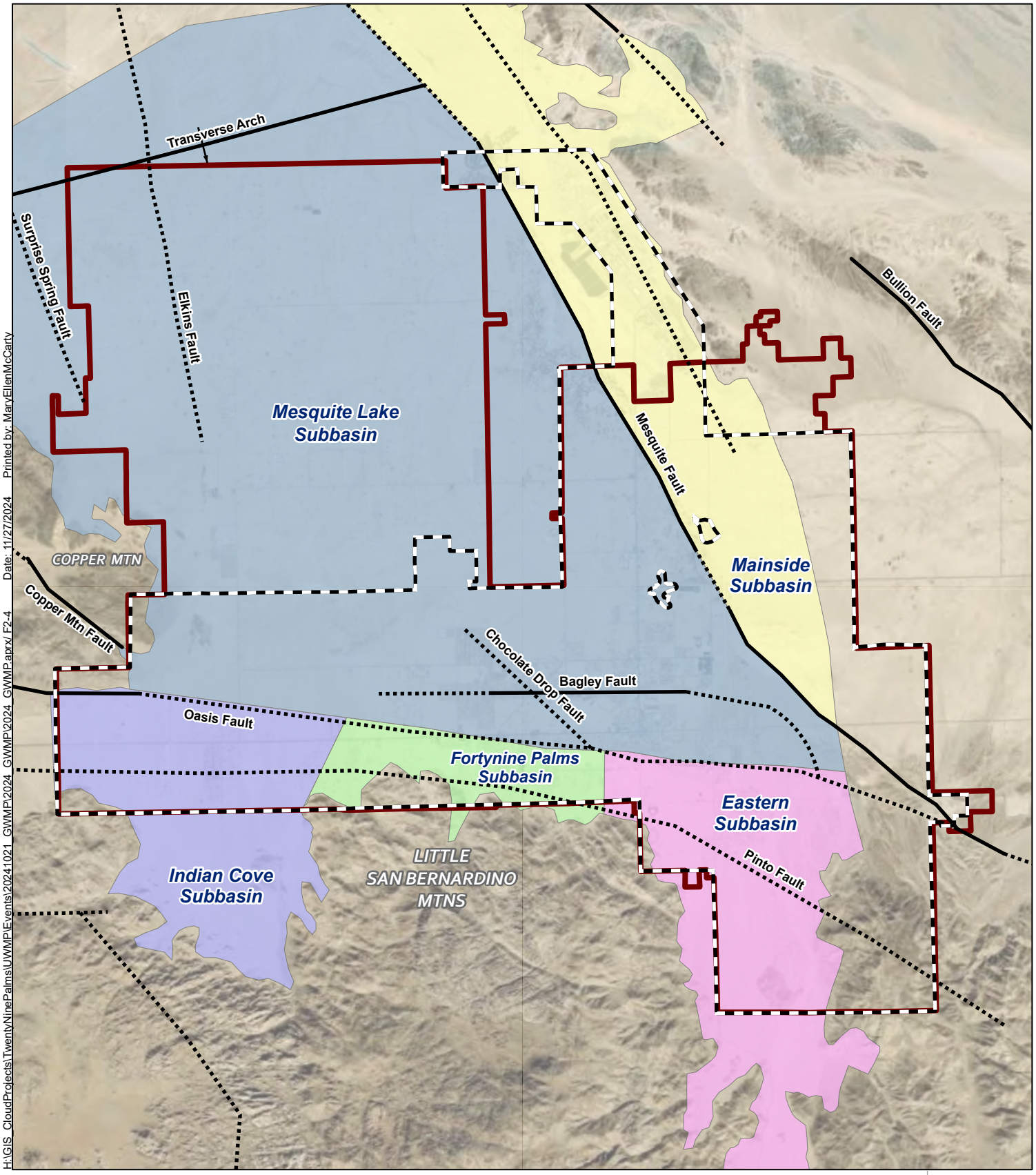
Document Title
City, County, State

**DWR Groundwater Basins**

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December 2024

**Figure 2-3**

World Imagery: County of San Bernardino, Earthstar Geographics




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**Legend**

**Faults**

- Known
- Inferred
- Anticline
- City Limit
- TPWD Boundary

- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

N

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Miles

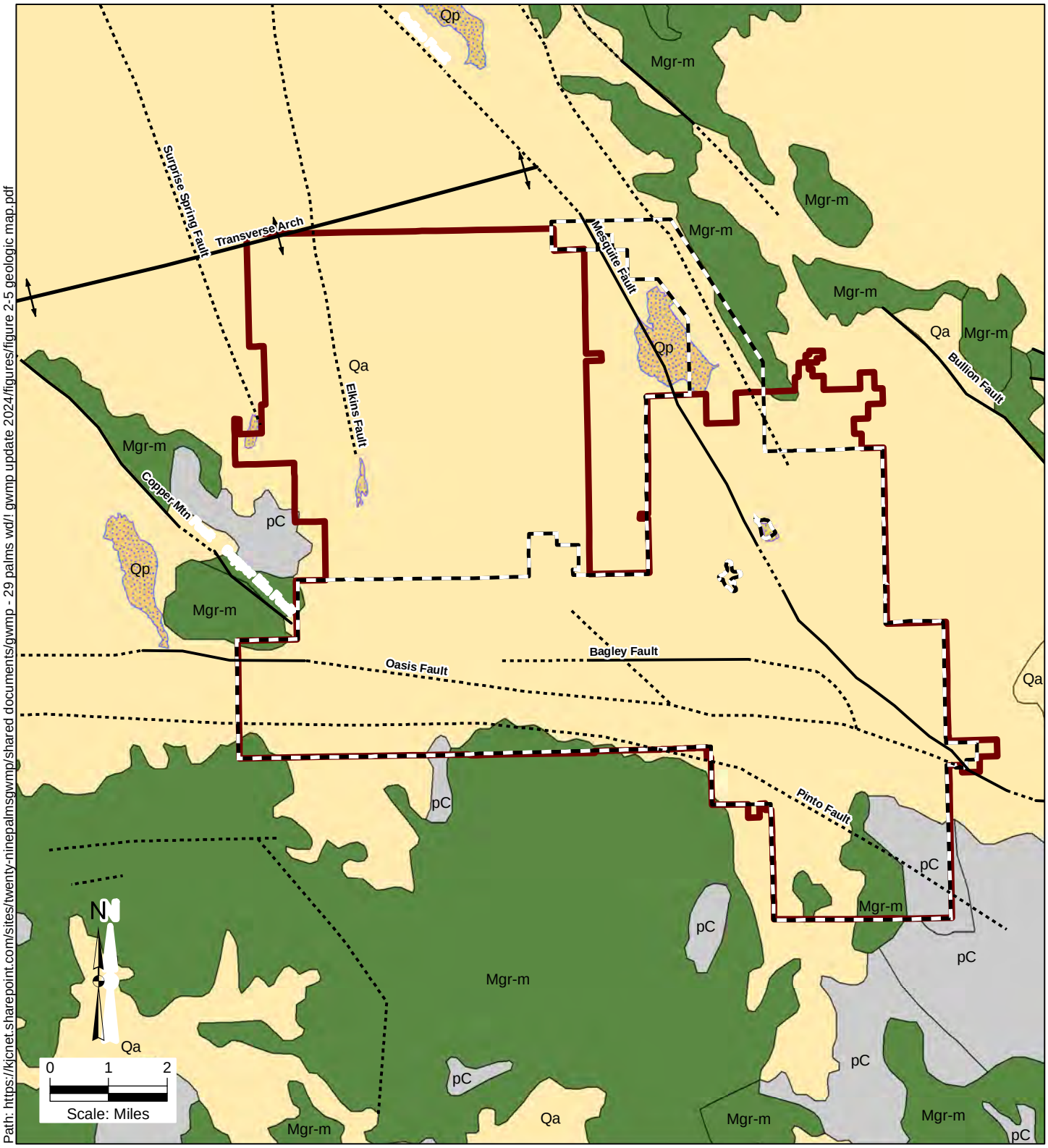
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Twentynine Palms Water District

**TPWD Groundwater Subbasins**

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December 2024

**Figure 2-4**




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## Legend

City Limit

Water District Boundary

Faults

Known

Inferred

Anticline

**Geologic Units**

Qp: Playa lakes

Qa: Quaternary alluvium

Mgr-m: Mesozoic igneous & metamorphic rocks

pC: Precambrian igneous & metamorphic rocks

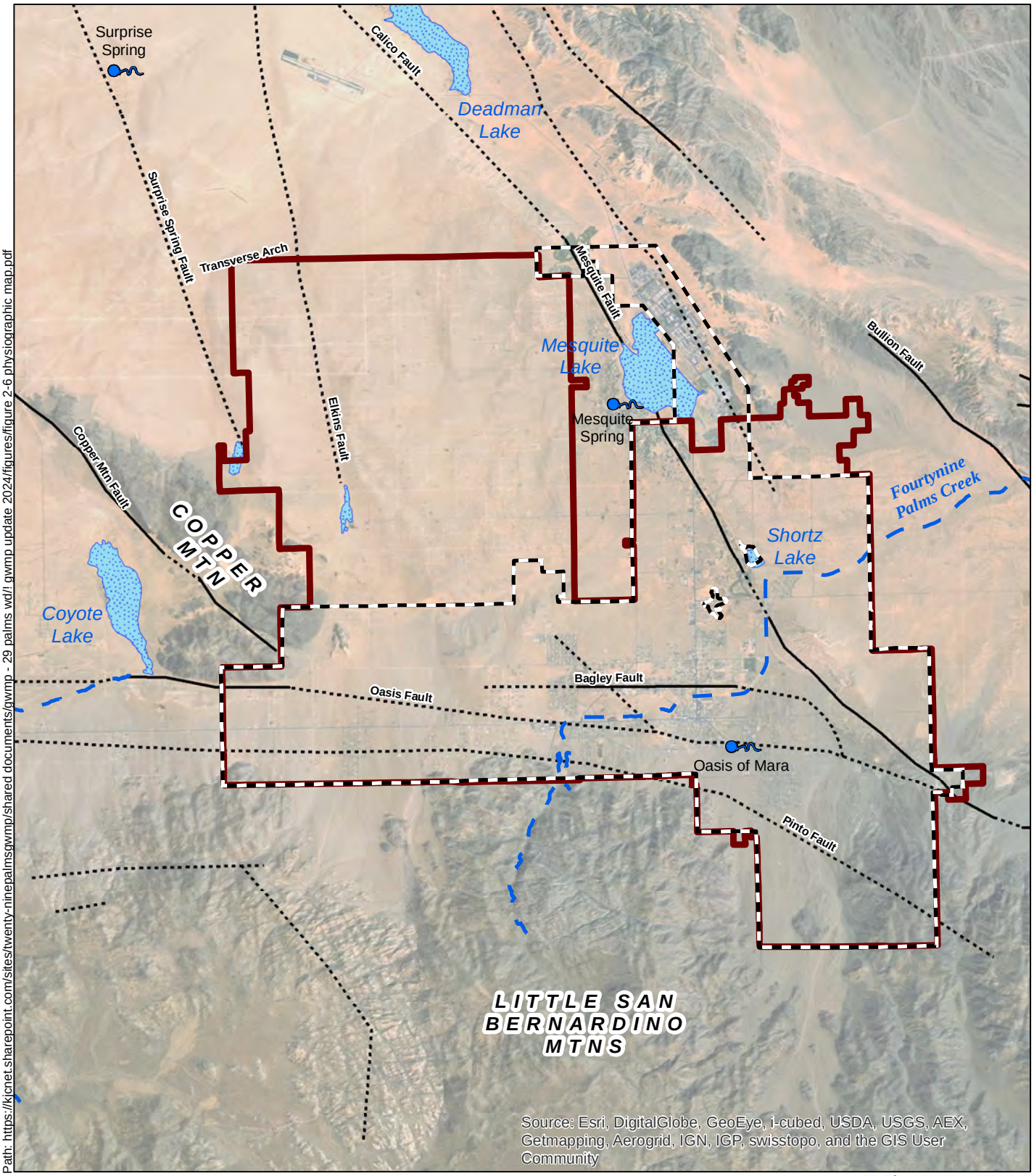
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**Geologic Map**

KJ 1365022*00
December 2024

**Figure 2-5**




Path: https://kjcnet.sharepoint.com/sites/twenty-ninepalmsgwmp/shared documents/gwmp - 29 palms wd/! gwmp update 2024/figures/figure 2-6 physiographic map.pdf

## Legend

**Surface Water Features**

- Spring
- Stream
- Playa Lake
- City Limit
- Water District Boundary

**Faults**

- Known
- Inferred

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Scale: Miles

Kennedy Jenks

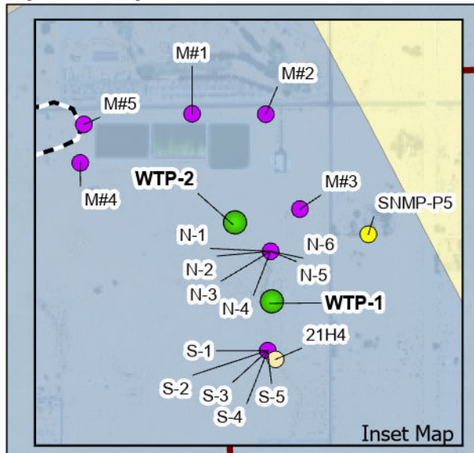
Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Physiographic Map**

KJ 2444214*00
December 2024

**Figure 2-6**

World Imagery: County of San Bernardino, Maxar
Google Earth Satellite: Google Earth






## Legend

**TPWD Wells**

- City of Twentynine Palms - Monitoring
- Private
- TPWD - Abandoned
- TPWD - Destroyed
- TPWD - Monitoring
- TPWD - Municipal, Active
- TPWD - Municipal, Inactive
- USGS - Monitoring, Active
- USGS - Monitoring, Inactive

**Boundaries**

- City Limit
- TPWD Boundary
- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

N

0 5,000 10,000
Scale: Feet

Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

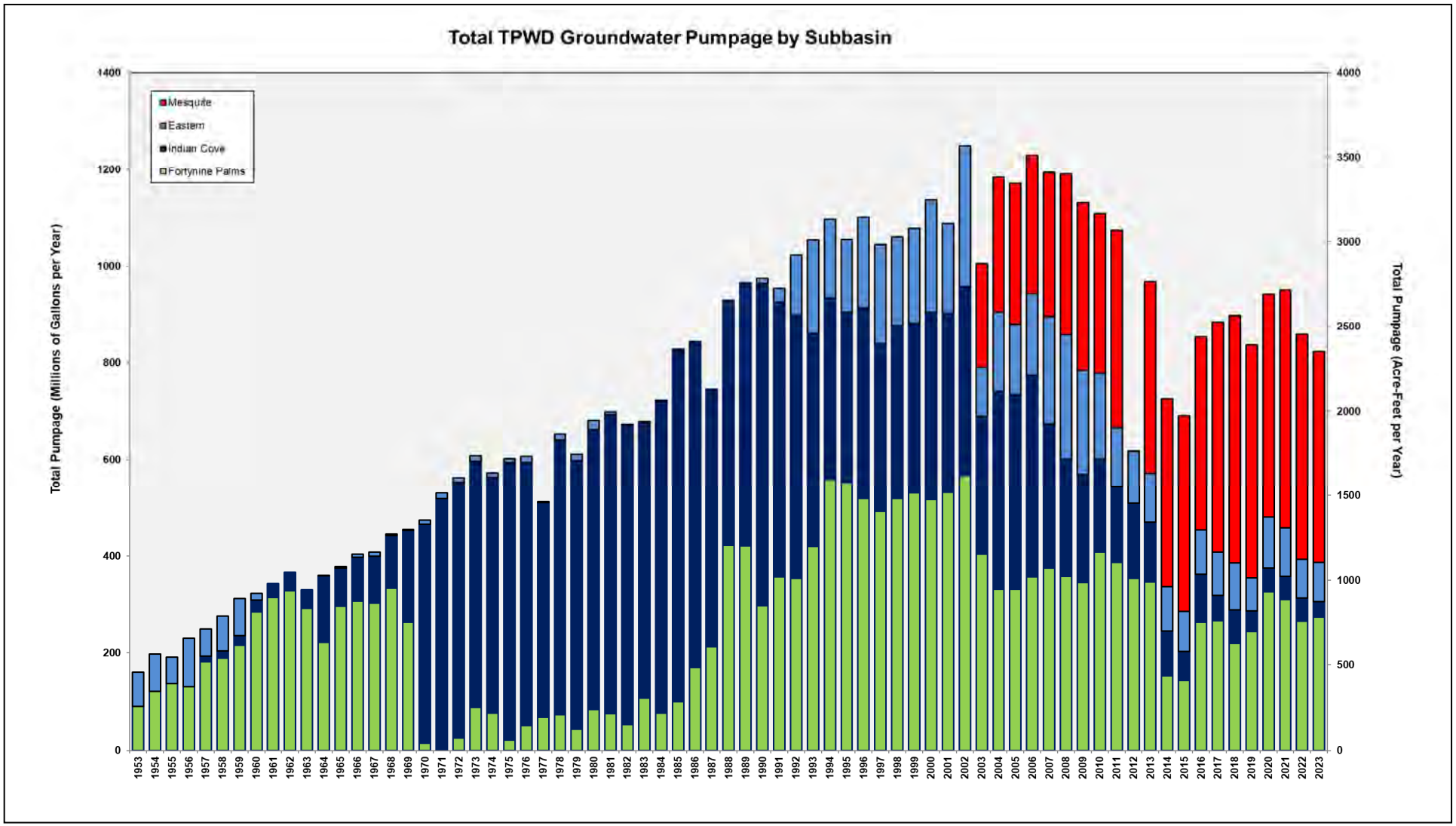
**Groundwater Subbasins and Wells in GWMP Area**

2444214*00
December 2024

**Figure 3-1**

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Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet Projection: Lambert Conformal Conic




Kennedy Jenks

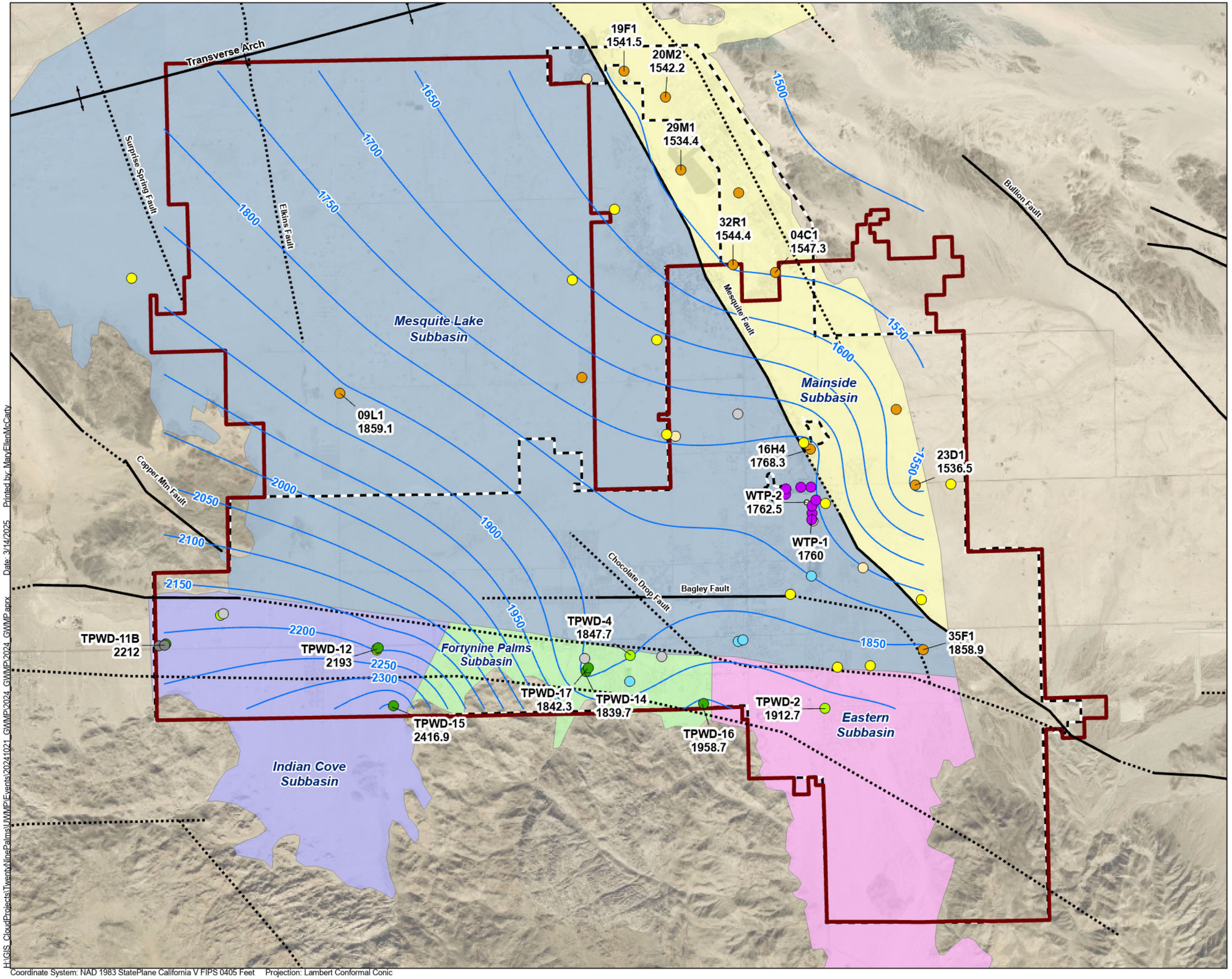
Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Annual Pumping from TPWD Wells by Subbasin**

KJ 2444214*00
December 2024

**Figure 3-2**

World Imagery: County of San Bernardino, Earthstar Geographics




## Legend

**Wells**

- City of Twentynine Palms - Monitoring
- Private
- TPWD - Abandoned
- TPWD - Destroyed
- TPWD - Monitoring
- TPWD - Municipal, Active
- TPWD - Municipal, Inactive
- USGS - Monitoring, Active
- USGS - Monitoring, Inactive

**Faults**

- Known
- Inferred
- Anticline

**Boundaries**

- City Limit
- TPWD Boundary
- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

**Groundwater Elevation Contours**

- Contour Line

**Notes:**

1. Groundwater elevation contours are based on March-May TPWD and USGS static groundwater level data from 2022 to 2024.
2. Displayed groundwater elevations are in ft, MSL.

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Scale: Feet

Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Spring Groundwater Elevation Map**

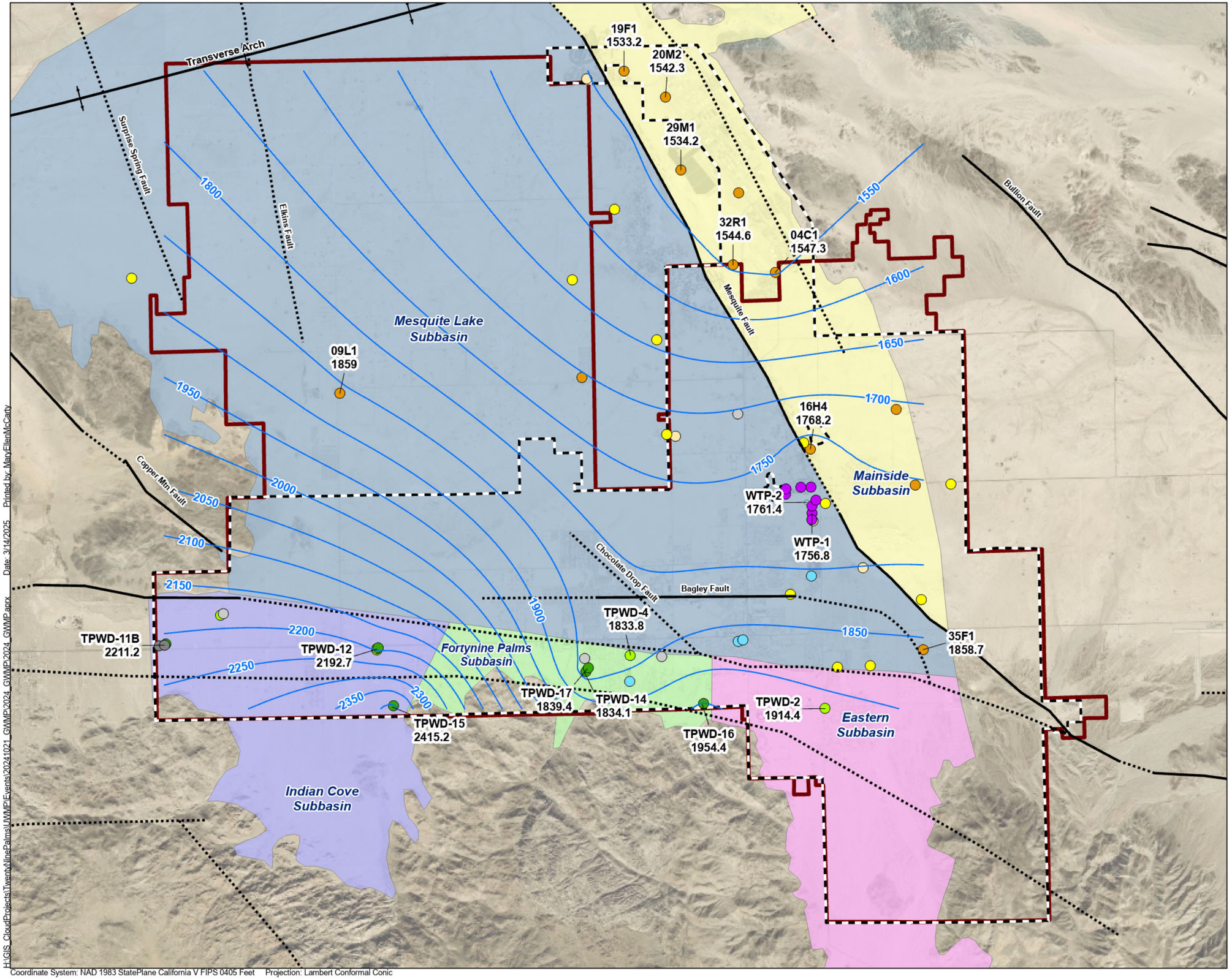
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December 2024

**Figure 4-1**

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Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet Projection: Lambert Conformal Conic

World Imagery: County of San Bernardino, Earthstar Geographics




## Legend

**Wells**

- City of Twentynine Palms - Monitoring
- Private
- TPWD - Abandoned
- TPWD - Destroyed
- TPWD - Monitoring
- TPWD - Municipal, Active
- TPWD - Municipal, Inactive
- USGS - Monitoring, Active
- USGS - Monitoring, Inactive

**Faults**

- Known
- Inferred
- Anticline

**Boundaries**

- City Limit
- TPWD Boundary
- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

**Groundwater Elevation Contours**

- Contour Line

**Notes:**

1. Groundwater elevation contours are based on October-November TPWD and USGS static groundwater level data from 2022 to 2024.
2. Displayed groundwater elevations are in ft, MSL.

N

0 5,000 10,000

Scale: Feet

Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Fall Groundwater Elevation Map**

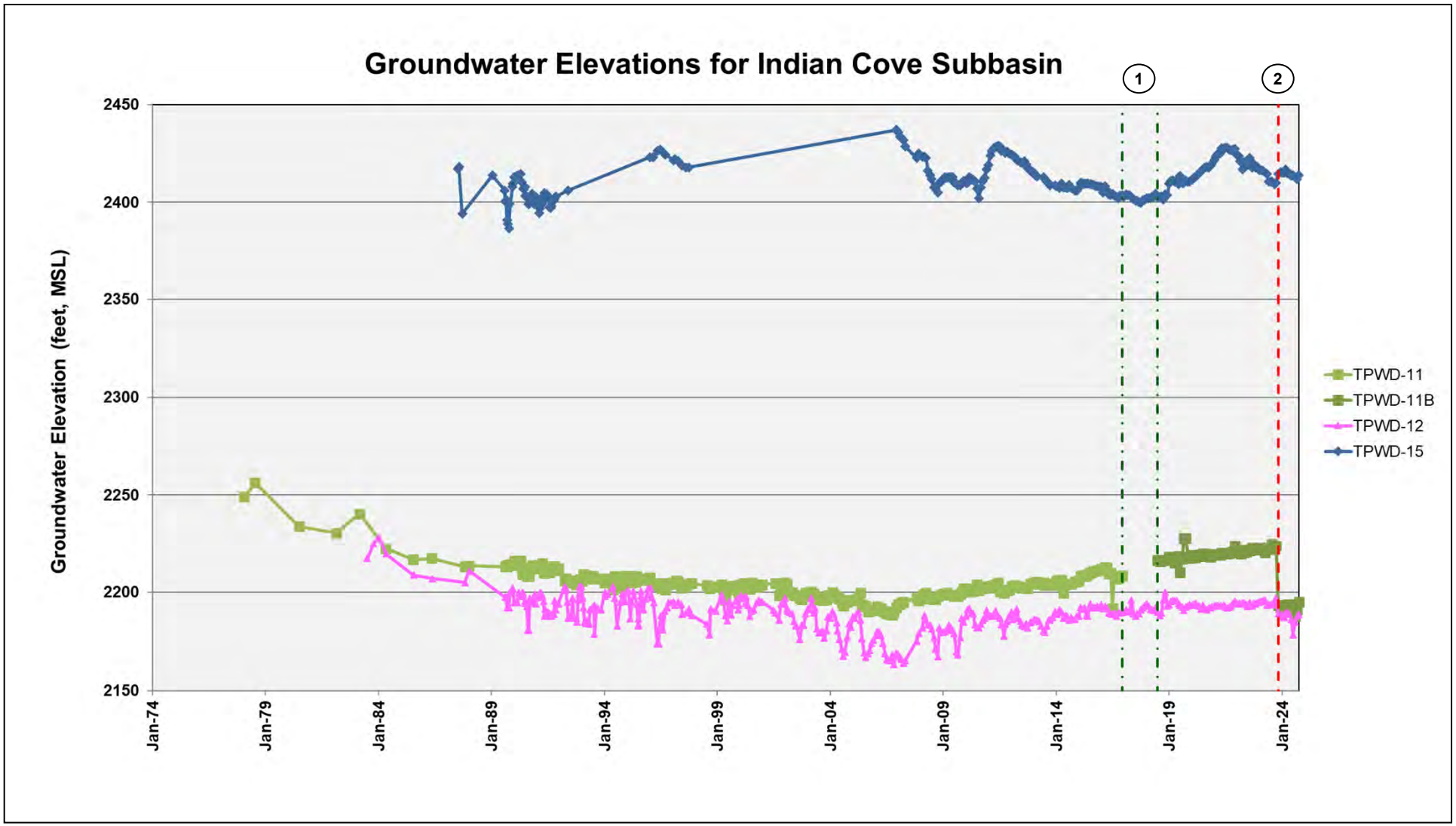
2444214*00
December 2024

**Figure 4-2**

Date: 3/14/2025 Printed by: MaryEllenMcCarty

H:\GIS_CloudProjects\TwentyNinePalms\GWMP\Events\20241021_GWMP2024_GWMP2024_GWMP.aprx

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet Projection: Lambert Conformal Conic




**Notes:**

(1) Production well TPWD-11 was replaced with production well TPWD-11B in 2017. The last TPWD-11 sample was taken on 12/6/2016 and the first TPWD-11B sample was taken on 7/3/2018.

(2) Well location surveys were conducted from September to November 2023 for TPWD active and inactive production wells. Before November 5th, 2023, groundwater elevations were calculated using assumed measuring point elevations for each TPWD production well. Starting November 5th, 2023, groundwater elevations are calculated using the respective surveyed measuring point elevations for each TPWD production well.

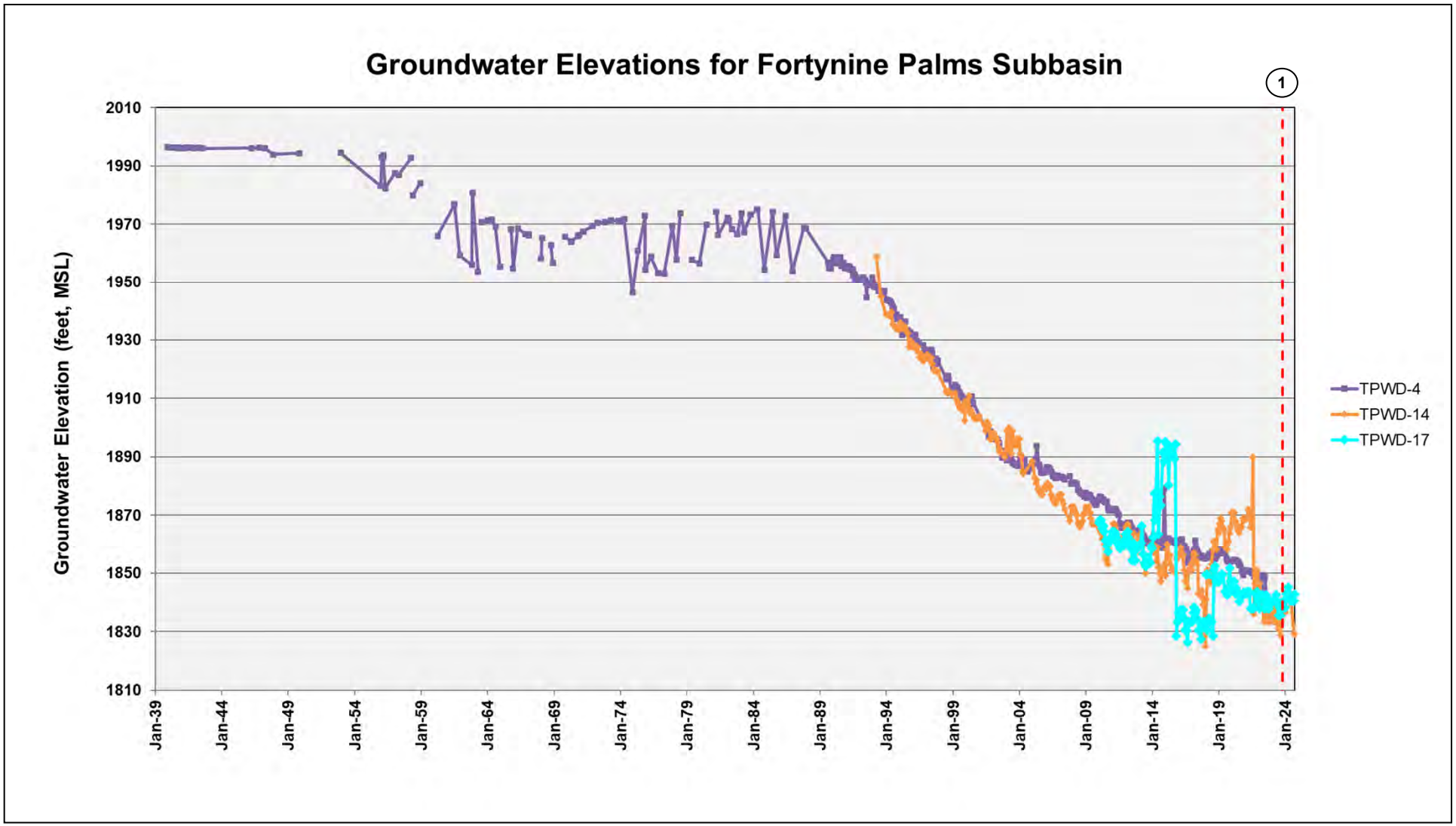
Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Hydrograph Showing Groundwater Elevation History for Indian Cove Subbasin**

KJ 2444214*00
December 2024

**Figure 4-3**




**Notes:**

(1) Well location surveys were conducted from September to November 2023 for TPWD active and inactive production wells. Before November 5th, 2023, groundwater elevations were calculated using assumed measuring point elevations for each TPWD production well. Starting November 5th, 2023, groundwater elevations are calculated using the respective surveyed measuring point elevations for each TPWD production well.

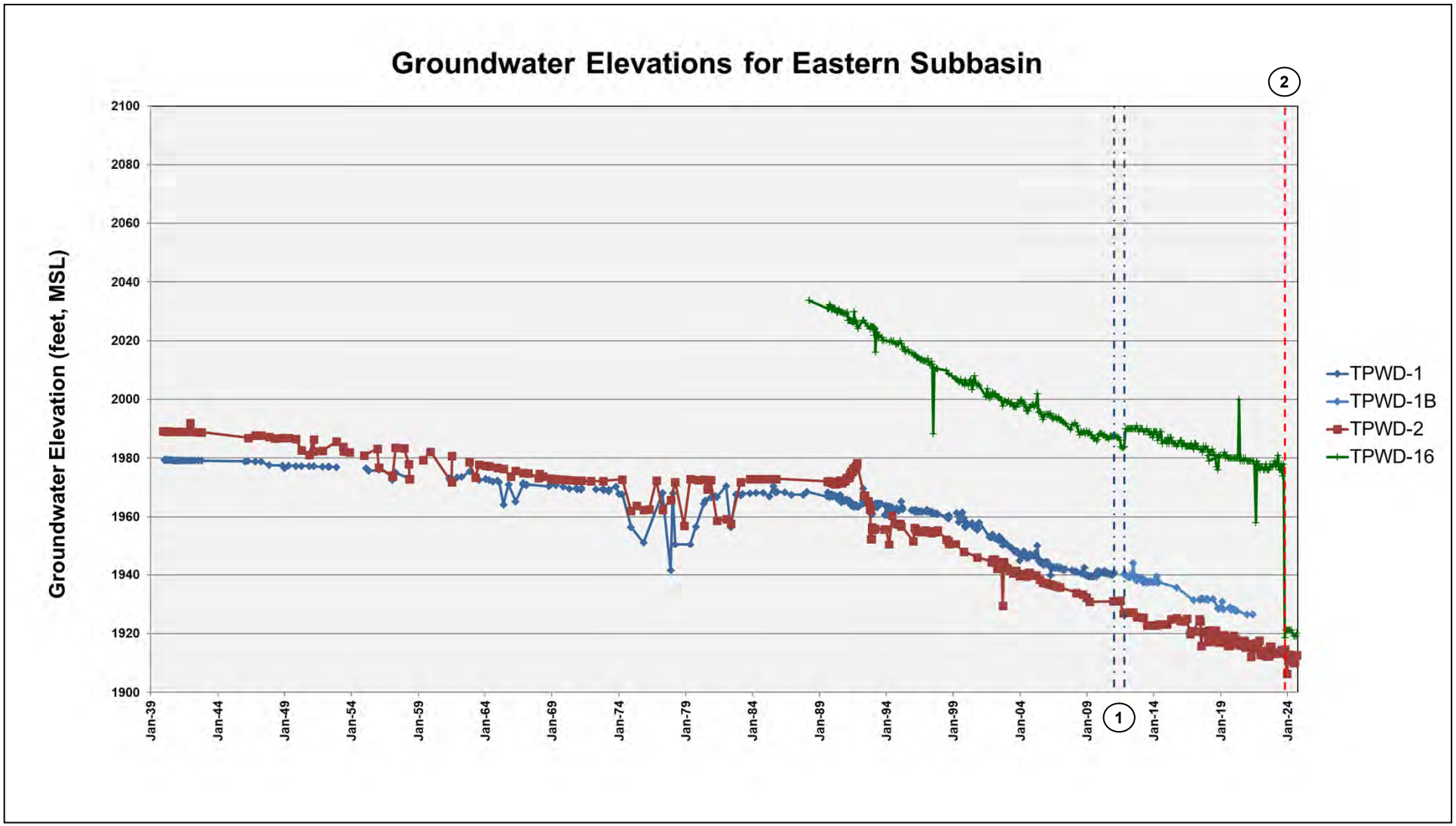
Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Hydrograph Showing Groundwater Elevation History for Fortynine Palms Subbasin**

KJ 2444214*00
December 2024

**Figure 4-4**




**Notes:**

(1) Production well TPWD-1 was replaced with monitoring well TPWD-1B in 2011. The last TPWD-1 sample was taken on 2/2/2011 and the first TPWD-1B sample was taken on 11/1/2011. Static water depth was last measured in TPWD-1B on 6/8/2021.

(2) Well location surveys were conducted from September to November 2023 for TPWD active and inactive production wells. Before November 5th, 2023, groundwater elevations were calculated using assumed measuring point elevations for each TPWD production well. Starting November 5th, 2023, groundwater elevations are calculated using the respective surveyed measuring point elevations for each TPWD production well.

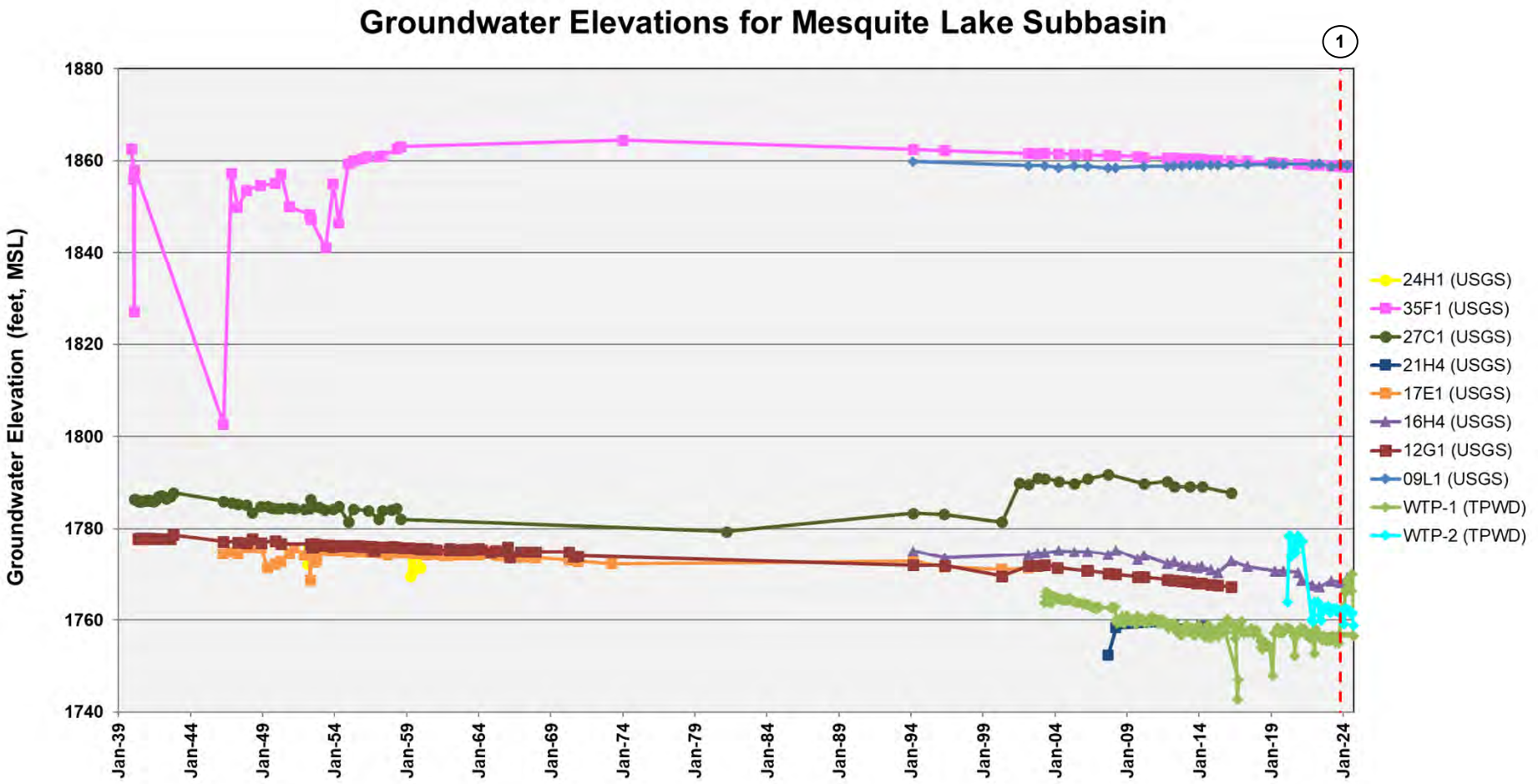
Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Hydrograph Showing Groundwater Elevation History for Eastern Subbasin**

KJ 2444214*00
December 2024

**Figure 4-5**




**Notes:**

(1) Well location surveys were conducted from September to November 2023 for TPWD active and inactive production wells. Before November 5th, 2023, groundwater elevations were calculated using assumed measuring point elevations for each TPWD production well. Starting November 5th, 2023, groundwater elevations are calculated using the respective surveyed measuring point elevations for each TPWD production well.

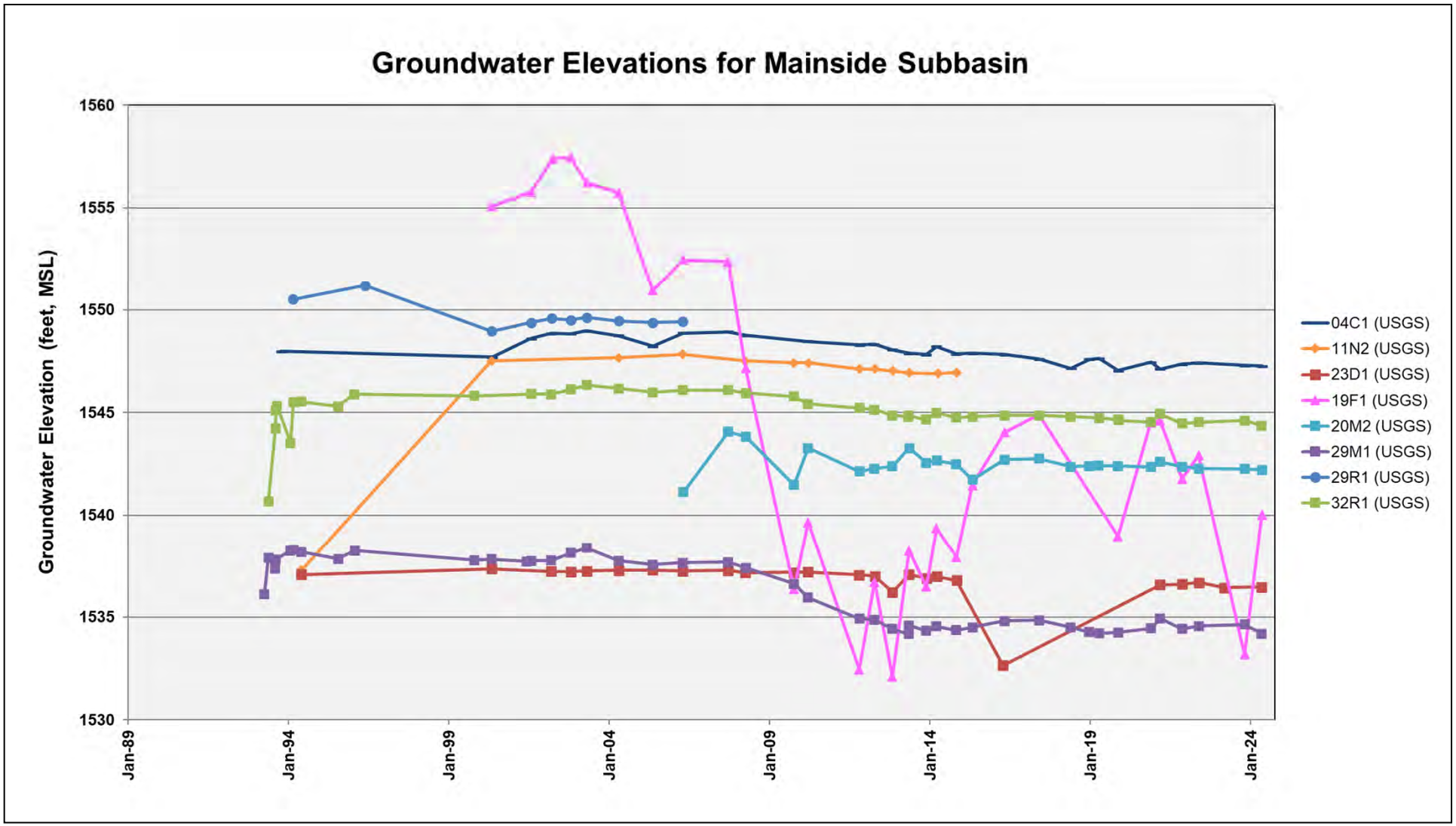
Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Hydrograph Showing Groundwater Elevation History for Mesquite Lake Subbasin**

KJ 2444214*00
December 2024

**Figure 4-6**




Kennedy Jenks

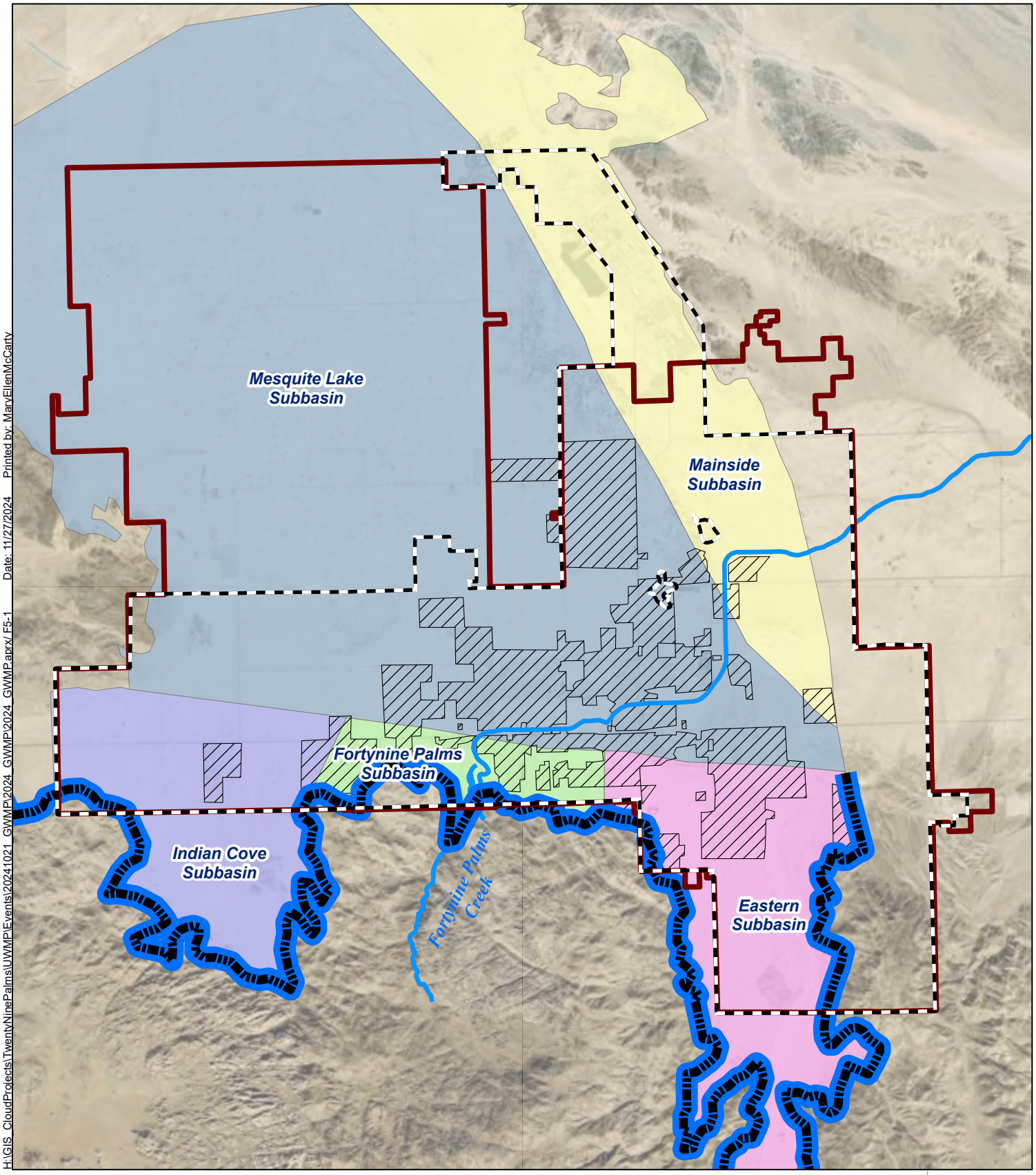
Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Hydrograph Showing Groundwater Elevation History for Mainside Subbasin**

KJ 2444214*00
December 2024

**Figure 4-7**

World Imagery: County of San Bernardino, Earthstar Geographics




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**Legend**

- Urban Recharge Zone
- Stream Recharge Zone
- Natural Recharge Zone
- City Limit
- TPWD Boundary
- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

N

0 1 2

Miles

Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**DWR Groundwater Recharge Areas**

2444214*00
December 2024

**Figure 4-8**

World Imagery: County of San Bernardino, Earthstar Geographics

Mesquite Lake Subbasin

Mainside Subbasin

Fortynine Palms Subbasin

Eastern Subbasin

Indian Cove Subbasin

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet Projection: Lambert Conformal Conic

H:\GIS_CloudProjects\TwentyNinePalms\UWMP\Events\20241021_GWMP\2024_GWMP\2024_GWMP.aprx Date: 12/19/2024 Printed by: MaryEllenMcCarty

## Legend

**NGS Survey Marks & Bench Marks**

**STABILITY**

- A - Monuments of the most reliable nature which are expected to hold their position/elevation well
- B - Monuments which probably hold their positions/elevations well
- C - Monuments which may hold their positions/elevations well, but which are commonly subject to surface ground movements
- D - Monuments of questionable or unknown reliability
- Not Rated

**Boundaries**

- City Limit
- TPWD Boundary
- Eastern Subbasin
- Fortynine Palms Subbasin
- Indian Cove Subbasin
- Mainside Subbasin
- Mesquite Lake Subbasin

**Notes:**

1. NGS Survey Marks and Bench Marks geospatial data acquired from NOAA. Stability Rating description found in User's Guide for GPS Observations at Tide and Water Level Station Bench Marks, Section 3.1

N

0 5,000 10,000

Scale: Feet

Kennedy Jenks

Groundwater Management Plan 2024 Update
Twentynine Palms Water District

**Subsidence Indicators**

2444214*00
December 2024

**Figure 4-9**

# Appendix A

Resolution of GWMP Adoption

**A REGULAR MEETING OF THE BOARD OF DIRECTORS**
**OF THE TWENTYNINE PALMS WATER DISTRICT**
**72401 HATCH ROAD, TWENTYNINE PALMS, CA 92277**

**March 26, 2025 / 4:00 P.M.**

**AGENDA**

This meeting may be viewed on the District's website at www.29palmswater.net
The Board reserves the right to discuss only or take action on any item on the agenda.

Next Resolution #25-05
Next Ordinance #104

Call to Order and Roll Call
Please make sure all cell phones are silenced.

Pledge of Allegiance

Additions/Deletions to the Agenda

Public Comments
Please complete a "Request to be Heard" form prior to the start of the meeting. The public may address the Board for 3 minutes on District-related matters. Government Code prohibits the Board from taking action on matters that are not on the agenda. However, the Board may refer matters for future consideration.

1 Public Hearing on Proposed Amendment to the District Groundwater Management Plan
    1.1 Board to Hear Public Testimony at This Time

2. Consideration of Resolution 25-02 Intent to Amend the District Groundwater Management Plan (GWMP)

3. Consideration of Resolution 25-03 Intention to Continue Currently Existing Water Availability Assessments of the Twentynine Palms Water District in the Upcoming Fiscal Year 2025/2026

4. Commending Steve Gurney for Twenty Years of Public Service

5. Approval of Kennedy Jenks Amendment #2 to the 2024-2027 Master Professional Service Agreement and Accept Proposal for Well 11B Treatment Evaluation

6. Formation of an Ad Hoc Committee for Joint City Meeting

7. Discussion on Health Benefits for the Board of Directors

8. Consent Calendar

Matters under the Consent Calendar are to be considered routine and will be enacted in a single motion. There will be no separate discussion of these items unless the Board, staff or the public requests specific items be removed for separate discussion and action before the Board votes on the motion to adopt.

- Minutes of the Regular Meeting held on February 26, 2025
- Audit List

9. Items Removed from the Consent Calendar for Discussion or Separate Action

10. Management Reports

10.1 Maintenance

10.2 Water Quality

10.3 Finance

10.4 General Manager

11. Conference With Legal Counsel-Anticipated Litigation - Initiation of litigation pursuant to paragraph (4) of subdivision (d) of Section 54956.9: (1 case)

12. Future Agenda Items and Staff Tasks/Directors' Comments and Reports

13. Adjournment

**Notice of agenda was posted on or before 4:00 p.m., March 21, 2025.**

Matthew Shragge, General Manager

Upon request, this Agenda will be made available in appropriate alternative formats to persons with disabilities, as required by Section 202 of the Americans with Disabilities Act of 1990. Any person with a disability who requires a modification or accommodation in order to participate in a meeting should direct such request to Cindy Fowlkes at (760) 367-7546 at least 48 hours before the meeting, if possible.

Pursuant to Government Code Section 54957.5, any writing that: (1) is a public record; (2) relates to an agenda item for an open session of a regular meeting of the Board of Directors; and (3) is distributed less than 72 hours prior to that meeting, will be made available for public inspection at the time the writing is distributed to the Board of Directors. Any such writing will be available for public inspection at the District offices located at 72401 Hatch Road, Twentynine Palms, CA 92277. In addition, any such writing may also be posted on the District's website.

**MINUTES OF A REGULAR MEETING OF THE BOARD OF DIRECTORS OF THE TWENTYNINE PALMS WATER DISTRICT 72401 HATCH ROAD, TWENTYNINE PALMS, CA 92277**

**March 26, 2025 / 4:00 P.M.**

Call to Order and Roll Call
President Bob Coghill called the Board meeting to order at 4:00 p.m. Those responding to roll call were Michael Arthur, Larry Bowden, Bob Coghill, Randy Leazer, and Amy Woods. Also present were General Manager Matt Shragge, Maintenance Superintendent Mike Minatrea, Treatment/Production Superintendent Robert Shelton, Financial Consultant Scott Nelsen, and District Secretary Cindy Fowlkes.

Pledge of Allegiance
Steve Gurney led the pledge.

Additions/Deletions to the Agenda
None

Public Comments
None

1. Public Hearing on Proposed Amendment to the District Groundwater Management Plan
   1.1 Board to Hear Public Testimony at This Time

   Director Leazer moved to open the Public Hearing at 4:01 p.m., seconded by Director Arthur, and unanimously approved.

   There being no public comment, Director Arthur moved to close the public hearing at 4:02 p.m., seconded by Director Leazer, and unanimously approved.

2. Consideration of Resolution 25-02 Intent to Amend the District Groundwater Management Plan
   Staff recommends adopting Resolution 25-02. The GWMP acts as a planning tool assisting the District in protecting the quantity and quality of groundwater within the District's service area. The data also provides useful information for the District's planning documents like the Salt Nutrient Management Plan (SNMP) and the 2025 Urban Water Management Plan.

   Director Woods moved to adopt Resolution 25-02 intent to amend the District Groundwater Management Plan, Director Arthur seconded, and the motion was approved by the following roll call vote:

   | | |
   |---|---|
   | Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
   | Noes: | None |
   | Abstain: | None |
   | Absent: | None |

3. Consideration of Resolution 25-03 Intention to Continue Currently Existing Water Availability Assessments of the Twentynine Palms Water District in the Upcoming Fiscal Year 2025/2026

The District intends to continue with the existing assessments levied on parcels within the District to which water is made available. The current fiscal budget projections stand at $592,000 for the imposed assessment.

Director Woods moved to adopt Resolution 25-03 intention to continue currently existing Water Availability Assessments for the upcoming fiscal year 2025/2026, Director Arthur seconded, and the motion was approved by the following roll call vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

4. Commending Steve Gurney for Twenty Years of Public Service

General Manager, Matt Shragge, thanked Steve for his commitment and service to the District. Coworker, Ryan Weber, read Resolution 25-04 commending Steve for his 20 years of public service as the mechanic for the District. Steve was also recognized for serving his country for 20 years in the United States Marine Corp.

Steve thanked the District and senior staff for affording him the opportunity to grow and learn throughout his career at the District.

Director Arthur moved to adopt Resolution 25-04 commending Steve Gurney for twenty years of public service, Director Leazer seconded, and the motion was approved by the following roll call vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

5. Approval of Kennedy Jenks Amendment #2 to the 2024-2027 Master Professional Service Agreement and Accept Proposal for Well 11B Treatment Evaluation

The project will evaluate and identify optimal treatment alternatives for the removal of arsenic, fluoride, and hexavalent chromium from Well 11B.

Director Arthur moved to approve Amendment #2 to the 2024-2027 Master Professional Service Agreement and accept proposal for Well 11B treatment evaluation, seconded by Director Bowden, and the motion was approved by the following roll call vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

6. Formation of an Ad Hoc Committee for Joint City Meeting

After discussion, Director Woods moved to withdraw her request to have a joint meeting with the City and forgo the formation of an ad hoc committee, seconded by Director Leazer, and the motion was approved by the following roll call vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

7. Discussion of a Health Insurance Feasibility Study for the Board of Directors

Scott Nelsen presented the Board with two scenarios for medical benefits provided through the District's insurance carrier ACWA/JPIA. The highest cost scenario for Board members to have medical insurance would cost the District $125,000 annually for an HMO plus one plan. The lowest cost scenario would be $52,000 a year for a PPO single member plan.

After discussion, the Directors decided not to move forward with a health benefit policy for the Board at this time.

8. Consent Calendar

- Minutes of a Regular Meeting held on February 26, 2025
- Audit List

Director Arthur moved to approve the Minutes and Audit List, seconded by Director Woods, and approved unanimously.

9. Items Removed from the Consent Calendar for Discussion or Separate Action

None

10. Management Reports

10.1 Maintenance

Mike reported that the District responded to 106 Underground Service Alerts, had 1 water main leak, 1 water meter leak, 0 service line leaks, 2 fire hydrant repairs/maintenance, installed 0 new services, replaced 6 customer gate valves, performed 3 leak audits, painted 0 fire hydrants, performed 4 customer pressure checks, replaced 5 water meters, Tested and exercised emergency generators and sounded wells for February. 0 water waste inquiries were received. There was a total of 517 work orders processed during the month.

10.2 Water Quality

Robert reported water production was down 14.29% as compared to the same month in 2013. 40 routine and 17 special water samples were taken. All special samples tested negative for Colilert. All current wells meet the 2.0 mg/L standard fluoride variance set by the State Water Resource Control Board. All samples tested were below the variance. Robert congratulated Steve on his retirement.

10.3 Finance

Scott Nelsen reported on January's financials. Bad debt expense is higher this month as unsettled accounts from 2020 are written off during January. The budget at 58% of the year is trending as expected with total expenditures at 54% and total revenues at 62%.

10.4 General Manager
Matt thanked Steve for his service and friendship over the years and wished him a happy retirement. Steve's 20 years of institutional knowledge will be missed at the District.

11. Conference With Legal Counsel-Anticipated Litigation - Initiation of litigation pursuant to paragraph (4) of subdivision (d) of Section 54956.9: (1 case)

Director Bowden moved to enter closed session at 5:36 p.m., seconded by Director Arthur, and unanimously approved.

The Board returned to open session at 6:20 p.m. Director Coghill announced there was no reportable action.

12. Future Agenda Items and Staff Tasks/Directors' Comments and Reports
Director Leazer would like to see a comparison of Board member benefits from other water districts.

Director Woods would like to see if a medical carve out policy is available. Director Woods thanked Steve for keeping employees of the District safe during his years of service.

13. Adjournment
On motion by Director Bowden, seconded by Director Leazer, and approved by the Board, the meeting was adjourned at: 6:23 p.m.

Bob Coghill, President
Board of Directors

Attest:

Matthew Shragge, Board Secretary
Twentynine Palms Water District

**RESOLUTION 25-02**

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TWENTYNINE PALMS WATER DISTRICT NOTICING A PROPOSED AMENDMENT TO THE DISTRICT GROUNDWATER MANAGEMENT PLAN**

**WHEREAS,** the Twentynine Palms Water District ("District") is a County Water District duly formed and operating pursuant to Section 31000 et seq. of the California Water Code and has the authority to and does provide water service to customers within its service area;

**WHEREAS,** groundwater is a valuable resource within the State of California and particularly within the boundaries of the District, and such groundwater must be monitored and evaluated;

**WHEREAS,** in recognition of the value of groundwater as a resource, the California State Legislature adopted Water Code, sections 10750 et seq., which encourage local water agencies to develop and implement groundwater management plans;

**WHEREAS,** in keeping with this state mandate and to assist in meeting the water needs of District customers, the District adopted a groundwater management plan (GMP) in 2013;

**WHEREAS,** the District has now determined that it would be prudent to consider amending its GMP;

**WHEREAS,** as described in Water Code Section 10753.5(a) and Government Code Section 6066, notice of this public hearing, notice that a copy of the proposed amendments to the GMP are available for public review at the District office, and a summary of the proposed amendments to the GMP were published in the Desert Trail on March 12, 2025 and March 19, 2025;

**WHEREAS,** a public hearing was conducted on March 26, 2025 by the Board of Directors of the District in order to receive oral and written testimony on the proposed amendments to the GMP, as well as to receive any landowner protests.

**NOW, THEREFORE,** the Board of Directors of the Twentynine Palms Water District hereby resolves as follows:

1. Review of Draft Amendments to the GMP. The District has prepared a draft amendment to its GMP and made such amendment available for public review.

2. Publication of Notice regarding Adoption of Amendments to the GMP. Pursuant to Sections 10753.5 and 10753.6 of the California Water Code, if written protests are filed by landowners representing less than 50% of the assessed value of land within the District, the District Secretary is directed to place consideration of the amendments to the GMP on the agenda for potential adoption at the next regularly scheduled District Board meeting.

**PASSED, APPROVED AND ADOPTED** on this 26th day of March 2025, at a regular meeting of the Board of Directors of the Twentynine Palms Water District by the following vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

Bob Coghill, President
Board of Directors

Attest:

Matthew Shragge, Secretary
Board of Directors

# ORDINANCE NO. 104

## AN ORDINANCE OF THE TWENTYNINE PALMS WATER DISTRICT ADOPTING A GROUNDWATER MANAGEMENT PLAN UPDATE PURSUANT TO WATER CODE SECTION 10750 ET SEQ. AND SUPERSEDING DISTRICT ORDINANCE 95

**WHEREAS,** the Board of Directors of the Twentynine Palms Water District ("District") approved Ordinance 82 on October 24, 2001, adopting a Groundwater Management Plan and establishing a Groundwater Management Program; and

**WHEREAS**, the District adopted updates to the Groundwater Management Plan in 2008 and 2014; and

**WHEREAS,** the District is a County Water District duly formed and operating pursuant to Section 31000 et seq. of the California Water Code and has the authority to provide water service to customers within its service area; and

**WHEREAS,** groundwater is a valuable resource within the State of California and particularly within the boundaries of the District and such groundwater must be monitored and evaluated; and

**WHEREAS,** in recognition of the value of groundwater as a resource, the California State Legislature enacted Water Code section 10750 et seq. ("AB 3030") and amendments thereto which encourage local water purveying agencies to manage groundwater resources within their jurisdictions and to develop and implement groundwater management plans; and

**WHEREAS**, the District service area overlies the Dale Valley, Joshua Tree and Twentynine Palms Valley groundwater basins, all of which have been designated by the California Department of Water Resources as very low priority and, accordingly, are not subject to the requirements of the Sustainable Groundwater Management Act; and

**WHEREAS,** the District's Board of Directors has determined that it is prudent to update its current Groundwater Management Plan; and

**WHEREAS,** as required by Water Code Section 10753.2(a) and Government Code Section 6066, a notice was published in the Desert Trail newspaper on March 12, 2025 and March 19, 2025 declaring the District's intent to update its Groundwater Management Plan; and

**WHEREAS,** on March 26, 2025, the Board of Directors adopted Resolution No. 25-02 Declaring an Intent to Amend the District's Groundwater Management Plan and as required by Water Code Section 10753.3 and Government Code Section 6066, Resolution 25-02 was published in the Desert Trail on May 14, 2025 and May 21, 2025 and a Groundwater Management Plan Update was subsequently prepared; and

**WHEREAS,** as required by Water Code Section 10753.5 and Government Code Section 6066, notice of a second public hearing was published in the Desert Trail newspaper on May 14, 2025 and May 21, 2025 and a second public hearing was conducted on May 28, 2025 by the Board of Directors of the District in order to receive and consider any protests on whether or not to adopt the Groundwater Management Plan Update. Pursuant to Water Code Section 10753.6(c)(3), the Board of Directors has determined that a majority protest has not been filed and therefore, the Board wishes to take action to adopt the Groundwater Management Plan Update.

**NOW, THEREFORE, BE IT ORDAINED** by the Board of Directors of the Twentynine Palms Water District as follows:

1. Adoption of the Groundwater Management Plan Update. Pursuant to Water Code Sections 10753 and 10753.6, the District hereby adopts that certain Groundwater Management Plan Update set forth as Exhibit "A" attached hereto and incorporated herein by reference. Pursuant to the 2025 Groundwater Management Plan Update, the District will also continue to implement its Groundwater Monitoring Implementation Plan 2020 Protocols and Procedures, which are attached to the Groundwater Management Plan Update as Appendix B.

2. Ordinance Shall be Superseding. All ordinances, resolutions, or administrative actions by the Board, or parts thereof that are inconsistent with any provision of this Ordinance are hereby superseded only to the extent of such inconsistency. As of the effective date of this Ordinance, Ordinance 95 shall be of no further force or effect.

3. Effective Date. This Ordinance shall be in full force and effect immediately upon adoption.

4. Publication of Ordinance. The Secretary of the District is hereby authorized and directed to publish this Ordinance in the Desert Trail within fifteen (15) days from the date of adoption. Upon written request, the Secretary shall also provide any interested persons with a copy of this Ordinance.

**PASSED, APPROVED AND ADOPTED** this 28th day of May 2025 by the following vote:

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

Bob Coghill, President
Board of Directors

Attest:

Matthew Shragge, Board Secretary
Twentynine Palms Water District

# Appendix B

TPWD Groundwater Monitoring Implementation Plan (2020)

# Twentynine Palms Water District
# Groundwater Monitoring Implementation Plan
# 2020 Protocols and Procedures

The Salt and Nutrient Management Plan (SNMP) Groundwater Monitoring Implementation Plan was formally approved by the Colorado River Basin Regional Water Quality Control Board (RWQCB) via a letter submitted to Mr. Ray Kolisz of Twentynine Palms Water District from the RWQCB Executive Officer Paula Rasmussen on **December 10, 2019**.

The SNMP was submitted to the RWQCB in June 2014; comments from the Board were received in October 2015. In April 2017, RWQCB staff met with District staff and Kennedy/Jenks and it was agreed upon that an addendum to the SNMP, in the form of the enclosed phased-approach Groundwater Monitoring Implementation Plan, would provide the necessary solutions to data gaps identified within the SNMP.

Accordingly, the first annual monitoring report is due to RWQCB by **June 1, 2020**. This report outlines the necessary monitoring dates and deadlines the District must abide by to implement this plan.

The annual report should include at a minimum: summary of monitoring and data collection efforts performed; table and charts of monitoring results; and any recommended changes to the monitoring program including the implementation of Phase 3 and Phase 4 monitoring efforts.

## Phase 1 – Increase Sampling Frequency of the District's Existing Production Wells

Schedule: Complete

Action: The District is currently implementing this phase of the monitoring plan and collects water quality data annually instead of every three years.

Table 1 below shows the parameters to be sampled. Table 2 identifies the wells the District is currently sampling.

**TABLE 1. SAMPLING AND ANALYSIS PLAN – LIST OF PARAMETERS**

| Analyte | Units | EPA Test Method | Typical Lab PQL |
|---|---|---|---|
| **General Minerals, Cautions, and Anions:** | | | |
| Boron | mg/L | 200.7 | 0.3 |
| Calcium | mg/L | 200.7 | 0.3 |
| Total Iron | mg/L | 200.7 | 0.05 |
| Manganese | mg/L | 200.7 | 0.1 |
| Potassium | mg/L | 200.7 | 0.2 |
| Total Alkalinity | mg/L | 310.1 | 0.3 |
| Bicarbonate | mg/L | 310.1 | 10 |
| Carbonate | mg/L | 310.1 | 10 |
| Hydroxide | mg/L | 310.1 | 10 |
| Bromide | mg/L | 300 | 10 |
| Chloride | mg/L | 300 | 1 |
| Fluoride | mg/L | 340.2 | 50 |

| Analyte | Units | EPA Test Method | Typical Lab PQL |
|---|---|---|---|
| Nitrate | mg/L | 300 | 0.1 |
| Nitrite | mg/L | 354.1 | 0.1 |
| Orthophosphate | mg/L | 365.2 | 0.01 |
| pH | s.u. | 150.1 | 0.2 |
| Sodium | mg/L | 200.7 | 0.01 |
| Specific Conductivity | µmhos/cm | 120.1 | 1 |
| Sulfate | mg/L | 300 | 1 |
| TDS | mg/L | 160.1 | 50 |
| Total organic carbon | mg/L | | 40 |
| **Field Sampling:** | | | |
| Dissolved Oxygen | mg/L | Field Probe 1 | |
| Temperature | F | Field Probe | |
| **Microbiological Analysis:** | | | |
| Total Coliform | MPN/100 ml | SM9223B | 2 |
| Fecal Coliform | MPN/100 ml | SM9223B | 2 |
| **Anthropogenic Analytes:** | | | |
| Sucralose | µg/L | Non-standard | 0.01 |
| Caffeine | µg/L | 8270M/SIMS | 0.01 |
| 17B-estradiol | µg/L | Non-standard | 0.001 |
| NDMA | µg/L | Non-standard | 0.002 |
| Triclosan | µg/L | Non-standard | 0.05 |
| DEET | µg/L | Non-standard | 0.05 |

**TABLE 2. EXISTING GROUNDWATER MONITORING BY THE DISTRICT**

| Well Name | Well Type | Water Levels | Water Quality – Other Constituents | Proposed SNMP Sampling Plan |
|---|---|---|---|---|
| 4 | Inactive | Monthly | Every 3 years | Annually |
| 6 | Inactive | Monthly | Every 3 years | Annually |
| 7 | Destroyed | Monthly | Not Sampled | Annually |
| 8 | Inactive | Monthly | Every 3 years | Annually |
| 9 | Inactive | Monthly | Every 3 years | Annually |
| 10 | Inactive | Monthly | Every 3 years | Annually |
| 11 | Destroyed | Monthly | Every 3 years | Annually |
| 12 | Active water supply | Monthly | Every 3 years | Annually |
| 14 | Active water supply | Monthly | Every 3 years | Annually |
| 15 | Active water supply | Monthly | Every 3 years | Annually |
| 16 | Active water supply | Monthly | Every 3 years | Annually |
| 17 | Active water supply | Monthly | Every 3 years; quarterly for VOCs | Annually |
| WTP-1 | Active water supply | Monthly | Every 3 years | Annually |

### Phase 2 – Establish a Water Quality Monitoring Well Network Using Existing Wells

Schedule: June 1, 2020

Action: Identify existing wells to sample; provide sampling operation (sample documentation, water level measurement, sampling and packaging); recommended analytical procedures; quality assurance procedures; and summary and reporting protocols.

Coordinate with USGS to obtain water quality data from wells in the Mesquite Lake and Mainside Subbasins.

Sample a representative number of wells (ex. 10-15) and evaluate results. Results will determine if additional sampling is recommended for 2021.

See Chapter 4 of the Implementation Plan, summarized below.

## Sampling Implementation Plan

### 1.1 Monitoring Design

A preliminary subset of wells has been identified by the District as shown in Tables 3 through 7. It is recommended that wells selected for this monitoring program be sampled on an annual basis. For 2020, it is recommended to sample a representative number of the wells (ex. 10-15). All results of the monitoring will be submitted to the District for inclusion into their current water quality database. Results will determine if additional sampling is required in 2021. The District will be the responsible party for collecting samples, compiling the results in tabular form, updating/revising the Monitoring Plan and submitting it to the RWQCB.

### 1.2 Water Quality Parameters

See Table 1.

### 1.3 Monitoring Sampling Frequency

Each well to be sampled on an annual basis or until such time the data provides sufficient evidence to extend or reduce the sampling frequency.

### 1.4 Sampling and Monitoring Areas

Five areas of the District's service area (53 wells total) are selected to be the focus of this implementation sampling program. These areas include:

- Indian Cove Subbasin
- Fortynine Palms Subbasin
- Eastern Subbasin
- Mesquite Subbasin, and
- Mainside Subbasin

#### 1.4.1 Indian Cove Subbasin Groundwater Monitoring Locations

Six groundwater wells will be used for sampling purposes in this area as shown in Table 3. These wells are also included in Phase 1.

**TABLE 3: INDIAN COVE SUBBASIN MONITORING INFORMATION**

| Well Name | Well Type | Pump Installed | Owner | Total Depth |
|---|---|---|---|---|
| TPWD-6 | Muni | Yes | TPWD | 403’ |
| TPWD-8 | Muni | Yes | TPWD | 785’ |
| TPWD-9 | Muni | Yes | TPWD | 530’ |
| TPWD-10 | Muni | Yes | TPWD | 400’ |
| TPWD-12 | Muni | Yes | TPWD | 410’ |
| TPWD-15 | Muni | Yes | TPWD | 352’ |

### 1.4.2 Fortynine Palms Subbasin Groundwater Monitoring Locations

There are seven groundwater wells that may be considered for sampling purposes in this area as shown in in Table 4.

**TABLE 4: FORTYNINE PALMS SUBBASIN MONITORING INFORMATION**

| Well Name | Well Type | Pump Installed | Owner | Total Depth |
|---|---|---|---|---|
| TPWD-3 | Muni | Yes | TPWD | 340’ |
| TPWD-3B | Muni | Yes | TPWD | 398’ |
| TPWD-4 | Muni | Yes | TPWD | 283’ |
| TPWD-5 | Muni | Yes | TPWD | TBD |
| TPWD-13 | Muni | Yes | TPWD | 337’ |
| TPWD-14 | Muni | Yes | TPWD | 430’ |
| TPWD-17 | Muni | Yes | TPWD | TBD |

### 1.4.3 Eastern Subbasin Groundwater Monitoring Locations

There are three groundwater wells that may be considered for sampling purposes in this area as shown in Table 5.

**TABLE 5: EASTERN SUBBASIN MONITORING INFORMATION**

| Well Name | Well Type | Pump Installed | Owner | Total Depth |
|---|---|---|---|---|
| TPWD-1 | Muni | Yes | TPWD | TBD |
| TPWD-2 | Muni | Yes | TPWD | 275’ |
| TPWD-16 | Muni | Yes | TPWD | 320’ |

### 1.4.4 Mesquite Lake Subbasin Groundwater Monitoring Locations

There are 27 groundwater wells that maybe considered for sampling purposes in this area as shown in Table 6.

**TABLE 6: MESQUITE LAKE SUBBASIN MONITORING INFORMATION**

| Well Name | Well Type | Pump Installed | Owner | Total Depth |
|---|---|---|---|---|
| WTP-1 | Muni | Yes | TPWD | 1,010 |
| TPWD-18 | Muni | Yes | TPWD | TBD |
| MW-1 | Mon | No | TPWD | TBD |
| MW-2 | Mon | No | TPWD | TBD |
| MW-3 | Mon | No | TPWD | TBD |
| MW-4 | Mon | No | TPWD | TBD |
| MW-5 | Mon | No | TPWD | TBD |
| N1 | Mon | No | TPWD | TBD |
| N2 | Mon | No | TPWD | TBD |
| N3 | Mon | No | TPWD | TBD |
| N4 | Mon | No | TPWD | TBD |
| N5 | Mon | No | TPWD | TBD |
| N6 | Mon | No | TPWD | TBD |
| S1 | Mon | No | TPWD | TBD |
| S2 | Mon | No | TPWD | TBD |
| S3 | Mon | No | TPWD | TBD |
| S4 | Mon | No | TPWD | TBD |
| S5 | Mon | No | TPWD | TBD |
| 09L1 | Mon | No | USGS | TBD |
| 12G1 | Mon | No | USGS | TBD |
| 16H4 | Mon | No | USGS | TBD |
| 17E1 | Mon | No | USGS | TBD |
| 21H4 | Mon | No | USGS | TBD |
| 27C1 | Mon | No | USGS | TBD |
| 32A1 | Mon | No | USGS | TBD |
| 35F1 | Mon | No | USGS | TBD |
| 24H1 | Mon | No | USGS | TBD |

### 1.4.5 Mainside Subbasin Groundwater Monitoring Locations

Eight groundwater wells that may be considered for sampling purposes in this area as shown in Table 7.

**TABLE 7: MAINSIDE SUBBASIN MONITORING INFORMATION**

| Well Name | Well Type | Pump Installed | Owner | Total Depth |
|---|---|---|---|---|
| 04C1 | Mon | No | USGS | UNK |
| 11N2 | Mon | No | USGS | UNK |
| 23D1 | Mon | No | USGS | UNK |
| 19F1 | Mon | No | USGS | UNK |
| 20M2 | Mon | No | USGS | UNK |
| 29M2 | Mon | No | USGS | UNK |
| 29R1 | Mon | No | USGS | UNK |
| 32R2 | Mon | No | USGS | UNK |

## Public Outreach

The Regional Board should be notified of the scheduled stakeholder and public outreach opportunities as they may participate in these efforts. Outreach may consist of the following:

- Website
- Branded informational flyers, templates, PowerPoint presentations
- Periodic newsletter
- SNMP related mailing lists
- Public workshops
- Press releases and guest editorials
- Existing group venues
- Outreach documentation

## Other Reporting

### GAMA

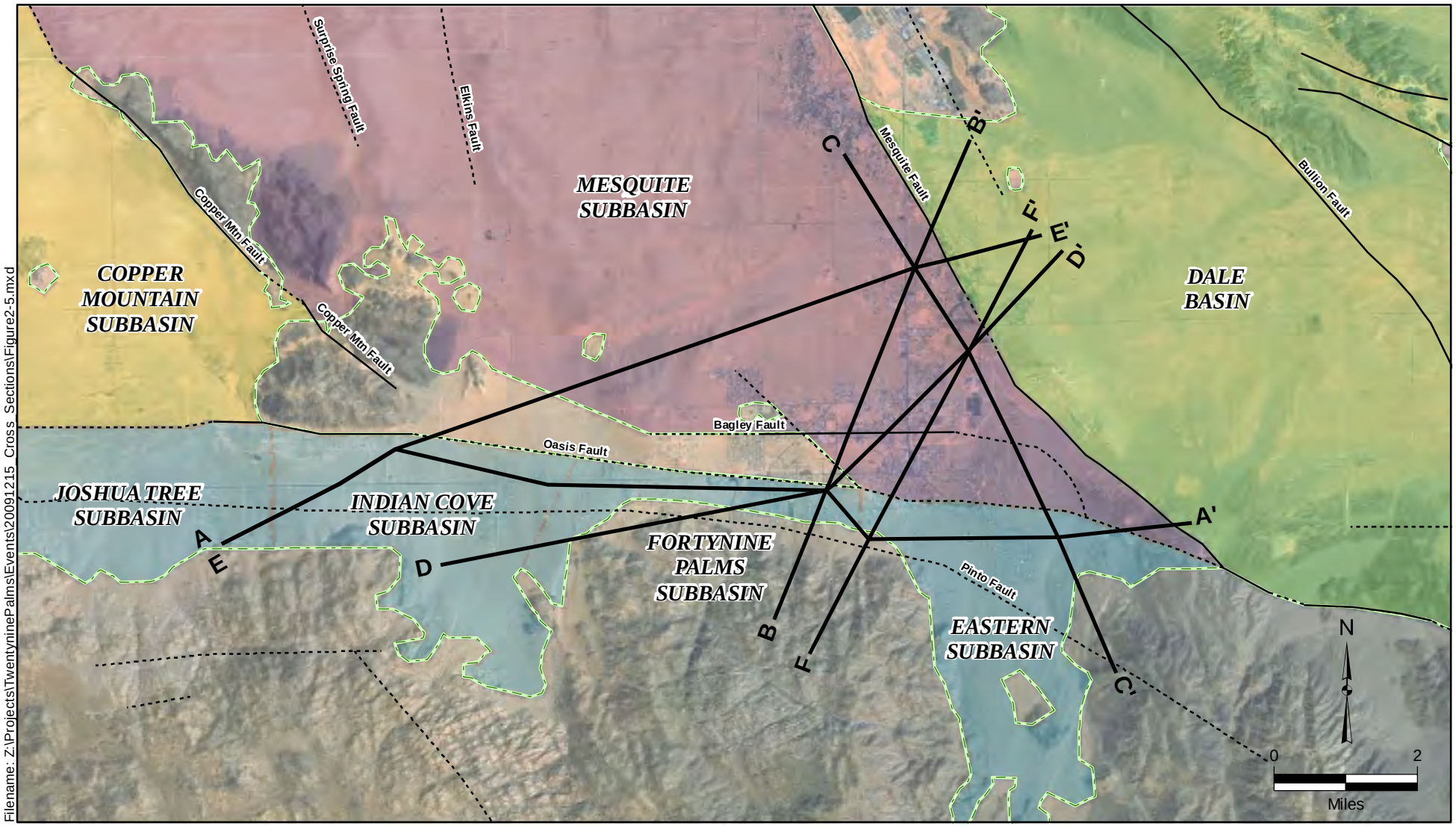
In addition, pursuant to the RWQCB and the Recycled Water Policy, all data must be electronically reported in a format that is compatible with a Groundwater Ambient Monitoring & Assessment (GAMA) information system and must be integrated into the GAMA information system or its successor.

### Proposition 1 Disadvantaged Community Grant Program

In 2018, Mojave Water Agency (Agency) was awarded a grant from the California Department of Water Resources (DWR) in the amount of $407,000 (Grant Agreement No. 4600012245). Of that grant amount, $50,000 was allocated to the District to assist with the activities necessary to implement the SNMP Groundwater Monitoring Implementation Plan. Quarterly reports will be submitted, through the Agency, to DWR documenting the District’s progress on the monitoring activities. A copy of the quarterly reports will also be provided with the annual monitoring reports described herein.

# Appendix C

GWMP Area Geologic Cross Sections (Kennedy Jenks, 2010)




Filename: Z:\Projects\TwentyninePalms\Events\20091215 Cross Sections\Figure2-5.mxd

Source: (c)2009 Microsoft Corporation.

Cross Section Trace

Site Boundary

**Faults**

Known

Inferred

**Note:**
The Oasis Fault is also known as the Pinto Mountain Fault.




**Kennedy/Jenks Consultants**

Twentynine Palms
San Bernardino County, California

**Cross Section Location Map**

K/J 0964003*00
March 2010

**Figure 2-5**

**A** (West)

**A'** (East)

Joshua Tree Subbasin

Indian Cove Subbasin

Fortynine Palms Subbasin

Eastern Subbasin

Mesquite Subbasin

Dale Basin

Pinto Fault

TPWD-11

TPWD-10

TPWD-7

TPWD-3/3B

TPWD-16

TPWD-1

Oasis Fault

Mesquite Fault

3000

2500

2000

1500

1000

500

0

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-6.mxd

**Note:** The Oasis Fault is also known as the Pinto Mountain Fault.

**EXPLANATION**

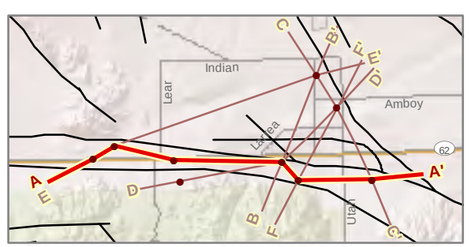
- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock

TPWD-1 — Well and Identifier

Fault (Dashed where inferred)
Arrows indicate direction of movement
Cross Circle indicates movement away from observer
Dot Circle indicates movement toward observer

Vertical Scale: 500' Feet, 250' Feet

Horizontal Scale: 0, 2500', 5000' Feet
Exaggeration: 10x




Index Map

**Kennedy/Jenks Consultants**

Twentynine Palms
San Bernardino County, California

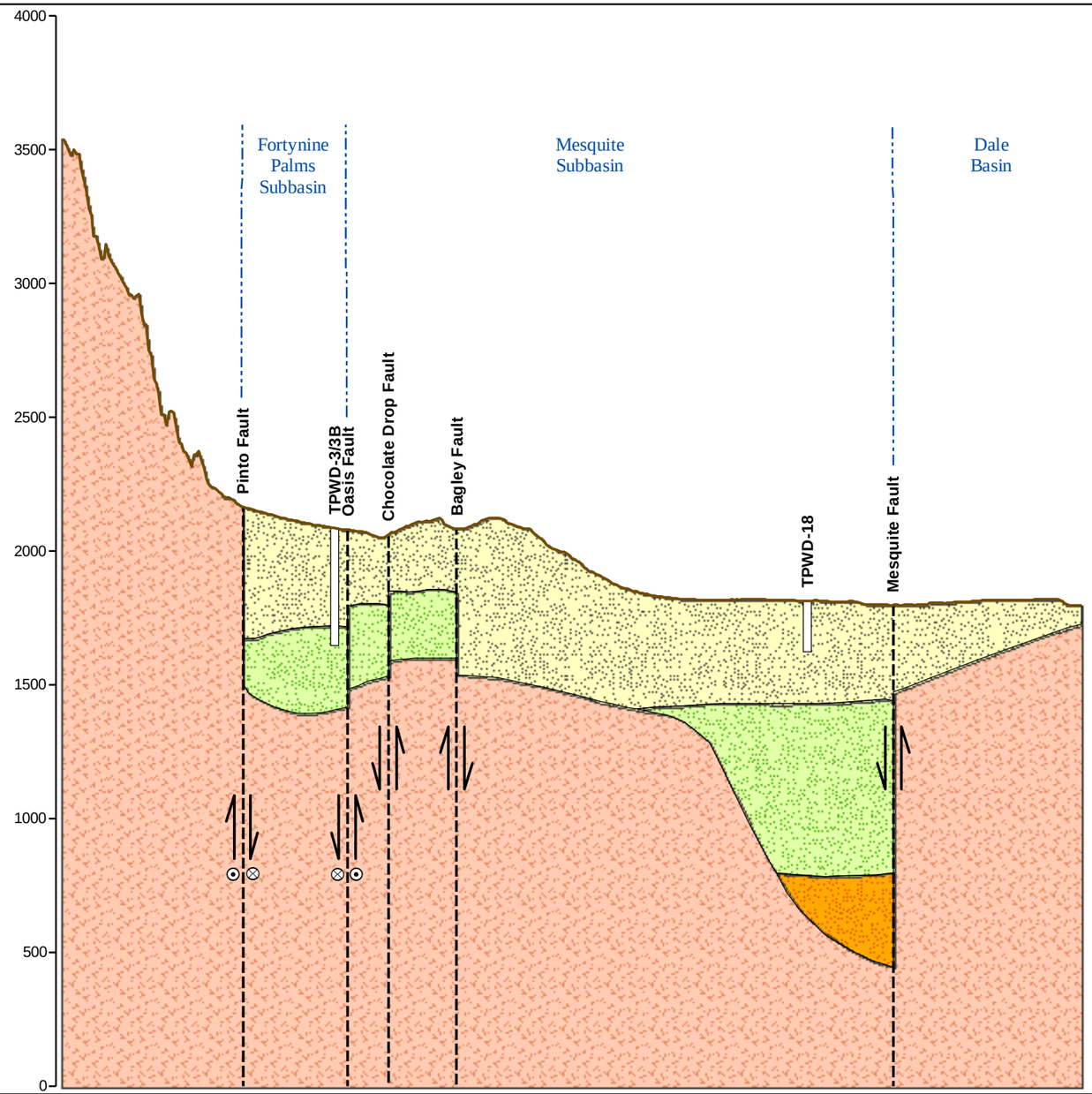
**Geologic Cross Section A-A'**

KJ 0964003*00
March 2010

**Figure 2-6**

**B**
(South)

**B'**
(North)



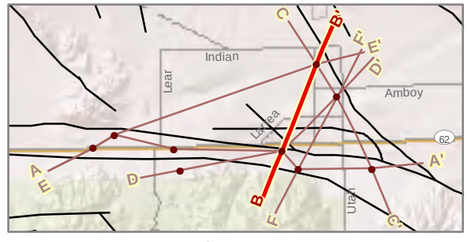

**Note:**
The Oasis Fault is also known as the Pinto Mountain Fault.

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-7.mxd

**EXPLANATION**

- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock
- TPWD-1 — Well and Identifier
- Fault (Dashed where inferred)
  Arrows indicate direction of movement
  Cross Circle indicates movement away from observer
  Dot Circle indicates movement toward observer

Vertical Scale: 500' Feet, 250'
Horizontal Scale: 0, 2500', 5000' Feet
Exaggeration: 10x




Index Map

**Kennedy/Jenks Consultants**
Twentynine Palms
San Bernardino County, California

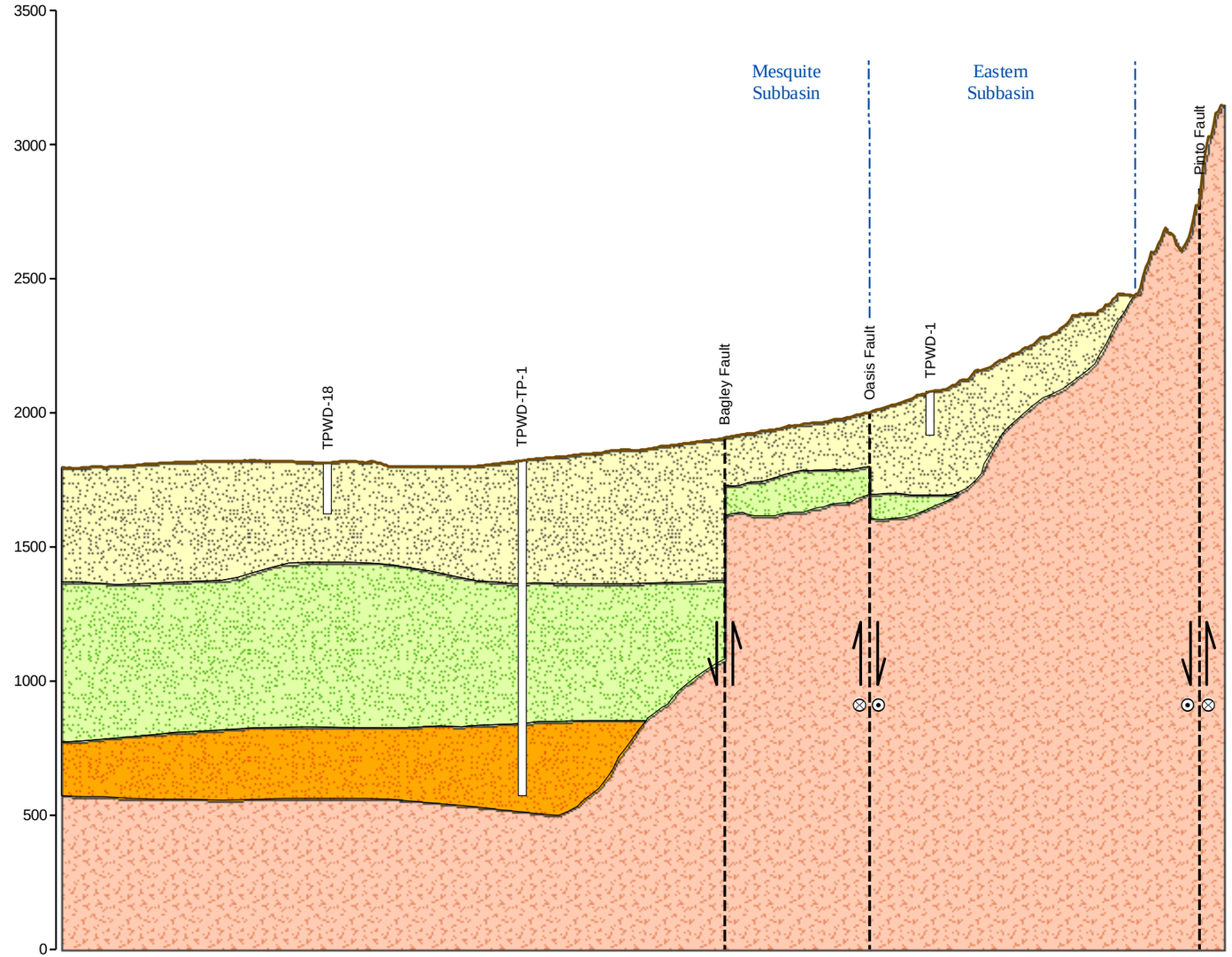
**Geologic Cross Section B-B'**

KJ 0964003*00
March 2010

**Figure 2-7**

**C**
(North)

**C'**
(South)




**Note:** The Oasis Fault is also known as the Pinto Mountain Fault.

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-8.mxd

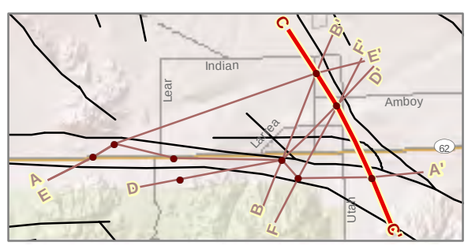
**EXPLANATION**

- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock
- TPWD-1 — Well and Identifier
- Fault (Dashed where inferred)
  Arrows indicate direction of movement
  Cross Circle indicates movement away from observer
  Dot Circle indicates movement toward observer

Vertical Scale: 500' Feet = 250' Feet

Horizontal Scale: 0 2500' 5000' Feet

Exaggeration: 10x




Index Map

**Kennedy/Jenks Consultants**

Twentynine Palms
San Bernardino County, California

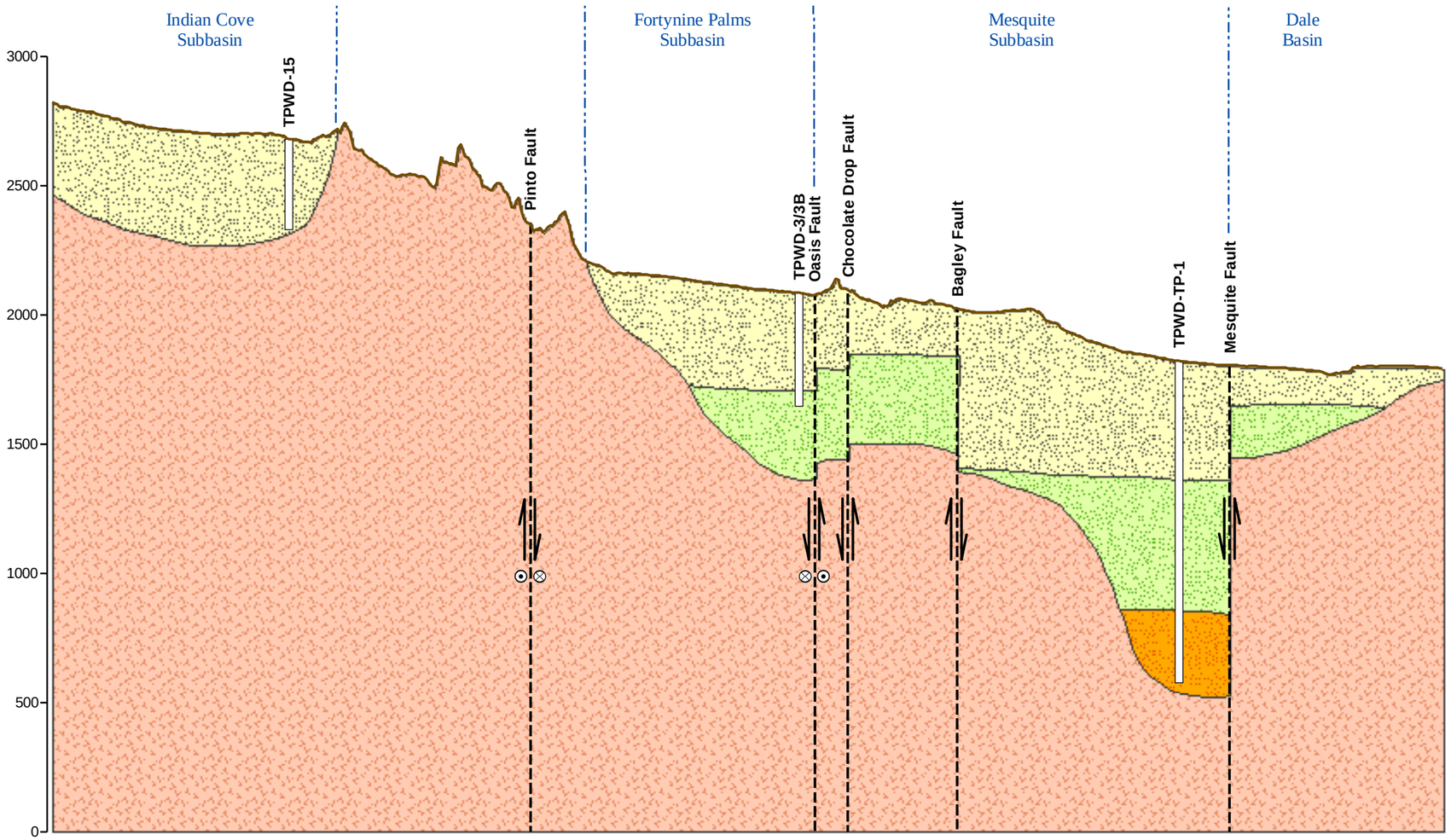
**Geologic Cross Section C-C'**

KJ 0964003*00
March 2010

**Figure 2-8**

**D**
(Southwest)

**D'**
(Northeast)



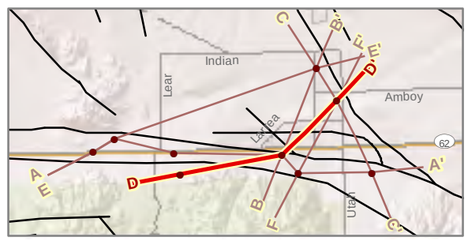

**Note:** The Oasis Fault is also known as the Pinto Mountain Fault.

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-9.mxd

**EXPLANATION**

- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock
- TPWD-1 — Well and Identifier
- Fault (Dashed where inferred)
  - Arrows indicate direction of movement
  - Cross Circle indicates movement away from observer
  - Dot Circle indicates movement toward observer

Vertical Scale: 500' Feet = 250' Feet
Horizontal Scale: 0 2500' 5000' Feet
Exaggeration: 10x




Index Map

**Kennedy/Jenks Consultants**
Twentynine Palms
San Bernardino County, California

**Geologic Cross Section D-D'**

KJ 0964003*00
March 2010

**Figure 2-9**

**E** (West)

**E'** (East)

Joshua Tree Subbasin

Indian Cove Subbasin

Mesquite Subbasin

Dale Basin

Pinto Fault

Oasis Fault

Mesquite Fault

TPWD-11

TPWD-10

TPWD-18

3000

2500

2000

1500

1000

500

0

**Note:** The Oasis Fault is also known as the Pinto Mountain Fault.

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-10.mxd

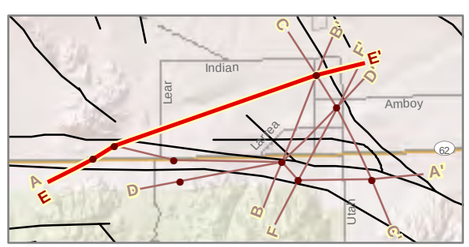
**EXPLANATION**

- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock

TPWD-1 — Well and Identifier

Fault (Dashed where inferred)
Arrows indicate direction of movement
Cross Circle indicates movement away from observer
Dot Circle indicates movement toward observer

500' Feet
250' Vertical Scale
0 2500' 5000' Feet
Horizontal Scale
Exaggeration: 10x




Index Map

**Kennedy/Jenks Consultants**

Twentynine Palms
San Bernardino County, California

**Geologic Cross Section E-E'**

KJ 0964003*00
March 2010

**Figure 2-10**

**F**
(South)

**F'**
(North)

4000
3500
3000
2500
2000
1500
1000
500
0

Eastern Subbasin

Mesquite Subbasin

Dale Basin

Pinto Fault
TPWD-16

Oasis Fault

Bagley Fault

TPWD-TP-1

Mesquite Fault

**Note:**
The Oasis Fault is also known as the Pinto Mountain Fault.

Filename: Z:\Projects\TwentyninePalms\Events\20091215_Cross_Sections\Figure2-11.mxd

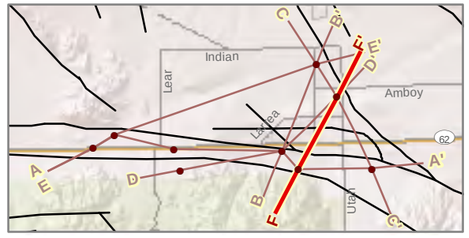
**EXPLANATION**

- Upper Aquifer
- Middle Aquifer
- Lower Aquifer
- Basement Rock

TPWD-1 — Well and Identifier

Selected Fault (Dashed where inferred)
Arrows indicate direction of movement
Cross Circle indicates movement away from observer
Dot Circle indicates movement toward observer

500' Feet
250'
Vertical Scale
0 2500' 5000' Feet
Horizontal Scale
Exaggeration: 10x



Index Map

**Kennedy/Jenks Consultants**
Twentynine Palms
San Bernardino County, California

**Geologic Cross Section F-F'**

KJ 0964003*00
March 2010

**Figure 2-11**

# Appendix D

Hydrologic Water Balance

# Appendix D: Hydrologic Water Balance

**Appendix D** provides a more detailed discussion of each of the components of the hydrologic water balance, as well as a more comprehensive breakdown of the hydrologic water balance calculations. This shows the level of understanding that is currently available for determining groundwater inflows and outflows and the projected change in storage.

## D.1 Water Balance Summary

The water balance was performed for the groundwater basins underlying the District service area, including the portions of the Indian Cove, Fortynine Palms, Eastern, Mesquite Lake and Mainside Subbasins. The water balance was calculated for two conditions, current (2022-2024) conditions and 2045 projected conditions. The current conditions water balance characterizes TPWD groundwater basin health under present-day practices. The 2045 projected water balance characterizes the sustainability of TPWD's groundwater basins and water supply over the next 20 years, assuming population and well pumpage growth.

The current conditions hydrologic water balance calculates an annual change in storage range of -2,484 to +1,029 AFY; see **Table D-4** for a more detailed water balance calculation. The 2045 projected conditions hydrologic water balance calculates an annual change in storage range of -2,893 to +620 AFY; see **Table D-5** for a more detailed water balance calculation.

The following discussion provides background information and assumptions used for quantifying each water balance component. Also described is the background on the various components of the water balance, including the sources of data and how each component was estimated. The water balance components were estimated based on various data sources, including the hydrogeologic knowledge of the basins from previous studies, current TPWD data (2022 to present), and 2045 projected data from the District's 2020 UWMP (Kennedy Jenks, 2021). A more detailed description of the data sources can be also found in the Groundwater Study for the Mesquite Lake Subbasin (Kennedy Jenks, 2010).

## D.2 Climate

Climatic factors including precipitation, temperature and evapotranspiration are the key controlling factors for the natural hydrologic water balance components. **Table D-1** provides a climatic summary per month based on data from the California Irrigation Management Information System (CIMIS) (DWR, 2024c).

The Twentynine Palms area is quite dry, with average annual precipitation of around 3.6 inches, most of which occurs during the winter months (**Table D-1**). Most of this precipitation is lost through evaporation; the total average monthly evapotranspiration (ETo) rate is 76.3 inches per year (**Table D-1**). Precipitation follows a generally bimodal distribution, with most annual precipitation falling during the summer monsoon and the winter wet season. Summer storms are intense and of relatively short duration and may lead to flash floods but are unlikely to contribute to recharge due in large part to the high potential evapotranspiration (ET) during the hot summer months and the lack of storm water retention. Winter storms are gentler and of longer duration and are more likely to contribute to recharge.

Temperatures range from 20 to 60 °F during the winter and from 80 to 110 °F degrees during the summer. Throughout the area, high temperatures tend to decrease with increasing elevation, while low temperatures do not vary greatly with elevation.

**Table D-1. Climate Data**

| | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|
| Standard Monthly Average ETo[a] (in) | 2.7 | 3.8 | 6.1 | 7.9 | 9.3 | 9.8 |
| Average Rainfall[b] (in) | 0.4 | 0.3 | 0.2 | 0.2 | 0.2 | 0.0 |
| Average Max. Temperature[b] (°F) | 62.8 | 67.1 | 73.2 | 81.8 | 88.7 | 100.2 |
| Average Min. Temperature[b] (°F) | 34.4 | 36.8 | 41.6 | 47.5 | 53.8 | 63.1 |

| | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|
| Standard Monthly Average ETo (in) | 9.8 | 9.0 | 7.2 | 5.2 | 3.3 | 2.3 | 76.3 |
| Average Rainfall[b] (in) | 0.6 | 0.6 | 0.3 | 0.2 | 0.2 | 0.3 | 3.6 |
| Average Max. Temperature[b] (°F) | 103.2 | 102.7 | 95.8 | 84.4 | 70.5 | 61.6 | 82.7 |
| Average Min. Temperature[b] (°F) | 71.0 | 70.4 | 63.1 | 50.4 | 38.6 | 32.6 | 50.3 |

Note:
(a) Standard Monthly Average ETo determined from CIMIS Station No. 200 Indio 2 (no ETo data available at CIMIS Station No. 233 Joshua Tree).
(b) Rainfall, max. temperature, and min. temperature averages determined from CIMIS Station No. 233 Joshua Tree.

## D.3 Groundwater Inflows

Inflows replenish water to the aquifer system through various routes and processes. This section discusses the different types of inflow. The total inflow is discussed below.

### D.3.1 Direct Precipitation Recharge

Direct recharge accounts for recharge of precipitation that falls on the basin floor, percolates downward through the vadose (unsaturated) zone, and eventually reaches the water table. Because the Twentynine Palms area is very arid, potential evapotranspiration (ET) far outstrips the actual amount of precipitation; Nishikawa et al. (2004) noted that ET is about 66.5 inches per year (in/yr) in the Joshua Tree area, while precipitation is about 4.8 in/yr (e.g. ET is nearly 14 times precipitation).

Direct recharge has been estimated in several different studies. Nishikawa et al. (2004) used a variety of methods to try to constrain direct recharge in the Joshua Tree area to the west of the study area, including temperature, matric potential, soil water chemistry, and a watershed model. The results of their physical measurements indicated that recharge probably does not occur on the basin floor away from stream channels. Their watershed model produced recharge rates of 0 to 0.0001 in/yr on the basin floor away from the stream channels, and 0.0001 to 0.01 in/yr at the Coyote Lake playa.

Kennedy Jenks (2010) used a modified Maxey-Eakin approach to estimate recharge throughout the study area. This analysis reached the same conclusion as did Nishikawa et al.: direct recharge on the basin floor is, for all intents and purposes, zero. However, the method used is a very coarse one and sets recharge to zero wherever precipitation is less than 8 inches per year, an area that includes almost the entire region aside from the highest mountains. Li and Martin (2011) reached a similar conclusion to the above two studies regarding direct recharge, stating that the amount of precipitation that falls on the basin floor is too small to induce recharge. This GWMP lumps basin floor recharge and mountain front recharge by using water budget numbers

from the earlier Groundwater Study (Kennedy Jenks, 2010). The amount contributed to recharge from precipitation on the basin floor is zero.

For this GWMP, direct recharge was calculated based on the range in precipitation recharge typical of the basin floor according to the watershed model of Nishikawa et al. (2004), 0 to 0.0001 in/yr. The total area of basin floor in the five subbasins considered for this study is approximately 66,000 acres, so the range in basin floor recharge is 0 to 0.5 AFY. This estimate is not anticipated to significantly change, so it is assumed for both current and 2045 projected conditions.

### D.3.2 Irrigation Return Flows

Return flow from agricultural or landscape irrigation can be a significant contributor to the water budget of a basin. Within the study area, agriculture is not present, but there are a few sites with regular and significant irrigation (Luckie Park in the Mesquite Lake Subbasin, Knott Sky Park in the Fortynine Palms Subbasin, and the Desert Winds Combat Center Golf near the intersection of the Mesquite Lake, Mainside, and Deadman Subbasins). Return flows from these locations of irrigation have not been included in any of the models to date. Li and Martin (2011) note that ignoring these return flows is a limitation in their numerical model. They also note that, until around 2000, there was no indication that return flows had yet passed through the unsaturated zone and reached the water table in the regional aquifer, meaning that the return flows must be maintained for many years before they actually can pass through the thick unsaturated zones of the study area and lead to recharge to the water table. Irrigation return flow was assumed to be effectively zero for both current and 2045 projected conditions.

### D.3.3 Septic Return Flows

Some of the groundwater produced and delivered to customers returns to the subbasins through infiltration and percolation of irrigation water and of septic tank discharges. Li and Martin (2011) and Kennedy Jenks (2010) did not consider septic return flow in their models. However, as the majority of water use is from the residential development and the outdoor water use is generally small, residential indoor water use (and in turn residential wastewater) is a large contributor to septic systems. The proportion of septic return flow attributed to each subbasin is assumed as follows (Kennedy Jenks, 2014a):

- Indian Cove Subbasin: 8.0%
- Fortynine Palms Subbasin: 8.2%
- Eastern Subbasin: 10.4%
- Mesquite Lake Subbasin: 72.0%
- Mainside Subbasin: 1.4%

For current conditions, TPWD water usage data from 1 August 2022 to 1 August 2024 was used to calculate average annual water usage of approximately 2,127 AFY. Assuming an 80 percent water to sewer conversion, the total residential and commercial septic return flow for current conditions is estimated at 1,702 AFY.

For 2045 projected conditions, the 2045 projected residential and commercial demands were used to calculate a projected annual water usage of 2,980 AFY (Kennedy Jenks, 2021).

Assuming an 80 percent water to sewer conversion, the total residential and commercial septic return flow for 2045 projected conditions is estimated at 2,384 AFY.

### D.3.4 Surface Water (Streamflow Infiltration)

Surface water recharge is the recharge that occurs as infiltration of streamflow through streambeds cutting across the basin floor. There are no perennial streams within the study area, but there are several large dry streambeds that experience intermittent flows. Previous studies have taken different approaches to estimating this stream infiltration.

The stream channels are ephemerally flowing streams with runoff originating in the adjoining mountains in response to the largest storms. However, very little surface flow leaves this area (Troxell et al, 1954). Nishikawa et al (2004) evaluated stream gage data in the region including the Fortynine Palms Creek. Over the period of record, Fortynine Palms Creek had measurable flow on an average of 2.4 days per year, totaling 74.3 AFY. These four gauges show streamflow to be highly intermittent, with the duration of surface flows limited to only 1 to 2 days in response to storms that primarily occurred in the summer months in response to monsoonal thunderstorms (Nishikawa et al, 2004).

Because Kennedy Jenks (2010) used the modified Maxey-Eakin approach to estimate total recharge, there is no specific estimate available for streamflow infiltration. Theoretically, the Maxey-Eakin method includes streamflow infiltration in its total basin recharge, in addition to direct recharge, mountain front recharge, and mountain block recharge.

Li and Martin (2010) used the watershed model of Nishikawa et al. (2004) to estimate streamflow infiltration into the Mesquite Lake Subbasin; this area was included in the original model but was not published in the 2004 report. Streamflow infiltration was estimated to be 165 AFY within the Mesquite Lake Subbasin, mostly along the Mesquite Lake Wash and Twentynine Palms Channel. This study implies that recharge largely results from summer streamflow. Given the seasonal discrepancy described above for the watershed model, the bulk of the recharge occurring in the summer may be more realistic.

These estimates are not anticipated to significantly change, so they are assumed for both current and 2045 projected conditions.

### D.3.5 Mountain Front Recharge

Mountain front recharge (MFR) is recharge that occurs at the boundary between the alluvial basin sediments and the crystalline bedrock of the basin-bounding mountains. It must be noted that there are several different ways to define MFR, and the conceptual understanding of MFR for the purpose of this water balance is equivalent to MFR in Wilson and Guan (2004). Under this definition, MFR is made up of that water that runs off the mountains as surface runoff and enters the alluvium upon leaving the mountains.

Nishikawa et al. (2004) does not provide specific estimates of MFR from their numerical model, instead grouping it with the other recharge components. However, they do state that “simulated recharge rates between 0.1 and 0.5 in/yr occurs [sic] along the flanks of the Little San Bernardino Mountains.” They calculated recharge throughout the topographic contributing area to their groundwater model, demonstrating that higher recharge rates are present at the

bedrock-alluvium interface than exist on either the exposed bedrock or basin floor. They speculate that any recharge that occurs outside of the numerical model domain (the main part of the groundwater basin) is eventually lost to evapotranspiration (ET) rather than reaching the groundwater basin, but there is no particular evidence presented for this.

As stated above, Kennedy/Jenks (2010) estimated recharge using a modified Maxey-Eakin method. The conceptual understanding of recharge for this analysis was that the recharge represents MFR as defined above. Calculated MFR varied from 0 to 54 AFY in the Indian Cove Subbasin, 7 to 212 AFY in the Fortynine Palms Subbasin, 2 to 190 AFY in the Eastern Subbasin, 0 to 8 AFY in the Mesquite Lake Subbasin, and 0 to 10 AFY in the Mainside Subbasin, for a total of 9 to 474 AFY for the subbasins.

Li and Martin (2011) do not directly address MFR because their groundwater model does not abut the major basin-bounding mountain ranges. However, they calculated that 510 AFY of groundwater inflow passes from the Indian Cove, Fortynine Palms, and Eastern Subbasins into the Mesquite Lake Subbasin, and presumably this would mostly be made up of MFR. This GWMP estimates a low recharge total of 8 AFY based on the numerical groundwater model of Kennedy Jenks (2010). As with the earlier study, this total can be assumed to represent MFR.

These estimates are not anticipated to significantly change, so they are assumed for both current and 2045 projected conditions.

### D.3.6 Mountain Block Recharge

Mountain block recharge (MBR) is that portion of recharge that occurs through the bedrock of the basin-bounding mountain ranges. It discharges from the bedrock itself into the basin alluvium, rather than flowing off the bedrock on or near the surface. For this GWMP, MBR is conceptually similar to the definition of MBR in Wilson and Guan (2004). MBR has not been specifically considered in any of the previous reports discussed above. In fact, Nishikawa et al. (2004) speculated that the recharge they simulated to occur outside of the alluvial basins was largely lost to ET before it could discharge to the alluvium as MBR. However, some of this mountain block water must make its way to the alluvial basin.

Fugro West and Cleath (2002) used a Darcy's Law approach to estimate groundwater inflow from the basin-bounding mountains surrounding the Paso Robles Groundwater Basin, which can be considered to be MBR under the definition used in this report. As a first approximation, we assume that the Little San Bernardino and Pinto Mountains can be considered hydraulically equivalent to the fractured granite bounding the Paso Robles Groundwater Basin, which Fugro West and Cleath (2002) give a hydraulic conductivity of 0.1 gallons per day per square foot ($gpd/ft^2$), a moderate value in their estimates. Their results indicated approximately 50 $ft^3$ of MBR per linear foot of mountain front length. Using this value, MBR into the subbasins was calculated to be 56 AFY into the Indian Cove Subbasin, 34 AFY into the Fortynine Palms Subbasin, 49 AFY into the Eastern Subbasin, 5 AFY into the Mesquite Lake Subbasin, and 10 AFY into the Mainside Subbasin, for a total of 154 AFY. These estimates are not anticipated to significantly change, so they are assumed for both current and 2045 projected conditions.

### D.3.7 Groundwater Inflow

Groundwater inflow represents water that enters a subbasin by flowing laterally within the saturated zone from another subbasin. Groundwater inflow in the study area is restricted somewhat by the presence of low-permeability faults and other barriers that help to compartmentalize the various subbasins.

Nishikawa et al. (2004) created a numerical model that included the Joshua Tree and Copper Mountain Subbasins, which border the Indian Cove and Mesquite Lake Subbasins, respectively, to the west. They allowed groundwater to leave their model along the eastern boundary of the Joshua Tree Subbasin and the far northern boundary of the Copper Mountain Subbasin. Their model indicated that 199 AFY (207 under pre-development conditions) leaves the two subbasins as groundwater outflow, and that it all flows out the northern boundary of the Copper Mountain Subbasin. They state that this groundwater flows into the Surprise Spring Subbasin, but it is unclear whether or not this would actually occur, as the Transverse Arch is still present to the north of this point. The groundwater flow could also pass east through the space between Copper Mountain and the Transverse Arch into the Mesquite Lake Subbasin, although to do so it would have to cross the Copper Mountain Fault.

Kennedy Jenks (2010) based their water budgets on all of the available USGS reports for the area. Conceptually, the Indian Cove Subbasin receives groundwater inflow from the Joshua Tree Subbasin to the west, while the Fortynine Palms and Eastern Subbasins do not receive inflow from other basins. The Mesquite Lake Subbasin receives inflow from the Indian Cove, Fortynine Palms, Eastern, Deadman Lake, Surprise Spring, and Copper Mountain Subbasins. Using a Darcy's Law approach, they estimated that the Indian Cove Subbasin receives about 36 AFY of inflow from the Joshua Tree Subbasin, while the Mesquite Lake Subbasin receives a total of about 730 AFY of inflow from the various surrounding subbasins.

Li and Martin (2011) also estimated groundwater inflow to the Mesquite Lake Subbasin. In contradiction to Nishikawa et al. (2004), they stated that 207 AFY of groundwater leaves the Copper Mountain Subbasin and flows into the Mesquite Lake Subbasin between Copper Mountain and the Transverse Arch. They also give a groundwater inflow of 8 AFY from the Deadman Lake Subbasin (and no inflow from the Surprise Spring Subbasin), much lower than the 577 AFY estimated by Kennedy Jenks (2010) for inflow from the Deadman Lake and Surprise Spring Subbasins. Groundwater inflow to the Mesquite Lake Subbasin from the three southern subbasins (Indian Cove, Fortynine Palms, and Eastern) was calculated to be about 510 AFY based on their estimates of inflow from other subbasins (Copper Mountain and Deadman) and published estimates of total ET at Mesquite Lake, and is far higher than the estimates of Kennedy Jenks (2010) from the same three subbasins (18 AFY).

These estimates are not anticipated to significantly change, so they are assumed to be the same (1,188 AFY) for both current and 2045 projected conditions.

## D.4 Groundwater Outflows

Outflows remove water from the aquifer system through various routes and processes. This section defines and discusses the different types of outflows.

### D.4.1 Groundwater Pumping

As development in the study area has continued, groundwater extraction by wells has become the primary outflow component. This component should be the easiest to estimate, but much of the groundwater extraction in the study area is unmetered, and hence unknown. The District provides pumping volumes, but many other groundwater users exist in the study area, and do not measure or report their pumping.

For current conditions, TPWD records and information were used to calculate average pumpage for each subbasin for the study period of 2022 to 2023; this is presented in Table D-2.

**Table D-2 – Average Pumpage 2022-2023**

| Subbasin | Average Annual Pumpage (AFY) |
|---|---|
| Indian Cove Subbasin | 112 |
| Fortynine Palms Subbasin | 772 |
| Eastern Subbasin | 229 |
| Mesquite Lake Subbasin | 1,290 |
| Mainside Subbasin[(a)] | 0 |
| **Total** | **2,403** |

**Notes:** (a) TPWD does not currently produce drinking water from the Mainside Subbasin. While there are non-TPWD wells in this subbasin, these volumes are not metered nor easily quantifiable. For the purposes of this GWMP, the pumpage in the Mainside Subbasin is assumed to be zero.

For 2045 projected conditions, 2045 projected groundwater pumping estimates were used; this is presented in Table D-3 (Kennedy Jenks, 2021).

**Table D-3 – 2045 Projected Pumpage**

| Subbasin | Average Annual Pumpage (AFY) |
|---|---|
| Indian Cove Subbasin | 284 |
| Fortynine Palms Subbasin | 993 |
| Eastern Subbasin | 328 |
| Mesquite Lake Subbasin | 1,806 |
| Mainside Subbasin[(a)] | 0 |
| **Total** | **3,411** |

**Notes:** (a) It is not anticipated that TPWD will produce drinking water from the Mainside Subbasin in 2045. While there are non-TPWD wells in this subbasin, these volumes are not metered nor easily quantifiable. For the purposes of this GWMP, the pumpage in the Mainside Subbasin is assumed to be zero.

### D.4.2 Evapotranspiration

Evapotranspiration (ET) is the transformation of liquid water to water vapor through either transpiration by plants or evaporation of standing or soil water. Where the water table is close to the land surface, ET can be supplied by the saturated zone of the aquifer; where the water table is out of reach of the root zone; ET is derived only from soil moisture and has no bearing on the groundwater budget.

As noted above, water tables in the study area tend to be far beneath the land surface, so ET from the water table is limited. Kennedy Jenks (2010) used existing reports to estimate ET within the study area. They determined that ET was about 550 AFY at Mesquite Lake before development and has likely decreased to around 340 AFY due to lowering of the water table. ET at the Oasis of Mara was estimated to be up to about 75 AFY, but there has been no rigorous estimate. Concentrations of phreatophytic vegetation (vegetation directly taps the water table to survive) at the Oasis of Mara and Mesquite Dry Lake (and Mesquite Springs) within the District (Riley and Worts, 1953).

Li and Martin (2011) used earlier estimates as the basis for their conceptual understanding of ET in the Mesquite Lake Subbasin, giving a total of 890 AFY from transpiration and soil evaporation. This total was used to calibrate boundary conditions in their groundwater model, so the model cannot be used to provide an independent estimate. This GWMP estimates ET based on the results of the groundwater model of Kennedy Jenks (2010). This results in about 20 AFY of ET in the Eastern Subbasin and 1,630 AFY in the Mesquite Lake Subbasin.

Based on these previous studies, ET varies from 20 to 75 AFY at the Oasis of Mara (Eastern) and 340 to 1,630 AFY at Mesquite Lake. ET is assumed to be zero in other subbasins. These estimates are not anticipated to significantly change, so they are assumed for both current and 2045 projected conditions.

### D.4.3 Groundwater Outflow

Groundwater exchanges between the southern subbasins and the Mesquite Lake Subbasin were discussed in the Groundwater Inflow section above (Section 6.4.1.6). This section only covers groundwater exchanges that leave the set of subbasins included in the study area.

Under the conceptual model of Kennedy Jenks (2010), groundwater from the three southern subbasins flowed out to the Mesquite Lake Subbasin, and groundwater from this subbasin flows out into the Dale Basin to the east. Under their water balance approach, 114 AFY flowed from the Mesquite Lake Subbasin to the Dale Basin. Their numerical model simulated a flow of 519 AFY across this boundary. Note that the Mainside Subbasin is not included in either the water budget or the numerical model.

Under the conceptual model of Li and Martin (2011), groundwater flows from the Mesquite Lake Subbasin into the Mainside Subbasin, from where it may enter the Dale Basin. However, they state that only a minor amount of groundwater flows from the Mesquite Lake Subbasin to the Mainside Subbasin.

These estimates are not anticipated to significantly change, so they are assumed for both current and 2045 projected conditions.

### D.4.4 Springs

Springs are locations where the water table intersects the ground and groundwater is discharged to the surface. Once there, this water can re-infiltrate, be utilized as a water source, or be lost to ET. Because the study area is very dry, water tables are typically well below the ground surface, so springs are very rare within the alluvial basins. Prior to development, springflow occurred at the Oasis of Mara and Mesquite Springs, where faults force groundwater

upward to the surface. However, there have been no rigorous estimates of flow at these springs. Because of lowered water tables, one can assume that there is no longer any flow occurring at these springs. This estimate is not anticipated to significantly change, so it is assumed for both current and 2045 projected conditions.

## D.5 Hydrologic Water Budget: Current Conditions

**Table D-4** presents the detailed hydrologic water budget calculations made under current conditions.

**Table D-4 – Current Conditions Hydrologic Water Balance Estimates for Sub-Basins in the TPWD Service Area (AFY)**

| | Indian Cove | | Fortynine Palms | | Eastern | | Mesquite Lake | | Mainside | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Precipitation Recharge | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 2.5 |
| Irrigation Return Flow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Septic Return Flow | 143 | 143 | 146 | 146 | 186 | 186 | 1,285 | 1,285 | 25 | 25 | 1,785 | 1,785 |
| Streamflow Infiltration | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 165 | 0 | 0 | 0 | 198 |
| MFR | 3 | 54 | 7 | 212 | 2 | 190 | 0 | 8 | 0 | 10 | 12 | 474 |
| MBR | 0 | 56 | 0 | 34 | 0 | 49 | 0 | 5 | 0 | 10 | 0 | 154 |
| Groundwater Inflow | 36 | 75 | 0 | 140 | 0 | 50 | 105 | 808 | 0 | 115 | 141 | 1,188 |
| **Total Recharge** | **182** | **328** | **153** | **566** | **188** | **475** | **1,390** | **2,272** | **25** | **160** | **1,938** | **3,801** |
| Well Discharge | 112 | 112 | 772 | 772 | 229 | 229 | 1,290 | 1,290 | 0 | 0 | 2,403 | 2,403 |
| ET | 0 | 0 | 0 | 0 | 20 | 75 | 340 | 1,630 | 0 | 0 | 360 | 1,705 |
| Groundwater Outflow | 10 | 30 | 0 | 120 | 0 | 50 | 0 | 114 | 0 | 0 | 10 | 314 |
| Springflow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Outflow** | **122** | **142** | **772** | **892** | **249** | **354** | **1,630** | **3,034** | **0** | **0** | **2,773** | **4,422** |
| **Storage Change** | **40** | **206** | **-739** | **-206** | **-166** | **226** | **-1,643** | **642** | **25** | **160** | **-2,484** | **1,028** |

## D.6 Hydrologic Water Budget: 2045 Projected Conditions

**Table D-5** presents the detailed hydrologic water budget calculations made under 2045 projected conditions.

**Table D-5 – 2045 Projected Conditions Hydrologic Water Balance Estimates for Sub-Basins in the TPWD Service Area (AFY)**

| | Indian Cove | | Fortynine Palms | | Eastern | | Mesquite Lake | | Mainside | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Precipitation Recharge | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 2.5 |
| Irrigation Return Flow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Septic Return Flow | 191 | 191 | 195 | 195 | 248 | 248 | 1,716 | 1,716 | 33 | 33 | 2,384 | 2,384 |
| Streamflow Infiltration | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 165 | 0 | 0 | 0 | 198 |
| MFR | 3 | 54 | 7 | 212 | 2 | 190 | 0 | 8 | 0 | 10 | 12 | 474 |
| MBR | 0 | 56 | 0 | 34 | 0 | 49 | 0 | 5 | 0 | 10 | 0 | 154 |
| Groundwater Inflow | 36 | 75 | 0 | 140 | 0 | 50 | 105 | 808 | 0 | 115 | 141 | 1,188 |
| **Total Recharge** | **230** | **376** | **202** | **615** | **250** | **537** | **1,821** | **2,703** | **33** | **169** | **2,537** | **4,401** |
| Well Discharge | 284 | 284 | 993 | 993 | 328 | 328 | 1,806 | 1,806 | 0 | 0 | 3,411 | 3,411 |
| ET | 0 | 0 | 0 | 0 | 20 | 75 | 340 | 1,630 | 0 | 0 | 360 | 1,705 |
| Groundwater Outflow | 10 | 30 | 0 | 120 | 0 | 50 | 0 | 114 | 0 | 0 | 10 | 314 |
| Springflow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Outflow** | **294** | **314** | **993** | **1,113** | **348** | **453** | **2,146** | **3,550** | **0** | **0** | **3,781** | **5,430** |
| **Storage Change** | **-84** | **82** | **-911** | **-378** | **-203** | **189** | **-1,729** | **557** | **33** | **169** | **-2,893** | **620** |

# Appendix H: Demand Management Measures

**RESOLUTION 22-08**

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TWENTYNINE PALMS WATER DISTRICT DECLARING A STAGE 2 WATER SHORTAGE PURSUANT TO ITS WATER SHORTAGE CONTINGENCY PLAN**

**WHEREAS,** on October 19, 2021, Governor Newsom proclaimed a condition of statewide drought emergency and reaffirmed the call for local agencies to voluntarily reduce water use by 15 percent compared to 2020 to protect water reserves and complement local conservation mandates, preceded by drought proclamations on April 12, 2021, May 10, 2021, and July 8, 2021; and

**WHEREAS,** Governor Newsom's State of Emergency Proclamation acknowledges that the State of California is experiencing critically dry conditions; and

**WHEREAS,** a third consecutive year of exceptionally low precipitation, snowpack, and runoff is affecting California's water supplies and resulting in near record low storage in California's largest reservoirs; and

**WHEREAS,** on March 28, 2022, Governor Newsom issued Executive Order N-7-22 directing the State Water Resources Control Board (SWRCB) to consider adopting drought emergency water conservation regulations to prepare for and mitigate the effects of the drought conditions; and

**WHEREAS,** on May 24, 2022, the SWRCB adopted Emergency Regulations for urban drought response actions, specifically requiring all urban water suppliers who submitted a Water Shortage Contingency Plan to the Department of Water Resources to implement at minimum, all demand reduction actions identified in the supplier's Water Shortage Contingency Plan for a level 2 shortage level of ten to twenty percent by June 10, 2022; and

**WHEREAS,** under N-7-22 and the SWRCB Emergency Regulations, the Twentynine Palms Water District (District) is required to implement all demand reduction actions identified in its Water Shortage Contingency Plan for a stage 2 shortage level; and

**WHEREAS,** the District has adopted a Water Shortage Contingency Plan under the Urban Water Management Planning Act; and

**WHEREAS,** pursuant to the District's Water Shortage Contingency Plan, the District, through its Board of Directors (Board) may take action by resolution and adoption at a public meeting to make a water shortage declaration.

**NOW, THEREFORE,** the Board of the District hereby finds, determines, declares, and resolves as follows:

**SECTION 1.** Incorporation of Recitals. All of the foregoing Recitals are true and correct, and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Resolution.

**SECTION 2.** Compliance with SWRCB Emergency Regulation. The Board hereby determines that the District must implement all demand reduction measures identified in the District's Water Shortage Contingency Plan, Stage 2 Water Shortage, to comply with the SWRCB Emergency Regulation.

**SECTION 3.** Declaration of Stage 2. The Board hereby declares a Stage 2 Water Shortage and implements the demand reduction measures as set forth within the District's Water Shortage Contingency Plan for a Stage 2 Water Shortage and as further set forth below. The following actions are required, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency:

1. Waste and unreasonable use of water is prohibited.

2. The following demand reduction action are required:
    a. Customers shall fix leaks in a timely manner and sprinklers shall be adjusted to eliminate over-spray.
    b. Customers shall not water outdoor landscapes within 48 hours of measurable rainfall.
    c. Landscape watering shall not runoff onto adjacent properties, roadsides, or gutters.
    d. Water for construction purposes, including but not limited to de-brushing of vacant land, compaction of fills and pads, trench backfill and other construction uses shall be used in an efficient manner.
    e. All new construction including residential, commercial, and industrial, shall be equipped with low flow toilets and fixtures.
    f. All new model homes and commercial and industrial development, when landscaped, shall include low water use, drought tolerant or native plant material, and drip irrigation systems. Irrigation systems shall include a smart irrigation controller or equivalent technology.
    g. Dedicated (separate) landscape meters shall be installed for all irrigated landscape areas in excess of 2500 square feet except for single family residences.
    h. Water used for cooling systems must be recycled to the extent possible.
    i. Evaporation resistant covers are required for all new swimming pools and hot tubs.
    j. Hosing of hardscape surfaces, except where health and safety needs dictate, is prohibited.

k. Car washing and outside cleaning activities are prohibited except when performed with buckets and automatic hose shutoff devices.
l. Water leaks shall be repaired in a timely manner and sprinklers shall be adjusted to eliminate over-spray.
m. The serving of drinking water other than upon request in eating or drinking establishments is prohibited.
n. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom.
o. Outdoor watering is limited to three days per week.
p. Landscape watering between the hours of 10:00 a.m. and 5: p.m. is prohibited.

**SECTION 4.** Non-Functional Turf Irrigation Ban. Under N-7-22 and while it and its implementing SWRCB Emergency Regulations are in effect, to prevent the unreasonable use of water and to promote water conservation, the use of potable water is prohibited for the irrigation of non-functional turf at commercial, industrial, and institutional sites, provided however, the use of water is not prohibited to the extent necessary to ensure the health of trees and other perennial non-turf plantings or to the extent necessary to address an immediate health and safety need. The District may approve requests for continued irrigation of non-functional turf where the user certifies that the turf is a low water use plant with a plant factor of 0.3 or less and demonstrates that the actual use is less than 40% of reference evapotranspiration. "Non-functional turf" means turf that is solely ornamental and not regularly used for human recreational purposes or for civic or community events and excludes sports fields and turf that is regularly used for human recreational purposes. Taking any action prohibited in this section is an infraction punishable by a fine of up to five hundred dollars ($500) for each day in which the violation occurs, and this fine is in addition to and does not supersede or limit any other remedies, civil or criminal.

**SECTION 5.** CEQA. The Board finds that adopting and enforcing mandatory restrictions on water use in order to comply with SWRCB Emergency Regulation is exempt from the California Environmental Quality Act ("CEQA") pursuant to State CEQA Guidelines Section 15268 and Public Resources Code Section 21080(b)(1) as a ministerial action. The SWRCB Emergency Regulations mandate that each urban water supplier implement all demand reduction measures identified in the supplier's Water Shortage Contingency Plan for a shortage level of ten to twenty percent. Therefore, an action to implement these measures is not a discretionary action, and as such, it is statutorily exempt from CEQA.

**SECTION 6.** Severability. If any section, subsection, clause, or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses, or phrases or the application thereof be held invalid.

**ADOPTED, SIGNED, AND APPROVED** this 22nd day of June, 2022.

| | |
|---|---|
| Ayes: | Directors Arthur, Coghill, Horn, Leazer, and Giannini |
| Noes: | None |
| Absent: | None |
| Abstain: | None |

Carol Giannini, President
Board of Directors

Attest:

Matthew Shragge, Board Secretary
Twentynine Palms Water District

# RESOLUTION 11-02

## A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TWENTYNINE PALMS WATER DISTRICT CONCURRING WITH A MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND CALIFORNIA GREEN BUILDING STANDARDS

**WHEREAS**, the Twentynine Palms Water District ("District") is a County Water District formed under the County Water District Law set forth in Water Code Section 30000 et seq. Under the Water Code, the District has the authority to store, conserve, appropriate, and acquire water and water rights for any useful purpose. In addition, the District has the authority to operate water rights, works, and property useful or necessary to convey, supply, store, or make use of water. The District also has the right to sell water and establish rules and regulations for the sale, distribution and use of water; and

**WHEREAS,** the District is subject to the requirements of the Urban Water Management Planning Act which requires the District to prepare an Urban Water Management Plan and required updates, amendments and revisions in order to plan for the conservation and efficient use of water; and

**WHEREAS**, as of the date of this Resolution, the District is in the process of engaging in the review, amendment, revision and updating of its Urban Water Management Plan. In connection with said update, the District has determined that it would be beneficial to make reference to, and otherwise concur with, the conservation and related measures which are available pursuant to that certain Model Water Efficient Landscape Ordinance ("Landscape Ordinance") which became the effective Landscape Ordinance for water efficiency within Twentynine Palms by way of action documented by the City of Twentynine Palms on or about February 2, 2010. For example, and not by way of limitation, the California Department of Water Resources ("DWR") has released its Draft Guidebook for 2010 Urban Water Management Plans which includes a suggestion that a Landscape Ordinance may assist a public agency in complying with the Water Demand Management Measure requirements of the Act, which also ties into an agency's eligibility for loan and grant funding opportunities; and

**WHEREAS**, the District has determined that it would be beneficial to make reference to, and otherwise concur with, the conservation and related measures which are available pursuant to those certain California Green Building Standards as adopted by the City of Twentynine Palms by way of its Ordinance No. 232, dated October 26, 2010. For example, and not by way of limitation, DWR's Draft Guidebook provides that the California Green Building Code update ("Cal Green") reinforces and in some cases exceeds the goal of water use efficiency in urban landscapes.

**NOW, THEREFORE,** the Board of Directors does hereby **RESOLVE** and **ORDER** as follows:

Section 1: The Recitals set forth above are incorporated herein and made an operative part of this Resolution.

Section 2: The District hereby makes reference to, and otherwise concurs with, the conservation and related measures which are available pursuant to the Landscape Ordinance which became the effective Landscape Ordinance for water efficiency within the City of Twentynine Palms, effective January 1, 2010.

Section 3: The District hereby makes reference to, and otherwise concurs with, the conservation and related measures which are available pursuant to the California Green Building Standards Code, 2010 Edition, published by the California Building Standards Commission, as adopted by the City of Twentynine Palms by way of its Ordinance No. 232, dated October 26, 2010.

Section 4: If any provision in this Resolution or the application thereof to any person or circumstances is for any reason held invalid, the validity of the remainder of this Resolution or the application of such provisions to other persons or circumstances shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each provision thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof to any person or circumstance be held invalid.

Section 5: This Resolution shall become effective upon the date of adoption as set forth herein.

**PASSED, APPROVED AND ADOPTED** this 23rd day of February 2011 by the following roll call vote:

| | |
|---|---|
| Ayes: | Directors Bourikas, Chambers, Cisneros and Moore |
| Noes: | None |
| Abstain: | None |
| Absent: | Director Shinaver |

_____
Philip C. Cisneros, President
Board of Directors

Attest:

_____
Mike Wright, Board Secretary
Twentynine Palms Water District

**RESOLUTION NO. 26-02**

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TWENTYNINE PALMS WATER DISTRICT ADOPTING A SCHEDULE OF RATES FOR MONTHLY WATER SERVICE CHARGES COMMENCING WITH FISCAL YEAR 2025-2026**

**WHEREAS**, the Twentynine Palms Water District (the "District") is organized and operates pursuant to the County Water District Law, Division 12 of the California Water Code, commencing with Section 30000 thereof; and

**WHEREAS**, the District provides water service throughout its service area, and is authorized under the County Water District Law, including without limitation Water Code section 31025, to fix and collect charges for the provision of water service pursuant; and

**WHEREAS**, the rate structure for the District's water service charges is comprised of two components: (1) a monthly Fixed Service Charge, which is established on the basis of the size of the meter serving a parcel of property and vary depending upon whether the parcel receives potable or non-potable water; and (2) a Commodity Charge, which is determined on the basis of the amount of water served to a parcel of property in hundreds of cubic feet ("HCF") and varies depending on whether the water delivered is potable or non-potable; and

**WHEREAS**, in addition, the District imposes and proposes to continue to impose a fixed fire service charge on certain commercial properties as a condition of extending or initiating water service by installation of a private fire suppression system, and upon the request of the consumer or property owner for the delivery of water to the property for the purpose of fire service and protection; and

**WHEREAS**, the District has installed certain automated meter reading infrastructure, and has previously adopted a policy allowing property owners to opt out of such automated meter reading. Consequently, the District will be required to incur costs associated with manual meter readings. Such customers of record and property owners that have determined to opt-out of automated meter reading will also be subject to an opt-out charge, to recover the cost of such manual readings of meters; and

**WHEREAS**, there has been presented to the District Board of Directors proposed rate increases to the water service charges (the "Charges") that are designed to proportionately allocate the cost of providing water service among the District's customer classes, all of which are more fully set forth in the Schedule of Water Service Charges attached hereto as Exhibit "A"; and

**WHEREAS**, the District's rates for Charges are calculated to recover the costs of the District in providing water services and to proportionately allocate those costs among the water customers; and

**WHEREAS**, the revenues derived from the Charges will not exceed the funds required to provide water services and shall be used exclusively for providing water service; and

**WHEREAS**, the Charges will not exceed the proportional cost of the services attributable to each parcel upon which they are imposed; and

**WHEREAS**, the Charges will not be imposed on a parcel unless the water services are actually used by, or immediately available to, the owner of the parcel; and

**WHEREAS**, pursuant to California Constitution Article XIII D, Section 6 ("Article XIII D"), the District provided written notice (the "Notice") by mail of: (1) the proposed increases to the rates for the Charges to

the record owner of each parcel upon which the Charges are proposed for imposition and any tenant directly liable for payment of the Charges; (2) the amount of the Charges proposed to be imposed on each parcel; (3) the basis upon which the Charges were calculated; (4) the reason for the proposed increases to the Charges; and (5) the date, time, and location of a public hearing (the "Hearing") on the proposed Charges; and

**WHEREAS**, the District provided such Notice not less than forty-five days prior to the Hearing on the proposed Charges; and

**WHEREAS**, the Board of Directors determined to hold the Hearing on February 25, 2026, after determining that no valid legal objections had been submitted to the District that required any changes to the proposed Charges; and

**WHEREAS**, at the Hearing, the Board of Directors heard all oral testimony, and considered all written materials, and written protests concerning the establishment and imposition of the proposed rate increases for the Charges, and at the close of the Hearing, the District did not receive written protests against the establishment and imposition of the proposed rate increases for the Charges from a majority of the affected property owners and tenants directly liable for the payment of the Charges; and

**WHEREAS**, the Board of Directors has determined to adopt the rates for the Charges set forth in Exhibit "A" hereto; and

**WHEREAS**, the rates for the Charges established by this Resolution and set forth in Exhibit "A" are for the purpose of: (A) meeting operational expenses, including employee wage rates and fringe benefits; (B) purchasing or leasing supplies, equipment, or materials; (C) meeting financial reserve needs and requirements; and (D) obtaining funds for capital projects necessary to maintain service within existing service areas, as set forth in this Resolution, and, therefore, the establishment of such Charges is not subject to the California Environmental Quality Act; and

**WHEREAS**, the District previously adopted Ordinance No. 99, authorizing the Board to adopt new or increased Fees by resolution or ordinance;

**NOW, THEREFORE, BE IT RESOLVED** by the Board of Directors of the Twentynine Palms Water District as follows:

1. The matters set forth in the recitals to this Resolution are true and correct statements and by this reference are incorporated herein and made findings and determinations of the Board of Directors.

2. The Board of Directors hereby adopts the Charges in the amounts and at the rates set forth in Exhibit "A" hereto. The Charges in Exhibit "A" shall be effective for all services provided on and after March 1, 2026. The General Manager, or his designee, is hereby authorized and directed to collect the Charge for services provided on or after March 1, 2026, according to the rates set forth in Exhibit "A" and to increase the rate for the Charges on each January 1 thereafter, commencing January 1, 2027, as set forth in Exhibit "A" hereto. The General Manager is further authorized and directed to take all actions necessary to effectuate and collect the rates for Charges and other authorizations set forth herein.

3. All ordinances, resolutions or administrative actions by the Board of Directors, or parts thereof that are inconsistent with any provision of this Resolution are hereby superseded only by this Resolution to the extent of such inconsistency.

4. If any section, subsection, clause, sentence, or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board of

Directors hereby declares it would have passed this Resolution and each section, sentence, clause, or phrase thereof, irrespective of the fact that all or more sections, subsections, clauses, sentences, or phrases are held invalid.

5. This Resolution shall take effect immediately upon its adoption.

ADOPTED, SIGNED, AND APPROVED this 25th day of February, 2026.

| | |
|---|---|
| Ayes: | Directors Arthur, Bowden, Leazer, Woods, and Coghill |
| Noes: | None |
| Abstain: | None |
| Absent: | None |

Bob Coghill, President
Board of Directors

Attest:

Matthew Shragge, Board Secretary
Twentynine Palms Water District

**Exhibit "A"**
**Schedule of Water Service Charges**

| Water Rates | Current | FY 2025/26 (Mar. 2026) | FY 2026/27 (Jan. 2027) | FY 2027/28 (Jan. 2028) | FY 2028/29 (Jan. 2029) | FY 2029/30 (Jan. 2030) |
|---|---|---|---|---|---|---|
| **Fixed Meter Service Charges (Monthly)** | | | | | | |
| 5/8-inch | $20.05 | $20.72 | $22.18 | $23.74 | $25.41 | $27.19 |
| 3/4-inch | $20.05 | $20.72 | $22.18 | $23.74 | $25.41 | $27.19 |
| 1-inch Dual Service - Residential | $20.05 | $20.72 | $22.18 | $23.74 | $25.41 | $27.19 |
| 1-inch | $28.31 | $30.67 | $32.82 | $35.12 | $37.58 | $40.22 |
| 1.5-inch | $48.94 | $55.54 | $59.43 | $63.60 | $68.06 | $72.83 |
| 2-inch | $73.71 | $85.38 | $91.36 | $97.76 | $104.61 | $111.94 |
| 3-inch | $152.12 | $229.62 | $245.70 | $262.90 | $281.31 | $301.01 |
| 4-inch | $267.68 | $503.19 | $538.42 | $576.11 | $616.44 | $659.60 |
| 6-inch | $544.19 | $1,000.58 | $1,070.63 | $1,145.58 | $1,225.78 | $1,311.59 |
| 8-inch | N/A | $1,746.66 | $1,868.93 | $1,999.76 | $2,139.75 | $2,289.54 |
| 10-inch | N/A | $2,741.44 | $2,933.35 | $3,138.69 | $3,358.40 | $3,593.49 |
| 2-inch Non-Potable | $495.74 | $534.77 | $572.21 | $612.27 | $655.13 | $700.99 |
| | | | | | | |
| **Commodity Charges** | | | | | | |
| Potable (per HCF) | $5.24 | $5.80 | $6.21 | $6.65 | $7.12 | $7.62 |
| Non-Potable (per HCF) | $0.92 | $1.00 | $1.07 | $1.15 | $1.24 | $1.33 |
| Utah Trail Pay Station (per gallon) | $0.0121 | $0.0133 | $0.0143 | $0.0154 | $0.0165 | $0.0177 |
| | | | | | | |
| **Commercial Fire Fixed Service Charges (Monthly)** | | | | | | |
| 2-inch | $65.06 | $10.52 | $11.26 | $12.05 | $12.90 | $13.81 |
| 3-inch | $91.37 | $19.51 | $20.88 | $22.35 | $23.92 | $25.60 |
| 4-inch | $127.25 | $35.02 | $37.48 | $40.11 | $42.92 | $45.93 |
| 6-inch | $246.84 | $90.68 | $97.03 | $103.83 | $111.10 | $118.88 |
| 8-inch | $390.36 | $186.69 | $199.76 | $213.75 | $228.72 | $244.74 |
| 10-inch | $1,060.10 | $331.11 | $354.29 | $379.10 | $405.64 | $434.04 |

# Appendix I: 2025 Water Shortage Contingency Plan



# 2025 Water Shortage Contingency Plan for Twentynine Palms Water District

Public Draft

Prepared by Kennedy Jenks

April 2026

Kennedy Jenks

2775 N. Ventura Road, Suite 202
Oxnard, CA 93036
805-973-5700

# Public Draft Twentynine Palms Water District 2025 Water Shortage Contingency Plan

April 2026

Prepared for

**Twentynine Palms Water District**
72401 Hatch Road
Twentynine Palms, CA 92277

K/J Project No. 2544227.00

# Table of Contents

*List of Tables* ..... *iii*

*List of Appendices* ..... *iii*

*List of Acronyms* ..... *iv*

*DWR Checklist Table for WSCP* ..... *v*

**Chapter 1: Introduction ..... 1-1**

1.1 Declaration of Purpose of WSCP ..... 1-1
1.2 Reduced Water Use During Water Shortage Events ..... 1-1
1.3 Coordination with Cities and Counties ..... 1-2
1.4 Plan Preparation, Adoption, Submittal, and Availability ..... 1-2
1.5 Relationship with the Urban Water Management Plan ..... 1-2
1.6 Water Shortage Event Contingency Plan Refinement Procedures ..... 1-3

**Chapter 2: Annual Water Supply and Demand Assessment Procedures ..... 2-1**

2.1 Timeline for Conducting the Annual Assessment ..... 2-1
2.2 Factors Affecting Demand and Supply ..... 2-2
2.2.1 Weather Outlook ..... 2-2
2.3 Current Year Unconstrained Demand ..... 2-3
2.3.1 Land Use ..... 2-3
2.3.2 Current Demand ..... 2-3
2.3.3 Potential Demand ..... 2-3
2.3.4 Total Near-Term Demands ..... 2-4
2.4 Assessing Supply in Current Year and Single Dry Year ..... 2-4
2.5 Assessing Water Supply Reliability ..... 2-4

**Chapter 3: Water Supply Interruptions ..... 3-1**

3.1 Actions to Prepare for Catastrophic Interruption ..... 3-1
3.1.1 Emergency Response Plan ..... 3-1
3.1.2 Local Hazard Mitigation Plan and Seismic Risk Assessment ..... 3-1

**Chapter 4: Water Shortage Stages ..... 4-1**

4.1 Six Standard Shortage Stages ..... 4-1
4.1.1 Procedures for Water Shortage Level Determination ..... 4-2
4.2 Legal Authorities ..... 4-2

**Chapter 5: Water Shortage Response Actions ..... 5-1**

## Table of Contents (cont'd)

5.1 Water Shortage Response Actions ....5-1
5.2 Supply Augmentation Actions ....5-3
5.3 Demand Reduction Actions....5-3
5.3.1 Shortage Stage Allocation....5-5
5.4 Operational Changes ....5-5
5.5 Benefit of Shortage Response Actions....5-6
5.5.1 Public Information ....5-6
5.5.2 Enforcement....5-7
5.5.3 Restrictions on Non-Essential Water Uses ....5-8
5.5.4 Additional Mandatory Restrictions....5-9

**Chapter 6: Communication Protocols ..... 6-1**

6.1 Customer Outreach ....6-1

**Chapter 7: Monitoring and Reporting ..... 7-1**

**Chapter 8: Enforcement ..... 8-1**

8.1 Appeals Procedure....8-1

**Chapter 9: Financial Consequences of Actions during Shortages ..... 9-1**

9.1 Revenue Impacts of Reduced Sales and Increased Costs ....9-1
9.2 Mitigation Actions to Address Revenue Reductions....9-2
9.3 Financial Consequences of Limiting Excessive Water Use ....9-2

**Chapter 10: References..... 10-1**

## List of Tables


Table 1-1: Near-Term Water Supply Reliability Assuming Five (5)-Year Drought.....1-3
Table 2-1: Calendar for Performing Annual Assessment .....2-2
Table 2-2: Annual Assessment of Supply.....2-4
Table 4-1: Rationing and Reduction Goals.....4-1
Table 4-2: Stages of TPWD Water Shortage Contingency Plan .....4-2
Table 5-1: Customer and TPWD Water Shortage Actions .....5-2
Table 5-2: Supply Augmentation Actions.....5-3
Table 5-3: Prohibitions During Different Shortage Stages.....5-4
Table 5-4: Drought Program Management Variables Effect on Residential Water Use .....5-7
Table 5-5: Effectiveness Demand Reduction and Other Actions (DWR Table 8-2) .....5-10
Table 6-1: Communication Protocols Support Shortage Response Actions .....6-2
Table 9-1: Revenue Impacts of Reduced Water Demand .....9-1
Table 9-2: Measures to Overcome Revenue Impacts During Shortage .....9-2


## List of Appendices


A Twentynine Palms Draft Water Shortage Contingency Ordinance

B Twentynine Palms Water District Adoption Resolution of the Water Shortage Contingency Plan (to be provided with the Final WSCP)

C Twentynine Palms Local Hazard Mitigation Plan

## List of Acronyms

| | |
|---|---|
| Act | Urban Water Management Planning Act |
| AF | Acre-Feet |
| AFY | Acre-Feet per Year |
| AMI | Advanced Metering Infrastructure |
| AMR | Automated Meter Reading |
| AWWA | American Waterworks Association |
| BMP | Best Management Practice |
| Board | Board of Directors |
| Cal OES | California Office of Emergency Services |
| CCR | Consumer Confidence Report |
| CII | commercial, industrial, and institutional |
| DDW | California Division of Drinking Water |
| District | Twentynine Palms Water District |
| DMM | Demand Management Measure |
| DWR | California Department of Water Resources |
| ENSO | El Niño Southern Oscillation |
| EPA | Environmental Protection Agency |
| ERP | Emergency Response Plan |
| ET | evapotranspiration |
| GPCD | gallons per capita per day |
| HAO | homeowners association |
| LHMP | Local Hazard Mitigation Plan |
| NIMS | National Incident Management System |
| TPWD | Twentynine Palms Water District |
| RRA | Risk Resilience Assessment |
| SBC | San Bernardino County (SBC) |
| SEMS | Standard Emergency Management System |
| SWRCB | State Water Resources Control Board |
| SWP | State Water Project |
| US | United States |
| UWMP | Urban Water Management Plan |
| WSCP | Water Shortage Contingency Plan |
| % | percent |

# DWR Checklist Table for WSCP

| Water Code Section | Summary as Applies to UWMP | 2025 WSCP Location |
|---|---|---|
| **Subject: Water Shortage Contingency Planning \| 2025 UWMP Guidebook Location: Chapter 8** | | |
| 10632(a) | Provide a water shortage contingency plan (WSCP) with specified elements below. | Full Document |
| 10632(a)(2)(A) | Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability. | Section 2.5 |
| 10632(a)(2)(B) | Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code. | Chapter 2 |
| 10632(a)(3)(A) | Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply. | Section 4.1 |
| 10632(a)(3)(B) | Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories. | Section 4.1 |
| 10632(a)(4)(A) | Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions. | Section 5.2 |
| 10632(a)(4)(B) | Specify locally appropriate demand reduction actions to adequately respond to shortages. | Section 5.3 |
| 10632(a)(4)(C) | Specify locally appropriate operational changes. | Section 5.4 |
| 10632(a)(4)(D) | Specify additional mandatory prohibitions against specific water use practices that are in addition to state- mandated prohibitions are appropriate to local conditions. | Section 5.5.4 |
| 10632(a)(4)(E) | Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action. | Table 5-2, 5-5 |
| 10632(a)(5)(A) | Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages. | Section 5.5.1, 6.1 |
| 10632(a)(5)(B)<br>10632(a)(5)(C) | Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications. | Chapter 6 |
| 10632(a)(7)(A) | Describe the legal authority that empowers the supplier to enforce shortage response actions. | Section 4.2 |
| 10632(a)(7)(B) | Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3. | Section 2.4 |
| 10632(a)(7)(C) | Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency. | Section 1.3 |
| 10632(a)(8)(A) | Describe the potential revenue reductions and expense increases associated with activated shortage response actions. | Section 9.1 |
| 10632(a)(8)(B) | Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions. | Section 9.2 |
| 10632(a)(8)(C) | Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought. | Section 9.3 |
| 10632(a)(9) | Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance. | Chapter 7 |
| 10632(a)(10) | Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented. | Section 1.4 |
| 10632(b) | Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas. | Section 5.3 |

# Chapter 1: Introduction

Water supplies may be interrupted or reduced significantly in several ways, such as a drought that limits supplies, an earthquake that damages water delivery or storage facilities, a regional power outage, or a toxic spill that affects water quality. As required in the California Water Code Section 10632, every urban water supplier shall prepare and adopt a Water Shortage Contingency Plan (WSCP) as part of its Urban Water Management Plan (UWMP). This WSCP serves as a guide for the intended actions of the Twentynine Palms Water District (TPWD, District) during water shortage conditions, improving preparedness for droughts and other impacts on water supplies by describing the process used to address varying degrees of water shortages.

This WSCP describes the actions TPWD will take to identify and respond to water shortages. Ultimately, this WSCP reflects TPWD's commitment to long-term water sustainability, regulatory compliance, and community stewardship. It ensures that even in times of scarcity, water resources are managed responsibly and transparently for the benefit of all users.

## 1.1 Declaration of Purpose of WSCP

The WSCP adopts regulations and restrictions on outdoor water use across six (6) standard water shortage stages: residential, commercial/institutional/industrial, landscape, parks, golf courses, and agriculture. These regulations are effective immediately and shall remain in effect until the District Board of Directors finds that the water shortage no longer exists. The overall principle of the District's WSCP is to reliably meet water demands during droughts, supply reductions, and other emergencies.

The purpose of the WSCP is to:

- Monitor and compare anticipated supplies and demands consistently with Water Code Section 10632(a)(2).
- Keep water use within supply and delivery capability.
- Define procedures to be used when supply cannot meet demand or continuing pumping will result in harm to the supply source.
- Familiarize all TPWD customers (residential, business, industrial, institutional/governmental, and others) with procedures to be implemented when voluntary or mandatory water restrictions are in effect.

TPWD developed a Draft Water Shortage Contingency Ordinance (included in Appendix A) that provides a framework for action in the event of a water shortage emergency. The ordinance includes voluntary and mandatory stages to address a reduction in water supply, at various levels, as noted in Table 4-1, to reduce demand by up to 50 percent. Prohibitions, penalties, and financial impacts of shortages have been developed by TPWD and are summarized in Chapter 7.

## 1.2 Reduced Water Use During Water Shortage Events

This WSCP establishes changes that may be imposed on water users during water shortage events. Such events may include a prolonged drought that has reduced groundwater supplies,

the sudden appearance of an unforeseen contaminant that may require shutting down the main groundwater pumping system, or an emergency condition caused by an earthquake, fire, or other interruption in water delivery to the system. These actions are discussed in later sections of this WSCP.

## 1.3 Coordination with Cities and Counties

TPWD will coordinate with the City of Twentynine Palms and San Bernardino County for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code, and to ensure that City/County facilities are operated in a water-efficient manner. Coordination will also include other agencies within the TPWD service area, such as schools, parks, and others.

## 1.4 Plan Preparation, Adoption, Submittal, and Availability

TPWD began preparation for this WSCP in October 2025. The public hearing for the WSCP was noticed in the local newspapers (The Desert Trail and The Hi-Desert Star), as prescribed by Government Code 6066, which included the time and place of the hearing (May 27, 2026, at the TPWD office located at 72401 Hatch Rd in Twentynine Palms), as well as the location where the plan was available for public inspection. Interested parties, including other local agencies, were notified of the public hearing. The 2025 UWMP, which includes the 2025 WSCP as an appendix, was made available on the TPWD website for public inspection prior to the public hearing, so that comments could be received and discussed by the TPWD Board of Directors before adoption of both plans.

The final draft of the WSCP was adopted by the Board of Directors by Resolution No. XX (provided in Appendix B) and was submitted to the California Department of Water Resources (DWR) within 30 days of approval. Additionally, the adopted plan will be made available in accordance with the Water Code.

## 1.5 Relationship with the Urban Water Management Plan

Water Code Section 10632(a) requires that every urban water supplier prepare and adopt a WSCP as part of its UWMP. While the WSCP is a stand-alone document, it is updated and adopted in concert with the UWMP. Content of the WSCP is informed by the analysis of water supply reliability conducted under Water Code Section 10635 (contained in Section 6 of the UWMP). The reliability analysis of the UWMP is considered “normal”, “single-dry”, and a “five (5)-year drought”.

Factors impacting TPWD water reliability include infrastructure (e.g., aging wells, need for new wells) and drought. While it is necessary for TPWD to implement planned water supply projects and WSCP actions, total supplies are anticipated to exceed projected gross water use, as shown in Table 1-1.

**Table 1-1: Near-Term Water Supply Reliability Assuming Five (5)-Year Drought**

| Parameter | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|
| Gross Water Use | 2,300 | 2,310 | 2,320 | 2,330 | 2,360 |
| Total Supplies | 6,995 | 6,995 | 6,995 | 6,995 | 6,995 |
| **Surplus/Shortfall w/o WSCP Action** | 4,700 | 4,690 | 4,680 | 4,670 | 4,640 |
| WSCP - supply augmentation benefit | N/A | N/A | N/A | N/A | N/A |
| WSCP - use reduction savings benefit | N/A | N/A | N/A | N/A | N/A |
| Revised Surplus/(shortfall) | N/A | N/A | N/A | N/A | N/A |
| Resulting % Use Reduction from WSCP action | N/A | N/A | N/A | N/A | N/A |

Note: Reformatted from UWMP Guidebook, Table 7-5 Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b).

## 1.6 Water Shortage Event Contingency Plan Refinement Procedures

TPWD will convene the following departmental staff as needed to refine the WSCP:

- Treatment Plant Staff
- Administrative Staff
- Operational Staff

The WSCP will be updated and refined as needed following significant changes to the TPWD groundwater supply and quality, but no less than every five (5) years. The updated WSCP also incorporates the most recent and relevant resolutions by TPWD pertaining to water use, as follows:

- Resolution 14-12, August 2014
- Resolution 15-07, May 2015
- Resolution 19-04, adopted March 2019
- Resolution 21-07, adopted June 2021
- Resolution 22-08, adopted June 2022

# Chapter 2: Annual Water Supply and Demand Assessment Procedures

California Water Code Division 1, Section 350, states:

"The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection."

New provisions in Water Code Section 10632.1 require that an urban water supplier, such as TPWD, conduct an annual water supply and demand assessment ("Annual Assessment") on or before July 1 of each year and submit it to DWR. The requirement to perform the Annual Assessment began in July 2022, and TPWD submitted reports to DWR in 2023, 2024, and 2025. The Annual Assessment procedures described herein are one tool for determining whether to declare a water shortage.

Droughts occur with unpredictable frequency, intensity, and duration. Developing and maintaining a healthy groundwater supply to serve its customers has always been an ongoing priority for TPWD, and TPWD wants to be prepared for drought and water shortages. TPWD regularly monitors its water supplies and demand and produces an annual Consumer Confidence Report (CCR).

Water supply projections and hydrologic conditions are significant components in deciding when a drought response is needed. The amount of water supply shortage contributes to the severity of the drought declared and the necessary level of response from TPWD and customers. This section of the WSCP provides the written procedure for TPWD's Annual Assessment.

## 2.1 Timeline for Conducting the Annual Assessment

Table 2-1 provides targets for performing the Annual Assessment. The table outlines actions for the current year and one (1) year of drought. By starting to plan in December of 2025, TPWD will get a snapshot of conditions and can begin lining up resources to mitigate supply and start outreach to customers to manage demand. Major actions are proposed in spring 2026, when an initial supply estimate is made and compared with demand. A final annual assessment is due to DWR by July 1, 2026.

**Table 2-1: Calendar for Performing Annual Assessment**

| Target Date | Action |
|---|---|
| Oct-Jan | • Monitor groundwater supply<br>• Monitor demand trends |
| Feb | • Confirm anticipated weather (e.g., National Weather Service Climate Prediction Center, La Niña, US Drought Seasonal Outlook)<br>• Contact City of Twentynine Palms for land use information<br>• Prepare initial assessment of supplies<br>• Make initial assessment of unconstrained demand<br>• Make initial estimate of shortage<br>• If shortage anticipated, form Water Shortage Task Force |
| Mar | • Prepare informational item to the Board of Directors confirming assessment of supplies and identify any additional supply mitigations |
| Apr | • Start public outreach<br>• Identify supplier efficiency actions<br>• Complete Draft Annual Assessment and present to the Board of Directors |
| May | • Continue public outreach<br>• Finalize Annual Water Assessment and submit to DWR<br>• If necessary, prepare notices of public hearing on water shortage |
| Jun-Sept | • Continue public outreach<br>• If necessary, declare water shortage and implement supply mitigations and demand reduction actions<br>• Monitor customer response to water shortage messaging and other actions |

## 2.2 Factors Affecting Demand and Supply

Weather affects the groundwater supply of TPWD in multiple ways. Due to drought conditions, the area has recently received far less than the historical average of approximately five (5) inches of annual rainfall. There is negligible infiltration of direct precipitation in areas where alluvial deposits are thick, and a substantial amount of available runoff is lost to evaporation after flowing into the basin. Even without population changes, water demand could increase. Precipitation and temperature influence water demand for outdoor landscaping and irrigated agriculture. Evaporative coolers and outdoor water use are major components of water demand in the TPWD service area.

### 2.2.1 Weather Outlook

Lower spring rainfall increases the need for irrigation. Further, warmer temperatures increase crop evapotranspiration, which increases water demand. While no long-term study or correlation between weather parameters and the local groundwater supply has been conducted, there are general “rules of thumb” to consider when evaluating the groundwater supply.

**Potential for La Niña** – ENSO (El Niño Southern Oscillation) refers to the warming and cooling of ocean water along the Equator in the Eastern Pacific Ocean near South America. The warm

phase is called El Niño, and the cold phase is called La Niña. When the Eastern Pacific Ocean is 0.5 degrees Celsius above normal for five (5) consecutive three (3)-month average periods, an El Niño is declared. When the Eastern Pacific Ocean is 0.5 degrees Celsius below normal for five (5) consecutive three (3)-month average periods, a La Niña is declared. El Niño and La Niña are classified as Weak, Moderate, or Strong based on how far from normal the ocean temperatures are. When the temperature is above 1.5 degrees Celsius, it is declared as strong. When the temperature is above 1.0 degrees Celsius, it is declared as Moderate. When the temperature is above 0.5 degrees Celsius, it is declared as Weak. The effect on TPWD trends is wetter during El Niños and drier during La Niñas. The National Weather Service Climate Prediction Center provides information on the potential for La Niña conditions.

**US Drought Information Seasonal Outlook** – The National Weather Service Climate Prediction Center provides information geographically on drought conditions and categorizes geographies as “Drought Persists”, “Drought Remains but Improves”, “Drought Removal Likely”, and “Drought Development Likely”.

**Climate change** – While groundwater is often considered a drought-resistant water resource, warmer temperatures, changing precipitation patterns, and more extreme drought conditions can affect rainfall and streamflow and, in turn, groundwater recharge. Climate change data developed by DWR for the California Water Commission’s Water Storage Investment Program, focusing on regional hydrology, estimates that streamflow may decrease groundwater recharge by eight (8) percent by 2070 (Woodard and Curran 2023).

## 2.3 Current Year Unconstrained Demand

DWR guidance for the Annual Assessment is to consider the expected water use in the upcoming year, based on recent water use, before any projected response actions an urban water supplier may trigger under its WSCP.

### 2.3.1 Land Use

Water demand for the TPWD service area was estimated from historical and current demands, population projection data, and land-use data. Land use was calculated from San Bernardino County (SBC) parcel data and from the California General Plan. Land use was calculated and classified for both the developed and undeveloped areas within the service area. Chapters 1 and 2 of the UWMP describe the methods for quantifying current and projected land use.

### 2.3.2 Current Demand

The Annual Assessment (provided in Appendix E) includes a table that summarizes total water consumption (potable and untreated) for each land use category within the TPWD service area, using the most recent 10-year average, by month. Based on anticipated weather, TPWD may adjust the assessment to account for an increase in current demand. The Annual Assessment estimates existing demand in the current calendar year and demand in the subsequent calendar year. For the purposes of the analysis, the subsequent year will be assumed to be a drought year.

### 2.3.3 Potential Demand

The Assessment identifies anticipated water use, forecasted by month. The calculations in the assessment will use the most recently developed demand factors, including water loss and a contingency to account for annual demand variations.

### 2.3.4 Total Near-Term Demands

Near-term demand will be the sum of baseline demand conditions and anticipated demand in the current calendar year and subsequent years. The evaluation of near-term demand may consider multiple baseline demand conditions (e.g., 1-year, 3-year, 5-year, and 10-year averages).

## 2.4 Assessing Supply in Current Year and Single Dry Year

The assessment will evaluate the local groundwater supply using the factors identified in Table 2-2. TPWD will evaluate the groundwater supply available by groundwater subbasin in the upcoming year, assuming the subsequent year will be a dry year. The assessment will develop a quantified summary for the upcoming year, assuming the subsequent year is a dry year. Anticipated water supply will be forecasted by month using past supply patterns.

TPWD has the power and authority to implement and enforce its shortage response actions, including mandatory water conservation measures within its boundaries, per Division 11 of the California Water Code. TPWD will declare the appropriate stage of a water shortage emergency in accordance with Chapter 3, commencing with Section 350, of Division 1 of the California Water Code. Should a water shortage be declared, TPWD may coordinate with the City of Twentynine Palms and the County of San Bernardino for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

**Table 2-2: Annual Assessment of Supply**

| Source | Factors to be Evaluated in Current Year | Establishing Supply in Assumed Subsequent Dry Year |
|---|---|---|
| Local Groundwater | • Regulatory limitations<br>• Annual extractions past 10 years<br>• Any constraints on supply due to infrastructure or water quality<br>• Consider if supply would be managed differently if it is known subsequent year will be a dry year | • Regulatory limitations<br>• Annual extractions past 10 years<br>• Any constraints on supply due to infrastructure or water quality |

## 2.5 Assessing Water Supply Reliability

TPWD will compare supply and demand in the Annual Assessment (Appendix E) to determine whether a supply shortage is anticipated and the level of the shortage, and to prepare to implement its WSCP.

# Chapter 3: Water Supply Interruptions

Water supply interruptions pose a risk to the water reliability of TPWD. These interruptions may result from natural disasters such as earthquakes or wildfires, infrastructure failures, power outages, or contamination events. This chapter outlines TPWD's preparedness strategies and response protocols for managing catastrophic events that disrupt water delivery. It includes an overview of the conservation reserves, emergency planning efforts, and coordination with regional partners. By establishing clear actions and resilience assessments, TPWD ensures that essential water services can be maintained during emergencies while minimizing impacts on public health and safety.

## 3.1 Actions to Prepare for Catastrophic Interruption

The distribution infrastructure within the groundwater basins from which TPWD relies is the limiting factor in groundwater production; however, the distribution infrastructure is expected to continue to produce reliable supplies even in a catastrophe with the management action items identified herein and in the TPWD Emergency Response Plan (ERP). Water stored in the TPWD distribution system storage tanks is monitored and managed to prevent the reservoir volumes from dropping to very low levels. Standard practice is to maintain, at a minimum, the required emergency and fire flows in all tanks at all times. In an emergency, these stored water volumes are available for distribution or truck delivery as necessary.

### 3.1.1 Emergency Response Plan

To prepare for catastrophic events, TPWD has established an ERP in accordance with other state and federal regulations. The purpose of this plan is to design actions to minimize the impacts of supply interruptions caused by catastrophic events. The ERP includes the TPWD standardized response and recovery procedures to prevent, minimize, and mitigate injury and damage resulting from emergencies or disasters of man-made or natural origin, such as earthquakes, regional power outages, fires, biological or chemical contamination, and floods.

The ERP considers the various aspects of the TPWD Water System Protection Program pertaining to potential malevolent threats or actual terrorism. The information contained in the ERP is intended to guide staff and inform other emergency response agencies, including response team plans and procedures. The ERP is included in Appendix C.

### 3.1.2 Local Hazard Mitigation Plan and Seismic Risk Assessment

As part of the 2024 Twentynine Palms Water District Local Hazard Mitigation Plan (LHMP), an update to the 2018 LHMP, TPWD evaluated seismic risk, assessed potential impacts to water facilities, and identified mitigation measures to lessen the risk. This LHMP meets the requirements of the federal Disaster Mitigation Act of 2000 (Public Law 106-390) as well as the requirements of Water Code Section 10644. A copy of the 2024 TPWD LHMP will be submitted to DWR with the adopted UWMP/WSCP. The LHMP is provided in Appendix D.

TPWD has identified hazards in the community, assessed the most significant risks, and identified projects to help reduce or eliminate them. After the hazards were identified, mitigation goals were set. TPWD derived its mitigation strategy from an in-depth review of the existing vulnerabilities and capabilities outlined in LHMP.

Overall, the primary objective is to protect lives and prevent damage to infrastructure that disrupts water services. Global measures that apply across all hazards include:

- Continually improve the community's understanding of potential impacts due to hazards and the measures needed to protect lives and critical infrastructure.
- TPWD communications should provide public outreach to inform the public of the hazards identified to the drinking water system in emergencies, such as how to conserve water in the event of a disaster and obtain drinking water when water is unavailable.
- Continually provide State and Local Agencies with updated information about hazards, vulnerabilities, and mitigation measures at TPWD.
- Review and verify that the infrastructure owned and operated by TPWD meets the minimum standards for safety.
- Review the TPWD facilities and developments in high-risk areas to verify that these areas are appropriately protected from potential hazards.
- Identify and mitigate imminent threats to life safety and facility damage.
- The high-profile hazards for TPWD are earthquakes, climate change-induced drought, flooding, and cybersecurity. While other hazards were profiled in previous sections, the priority and focus of TPWD for the mitigation projects will be on these high-profile hazards.

Specifically, TPWD identified mitigation projects to address earthquake hazards. The activities identified are the following:

- Bolt down water reservoir facilities.
- Seismic shut-off valves on all reservoirs.
- Protect critical facilities and infrastructures by tying down equipment, strengthening buildings, and training on following the emergency response plan.
- Conduct annual employee training on responding to an earthquake. This includes tabletop exercises, boots-on-the-ground exercises, and training on the Standard Emergency Management System (SEMS)/National Incident Management System (NIMS).

# Chapter 4: Water Shortage Stages

TPWD will implement water supply shortage stages that are increasingly restrictive and promote conservation, as needed, during periods of low supply. TPWD will determine which water supply shortages may be triggered when evaluating supply and demand conditions, indicating the potential for shortage. The following sections define the water shortage stages and outline actions to prepare for and respond to reductions in water supply, including catastrophic service interruptions.

## 4.1 Six Standard Shortage Stages

As required by California Water Code Section 10632(a)(3)(A), this WSCP is structured around six (6) standard water shortage stages, which correspond to progressively increasing ranges of percent supply reductions from zero (0) to more than 50 percent. Table 4-1 presents a description of the six (6) water supply shortage stages, defined as stages I to VI. Each stage may be triggered by a declaration from federal or state authorities, or from TPWD, in response to events that result in a water shortage. The stages and applicable triggers are summarized in Table 4-2.

**Table 4-1: Rationing and Reduction Goals**

| Deficiency or State Mandated Reduction | Stage | Demand Reduction Goal | Type of Program | Water Shortage Condition |
|---|---|---|---|---|
| 1-10% | I | 10% reduction | Voluntary | Minor Shortage |
| 11-20% | II | 20% reduction | Voluntary/Mandatory | Moderate Shortage |
| 21-30% | III | 30% reduction | Mandatory | Severe Shortage |
| 31-40% | IV | 40% reduction | Mandatory | Critical Shortage |
| 41-50% | V | 50% reduction | Mandatory | Emergency Shortage |
| >50% | VI | >50% reduction | Mandatory | Catastrophic Failure |

**Table 4-2: Stages of TPWD Water Shortage Contingency Plan**

| Stage | Percent Supply Reduction | Triggers |
|---|---|---|
| I | Up to 10% | • Results of the Annual Assessment<br>• Federal, state, or local disaster declaration that may impact water supplies<br>• State declaration due to drought or system maintenance<br>• Unplanned TPWD water system maintenance |
| II | Up to 20% | • Results of the Annual Assessment<br>• Federal, state, or local disaster declaration that may impact water supplies<br>• State declaration due to drought or system maintenance<br>• Unplanned TPWD water system maintenance requiring more time to repair |
| III | Up to 30% | • Results of the Annual Assessment<br>• Federal, state, or local disaster declaration that may impact water supplies<br>• State determination due to drought or significant system failure<br>• State outdoor irrigation restriction<br>• Unplanned TPWD water system failure or emergency |
| IV | Up to 40% | • Federal, state, or local disaster declaration that may impact water supplies<br>• State determination due to drought or significant system failure.<br>• State outdoor irrigation restriction<br>• Unplanned TPWD water system failure or emergency |
| V | Up to 50% | • Results of the Annual Assessment<br>• Federal, state, or local disaster declaration that may impact water supplies<br>• State determination due to drought or significant system failure<br>• State outdoor irrigation restriction<br>• Advanced TPWD water system failure or emergency |
| VI | 50% or higher | • Results of the Annual Assessment<br>• Federal, state, or local disaster declaration that may impact water supplies<br>• State determination due to drought or significant system failure.<br>• Natural or human-caused catastrophe disrupting the delivery of water to, or within, the service area<br>• Severe TPWD water system failure |

### 4.1.1 Procedures for Water Shortage Level Determination

The results of the Annual Assessment will be used to determine the water shortage level. In the event of an emergency, the Board may call a special meeting with no less than 24 hours' notice and without an agenda to address service disruptions. If an emergency arises that would ordinarily be brought to the attention of the Board, but for which insufficient time exists, the General Manager has administrative authority to act as deemed appropriate and reasonable.

## 4.2 Legal Authorities

TPWD's enabling legislation provides the legal authority for the TPWD Water Conservation Program, which aims to reduce water consumption through conservation, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, and

maximize the efficient use of water within the TPWD service area to avoid and minimize the effect and hardship of water shortage to the greatest extent possible.

# Chapter 5: Water Shortage Response Actions

This chapter outlines the suite of actions TPWD will implement to respond to water shortages, ranging from mild supply reductions to catastrophic interruptions. These response actions are designed to reduce demand, augment supply, and adjust operations to protect public health, sustain essential services, and support long-term water reliability. The strategies include both voluntary and mandatory measures, tailored to each shortage stage, and are supported by enforcement mechanisms and public outreach efforts. By quantifying the anticipated benefits of each action, TPWD ensures that its response is both effective and equitable across its service area.

## 5.1 Water Shortage Response Actions

Once a shortage stage is declared, TPWD may implement shortage response actions required by the customer and, through operational changes, as listed in Table 5-1. These actions will be supported by communication protocols (discussed in Chapter 4), enforcement actions (discussed in Chapter 6), and monitoring and reporting efforts (discussed in Chapter 5), with activities appropriate to each shortage stage level.

**Table 5-1: Customer and TPWD Water Shortage Actions**

| Stage | District Actions | Customer Actions |
|---|---|---|
| I | • Initiate public information campaign<br>• Increase awareness of conservation measures<br>• Commence enforcement of conservation measures<br>• Promote methods to reduce water use<br>• Conduct focused outreach to large water users<br>• Publish Water shortage Event Contingency Plan stages and actions per stage | • Voluntary water conservation<br>• Adhere to conservation measures<br>• Consider conversion to more efficient irrigation methods<br>• Consider turf removal and conversion to California-friendly landscaping<br>• Patronize local carwashes that recycle their water |
| II | • Expand public information campaign<br>• Step up enforcement of conservation measures<br>• Continue previous actions | • Comply with mandatory conservation regulations<br>• Continue previous actions |
| III | • Continue previous actions<br>• Intensify public information campaign<br>• Expand enforcement of conservation measures<br>• Provide incentives to single metered multi-family units to install individual meters or sub-meters<br>• Send direct notices to all customers<br>• Provide regular media, city council and County briefings<br>• Activate emergency connections with mutual aid agencies<br>• Suspend issuance of potable construction meters.<br>• Evaluate size of monetary fines for water waste<br>• Begin water waste patrols | • Continue previous actions<br>• Limit washing of sidewalks, driveways, walkways, parking lots, or any other hard-surfaced area by hose or flooding unless otherwise necessary<br>• Comply with prohibited outdoor irrigation of ornamental landscape or turf with potable water through an irrigation system between 9:00 am and 6:00 pm and limit system use to two days a week |
| IV | • Continue previous actions<br>• Implement customer allocations, enforce mandatory water consumption goals and allocations | • Continue previous actions<br>• Obligation to fix leaks, breaks, or malfunctions within 48 hours |
| V | • Continue previous actions<br>• Enforce mandatory water consumption goals and allocations for all customers and users | • Prohibit all outdoor irrigation with potable water<br>• Continue previous actions |
| VI | • Continue previous actions<br>• Implement crisis communication plan<br>• Activate Emergency Operations Center<br>• Coordinate actions with regulatory agencies<br>• Coordinate actions with public safety agencies to address enforcement and fire protection issues<br>• Recall all temporary meters and activate water fill stations<br>• Suspend issuance of new development approvals and new water connections other than those required to be processed by state law | • Continue previous actions<br>• Terminate outdoor water use for irrigation, pools and fountains<br>• Water may only be used outdoors for public health and safety purposes<br>• Be on alert for Boil Water Orders if they become necessary |

## 5.2 Supply Augmentation Actions

Any water shortage event should trigger a review of potential supplemental water sources. Any supplemental water supply project or improvement to existing facilities to enhance water supply should be a priority for consideration in immediate capital projects if a shortage (e.g., demand exceeding supply) greater than 10 percent is anticipated, or if a Stage III Water Shortage Event continues for more than 18 months. While groundwater basins in the TPWD area are expected to continue providing reliable supplies even in an emergency, the limiting factor is groundwater production capacity. To respond to future disasters, TPWD is considering emergency intertie connections with neighboring water agencies to allow for the receipt of imported water or additional groundwater. Supply augmentation in the near term is presented in Table 5-2 below.

**Table 5-2: Supply Augmentation Actions**

| Shortage Level | Supply Augmentation Methods and Other Actions by Water Supplier *(based on DWR's WUE database categories)* | How much is this going to reduce the shortage gap?[(a)] | Additional Explanation or Reference |
|---|---|---|---|
| III | Groundwater | 780 AF | Pump Additional Groundwater |
| IV | Groundwater | 1,050 AF | Pump Additional Groundwater |
| V | Groundwater | 1,310 AF | Pump Additional Groundwater |
| VI | Groundwater | 1,570 AF | Pump Additional Groundwater |

Note: Modified from DWR Table 8-2 R.
(a) Percent shortage applied to the projected 2050 value from UWMP Table 2-6.

## 5.3 Demand Reduction Actions

The water conservation measures, restrictions in this WSCP and the Draft Water Shortage Ordinance (Appendix B) and below in Table 5-3 enable TPWD to control water use and plan and implement water measures and restrictions in a fair and orderly manner for the benefit of the public.

**Table 5-3: Prohibitions During Different Shortage Stages**

| Stage | Prohibition/Requirement |
|---|---|
| In Effect at All Times | Water waste is prohibited at all times. Water waste includes but is not limited to:<br>• Application of potable water to outdoor landscapes in a manner causing runoff<br>• No watering of outdoor landscapes within 48 hours of measurable rainfall<br>Efficient water use is required at all times:<br>• Water for construction purposes, including but not limited to de-brushing of vacant land, compaction of fills and pads, trench backfill and other construction uses shall be in an efficient manner<br>• All new construction including residential, commercial, and industrial, shall be equipped with low flow toilets and fixtures<br>• All new model homes and commercial and industrial development, when landscaped, shall include low water use, drought tolerant or native plant material, and drip irrigation systems. Irrigation systems shall include a smart irrigation controller or equivalent technology<br>• Dedicated (separate) landscape meters shall be installed for all irrigated landscape areas in excess of 2,500 square feet except for single family residences<br>• Water used for cooling systems must be recycled to the extent possible<br>• Evaporation-resistant covers required for new swimming pools and hot tubs |
| I | • Hosing of hardscape surfaces, except where health and safety needs dictate, is prohibited<br>• Car washing and outside cleaning activities prohibited except when performed with buckets and automatic hose shutoff devices<br>• Water leaks shall be repaired in a timely manner and sprinklers shall be adjusted to eliminate over-spray<br>• The serving of drinking water other than upon request in eating or drinking establishments is prohibited<br>• Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom |
| II | • All restrictions/prohibitions/initiatives from Stage I are in effect<br>• Landscape watering between the hours of 8:00 am and 5:00 pm is prohibited<br>• Outdoor watering is limited to three (3) days per week<br>• New meters for land development restricted to properties owners of presently existing parcels |
| III | • All restrictions/prohibitions/initiatives from Stage I and Stage II are in effect and are mandatory<br>• Irrigating ornamental turf on public street medians with potable water is prohibited<br>• Outdoor watering is limited to two (2) days per week<br>• Issuance of construction water meters will cease and meters will only be installed for new accounts where the building permit was issued prior to the declaration of water shortage<br>• Water patrol personnel will be utilized |

| Stage | Prohibition/Requirement |
|---|---|
| IV | • All restrictions/prohibitions/initiatives from Stage I, Stage II, and Stage III are in effect and are mandatory<br>• No meters will be installed for new accounts<br>• Irrigation with potable water of landscapes outside of newly constructed homes and buildings is prohibited<br>• Filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, etc., is prohibited. Topping off is allowed to the extent that the designated water allocation is not exceeded<br>• Water cannot be used to maintain fountains, reflection ponds, and decorative water bodies for aesthetic or scenic purposes except where necessary to support aquatic life |
| V | • All restrictions/prohibitions/initiatives from previous Shortage Stages are in effect and are mandator<br>• Outdoor irrigation is prohibited |
| VI | • All restrictions/prohibitions/initiatives from previous Shortage Stages are in effect and are mandatory |

As described in the table above, prohibitions and restrictions on water features that are artificially supplied with water, such as ornamental lakes, ponds, and decorative fountains, are treated differently from swimming pools and spas, as defined in Section 115921 of the California Health and Safety Code.

### 5.3.1 Shortage Stage Allocation

In addition to prohibitions, when the shortage exceeds 30 percent, TPWD may implement allocation limits for each customer class. At the direction of the General Manager, each customer will be classified and assigned a monthly allotment in accordance with the methods described in the Draft Water Shortage Contingency Ordinance. Customers will be notified of their classification and allotment by mail before the date when allocation goes into effect. In a disaster, prior notice of allotment may not be possible. In such cases, notice may be provided by other means, such as telephone, radio, television, or newspaper. Customers may appeal the classification based on use or incorrect calculation. The appeals process is set forth in the Draft Water Shortage Contingency Ordinance and described in Chapter 8.

## 5.4 Operational Changes

TPWD shall comply with restrictions similar to those implemented for the public to the extent possible. Hydrant flushing shall be limited except as deemed necessary by the General Manager to enhance water quality or to conduct fire flow and large meter tests. Other actions include efficient water use practices identified in Table 5-3, such as minimizing water waste in construction, following a modified outdoor landscape watering schedule for TPWD facilities based on the shortage stage, and fixing any identified leaks in the distribution system or other related water infrastructure components. Lastly, TPWD completed the full replacement of all its customer meters with AMI smart meters in 2024, allowing TPWD to more closely monitor customer leaks. A public portal is currently being worked on and planned for implementation in the next couple of years to give customers a sense of how they can manage their leaks as well.

## 5.5 Benefit of Shortage Response Actions

Implementing shortage response actions under the WSCP enables TPWD to proactively manage limited water supplies while minimizing harm to the community, economy, and environment. Key benefits include:

**1. Public Health and Safety Protection**
- Prioritizes essential uses such as drinking water, sanitation, and fire suppression.
- Ensures that vulnerable populations retain access to safe, reliable water during shortages.

**2. Environmental Stewardship**
- Reduces groundwater and surface water stress, helping prevent long-term ecological degradation.

**3. Regulatory Compliance**
- Aligns with California Water Code §10632 and the Urban Water Management Planning Act.
- Supports TPWD's obligations under State Water Resources Control Board orders and regional drought response coordination.

**4. Demand Reduction and Supply Extension**
- Encourages conservation through tiered actions (e.g., voluntary reductions, irrigation limits, non-essential use bans).
- Helps stretch available supplies across all customer classes and service areas.

**5. Economic Resilience**
- Minimizes abrupt service disruptions that could impact tourism, agriculture, and small businesses.
- Provides clear expectations for water users, reducing uncertainty and enabling better planning.

**6. Community Trust and Transparency**
- Demonstrates TPWD's commitment to equitable, data-driven drought response.
- Builds public confidence through consistent communication and phased implementation.

**7. Operational Readiness**
- Activates pre-defined actions and enforcement mechanisms, reducing response time during emergencies.
- Supports coordination with Cal OES, local jurisdictions, and mutual aid partners.

### 5.5.1 Public Information

Without exception, experience has shown that a well-informed public is generally more willing to voluntarily conserve or alter water use patterns and is more likely to comply if mandatory water use restrictions become necessary. DWR (2008) estimates that public information campaigns alone have reduced demand by five (5) to 20 percent, depending on the time, money, and effort spent. Public information supports voluntary and mandatory measures by educating and convincing the public that a critical water shortage exists, how water is used, and how they can help. The DWR Drought Guidebook highlights that when the public perceives a drought as being severe, they change their behavior (such as flushing the toilet less often).

The information provided to the public should include a description of the conditions that will trigger implementation of shortage stages as well as a description of what the plan entails

(restrictions, enforcement provisions, etc.). It is also advisable to provide practical "consumer" information that will help water users comply with the plan. For example, information about lawn watering restrictions might be accompanied by guidance on proper lawn watering practices.

Based on experience, with minimal public outreach, a water savings of five (5) percent is assumed; with extensive public outreach, a water savings of seven (7) percent is assumed; with public information combined with enforcement, water savings of 22 percent are assumed.

### 5.5.2 Enforcement

A study examining the effectiveness of drought management programs in reducing residential water use (Virginia Polytechnic Institute 2006) found considerable variation in their impact and highlighted the importance of public information and enforcement. Results, shown in Table 5-4, indicate that overall reductions in residential water use ranged from zero (0) to seven (7) percent for voluntary restrictions and from zero (0) to 22 percent for mandatory restrictions. The observed differences were statistically attributed to information efforts for voluntary restrictions and both information and enforcement efforts for mandatory restrictions.

**Table 5-4: Drought Program Management Variables Effect on Residential Water Use**

| Classification | Estimated Change in Water Use | Statistically Different than No Effect? |
|---|---|---|
| Voluntary Restrictions | | |
| Little or no information disseminated | -2% | No |
| Moderate level of information | -2% | No |
| Aggressive information dissemination | -7% | Yes |
| Mandatory Restrictions | | |
| Low information and low enforcement | -5% | No |
| Moderate information and low enforcement | -6% | Yes |
| Aggressive information and low enforcement | -12% | Yes |
| Low information and moderate enforcement | -4% | No |
| Moderate information and enforcement | -9% | Yes |
| Aggressive information and moderate enforcement | -15% | Yes |
| Moderate information and aggressive enforcement | -20% | Yes |
| Aggressive information and enforcement | -22% | Yes |

Source: Virginia Polytechnic Institute, 2006

The analysis highlights the key role that public outreach and information play in the success of drought response actions. Voluntary restriction programs with little to moderate levels of information dissemination had no appreciable effect on water use. Voluntary restriction programs with active promotional efforts, however, reduced water use by an estimated seven (7) percent compared with what would have occurred without any restriction program. Thus, among voluntary restrictions, only the most intensive programs achieved even moderate success in reducing water use.

Mandatory restriction programs without a significant enforcement component broadly mirrored the outcomes achieved by the voluntary programs. Programs with mandatory restrictions that invested minimal effort in information dissemination did not appreciably reduce residential water use. Programs with no active enforcement efforts but with moderate to high levels of informational

dissemination achieved six (6) and 12 percent reductions in water use, respectively. These estimated reductions are similar to those achieved by voluntary programs with aggressive informational campaigns.

The City of Santa Cruz's experience implementing its Drought Contingency Plan and successfully achieving its reduction goals underscores the importance of a strong public information program. Analysis of the implementation program identified the key ingredient to its success was "the public's understanding, awareness, and belief that the City was confronted with a true water shortage problem. Media coverage of water problems across California reinforced the situation. Without that sense of a real and imminent problem, it's likely the level of cooperation and willingness demonstrated by the community in making changes they did might have been considerably reduced" (Santa Cruz 2010).

Delivering accurate and timely information to water users, news media, and local governments with updates on conditions, restrictions, and helpful contact information is key. With aggressive information dissemination and enforcement, TPWD is assumed to achieve 22 percent water savings.

### 5.5.3 Restrictions on Non-Essential Water Uses

The demand reduction strategies discussed in this WSCP largely focus on curtailing water waste and non-essential water use. Outdoor water use, including washing sidewalks and watering ornamental landscapes, is targeted. These uses are typically considered discretionary or nonessential, are highly visible, are therefore relatively easy to monitor, and often constitute a substantial component of water demand, particularly during the summer months when drought conditions are likely to be most severe.

Given the significance and visibility of lawn watering as the predominant component of seasonal use, best management practices in drought contingency plans typically prescribe time-of-use and other restrictions on lawn watering. This often involves placing water users on a schedule that allows for staggered lawn watering days, as well as restrictions on the times during the day when lawns can be watered.

The American Waterworks Association (AWWA) estimates that voluntary outdoor water use limits can result in a water savings of up to 10 percent, and mandatory outdoor water limits can achieve up to a 56 percent reduction in outdoor water use (AWWA 2008; AWWA 2011). There have been no detailed studies of outdoor water use in the TPWD service area. However, a comparison of low-water-use months, when water use is assumed to be primarily indoor (January and February), with high-water-use months, when outdoor water use is greatest, has been used to estimate the percent of outdoor water demand. Based on this comparison, it is estimated that outdoor water use may account for between 20 and 50 percent of TPWD water use. To be conservative and not to overestimate the savings that could be achieved by curtailing outdoor water use, this WSCP assumes outdoor water use is 18 percent of the TPWD demand:

- Voluntary outdoor water limits could save 10 percent of outdoor water use or about 40 AFY (about two (2) percent of total water use).
- Restricting water use to twice a week could reduce outdoor water use by 33 percent or about 130 AFY (about six (6) percent of total water use).
- Restricting water use to once a week could reduce outdoor water use by 56 percent or about 220 AFY (about 10 percent of total water use).

- Eliminating outdoor water use would reduce demand by approximately 18 percent, about 394 AFY.

### 5.5.4 Additional Mandatory Restrictions

In 2017, the State Water Board identified statewide water conservation emergency regulations. As of June 5, 2024, these emergency regulations have expired. Local authorities may adopt different and/or stricter water conservation measures than the statewide regulations. Further:

- For urban water suppliers, statewide Level II demand reduction actions are not required: The requirement for urban water suppliers to implement demand-reduction actions that correspond to at least Level II of their water shortage contingency plans has not been in effect since June 5, 2023.

- For commercial, institutional, and homeowners association (HOA) common areas, the decorative grass watering emergency ban has expired: The Emergency Regulation to Ban Decorative Grass Watering (non-functional turf irrigation) in commercial, industrial, and institutional areas, including HOA common areas, expired by operation of law on June 5, 2024. In October 2023, however, the California State Legislature passed Assembly Bill 1572, which permanently phases in a ban on decorative grass watering in commercial, industrial, and institutional areas.

- Emergency prohibition on wasteful water uses has expired: The Emergency Regulation to Prohibit Wasteful Water Uses (such as refilling fountains without recirculating pumps, overwatering landscapes, watering grass within 48 hours of rainfall, etc.) expired on December 21, 2023.

As directed by Executive Order B-40-17, the State Water Board is conducting a rulemaking to establish permanent prohibitions on wasteful water-use practices. This rulemaking is part of the broader legislation Making Water Conservation a California Way of Life. Chapter 2 of the UWMP describes the current water use standards, including the indoor residential water use standard, and the still-to-be-developed commercial, industrial, and institutional (CII) landscape standards. An evaluation of TPWD's trajectory toward meeting legislative standards is also provided.

## Table 5-5: Effectiveness Demand Reduction and Other Actions (DWR Table 8-2)

| Shortage Level | Demand Reduction Actions | Reduction in Shortage Gap | Explanation | Penalty, Charge, or Other Enforcement? |
|---|---|---|---|---|
| 1 | Expand Public Information Campaign | 7% | Based on AWWA 2008 assumes savings of 7% | No |
| 1 | Voluntary outdoor water use changes | 2% | Based on AWWA 2011 | No |
| 2 | Expand Public Information Campaign | 22% | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 2 | Implement or Modify Rate Structure | 10% | Based on AWWA 2011 assumes savings of 10% | Yes |
| 2 | Landscape - Other landscape restriction or prohibition | 2% | Outdoor water limited to 3 days a week. Based on AWWA 2011 | Yes |
| 3 | Expand Public Information Campaign | 22% | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 3 | Implement or Modify Rate Structure | 10% | Based on AWWA 2011 assumes savings of 10% | Yes |
| 4 | Landscape - Other landscape restriction or prohibition | 6% | Outdoor water limited to 2 days a week. Based on AWWA 2011 | Yes |
| 4 | Expand Public Information Campaign | 22% | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 4 | Implement or Modify Rate Structure, Allocation | 15% | Based on AWWA 2011 assumes savings of 15% | Yes |
| 5 | Expand Public Information Campaign | 22% | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 5 | Implement or Modify Rate Structure, Allocation | 15% | Based on AWWA 2011 assumes savings of 15% | Yes |
| 5 | Landscape - Other landscape restriction or prohibition | 13% | Outdoor water limited to 2 days a week. Based on AWWA 2011 | Yes |
| 6 | Expand Public Information Campaign | 22% | Based on AWWA 2008 assumes savings of 22% with enforcement | Yes |
| 6 | Implement or Modify Drought Rate Structure, Allocation | 15% | Based on AWWA 2011 assumes savings of 15% | Yes |
| 6 | Landscape - Other landscape restriction or prohibition | 18% | Outdoor water use prohibited | Yes |

# Chapter 6: Communication Protocols

TPWD will periodically provide the public with information about the WSCP, including its implementation. Such information will include, but not be limited to, stages of action, restrictions on water use, water budget reductions, water-saving tips, and potential Allocation Surcharges, monetary assessment, and fines for noncompliance with prohibited activities for water conservation, water use efficiency, and failure to achieve water budget reductions redefined in the WSCP.

## 6.1 Customer Outreach

Customer participation is a key element in responding to a supply shortage. While general media coverage of a drought is likely to increase awareness, TPWD should still develop and implement a specific and comprehensive outreach program. The goals of the outreach program will be to:

- Educate customers and the public about state and local drought conditions.
- Make water shortage stages and customer responsibilities clear.
- Target specific customer groups with specialized messaging.
- Provide information to customers and the public that will assist them in reducing water demand.

Outreach activities may include press releases, updated postings on the TPWD website, social media updates and postings, water conservation forums hosted at TPWD headquarters or through virtual platforms, advertisements in local publications and cable channels, and door hangers or other leave-behind reminders. Table 6-1 describes the communication protocols and procedures TPWD will use to reach customers and reduce demand during each defined shortage stage.

**Table 6-1: Communication Protocols and Procedures to Support Shortage Response Actions**

| Shortage Stage | Percent Supply Reduction | Communication Protocols and Procedures *(Outreach to customers when each Stage is declared)* |
|---|---|---|
| I | Up to 10% | • Declaration and notification of water supply shortage I by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper |
| II | Up to 20% | • Declaration and notification of water supply shortage II by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper<br>• Advertisement in Local Public Newspaper<br>• Commence social media updates<br>• Notify top 5 water users in each customer class, e.g. residential, and CII |
| III | Up to 30% | • Declaration and notification of water supply shortage III by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper<br>• Advertisement in Local Public Newspaper and local cable channel<br>• Schedule regular media, city council and County briefings<br>• Continue social media updates<br>• Targeted Messaging to customers<br>• Notify top 10 water users in each customer class, e.g. residential, and CII |
| IV | Up to 40% | • Declaration and notification of water supply shortage IV by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper<br>• Advertisement in Local Public Newspaper and local cable channel<br>• Continue regular media, city council and County briefings<br>• Continue social media updates<br>Targeted Messaging to customers<br>Notify top 15 water users in each customer class, e.g. residential, and CII |
| V | Up to 50% | • Declaration and notification of water supply shortage V by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper<br>• Advertisement in Local Public Newspaper and local cable channel<br>• Continue regular media, city council and County briefings<br>• Continue social media updates<br>• Targeted Messaging to customers<br>• Notify top 20 water users in each customer class, e.g. residential, and CII |
| VI | 50% of More | • Declaration and notification of water supply shortage VI by resolution, and adoption at a public meeting in accordance with state law<br>• Notification of supply shortage in Public Newspaper<br>• Advertisement in Local Public Newspaper and local cable channel<br>• Continue regular media, city council and County briefings<br>• Continue social media updates<br>• Targeted Messaging to customers<br>• Notify top 25 water users in each customer class, e.g. residential, and CII |

# Chapter 7: Monitoring and Reporting

Certain aspects of water conservation can be readily monitored and evaluated, such as metered water use and production quantities. Other aspects, such as public education, are more difficult to measure in terms of effectiveness. Additionally, weather patterns make it more difficult to compare one year's water demand and conservation results with another year's usage.

When severe shortages occur and some degree of mandatory reduction is required, a program's effectiveness can be measured directly from water bills. In these cases, targeted results must be met, and even reluctant customers will, overall, meet the goals. Specific methods to evaluate the effectiveness of water conservation programs to be employed by TPWD are:

**Monitoring of Metered Water Usage** – This will determine how much has been used. Compiling statistics to track customer group usage and determine trends is currently done through the water billing computer system. Meter readings/billings can be compared and analyzed to determine the effectiveness of conservation for all customer classes.

**Monitoring Production Quantities** – In normal water-supply conditions, TPWD records production figures daily. The totals are incorporated into the monthly water supply report to the State by TPWD.

To verify that conservation reduction goals are being met, production and metered usage reports will be evaluated during each stage of the conservation period. Water production figures will be compared with the previous year for the same period to determine whether conservation goals are being met.

To reduce labor costs to manually read the water meters, provide early leak detection that will ultimately provide cost saving to the customer and provide water conservation, the District investigated the use of AMI and/or Automated Meter Reading (AMR) systems to reduce labor costs associated with manually reading water meters, provide early leak detection with potential customer cost savings, and encourage water conservation. The Board of Directors adopted Resolution 19-04 on March 12, 2019, to secure funding to convert all meters within TPWD to AMI/AMR. In June 2020, TPWD completed installing 8,000 small- to medium-sized water meters.

The AMI system provides TPWD a tool to assist with water conservation, leak audits, and real-time data collection. AMI generates a continuous leak report that alerts TPWD weekly on meters that are not shutting off. Customers, in turn, are being made aware of potential leaks before they escalate in their next billing cycle and are making the necessary repairs, helping conserve water. Another advantage of AMI is its assistance with leak audits. This involves helping customers with high water demands, usage issues, and billing issues on their properties. Collecting real-time hourly data is another important tool for the AMI system. Currently, the AMI system reads every meter in the district once an hour, and the data is being captured by the collectors and repeaters. Real-time data and water-use trends are very important for water conservation and for identifying unknown leaks on a customer's property.

In late 2023 and early 2024, TPWD staff completed the final phase of the larger water meter replacement project. TPWD is currently reading all meters through the AMI system, except for a select few customers who have opted out of the AMI program and fire line services. The AMI system has proven instrumental in detecting water leaks, ultimately saving customers hundreds of dollars and conserving hundreds of gallons of water. TPWD is still dedicated to installing a

customer portal that would allow customers to access their water consumption, leak alerts, and real-time data via the web. This is a priority for TPWD, which has a goal to begin implementation of the portal in 2025/2026.

# Chapter 8: Enforcement

TPWD has the power and authority to implement and enforce its shortage response actions, including mandatory water conservation measures, within its boundaries. During a declared water shortage emergency (Stage IV, V, or VI), a customer who exceeds the established allotment will pay a surcharge of two (2) times the highest rate tier per cubic foot of water for excess water delivered during the first and second billing period, and a surcharge of four (4) times the highest rate tier per cubic foot for excess water delivered during the third and subsequent consecutive billing periods.

If a customer exceeds the allotment usage for three (3) consecutive billing periods, TPWD will install a flow restrictor at the service meter with a capacity of two (2) gallons per minute for meters up to 1.5 inches in size (and comparably sized restrictors for larger meters). The customer must pay a flow restrictor installation and removal charge before normal service will be restored.

## 8.1 Appeals Procedure

1. Any person who wishes to appeal their customer classification or allotment must do so in writing, using forms provided by TPWD.

2. Appeals will be reviewed by TPWD staff; site visits will be scheduled if required.

3. One of the conditions of approval will be that all applicable plumbing fixtures or irrigation systems be replaced or modified for maximum water conservation.

4. Increased allotments may be approved for the following:

    a. Substantial medical requirements.

    b. Residential connections with three (3) or more residents in a household. These connections can receive additional allotments based upon the same calculations used for the standards applied in Stages V and VI, per additional person. A census may be conducted to determine the actual number of residents per dwelling unit. Additional water will be approved for permanent residents only; permanent residents are defined as people who live in the specific residence for a minimum of five (5) days per week, nine (9) months per year.

    c. Commercial/Industrial/Intuitional customers for which water supply reductions will result in unemployment or decreased production; a TPWD water auditor must first confirm that the customer has instituted all applicable water efficiency improvements.

    d. Non-agricultural customers can appeal for an additional allotment of 12 cubic feet per year per horse, cow, or other large animal, and six (6) cubic feet per year for each efficiently irrigated mature fruit tree.

    e. Government agencies (parks, schools, county, etc.) may have separate account allotments combined into one agency allotment.

5. If an appeal for an additional allotment is requested for irrigation of trees or vegetation in residential categories or for any agricultural use, TPWD staff may use the services of a qualified consultant in determining the validity of the request.

    1. TPWD staff will approve or deny appeals and report all appeals to the TPWD Board of Directors monthly.
    2. If TPWD staff and the applicant are unable to reach an agreement, the appeal will then be heard by the TPWD General Manager, who will make the final determination.
    3. All appeals will be reported monthly to the TPWD Board of Directors.

If a Stage V or Stage VI water shortage occurs, in addition to prohibitions, the TPWD will establish mandatory annual allotments for each connection. The General Manager or designee will classify each customer and calculate each customer's allotment.

During a Stage V shortage, allocations will be calculated based on the following formula:

1. Each residential connection will receive no more than 51 cubic feet per year (47 gallons per capita per day minimum water requirement x 2.2 persons per household x 365 days = 37,741 gallons = 51 cubic feet) plus 15 percent of the average annual usage of the past three (3) years, more than 51 cubic feet.

2. Each commercial, industrial, and governmental connection will receive no more than 70 percent of the average annual usage of the past three (3) years.

3. Each landscaping connection will receive 20 percent of the average annual usage of the past three (3) years, unless the specific account has been determined by TPWD staff to meet the TPWD guidelines for Xeriscaping, irrigation, and maintenance, in which case it will receive 70 percent of the average annual usage of the past three (3) years.

During a Stage VI Shortage, allocations shall be based on the following formula:

1. Each residential connection will receive no more than 51 cubic feet per year (47 gallons per capita per day minimum water requirement x 2.2 persons per household x 365 days = 37,741 gallons =51 cubic feet) plus 15 percent of the average annual usage of the past three (3) years, more than 51 cubic feet.

2. Each commercial, industrial, and governmental connection will receive no more than 65 percent of the average annual usage of the past three (3) years.

3. Each landscaping connection will receive 10 percent of the average annual usage of the past three (3) years, unless the specific account has been determined by TPWD staff to meet the TPWD guidelines for Xeriscaping, irrigation, and maintenance, in which case it will receive 65 percent of the average annual usage of the past three (3) years.

# Chapter 9: Financial Consequences of Actions during Shortages

Water providers face significant financial challenges during droughts. During periods of reduced consumption, revenue from water sales declines while expenses remain relatively constant. A reduction in construction activities can also reduce the amount of water service connection fees collected. At the same time, as consumption decreases, some expenditures are expected to increase, including staff costs for community education, enforcement of ordinances, monitoring and evaluation of water use, and drought planning. Operations and maintenance costs may also increase because of the need to identify and quickly repair all water losses.

## 9.1 Revenue Impacts of Reduced Sales and Increased Costs

Potential fiscal impacts may include additional expenses for implementing and enforcing water conservation measures, as well as a loss of revenue from reduced water sales. Based on the Adopted Budget for 2025/2026, TPWD had total annual water-based revenues $7.1M, of which approximately 66 percent is derived from water sales. As a result, water conservation efforts can significantly impact revenues and the ability to cover fixed, non-variable costs. Reductions in potable water use could result in an operating shortfall. While operating expenses decline with lower sales, fixed costs cannot be fully recovered when sales fall significantly, resulting in a net operating loss.

In the case of future water-use reductions resulting from the implementation of the WSCP, TPWD would likely experience impacts on operating revenue and would draw from reserves as necessary and as possible. Depending on the level of mandatory water reductions, TPWD could experience a decrease in revenue between seven (7) percent and 34 percent, based on water use reductions of 10 percent to 50 percent, respectively. Future or continued reductions in consumption would ultimately require a rate structure adjustment, or TPWD may consider implementing a drought surcharge to generate sufficient revenue to fund operations without drawing on reserves. According to the December 2025 Water Rate Study, the proposed rate schedule accounts for a seven (7) percent increase in total rate revenue. Table 9-1 below presents revenue impacts due to demand reduction, based on recent data.

**Table 9-1: Revenue Impacts of Reduced Water Demand**

| Demand Reduction | Annual Revenue Reduction ($) | Ancillary Costs ($)[a] | Net Cost of Compliance ($)[b] |
|---|---|---|---|
| 10% | ~471,000 | 60,000 | ~530,000 |
| 20% | ~941,000 | 60,000 | ~1,001,000 |
| 30% | ~1,411,000 | 60,000 | ~1,471,000 |
| 40% | ~1,881,000 | 60,000 | ~1,941,000 |
| 50% | ~2,351,000 | 60,000 | ~2,411,000 |

Notes:

a. Reduction in non-fixed water service revenues based on fiscal year 2025/2026 water sales (volumetric) revenues and assuming additional staff time of $60,000 to implement and enforce water use restrictions.

b. Calculated sum of annual revenue reduction plus ancillary costs.

## 9.2 Mitigation Actions to Address Revenue Reductions

A reduction in water revenue could be mitigated by using the established reserve fund, deferring or avoiding capital expenditures, using less costly water supplies (if possible), and implementing drought surcharge rates. This would meet short-term cash flow needs, but it should be considered only temporary. A summary of measures to overcome revenue and expenditure impacts is provided in Table 9-2.

**Table 9-2: Measures to Overcome Revenue Impacts During Shortage**

| Measure | Summary of Effects |
|---|---|
| Use of Reserve Funds | Use of reserves may provide short-term rate stabilization but would require delays in capital expenditures and rebuilding of reserves after the water shortage. Given TPWD's aging infrastructure and the resulting increase in facility needs, TPWD's existing reserve policy must be updated to raise minimum reserve levels to address potential risks. The reserve is set at a minimum of 180 days of budgeted Operating and Maintenance expenses. |
| Re-evaluate Capital Expenditure Plans | Delay major construction projects for facilities, as well as upgrades and replacements. |

## 9.3 Financial Consequences of Limiting Excessive Water Use

Per the California Water Code Section 365 et al., retail water suppliers are required to prohibit or discourage excessive water use. Reporting this is not a required part of the UWMP; however, Water Code Section 10632(a)(8)(C) requires the financial consequences of these actions to be reported as part of the UWMP.

Water Code Section 367 states that there are three (3) types of drought emergencies:

- Declared statewide drought emergency
- When a supplier implements its mandatory reductions per their WSCP
- A declared local drought emergency

Water Code Section 366 states that a retail water supplier must prohibit excessive use through one of two strategies:

- Rate structure, specifically, a rate structure that includes block tiers, water budgets, or rate surcharges over and above base rates for excessive water use by a residential water customer.
- An excessive water use ordinance, specifically an ordinance that includes a procedure to identify and address excessive water use by metered single-family residential customers and customers in multiunit housing complexes in which each unit is individually metered or sub metered and may include a process to issue written warnings to a customer and perform a site audit of customer water usage prior to deeming the customer in violation.

# Chapter 10: References

American Water Works Association, 2011. Drought Preparedness and Response. Manual of Water Supply Practices, M60.

American Water Works Association, 2008. Forecasting Urban Demand. Second Edition.

City of Santa Cruz Water Department, Water Conservation Office, December 2010. The 2009 Water Shortage An Evaluation of Water Management Strategies, Actions, and Results.

Twentynine Palms Water District. 2018 Local Hazard Mitigation Plan.

Twentynine Palms Water District. 2024 Local Hazard Mitigation Plan.

Virginia Polytechnic Institute and State University Blacksburg, Virginia, 2006. The Effectiveness of Drought Management Programs in Reducing Residential Water-Use in Virginia. http://water.ky.gov/wa/Documents/AdditlDroughtResources/VirginiaStudyonDroughtProgramEffectiveness.pdf

Water Resources Economics, LLC. 2025 Water Rate Study. December.

# Appendix A: Twentynine Palms Draft Water Shortage Contingency Ordinance

Ordinance (XXXX)

An ordinance enacted as a measure establishing rules and regulations for allocating water during a water shortage and establishing penalties for violations thereof

Be it ordained by the Board of Directors of Twentynine Palms Water District as follows:

Section 1: Purpose and Scope

This ordinance adopts regulations to deal with water shortages, which the Board has found to exist. These regulations are effective immediately and shall be effective until the Board finds that water shortage no longer exists.

Section 2: Findings

The Board finds, determines and declares that the following facts are true:

1. California Water Code Section 350 provides that the Board of Directors has the authority to declare water shortage emergency conditions. California Water Code Section 353 enables the Board of Directors to adopt regulations and restrictions to conserve the water supply for the greatest public benefit.
2. This Board has conducted public meeting on (INSERT DATE) to determine whether a water shortage emergency exists and, if so, what regulations should now be adopted in response to that shortage.
3. This Board adopts the following regulations, and finds that the regulations set forth herein are necessary and proper to protect the water supply for human consumption, sanitation, and fire protection during the duration of the shortage.

Section 3: Definitions

The following terms are defined for the purpose of the ordinance:

a. “Agricultural water user” or “Agricultural” means water use for the growing of food crops, livestock, and ornamental landscape plants.
b. “Commercial water user” or “Commercial” means any water user whose purpose is to provide or distribute a product or service, such as hotels, restaurants, office buildings, commercial businesses or other places of commerce. A “Commercial” water user does not include multi-family residences, agricultural users, or customers that fall within the industrial or institutional classifications.
c. "Customer" means a person receiving water from the water distribution system of the District.
d. "District" means Twentynine Palms Water District.
e. "General Manager" means the general manager of the District, or the Manager's designate.
f. “Landscape Irrigation water use” or “Landscape Irrigation” means water used for maintaining outdoor areas of golf courses, community parks, business parks, and common areas in

DRAFT

homeowner associations. “Landscape Irrigation” customers have a dedicated outdoor use meter.

g. “Single family residential" which consists of water service to land improved with structures designed to serve as a residence for a single family.

h. “Stage I Shortage” when total supply is 90 to 99 percent of normal for the next twelve months, there will be imposed a 10% voluntary demand reduction goal.

i. “Stage II Shortage, when total supply is 80 to 89 percent of normal for the next twelve months, there will be imposed a 20% voluntary demand reduction goal.

j. “Stage III Shortage” when total supply is 70 to 79 percent of normal for the next twelve months, there will be imposed a 30% mandatory demand reduction goal.

k. “Stage IV Shortage” when total supply is 60 to 69% of normal for the next twelve months, there will be imposed a 40% mandatory demand reduction goal.

l. “State V Shortage” when total supply is less than 60% of normal for the next twelve months, there will be imposed a 50% or greater mandatory demand reduction goal.

Section 4: Prohibitions of Certain Uses

a. Water waste, including the following, is prohibited at all times

    1. Application of potable water to outdoor landscapes in a manner that causes runoff.
    2. Watering of outdoor landscapes within 48 hours of measurable rainfall.

b. Efficient water use is required at all times:

    1. Water for construction purposes, including but not limited to debrushing of vacant land, compaction of fills and pads, trench backfill and other construction uses shall be in an efficient manner.
    2. All new construction including residential, commercial and industrial, shall be equipped with low flow toilets and fixtures.
    3. All new model homes and commercial and industrial development, when landscaped, shall include low water use, drought tolerant or native plant material, and drip irrigation systems. Irrigation systems shall include a smart irrigation controller or equivalent technology.
    4. Dedicated (separate) landscape meters shall be installed for all irrigated landscape areas in excess of 2500 square feet except for single family residences.
    5. Water used for cooling systems must be recycled to the extent possible.
    6. Evaporation resistant covers are required for all new swimming pools and hot tubs.

c. During a Stage I water shortage, the following voluntary restrictions are in effect:

    1. Hosing of hardscape surfaces, except where health and safety needs dictate, is prohibited.
    2. Car washing and outside cleaning activities prohibited except when performed with

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buckets and automatic hose shutoff devices.

3. Water leaks shall be repaired in a timely manner and sprinklers shall be adjusted to eliminate over-spray.

4. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom.

5. The serving of drinking water other than upon request in eating or drinking establishments is prohibited.

d. During a Stage II water shortage, the following voluntary restrictions are in effect:

1. Extension of voluntary requests from Stage I

2. No landscape watering between 0800 and 1700 hours

3. Outdoor watering is limited to 3 days per week.

4. New meters for land development restricted to property owners of presently existing parcels

e. During a Stage III water shortage, the following mandatory restrictions are in effect:

1. Voluntary requests from Stage I and Stage II become mandatory

2. Issuance of construction water meters will cease and meters will only be installed for new accounts where the building permit was issued prior to the declaration of the water shortage

3. Irrigation with potable water or ornamental turf on public street medians is prohibited.

4. Outdoor watering is limited to 2 days per week.

5. Mandatory use prohibitions will be enforced through water patrol personnel

f. During a Stage IV water shortage, the following mandatory restrictions are in effect:

1. All prohibitions of Stage III will be in force

2. No meters will be installed for new accounts

3. Irrigation with potable water of landscapes outside of newly constructed homes and buildings is prohibited.

4. Filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools is prohibited. Topping off is allowed to the extent that the designated water allocation is not exceeded.

5. Water cannot be used to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.

g. During a Stage V water shortage, the following mandatory restrictions are in effect:

6. All prohibitions of Stages I through IV will be in force.

7. Outdoor irrigation is prohibited.

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Section 5: Allocation

a. In the event that a Stage IV or Stage V water shortage occurs, in addition to prohibitions, the District will establish mandatory annual allotments for each connection.

b. The General Manager or designee shall classify each customer and calculate each customer's allotment. Each customer shall receive notice of the allotment specified above, or as modified in accordance with Section 4 herein, on each monthly billing for service. Each new customer shall be notified of the General Manager's determination by first class mail within 30 days of the commencement of water service.

c. Any customer may contest the General Manager's classification on the basis of use or the General Manager's allotment on the basis of hardship or incorrect calculation. Appeals shall be processed as set forth below.

d. During a Stage IV Shortage, allocations shall be based on the following formula

    1. Each residential connection will receive no more than 51 ccf per year (47 gpcd minimum water requirement x 2.2 persons per household x 365 days = 37,741 gallons = 51 CCF) plus 15% of average annual usage of the past 3 years in excess of 51 CCF.

    2. Each commercial, industrial, and governmental connection will receive no more than 70% of average annual usage of the past 3 years.

    3. Each landscaping connection will receive 20% of average annual usage of the past 3 years, unless the specific account has been determined by District staff to meet the District's guidelines for Xeriscaping, irrigation, and maintenance, in which case it will receive 70% of average annual usage of the past 3 years.

    4. No meters will be installed for new accounts during the declared water shortage emergency.

e. During a Stage V Shortage, allocations shall be based on the following formula

    1. Each residential connection will receive no more than 51 ccf per year (47 gpcd minimum water requirement x 2.2 persons per household x 365 days = 37,741 gallons = 51 CCF) plus 15% of average annual usage of the past 3 years in excess of 51 CCF.

    2. Each commercial, industrial, and governmental connection will receive no more than 65% of average annual usage of the past 3 years.

    3. Each landscaping connection will receive 10% of average annual usage of the past 3 years, unless the specific account has been determined by District staff to meet the District's guidelines for Xeriscaping, irrigation, and maintenance, in which case it will receive 65% of average annual usage of the past 3 years.

    4. No meters will be installed for new accounts during the declared water shortage emergency.

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Section 5: Limits on Use during Shortage

a. Water use in excess of the monthly amounts established below shall be subject to a charge at an increased rate in accordance with Section 7, herein.

Section 6: Appeals

Appeals Procedure:

1. Any person who wishes to appeal their customer classification or allotment must do so in writing, using forms provided by the District.
2. Appeals will be reviewed by District staff; site visits will be scheduled if required.
3. One of the conditions of approval will be that all applicable plumbing fixtures or irrigation systems be-replaced or modified for maximum water conservation.
4. Increased allotments may be approved for the following:
    a. Substantial medical requirements
    b. Residential connections with three or more residents in a household. These connections can receive additional allotments based upon the same calculations used for the standards applied in Stages IV and V per additional person. A census may be conducted to determine the actual number of residents per dwelling unit. Additional water will be approved for permanent residents only; permanent residents are defines as people who live in the specific residence a minimum or five days per week, nine months per year.
    c. Commercial/Industrial/Intuitional customers for which water supply reductions will result in unemployment or decreased production; a District water auditor must first confirm that the customer has instituted all applicable water efficiency improvements.
    d. Non-agricultural customers can appeal for an additional allotment of 12 CCF per year per horse, cow, or other large animal, and 6 CCF per year for each efficiently irrigated mature fruit tree.
    e. Government agencies (parks, schools, county, etc.) may have separate account allotments combined into one agency allotment.
5. In the event that an appeal for an additional allotment is requested for irrigation of trees or vegetation in residential categories or for any agricultural use, District staff may use the services of a qualified consultant in determining the validity of the request.
6. District staff will approve or deny appeals and report all appeals to the District's Board of Directors monthly.
7. If District staff and the applicant are unable to reach agreement, the appeal will then be heard by the District's General Manager, who will make the final determination.
8. All appeals will be reported monthly to the District's Board of Directors.

Section 7: Citations for Violations of Water Use Restrictions and Water Limitations

During any declared water shortage emergency, a customer who exceeds the established allotment will pay a surcharge of two times the highest rate tier per CCF of water for excess water

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delivered during the first and second billing period, and a surcharge of four times the highest rate tier per CCF for excess water delivered during the third and subsequent consecutive billing periods.

If a customer exceeds the allotment usage for three consecutive billing periods, the District will install a flow restrictor at the service meter with a capacity of two gallons per minute (gpm) for meters up to one and one-half inch sizes (and comparatively sized restrictors for larger meters) for a period of seven days. The customer must pay a flow restrictor installation and removal charge of $100 before the normal service will be restored.

Section 8: Rule Making

The General Manager shall present periodical reports to the Board concerning the effectiveness of this ordinance, including a report within four months of the date of adoption of this ordinance concerning the first 3 months of ordinance administration. Said Reports shall review the nature and scope of appeals and exceptions. The Board shall periodically consider the adoption of rules implementing this ordinance in light of the Manager's reports. Such rules shall be adopted by the Board by resolution and shall deal with the administration of this ordinance. Any proposal to change the meaning of this ordinance shall be adopted by the Board by ordinance following a duly-noticed public hearing.

Section 9: Urgency

This ordinance is an urgency ordinance. It is necessary that the regulations set forth in this ordinance be adopted as forth herein in order to protect the supply of water for human consumption, sanitation and fire protection.

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# Appendix B: Twentynine Palms Water District Adoption Resolution of the Water Shortage Contingency Plan and the Draft Water Shortage Ordinance

[To be provided with the Final UWMP and WSCP]

# Appendix C: Twentynine Palms Local Hazard Mitigation Plan

# 2024 Local Hazard Mitigation Plan

# Twentynine Palms Water District



Hazard Mitigation Plan Update

Date of Districts Board Approval: 10-23-2024

FEMA Approval Date: 10-03-2024

TABLE OF CONTENTS


**SECTION 1. INTRODUCTION ..... 4**

1.1 PURPOSE OF THE PLAN ..... 4
1.2 AUTHORITY ..... 4
1.3 WHAT'S NEW ..... 5
1.4 NEW RISK ASSESSMENT ..... 6
1.5 SUCCESSFUL MITIGATION IMPLEMENTATION ..... 7
1.6 COMMUNITY PROFILE ..... 7
1.7 CLIMATE ..... 11
1.8 DEMOGRAPHICS ..... 12
1.9 EXISTING LAND USE ..... 13
1.10 DEVELOPMENT TRENDS ..... 13

**SECTION 2. PLAN ADOPTION ..... 14**

2.1 ADOPTION BY LOCAL GOVERNING BODY ..... 14
2.2 PROMULGATION AUTHORITY ..... 14
2.3 PRIMARY POINT OF CONTACT ..... 15

**SECTION 3. PLANNING PROCESS ..... 16**

3.1 PREPARING FOR THE PLAN ..... 16
3.2 PLANNING TEAM ..... 18
3.3 COORDINATION WITH OTHER EXTERNAL JURISDICTIONS, AGENCIES, & ORGANIZATIONS ..... 19
3.4 PUBLIC INVOLVEMENT/OUTREACH ..... 20
3.5 ASSESS THE HAZARD ..... 21
3.6 SET GOALS ..... 21
3.7 REVIEW AND PROPOSE MITIGATION MEASURES ..... 21
3.8 DRAFT THE HAZARD MITIGATION PLAN ..... 23
3.9 ADOPT THE PLAN ..... 23

**SECTION 4. RISK ASSESSMENT ..... 24**

4.1 HAZARD IDENTIFICATION ..... 24
4.2 HAZARD SCREENING CRITERIA ..... 24
4.3 HAZARD PROFILES ..... 26
4.3.1 EARTHQUAKES ..... 26
4.3.2 CLIMATE CHANGE INDUCED DROUGHT ..... 34
4.3.3 FLOOD ..... 42
4.3.4 CYBER SECURITY ..... 46

**SECTION 5. COMMUNITY CAPABILITY ASSESSMENT ..... 48**

5.1 INTRODUCTIONS ..... 48
5.2 EMERGENCY MANAGEMENT ..... 48
5.3 PLANNING AND REGULATORY CAPABILITY ..... 49
5.4 EXISTING PLANS ..... 50
5.5 MITIGATION PROGRAMS ..... 50
5.6 FISCAL RESOURCES ..... 51
5.7 CAPABILITIES ASSESSMENT ..... 52
**SECTION 6. MITIGATION STRATEGIES ..... 53**
6.1 OVERVIEW ..... 53
6.2 MITIGATION GOALS, OBJECTIVES, AND PROJECTS ..... 53
6.3 EARTHQUAKE ..... 54
6.4 CLIMATE CHANGE INDUCED DROUGHT ..... 55
6.5 FLOOD ..... 55
6.6 CYBER SECURITY ..... 56
6.7 MITIGATION PRIORITIES ..... 57
6.8 IMPLEMENTATION STRATEGY ..... 57
**SECTION 7. PLAN MAINTENANCE ..... 59**
7.1 MONITORING, EVALUATING, AND UPDATING THE PLAN ..... 59
7.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS ..... 59
7.3 CONTINUED PUBLIC INVOLVEMENT ..... 60
**APPENDIX A PLANNING TEAM MEETING MATRIX ..... 61**
**APPENDIX B PUBLIC OUTREACH ..... 68**

# SECTION 1. INTRODUCTION

The Local Hazard Mitigation Plan (LHMP) update is a "living document" that should be reviewed, monitored, and updated to reflect changing conditions and the latest information. As required, the LHMP must be updated every five (5) years to comply with regulations and Federal mitigation grant conditions. In that spirit, this LHMP is an update of the Twentynine Palms Water District Hazard Mitigation Plan under review by the Federal Emergency Management Agency (FEMA).

## 1.1 PURPOSE OF THE PLAN

Hazard mitigation intends to reduce and/or eliminate loss of life and property. FEMA defines Hazard Mitigation as "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." A "hazard" is defined by FEMA as "any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss."

The Local Hazard Mitigation Plan aims to demonstrate the plan for reducing and/or eliminating risk in the Twentynine Palms Water District's service area. The LHMP process encourages communities to develop goals and projects to minimize risk and build a more disaster-resilient community by analyzing potential hazards.

After disasters, repairs and reconstruction are often completed to restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, restoring things to pre-disaster conditions sometimes results in feeding the disaster cycle: damage, reconstruction, and repeated damage. Mitigation is a primary phase of emergency management dedicated to breaking the cycle of damage. Hazard mitigation is distinguished from other disaster management functions by measures that make TPWD infrastructure development and the natural environment safer and more disaster resilient. Mitigation generally involves the alteration of physical environments, significantly reducing risks and vulnerability to hazards by altering the built environment so that life and property losses can be avoided or reduced. Mitigation also makes responding to and recovering from disasters easier and less expensive.

With an approved (and adopted) LHMP, Twentynine Palms Water District is eligible for federal disaster mitigation funds/grants (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Management Assistance) aimed to reduce and/or eliminate risk.

## 1.2 AUTHORITY

In 2000, FEMA adopted revisions to the Code of Federal Regulations, known as the "Disaster Mitigation Act (DMA)." DMA 2000, Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a Hazard Mitigation Plan (HMP) that describes the process for assessing hazards, risks, and vulnerabilities, identifying and prioritizing

mitigation actions, and engaging/soliciting input from the community (public), key stakeholders, and adjacent jurisdictions/agencies.

Senate Bill No. 379 will, upon the next revision of a local hazard mitigation plan on or after January 1, 2023, or, if the local jurisdiction has not adopted a local hazard mitigation plan, beginning on or before January 1, 2028, require the safety element to be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to that city or county.

The Twentynine Palms Water District is a consolidated independent Special District formed in and operating under the provisions of the Twentynine Palms Water District Law. The legal authority for Twentynine Palms Water District is outlined in Division 12 of the Water Code in the State of California, section 30000 et. seq. The District is governed by a five (5) member Board of Directors, elected at-large from within the District's service area. The General Manager administers the District's day-to-day operations by policies and procedures established by the Board of Directors. The Board of Directors employs a General Manager and a Financial Consultant. The General Manager employs a District Secretary, Maintenance Superintendent, Office Manager, and Treatment/Production Superintendent. There are 19 full-time non-management employees in the District.

TPWD's legal jurisdiction encompasses serving water to the City of Twentynine Palms and parts of the unincorporated San Bernardino County, California. The Twentynine Palms Water District has legal authority for infrastructure, pipelines, wells, and water storage to serve this purpose. TPWD does not have legal authority for zoning, land use, new construction, planning, building inspections, or codes. These functions are assigned to San Bernardino County and the City of Twentynine Palmas.

## 1.3 WHAT'S NEW

The 2018 Twentynine Palms Water District Local Hazard Mitigation Plan contained a detailed description of the planning process, a risk assessment of identified hazards for the TPWD Service Area, and an overall mitigation strategy for reducing the risk and vulnerability of these hazards. Since FEMA's approval of the plan, TPWD has made progress on the mitigation strategy. As part of this 2024 LHMP update, a thorough review and update of the 2018 plan was conducted to ensure that this update reflects current conditions and priorities to realign the overall mitigation strategy for the next five-year planning period. Completing this 2024 LHMP update further provides documentation of the TPWD's continued commitment and engagement in the mitigation planning process.

This section of the plan includes the following:

**What's New in the Plan Update.** This section provides an overview of the approach to updating the plan and identifies new analyses, data, and information included in this Plan update to reflect current service area conditions. This consists of a summary of new hazard and risk assessment data

relating to the TPWD Service Area and information on current and future development trends affecting infrastructure vulnerability and related issues. The updated data and analyses are in their respective sections within this 2024 LHMP update.

**Summary of Significant Changes to Current Conditions and Hazard Mitigation Program Priorities.** This section summarizes significant changes in current conditions, changes in vulnerability, and any resulting modifications to the community's mitigation program priorities.

**2018 Mitigation Strategy Status and Successes.** Section 1.5 describes the status of mitigation actions from the 2018 plan and indicates whether a project is no longer relevant or recommended for inclusion in the updated 2024 mitigation strategy.

This What's New section provides documentation of TPWD Service Area's progress or changes in their risk and vulnerability to hazards and their overall hazard mitigation program. Completing this 2024 LHMP Update further provides documentation of the TPWD's continued commitment and engagement in the mitigation planning process.

## 1.4 NEW RISK ASSESSMENT

As part of its comprehensive review and update of each plan section, TPWD recognized that updated data, if available, would enhance the analysis presented in the risk assessment and be utilized in developing the updated mitigation strategy. Highlights of new data used for this Plan Update are identified below and sourced in context within **Chapter 4**, Risk Assessment. Specific data used is sourced throughout this plan document. This new data and associated analysis provided valuable input for developing the mitigation strategy presented in **Chapter 5** of this plan. A highlight of the latest information and analyses contained in this plan update includes the following:

- A new assessment of updated hazards affecting the TPWD Area was completed, adding additional hazards to the planning documents.
- The risk assessment for each identified hazard was completely reworked. This included reworking the hazard profile and adding new hazard event occurrences, revising vulnerability as the whole analysis to add items identified below, and updating the vulnerability assessment based on more recent hazard data.
- An update of the flood hazard analysis was completed, including an updated analysis of the 100-year flood and an analysis of the 500-year flood, including the new and updated DFIRMs.
- An enhanced vulnerability assessment.

This LHMP incorporated and analyzed the new 2020 Census data. Census data was used in an intersect analysis to determine the percentage of the population exposed to flood, wildfire, and earthquake hazards.

## 1.5 SUCCESSFUL MITIGATION IMPLEMENTATION

TPWD has completed a review of past seismic retrofit studies and has applied the studies to current and future projects. TPWD participates annually with the Great California Shakeout to prepare and train employees for earthquakes.

- Flood Mitigation project at Wells 14 and 17. TPWD will be completing diversion walls around the wells. Anticipated completion in 1-2 years.
- Earthquake Mitigation at Lupine and Two-Mile booster stations. The District installed two permanent backup generators.
- Mitigation of Terrorist events: The district installed bulletproof glass at the front customer service counter in the main office and cameras at the District office, Fluoride Treatment Plant, and meter station. These projects were completed in 2021.
- Terrorist Event Mitigation. TPWD installed video surveillance at its critical facilities. This project is currently ongoing and will be completed in 2022.
- The District installed two backup generators, one at Lupine and one at Two Mile booster stations. Completed in 2023
- Terrorist Event Mitigation. TPWD Installed security glass at the front counter of their main office as a safety precaution. This project was completed in 2021.
- Earthquake Mitigation. Purchase of generators with transfer switches in the event of power failure. This project was completed in 2024.
- Earthquake Mitigation. Standardized all emergency generator hook-ups. This project was completed in 2022.

Approximately six years ago, Twentynine Palms Water District and Joshua Basin Water District collaborated on drafting and obtaining a grant to construct an intertie. However, California Transportation (Caltrans) expressed interest in having the pipeline reinforced with concrete during the planning process, significantly driving up the project cost. As a result, Twentynine Palms Water District and Joshua Basin Water District decided to decline the grant due to the financial burden associated with the enhanced construction. Consequently, the grant was returned to CalOES and FEMA.

## 1.6 COMMUNITY PROFILE

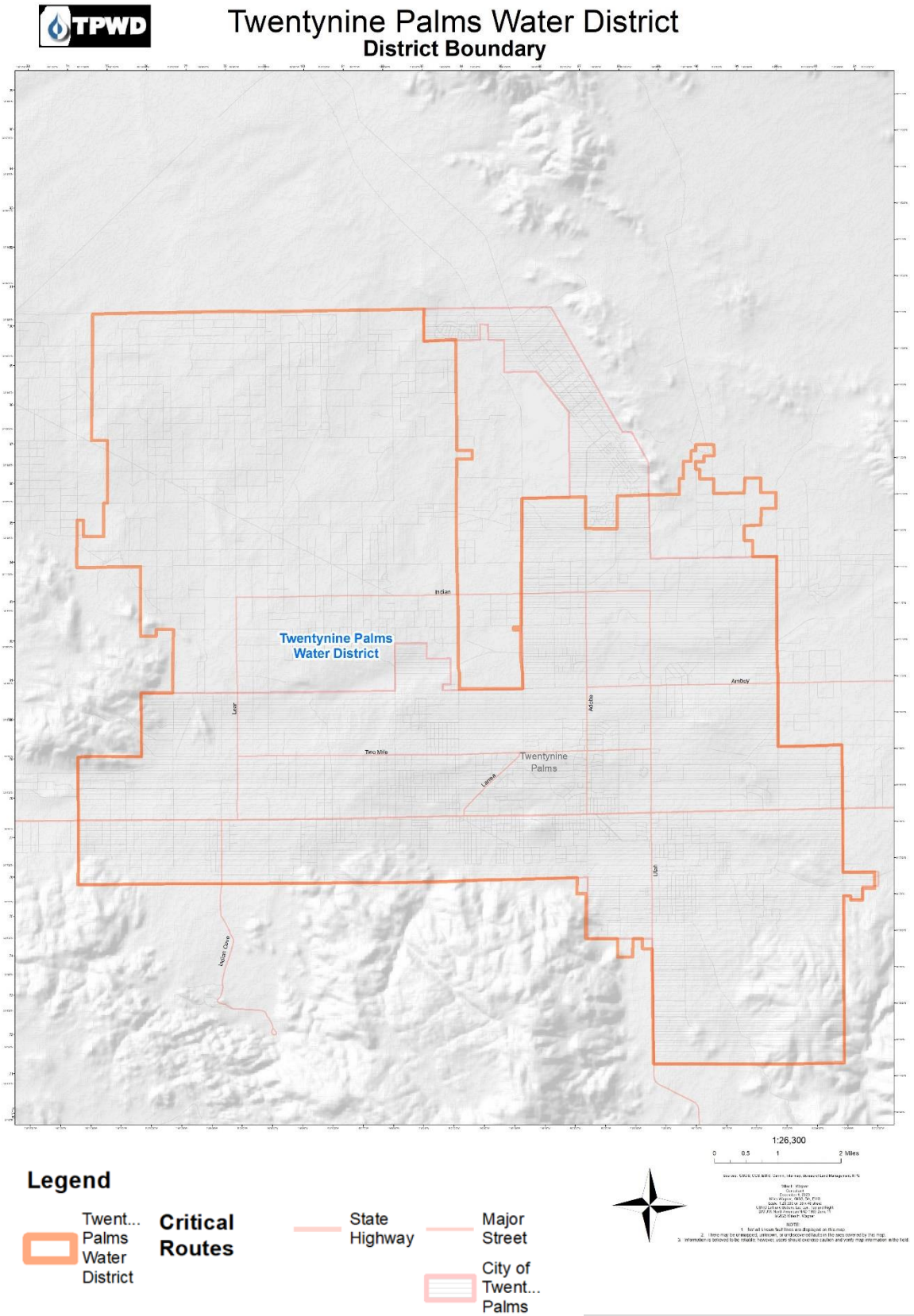
## PHYSICAL SETTING

The Twentynine Palms Water District serves Twentynine Palms, California, with water. The water services cover the City of Twentynine Palms and outlying areas in San Bernardino. The District pumps water from the underground aquifer and distributes the water to the customer. The only available water supply is local groundwater. The District serves approximately 18,000 residents within an 87-square mile area and maintains approximately 8,250-meter services, 360 miles of pipeline, and 17 million gallons of water storage capacity. When physical operations began in

1955, the District served a population of 4,675 residents within 26.7 square miles. The 1,422-meter services were fed by approximately 94 miles of leaky, undersized, and substandard pipeline. The community's water storage capacity amounted to less than 200,000 gallons.

Twentynine Palms is a unique Hi-Desert community on the southern boundary of the Mojave Desert in San Bernardino County, just north of the Little San Bernardino and Pinto Mountains. Located 54 miles northeast of Palm Springs at 2,000 feet, the area is known for its pure water, crystal clear air, and deep blue skies. It is nestled between the world's most extensive Marine Corps base, the Marine Corps Air Ground Combat Center to the north, and the Joshua Tree National Park to the south. The Oasis of Mara, a large group of springs aligned along the Pinto Mountain fault and bordering Joshua Tree National Park, is a significant archaeological site and was a water source to this area for over 4,000 years.

**Figure 1. TPWD Service Map**



## HISTORY

The earliest settlers of Twentynine Palms were Native Americans who lived around the Oasis of Mara. By the 1870s, early American miners inspired by the Gold Rush traveled to California. They settled around the Oasis, followed by cattlemen in the 1880s who were drawn to the grasslands in the area. The Oasis provided refuge from the harsh surrounding desert environment and continued to attract settlers throughout the 1900's.

To meet growing demand, private developers created and maintained small water distribution companies, and in 1938, the first public water system was developed. More public water agencies formed over the years, and finally, in 1954, Twentynine Palms residents voted to combine the existing public utility agencies to create the Twentynine Palms County Water District **Charter**. Members of the Chamber of Commerce, known as the "water committee," spearheaded this community effort, electing the district's first governing Board of Directors: John Wuerth, John Bagley, William Hatch Jr., John Lyon, and Joseph Wasserburger.

In 1955, the District adopted three more private water companies, acquiring over 200,000 gallons of water. Before this, the community had virtually no storage system, putting the water supply at risk in the case of emergencies. From 1957 to 1969, the District focused on water storage reservoirs.

A groundwater study conducted by the Department of Water Resources in 1983 yielded harrowing results, resulting in the development of the District Master Plan. This plan addressed key issues and highlighted the need for significant infrastructure improvements. The District faced major problems: a badly deteriorating water pipeline system and unacceptably high fluoride levels. By 1984, the California State Health Department demanded that the District submit a timeline for implementing the improvements in the master plan.

With the implementation timeline submitted, funding from the Department of Water Resources and the Environmental Protection Agency allowed the District to make significant infrastructure improvements. Over the next 20 years, more than 100,000 feet of pipeline were replaced, multiple storage reservoirs were constructed, and a $1.7 million fluoride water treatment plant was built. These upgrades brought security and reliability to the Twentynine Palms water supply. In 2005, the District earned another EPA grant to assist in constructing two more 1,000,000-gallon storage reservoirs and 43,000 more feet of pipeline, providing new water storage and enhancing water reliability throughout the District. These improvements allowed the District to accept and deliver water from the fluoride removal plant to the entire area, ensuring adequate water supplies far into the future.

The District operates 1 (one) Fluoride Removal Water Treatment Plant, 11 (eleven) Reservoirs with a total 17-million-gallon storage capacity, 9 (nine) wells, 8 (eight) booster stations, and approximately 360 miles of distribution mains, all of which are prone and at risk from the effects of each identified hazard in **Section 4.3**.

Table 1 TPWD Critical Facilities

| Critical Facilities | Hazard Vulnerability |
|---|---|
| **Corporate Yard/ Main Office** | Earthquake, Drought, Flooding, Cyber Attacks |
| **Reservoirs (11)** | Earthquake, Drought, Flooding, Cyber Attacks |
| **Fluoride Removal Water Treatment Plant** | Earthquake, Drought, Flooding, Cyber Attacks |
| **Wells (9)** | Earthquake, Drought, Flooding, Cyber Attacks |
| **Booster Stations (8)** | Earthquake, Drought, Flooding, Cyber Attacks |
| **Pipeline (360 miles)** | Earthquake, Drought, Flooding, Cyber Attacks |

## 1.7 CLIMATE

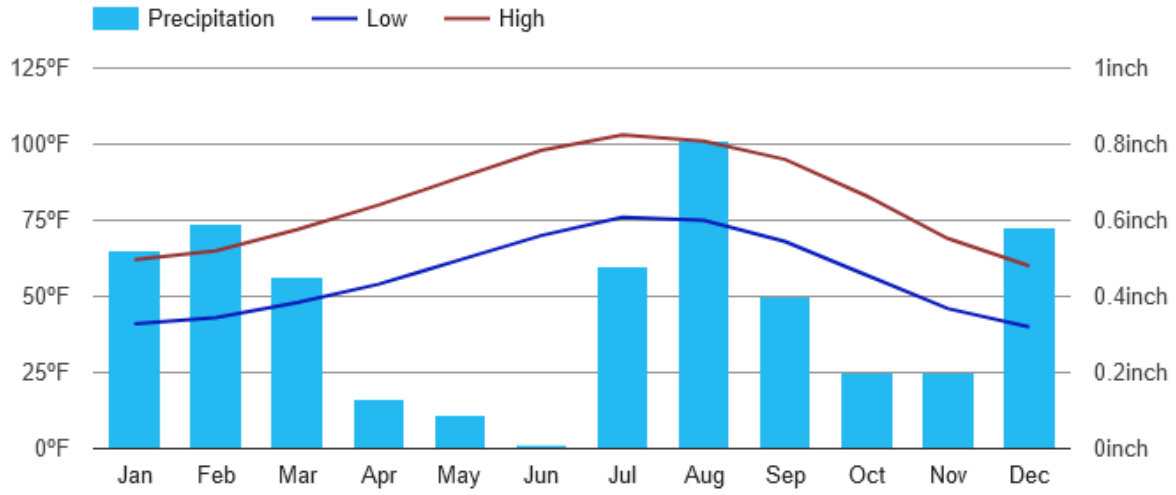
The average rainfall[1] The City of Twentynine Palms, where our Main Headquarters is located, has 0.37 inches of snow. Average temperatures range from 56 to 81 degrees Fahrenheit. The region's temperate Mediterranean climate fosters moderate winters, hot summers, and generally low humidity.

Table 2. Average Max and Min Temp and Total Precipitation for the City of Twentynine Palms

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Avg. Max. Temp (F)** | 62 | 65 | 72 | 80 | 89 | 98 | 103 | 101 | 95 | 83 | 69 | 60 | 81.4 F |
| **Avg. Min. Temp (F)** | 41 | 43 | 48 | 54 | 62 | 70 | 76 | 75 | 68 | 57 | 46 | 40 | 56.6 F |
| **Avg. Total Precipitation** | 0.52 | 0.59 | 0.45 | 0.13 | 0.09 | 0.01 | 0.48 | 0.81 | 0.40 | 0.20 | 0.20 | 0.58 | 0.37in. |

[1] Average weather Twentynine Palms 2023 normal US Climate Data https://www.usclimatedata.com/

Twentynine Palms Climate Graph - California Climate Chart




## 1.8 DEMOGRAPHICS

Demographics for our service area are based on Census 2020[2]. TPWD manages and distributes the local groundwater supply in the unique Hi-Desert community of Twentynine Palms and portions of the surrounding unincorporated areas of San Bernardino County. TPWD serves a population of approximately 18,000 residents within an 87-square-mile area. The County of San Bernardino and the City of Twentynine Palms handle underserved communities and socially vulnerable populations in emergencies. Twentynine Palms Water District serves a severely economically disadvantaged community based on the 2020 Federal Census.

**Table 3. Percentage of the Population at Risk from Identified Hazards within TPWD**

| % of the Population at Risk from Identified Hazards | Twentynine Palms | Population Total |
|---|---|---|
| **Population within the Service Area** | 18,000 | 18,000 |
| **Earthquake** | 100% | 18,000 |

[2] Service area population from http://datausa.io

| | | |
|---|---|---|
| **Drought** | 55% | 9,900 |
| **Flooding** | 35% | 6,300 |
| **Cyber Security** | 0% | 0 |

## 1.9 EXISTING LAND USE

TPWD does not regulate land use within its service area. The City of Twentynine Palms is responsible for land use. The existing land used is for housing, commercial, and light industry. The City of Twentynine Palms regulates incorporated areas, and the County of San Bernardino regulates unincorporated areas.

## 1.10 DEVELOPMENT TRENDS

Development within the Twentynine Palms area reduced significantly during the housing industry crash in 2008. Twentynine Palms sees only individual custom or speculation homes being built in the area. No housing tracks are being developed in the District's sphere of influence. Home prices in the area are increasing at a much lower rate than other communities in the high desert and a much lower increase than in the State of California.

All future development that will take place is planned to occur by the General Plan Land Use Zones and will consider all potential hazards identified within this 2023 LHMP. Additionally, all developments will comply with all the county and state Fire, Flood, and Seismic codes at the time of development. No development changes since the 2018 LHMP affected the jurisdiction’s overall vulnerability. There have been no changes to the community’s priorities since the 2018 LHMP.

# SECTION 2. PLAN ADOPTION

## 2.1 ADOPTION BY LOCAL GOVERNING BODY

According to the mitigation planning regulations, Twentynine Palms Water District LHMP will be submitted to the California Office of Emergency Services (CalOES) for review and approval. CalOES will conduct a review of the Plan by the Code of Federal Regulations; once this review is complete and any revisions are made, CalOES will forward the plan to FEMA for another review and revisions, as FEMA requires. CalOES will notify TPWD when FEMA has approved the final LHMP. The final approval letter will be pending adoption by the District's Board of Directors. The Board of Directors' Resolution will be sent to CalOES and FEMA. SEMC will send a copy of the LHMP and Resolution to the San Bernardino Office of Emergency Management.

## 2.2 PROMULGATION AUTHORITY

The Promulgator Authority for the adoption of the Hazard Mitigation Plan Twentynine Palms Water District and the Board of Directors and incorporation of the LHMP into the San Bernardino County Operational Area Multi-Jurisdiction General Plan is:

**Carol Giannini (President)**
Twentynine Palms Water District Board of Directors

**Bob Coghill (Vice-President)**
Twentynine Palms Water District Board of Directors

**Michael Arthur (Director)**
Twentynine Palms Water District Board of Directors

**Randy Leazer (Director)**
Twentynine Palms Water District Board of Directors

**Amy Woods (Director)**
Twentynine Palms Water District Board of Directors

## 2.3 PRIMARY POINT OF CONTACT

The Points of Contact for information regarding this LHMP are:

**Matt Shragge, General Manager**
Twentynine Palms Water District
72401 Hatch Rd, Twentynine Palms, CA 92277
(760) 367-7546 (Office)

Consultant Primary Contact:
**Gary Sturdivan, Project Lead**
Sturdivan Emergency Management Consulting, LLC.
(909) 658-5974
GSturdivan@semcllc.com

# SECTION 3. PLANNING PROCESS

## 3.1 PREPARING FOR THE PLAN

TPWD developed a broad approach to prepare its hazard mitigation plan update. As an active participant in the County of San Bernardino's Multi-Hazard Multi-Jurisdictional Mitigation Plan, TPWD used the county-provided resources to assist in developing and evaluating data to start the plan update.

Internally, TPWD has a wealth of experienced and resourceful employees who provide benefits to the program. The TPWD team participated in regular discussions, staff meetings, and health and safety meetings supporting the plan update. The TPWD internal planning team was invited to the meeting through emails and the Microsoft Outlook calendar. Members of this team also participated in community outreach events such as fairs and local events/meetings and provided education.

In addition to participating at the County level, TPWD staff participated in plan updates with local agencies undergoing plan updates. This included the City of Twentynine Palms and Joshua Basin Water District staff. This team also participated in community outreach with local businesses, including community-based organizations, that work directly with and/or provide support to underserved communities and socially vulnerable populations and members of the public through fairs and events.

Organizations within or surrounding TPWD service boundaries that conduct outreach and assistance for vulnerable populations include the American Red Cross Chapter San Bernardino, KCDZ 107.7 FM Local radio station, and the City of Twentynine Palms Community Center. Underserved and vulnerable populations they serve include socioeconomically disadvantaged people; people with limited English proficiency; geographically isolated or educationally disenfranchised people; people of color as well as those of ethnic and national origin minorities; women and children; individuals with disabilities and others with access and functional needs and seniors. These local organizations were able to specialize in the community disadvantages that are found within the service area, such as homelessness, and other well-being initiatives that aid awareness and education to the public on fentanyl-controlled substances and alcohol abuse.

The District's approach to updating the plan consisted of the following:

- Establishing the internal planning team.
- Coordination with outside agencies, organizations, jurisdictions, and the public.
- Documenting past events.
- Posting the meeting agendas and meeting minutes, drafting LHMP onto the TPWD website, and asking for public input and comments on the planning process.
- Conducting public outreach.
- Reviewing and updating the hazards.

- Reviewing and updating mitigation measures.
- Plan Adoption.

During the planning process, the Planning Team utilized the following plans to gain information on the area's hazards and TPWD's mitigation goals. Relevant information from the following plans, including County government priorities, was included when aligned with TPWD strategies and projects and incorporated into the LHMP. There have not been any changes in priorities since the approval of the 2018 LHMP.

TPWD Water Master Plan is a basin plan that deals with community water systems, water storage, water shortage, and climate change to ensure all the water agencies that take water from the local basin are all in agreement about water shortages, water replenishment, and effects of climate change on our water. The following plans were used:

**Table 4 Plans Used by the Planning Team**

| Study Plan | Key Information |
|---|---|
| **TPWD Urban Water Management Plan** | Land Use Trends, Historical Trends for water use, and local trends |
| **2018 TPWD LHMP** | Hazard Identification, Mitigation Measures |
| **USGS Golden Guardian 2008** | Earthquakes, Affects, Planning |
| **2020 San Bernardino County LHMP** | Land Use For Area, Future Projects |
| **2023 California HMP** | Goals For The State Of California |
| **San Bernardino County Flood Control** | Gain Information On Future Flood Control Projects |
| **FEMA Flood Insurance Study for S.B. County** | Flood History |

The planning process consisted of:

Figure 2. Flow Chart for Developing A Hazard Mitigation Plan




## 3.2 PLANNING TEAM

As identified in **Section 3.1**, several planning teams were associated with preparing the update. The Hazard Mitigation Plan was compiled and authored by members of the following District Planning Team:

Matthew Shragge
**General Manager, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

Mike Minatrea
**Maintenance Superintendent, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

Cindy Fowlkes
**District Secretary, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

Robert Shelton
**Treatment/Production Superintendent, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

Austin Murphy
**Service Worker II, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

Jayna Olsen
**Customer Representative, Twentynine Palms Water District**
*Description of Involvement: Member of the Planning Team*

**External Planning Team**

Ron Wortham
**Special Projects Manager, Hi-Desert Water District**
*Description of involvement: Member of External Planning Team*

Gary Sturdivan
Sturdivan Emergency Management
*Description of involvement: Lead Consultant of the LHMP*

Larry Bowden
**City of Twentynine Palms Interim City Manager**
*Description of involvement: Member of External Planning Team*

Jane Rogers
**Joshua Tree National Park**
**National Park, National Park Superintendent**
*Description of involvement: Member of External Planning Team*

Sarh Johnson
**Joshua Basin Water District, General Manager**
*Description of involvement: Member of External Planning Team*

## 3.3 COORDINATION WITH OTHER EXTERNAL JURISDICTIONS, AGENCIES, & ORGANIZATIONS

The Internal and External Planning Teams include six people from Twentynine Palms Water District and two from local water agencies. The County of San Bernardino OES was invited to be on the Planning Team but could not attend. However, they reviewed the plan's content and had no feedback. Appendix A contains the meeting matrix and agendas outlining the subjects covered and the attendees.

The Planning Team participated in monthly meetings to coordinate efforts, provide input, and receive support for the LHMP. The support included receiving technical expertise, resource materials, and tools. The District facilitated the LHMP process and provided information that followed FEMA requirements for the program. The tools, resource materials, and other project-related information are maintained on a project portal on the District's website https://29palmswater.com/, which allows access to the information by all participants and the public; screenshots are located under Appendix B. Mr. Gary Sturdivan's contact information was

on each document for questions and concerns. The Planning Team reviewed the document and made corrections or voiced concerns to the consultant. These comments were discussed at the next team meeting, and corrections were made to the document. These meetings were not publicly held.

Accomplishing a shared goal for emergency preparedness and hazard mitigation requires the coordinated efforts of various jurisdictions, agencies, and organizations.

This team's objective consisted of:

- Assisting all participating jurisdictions with the Local Hazard Mitigation Plan planning process.
- Guidance from CalOES and FEMA requirements.
- Assisting in the development of regional maps and supporting information regarding hazards.
- Provide a forum for all jurisdictions participating in the update for questions and issues to be discussed.

TPWD LHMP planning staff participated in each of the scheduled stakeholder meetings and conference calls facilitated by SEMC related to the update project.

## 3.4 PUBLIC INVOLVEMENT/OUTREACH

In support of the Twentynine Palms Water District's LHMP update, the District solicited information from members of the public through various methods. TPWD conducted its outreach through various social media platforms, including Facebook and Instagram, posting sections of the draft LHMP onto TPWD's website and including notices on billing statements requesting comments. Outreach to nonprofit organizations, including community-based organizations and the agencies listed in **Section 3.1**, was conducted to allow those representing vulnerable populations to be involved in the planning process. TPWD outreach included a solicitation for comment through phone calls and emails to the organizations in Section 3.1 on numerous occasions but could not elicit feedback.

These methods consist of:

- Community Outreach events
- Local meetings and visits with local agencies
- Local Emergency Coordination meetings
- Plan/Project inclusion in the District's Programs includes mitigation actions that require public involvement and are open for public comment. (10-Year Capital Improvement Plan, Annual Budget Report, etc.)

Any information and public feedback collected from the public outreach phase, public events, and meetings will be documented in Appendix B, including outreach to representatives of the underserved and vulnerable populations who were allowed to be involved. Any feedback collected

will be evaluated and assessed to see if it should be adjudicated within the LHMP renewal. No comments were received.

### Annual, The Great ShakeOut Exercise

Twentynine Palms Water District participated in The Great ShakeOut. Through this plan, we provide information on disaster response related to the District's business and water. This information includes steps the District has taken to respond to earthquake emergencies that impact the District and the surrounding community.

## 3.5 ASSESS THE HAZARD

A critical component of the LHMP process is assessing the hazards that may impact the District's facilities and operations. It is important to thoroughly understand these hazards without over-analyzing remote or highly unlikely hazards.

This LHMP has been developed through an extensive review of available information on hazards TPWD has faced and most likely will face in the future. The Planning Team reviewed and discussed events in the State of California and disasters in the District's service area and Southern California. The Team reviewed documents such as engineering drawings, photographs, and available geotechnical and geologic data from the Internet and outside sources such as FEMA Hazard Mapping, San Bernardino County hazard maps, and documents.

Additionally, for each profiled hazard, the TPWD Planning Team analyzed the community's exposure to each hazard (inventory of assets) and the potential impact under scenario events. The Planning Team produced this information using FEMA's HAZUS program and hazard intersect analyses, which had recently been completed within San Bernardino County. See Chapter 4 for more information.

## 3.6 SET GOALS

The goal-setting process for the 2024 Hazard Mitigation Plan update consisted of the Planning Team reviewing the hazard exposure and scenario impacts developed during the Risk Assessment portion of the process. With an understanding of the risk the community is potentially facing, the Planning Team then re-evaluated the 2018 Hazard Mitigation Plan Goals and Objectives, assessed their status and effectiveness in meeting the 2018 Mitigation Measures, and identified new Goals and Objectives.

## 3.7 REVIEW AND PROPOSE MITIGATION MEASURES

Identifying mitigation measures began with reviewing and validating the previous mitigation measures in the District's 2018 Hazard Mitigation Plan. Using the existing plan as a starting point, the planning team assessed whether the measures were valid. Through this discussion, the development of new mitigation measures was determined.

The planning team identified and analyzed mitigation measures relative to the hazards that influence the District. This analysis assisted the District in developing an implementation strategy for the prioritization of mitigation measures. Meetings (in-person and virtual) were held with the planning team as a group and through meetings within their departments to solicit input on the plan updates.

A wide variety of mitigation measures that can be identified to help reduce the impact or the severity of damage from hazards was examined. The projects were identified to help implement the Planning Team's goals and objectives. The following categories were used in the review of possible mitigation measures:

1. Public Information and Education - Outreach projects and technical assistance.
2. Preventive Activities - Zoning, building codes, stormwater ordinances
3. Structural Projects - Detention basins, reservoirs, road, and bridge improvements
4. Property Protection - Acquisition, retrofitting
5. Emergency Services - Warning, sandbagging, road signs/closures, evacuation
6. Natural Resource Protection - Wetlands, protection, best management practices.

In addition to the Social, Technical, Administrative, Political, Legal, Economic, Environment (STAPLEE) methodology, each Planning Team incorporated other criteria/factor questions into the process to help engage and solicit member input.

The Planning Team addressed the following questions to determine mitigation options:

Does the Action:

1. Solve the problem
2. Address Vulnerability Assessment?
3. Reduce the exposure or vulnerability to the highest priority hazard
4. Address multiple hazards.
5. Address more than one (1) Goal/Objective.
6. Benefits equal or exceed costs?

Can the Action:

1. Be implemented with existing funds?
2. Be implemented by existing state or federal grant programs?
3. Is it completed within the 5-year life cycle of the LHMP?
4. Be implemented with currently available technologies?

Will the Action:

1. Be accepted by the community?

2. Be supported by community leaders.
3. Adversely impact segments of the population or neighborhoods.
4. Result in legal action such as a lawsuit?
5. Positively or negatively impact the environment.

Is there:

1. Sufficient staffing to undertake the project?
2. Sufficient funds to complete the project?
3. Existing authority to undertake the project?

After going through this process for each project, the Planning Team was able to identify the higher-priority projects.

## 3.8 DRAFT THE HAZARD MITIGATION PLAN

The Project Manager drafted the TPWD Hazard Mitigation Plan Update based on input and comments from the Planning Team. As indicated previously, the Planning Team used the 2018 LHMP as a starting point but revised it to reflect updated information.

The District's consultant led the Planning Team and prepared the draft LHMP with input from the Planning Team, outside the water district in the area, and the public. The Planning Team reviewed and commented on the draft LHMP, and subsequent changes were made before the LHMP was finalized and adopted by the Board of Directors. All draft documents were posted on the District's website. Notices were sent to all water customers in the service area via billing statements and public updates on social media that TPWD has at its disposal. Stating that all LHMP documents were posted on the website and asking for comments.

The LHMP was reviewed in comparison to the FEMA-designed Review Tool. The Review Tool links the federal requirements, identifies the sections in the LHMP where the information can be found, and provides a rating as to the level of compliance with the federal regulations.

Once the LHMP update was drafted, the Planning Team finalized the plan and forwarded it to Cal/OES and FEMA for approval.

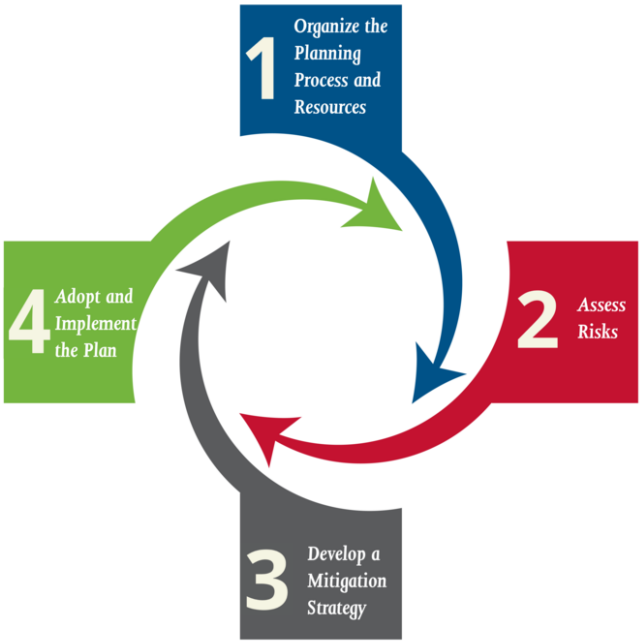
## 3.9 ADOPT THE PLAN

After the 30-day public review, the draft plan will be submitted to the State of California OES for review. Once the State has approved the LHMP, the document will be sent to FEMA by the State. When the Hazard Mitigation Plan update meets all federal requirements, FEMA will provide the District with an "Approval Pending Adoption" letter. At this time TPWD will sent to the State of California and FEMA the resolution.

# SECTION 4. RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of a hazard, including property damage, disruption to local and regional economies, and the amount of public and private funds spent for recovery. Mitigation decisions are based on risk assessments where the probability of an event is evaluated with respect to the anticipated damages caused by such an event.

This section aims to understand the hazards and risks in the Twentynine Palms Water District service area. This process generally has four steps: 1) Hazard Identification, 2) Vulnerability Analysis, 3) Risk Analysis, and 4) Vulnerability Assessment, including an estimation of potential losses. These are four items; however, the terms can be used interchangeably.




## 4.1 HAZARD IDENTIFICATION

The Planning Team discussed potential hazards and evaluated their probability of occurrence. The following sections describe this process and the results.

## 4.2 HAZARD SCREENING CRITERIA

Screening the hazards aims to help prioritize which hazards create the greatest concern for TPWD. A list of natural hazards to consider was obtained from the Federal Emergency Management Agency's (FEMA) State and Local Mitigation Planning How-to Guide: Understanding Your Risks (FEMA 386-1). The team used the Stafford Act, the California Emergency Service Act, and STAPLEE criteria to help rank each risk. The risks were ranked from 1 – 4, with (1) being a "Highly Likely" event, (2) being a "Likely" event, (3) being a "Somewhat Likely" event, and (4) being a "Least Likely" event. The Planning Team reviewed each hazard on the list using their

experience and historical data pertaining to each hazard and developed the following ranked list in Table 5.

Table 5 Hazard Risk Rankings

| Hazard | Risk Ranking (1-4) |
|---|---|
| **Earthquake** | 1 |
| **Flooding** | 2 |
| **Climate Change Induced Drought** | 2 |
| **Cyber Security** | 2 |
| **Windstorm** | 4 |
| **Dam Inundation** | 4 |
| **Wildfire** | 4 |
| **Freezing events** | 4 |
| **Volcanoes** | 4 |
| **Tsunami** | 4 |
| **Landslides** | 4 |

The natural hazards considered not to affect or be a risk to TPWD were ranked 4 "Least Likely" and are not considered applicable to TPWD for mitigation.

**Hazard Assessment Matrix**

TPWD used a qualitative ranking system for the hazard screening process, which generated a high/medium/low rating for the probability and impact of each screened hazard.

**Probability Ratings:** Highly Likely (1), Likely (2), or Somewhat Likely (3)

**Impact Ratings:** Catastrophic, Critical, or Limited

### SCREENING ASSESSMENT MATRIX

The screening assessment matrix was used to assess TPWD's hazards. The hazards have been placed in the appropriate cell of the corresponding "Screening Assessment Matrix" based on the Planning Team's collective experience. The hazard screening assessment is shown in Table 6.

Prioritization of the hazards is discussed in the following section. The Probability/Impact rating is based on a 5-year occurrence. The percentages represent the likelihood within the 5-year occurrence.

**Table 6 Screening Assessment Matrix**

| | Impact | | | |
|---|---|---|---|---|
| Probability | **Probability/Impact Rating** | ***Catastrophic*** | ***Critical*** | ***Limited*** |
| | ***Highly Likely (1)*** ***(75 – 100%)*** | Earthquake (1) | Climate Change Induced Drought (2) | |
| | ***Likely (2)*** ***(50-75%)*** | | Flooding (2) Cyber Security (2) | |
| | ***Somewhat Likely (3)*** ***(25 – 50%)*** | | | |

## 4.3 HAZARD PROFILES

This section looks at all the hazards identified by the Planning Team that may impact TPWD within its boundaries. This section gives an overview of each hazard, the definition of each hazard, and a description of how each hazard is expected to affect TPWD's service and/or service area using observed hazards in TPWD's service area, the hazards identified in the FEMA website, and the FEMA software program known as HAZUS (Hazards United States). HAZUS contains models of natural disasters and the effects the disasters can have on a region.

### 4.3.1 EARTHQUAKES

**Probability:** (75-100%) Highly likely – Historical earthquake data for TPWD and its region indicate at least eight significant earthquakes within the last 14 years. However, some earthquakes in southern California occur daily but are insignificant to TPWD. This equates to an average significant earthquake every 1.75 years or a 57.14 percent chance of a significant earthquake in any given year. Based on this data, TPWD determined that future earthquake

occurrences within their boundaries continue to be highly likely. This section looks at all the hazards affecting the district within its boundaries, which the Planning Team identified.

**Impact:** Catastrophic

**Priority:** Highly Likely

**General Definition:** An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the earth's surface. The plates move slowly over, under, and past each other to create mountains, valleys, and all other geological formations. Usually, the movement is gradual; however, increased movement occurs when the plates become locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. Most earthquakes occur at the boundaries where plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges and disrupt gas, electric, water utilities, and phone service. Additionally, earthquakes can trigger landslides, avalanches, fires, and destructive ocean waves such as tsunamis. Buildings with foundations resting on unconsolidated fill material and other unstable soil, as well as homes not tied to their foundations, are at risk because they can be shaken off their mountings even during a mild earthquake. An earthquake in a populated area may cause deaths, injuries, and/or extensive property damage.

Earthquakes strike suddenly and without warning at any time of year. On a yearly basis, 70 to 75 damaging earthquakes occur worldwide. Estimates of losses from a 7.8-magnitude earthquake in the southern section of the San Andreas Fault System (located in the regional area near Los Angeles County) could easily reach $200 billion in damages. This information was pulled from the California Great ShakeOut© USGS scenario.

Earthquakes pose a moderate to very high risk for 45 states and territories in the United States of America, and earthquakes occur in every region of the Country. California experiences the most frequent damaging earthquakes of the 45 states and territories of the United States; however, Alaska experiences the most significant number of large earthquakes, most located in uninhabited areas. The nearby southern section of the San Andreas Fault is ranked in the top five (5) faults that are most likely to cause significant damage in the United States, according to the United States Geological Survey (USGS).

The source for the earthquake profile is a report that describes a new earthquake rupture forecast for California developed by the 2007 Working Group on California Earthquake Probabilities (WGCEP 2007). The Earthquake Working Group was organized in September 2005 by the USGS, the California Geological Survey (CGS), and the Southern California Earthquake Center (SCEC) to better understand the locations of faults in California. The group produced a revised, time-independent forecast for California for the National Seismic Hazard Map.

**Climate Change Impacts:**

The following summarizes changes in exposure and vulnerability to earthquake hazards resulting from climate change:

**Population**– Vulnerability to earthquakes is unlikely to increase due to climate change.

**Critical facilities –** All critical facilities' exposure and vulnerability are unlikely to increase due to climate change.

**Vulnerability:** The socially vulnerable population comprises individuals such as children, the elderly, individuals with mental health challenges, and those who are facing financial hardship. These individuals may reside in unconventional living situations, such as under bridges, in tents, or in makeshift shelters along waterways or freeway bridges. The socially vulnerable populations are most susceptible based on many factors, including how the people respond to their financial ability to purchase supplies. Food, clothing, and safe housing may be manageable for only short periods and then fall into extreme poverty, with a lack of resources and the ability to navigate special needs in an emergency or to manage to obtain adequate food, housing, clothing, or medical treatment.

In an earthquake, vulnerable populations may be unable to find adequate shelter as the landscape streets and shelters are unavailable in the short term. Shelter must be developed and put in place by the affected cities, counties, States, or FEMA.

Table 7 is a replacement cost estimate for all TPWD-owned critical facilities.

**Table 7 Earthquake Magnitude Replacement Costs**

| TPWD / Earthquake Magnitude | Replacement Value |
|---|---|
| **Magnitude 7.0 or Above (Very High Impact)** | |
| **TPWD – All Critical Assets** | $300 Million |
| **Magnitude 5.0 or 6.9 (Moderate Impact)** | |
| **TPWD – All Critical Assets** | $250 Million |
| **Magnitude 1.0 or 4.9 (Low Impact)** | |
| **TPWD – All Critical Assets** | $5 Million |

**Description:** The area around TPWD Facilities is seismically active since it is situated on the boundary between two fault lines. There have been many earthquakes in and around the District's service area; the 1992 Landers earthquake caused over $1 million in damage to the District.

**Figure 3. TPWD Earthquake Fault Lines**

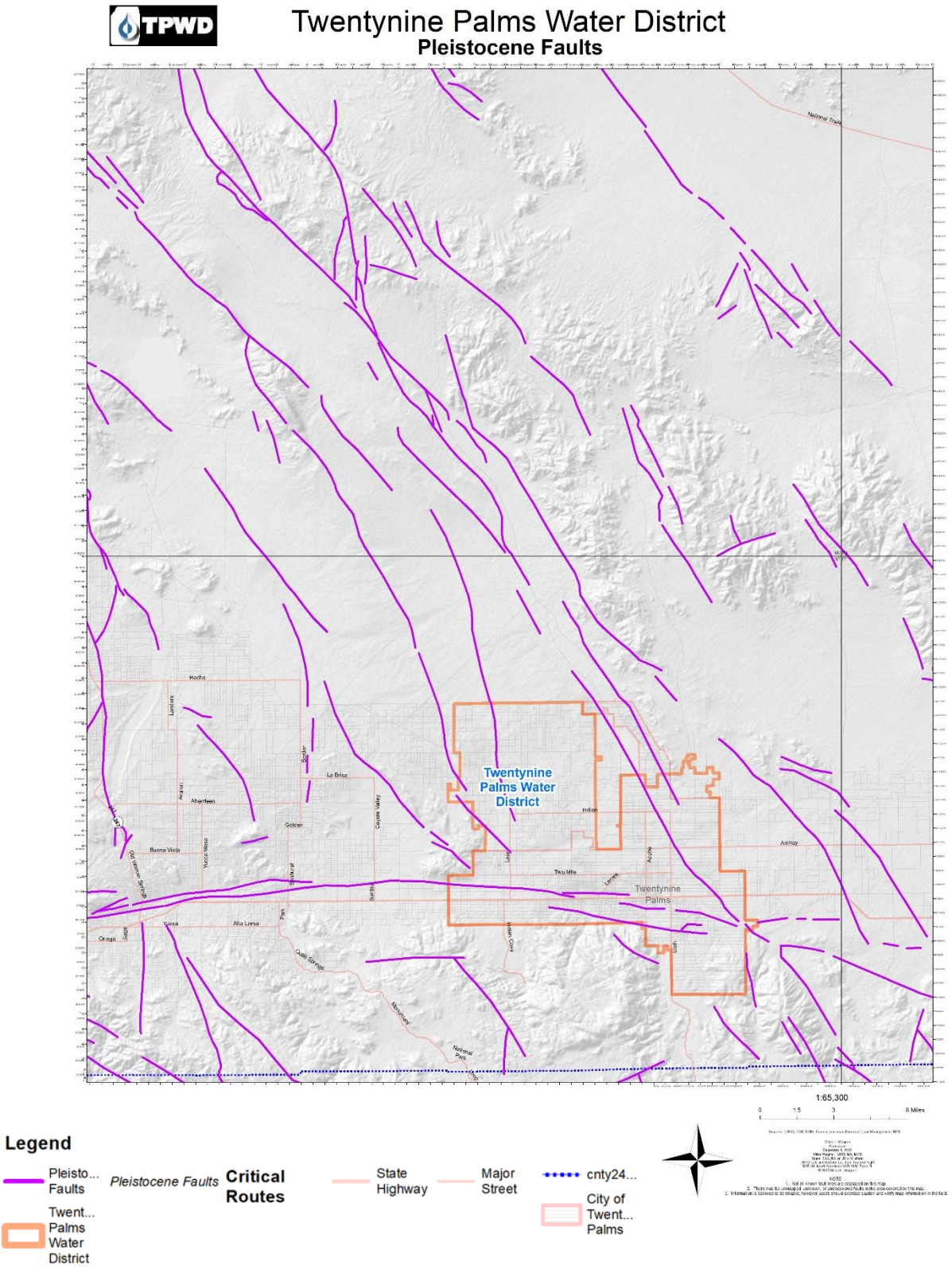


**Figure 4 USGS Modified Mercalli Intensity Scale**

| Intensity | Shaking | Description/Damage |
|---|---|---|
| I | Not felt | Not felt except by a very few under especially favorable conditions. |
| II | Weak | Felt only by a few persons at rest,especially on upper floors of buildings. |
| III | Weak | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated. |
| IV | Light | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. |
| V | Moderate | Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop. |
| VI | Strong | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. |
| VII | Very strong | Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. |
| VIII | Severe | Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. |
| IX | Violent | Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. |
| X | Extreme | Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. |

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines in the central and western states; however, the Eastern United States faces a moderate risk of less frequent, less intense earthquake events.

**Figure 5 United States Earthquake Hazard Map**

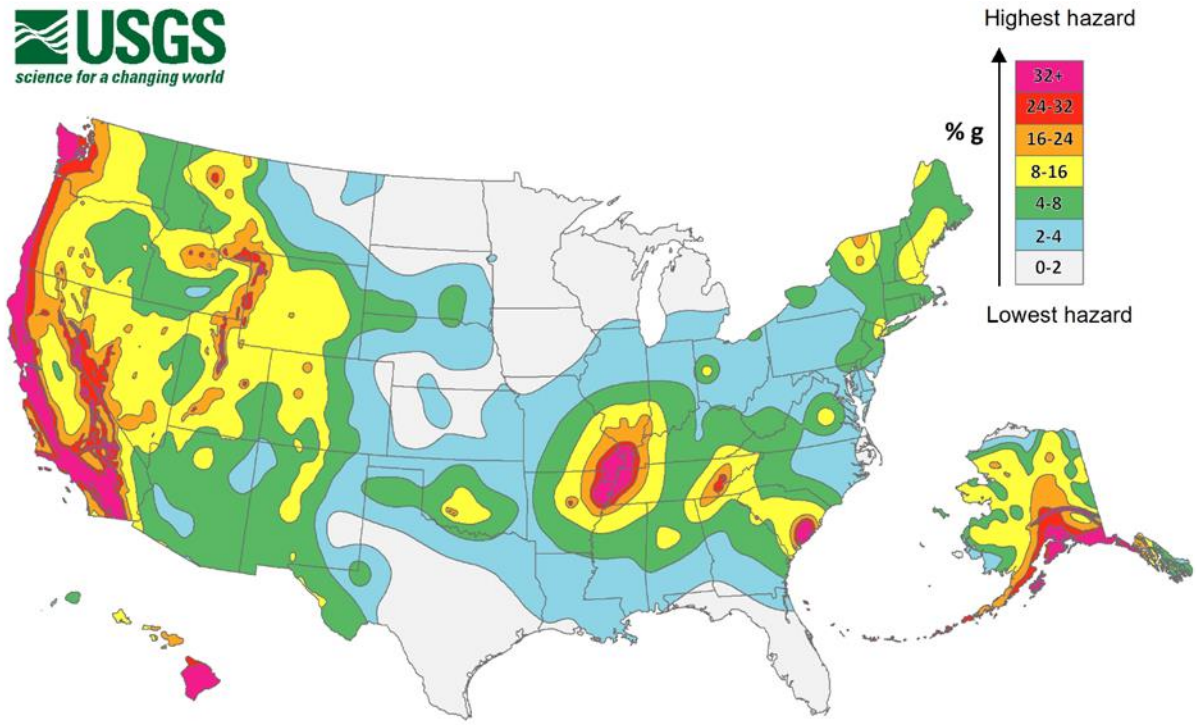


Table 8 Significant Earthquakes within San Bernardino County

| Date | Area | Mag ($M_w$) | Total damage/notes |
|---|---|---|---|
| 7/29/2008 | Chino Hills | 5.4 | No damage to TPWD |
| 1/15/2014 | La Habra | 5.1 | No damage to TPWD |
| 3/29/2014 | La Verne | 4.4 | No damage to TPWD |
| 7/5/2014 | Borrego Springs | 5.4 | No damage to TPWD |
| 1/25/2018 | Trabuco Canyon | 4.0 | No damage to TPWD |
| 7/4/2019 | Ridgecrest | 6.4 | No damage to TPWD |
| 7/6/2019 | Ridgecrest/Trona | 7.1 | No damage to TPWD |
| 9/10/2019 | Wildomar | 4.0 | No damage to TPWD |

Within the 2018-2023 timeframe, a federal and/or state declaration was declared for earthquakes within the TPWD service area. On July 8, 2019, The President issued an emergency declaration (EM-3415-CA) under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC 5121-5207 (The Stafford Act), as follows:

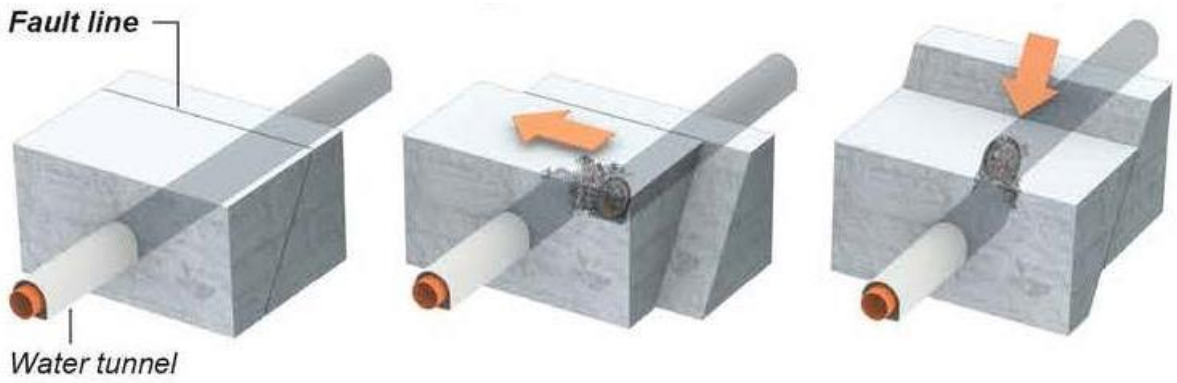
"I have determined that the emergency conditions in certain areas of the State of California resulting from earthquakes beginning on July 4, 2019, and continuing, are of sufficient severity and magnitude to warrant an emergency declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC 5121 ET SEQ. ("the Stafford Act"). Therefore, I declare that such an emergency exists in California…"

**Impact Statement:** A significant earthquake could devastate TPWD and its assets. Shaking during earthquakes can cause structural failures, while ground displacement and liquefaction can cause infrastructure to sink, sag, float, rupture, or sever completely. Access to all assets may be impeded if the roads needed to access them are damaged and impassable. An extended loss of power or widespread damage to a system could impair the District's ability to provide service, especially if generators are compromised. This could, in turn, lead to a loss of service and revenue for a time while costly repairs are being made. Fires following earthquakes are also a significant concern and could impact operations. Direct impacts to employees are possible,

including injury, death, and an impeded ability of essential personnel to report for duty may also hinder operations.

There is no increase in the impact of earthquakes that can be caused by climate change. Earthquakes can cause displacement, changing population patterns throughout their service area. TPWD has no jurisdiction over land use, development, and zoning of socially vulnerable populations and/or land development within their service area, especially post-earthquake disasters. Water districts nationwide follow the standards set by the American Water Works Association and USEPA governing public water systems.

**Figure 6 How Ground Displacement Can Severe Pipes**




Liquefaction may cause buried domestic water pipes to sink, impacting gravity-fed systems. Once liquefied soils re-solidify after a quake, they must be dug up and repaired. Lateral spreading may damage wells and percolation ponds. TPWD could experience a loss of water from damaged systems.

State Water Project assets like water pipelines, ground shaking, displacement, and liquefaction may cause canals and laterals to crack, sever, and otherwise fail.

**Building Facilities:** Shaking, ground displacement, and liquefaction can cause structural failure in buildings, including the office buildings at the District's administrative buildings. Less catastrophic events may cause unanchored furniture and items on shelves to fall. Failure may result in employee and customer deaths and injuries if an event occurs during working hours. Further, crews out in the field may also be injured or killed.

**Energy Storage and Power Failure:** An adequate energy supply is critical for TPWD to maintain its daily processes and functions. Power failures occur when the reliable, uninterrupted energy supply to all or part of the service area is disrupted, affecting TPWD's ability to provide service. In summary, the entire District, including all current and future assets (infrastructure, buildings, critical facilities, and population), is considered at risk of earthquake events.

### 4.3.2 CLIMATE CHANGE INDUCED DROUGHT

**Probability: (75-100%)** Highly likely – Historical drought data for TPWD and its region indicate at least five multi-year significant droughts within the last 47 years. This equates to an average drought every 9.4 years or a 10.63 percent chance of a drought in any given year. Based on this data and given the multi-year length of droughts and future climate change effects, TPWD determined that future drought occurrence within their boundaries continues to be highly likely. TPWD is consistently in a stage 2 drought. This section looks at all the hazards affecting the District within its boundaries that the Planning Team identified.

**Impact: Critical**

**Priority: Highly Likely**

**General Definition:** A drought is a period of below-average precipitation in each region resulting in prolonged shortages in its water supply, surface water, or groundwater. Climatic factors such as high temperatures, high wind, and low relative humidity are often associated with drought. Drought occurs in virtually all climatic zones, varying significantly from one region to another. Droughts occur when there are extended periods of inadequate rainfall. The cycle of droughts and wet periods is often part of El Niño and La Niña weather cycles.

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. It is generally difficult to pinpoint the beginning and end of a drought. In California, a few dry months do not typically constitute a drought. Because the impacts of a drought accumulate slowly at first, a drought may not be recognized until it has become well established. Even during a drought, there may be one or two months with above-average precipitation totals. These wet months do not necessarily signal the end of a drought and generally do not majorly impact moisture deficits. Droughts can persist for several years before regional climate conditions return to normal. While drought conditions can occur at any time throughout the year, the most apparent time is during the summer months.

**Climate Change Probability:** The probability of damage to TPWD caused by climate change will increase. Drought's probability will increase in the southwestern United States, creating longer and hotter days with less rain, leading to long periods of drought. Research supports that climate change will significantly impact drought frequency and intensity, varying by region. Higher temperatures increase evaporation rates, including more moisture loss through plant leaves. Even in regions where precipitation does not decrease, increases in surface evaporation will lead to more rapid drying of soil if not offset by other changing factors, such as reduced wind speed or humidity. As soil dries out, more of the sun's incoming heat will go toward heating soil and adjacent air rather than evaporating moisture, resulting in hotter temperatures and drier conditions.

**Measuring Droughts:** There are several quantitative methods for measuring drought in the United States. The U.S. Drought Monitor is a relatively new index that combines quantitative measures with input from experts in the field.

In March 2022, California's Governor Newsom implemented an executive order (Executive Order N-7-22) to address the impacts of the drought in California. This order required urban water suppliers, such as TPWD, to adopt more stringent water conservation efforts, including but not limited to banning irrigating "non-functional turf" and voluntarily activating a water shortage contingency planning Level 2.

Along with this executive order, and by the State Water Resources Control Board (SWRCB) and California Water Code (CWC) requirements as outlined in Sections 10632 and 10644, urban water supplies in California would have to prepare Annual Water Supply and Demand Assessments (AWSDA) and submit these assessments annually to the state to remain in compliance with water conservation efforts. TPWD submitted its 2023 AWSDA and is in the process of submitting its 2024 AWSDA before the July 1 deadline. TPWD promotes water conservation efforts to its customers through joint radio announcements with local water districts, public notifications on its website, and conservation messages on monthly billing invoices. The current permanent water conservation requirements are posted online to continue efforts to conserve water to prepare for California's drought conditions.

**Climate Change Impacts:**

The following summarizes changes in exposure and vulnerability to the drought hazard resulting from climate change:

**Population** - Population exposure and vulnerability to drought are likely to increase due to climate change.

**Critical facilities—Climate change is likely to increase the exposure and vulnerability of all crucial facilities**.

**Vulnerability &Impacts:** Underserved and vulnerable populations they serve include socioeconomically disadvantaged people; people with limited English proficiency; geographically isolated or educationally disenfranchised people; people of color as well as those of ethnic and national origin minorities; women and children; individuals with disabilities and others with access and functional needs; and seniors. Those who may live under bridges, in tents or in makeshift housing along waterways. The socially vulnerable populations are most susceptible based on many factors, including how the people respond to financial ability to purchase supplies. Food, clothing, and safe housing may be manageable for only short periods of time and then fall into extreme poverty, with a lack of resources and the ability to navigate special needs in an emergency or to manage to obtain adequate food, housing, food, clothing, or medical treatment.

In drought conditions, vulnerable populations may not be able to find adequate, safe, potable water supplies for drinking, cooking, or hygiene needs.

The following table is a replacement cost estimate for all TPWD-owned critical facilities.

Table 9 Drought Severity Replacement Costs

| TPWD / Drought D0-D4 Severity | Replacement Value |
|---|---|
| **D4 (Exceptional Drought)** | |
| **TPWD - All Critical Assets** | $300 Million |
| **D3 (Extreme Drought)** | |
| **TPWD - All Critical Assets** | $250 Million |
| **D2 (Severe Drought)** | |
| **TPWD - All Critical Assets** | $5 Million |
| **D1 (Moderate Drought)** | |
| **TPWD - All Critical Assets** | $100,000 |
| **D0 (Abnormally Dry)** | |
| **TPWD - All Critical Assets** | $50,000 |

**U.S. Drought Monitor:** The U.S. Drought Monitor is designed to provide the public, media, government officials, and others with an easily understandable overview of weekly drought conditions across a county throughout the United States. It is unique because it assesses multiple numeric drought measures, including the PDSI and three other indices and experts' interpretations, to create a weekly map depicting drought conditions across the United States. The U.S. Drought Monitor uses five drought intensity categories, D0 through D4, to identify areas of drought.

The maps below are taken from https://droughtmonitor.unl.edu/Maps/MapArchive.aspx and show the drought differences between January 2018 and October 2023. Note the drastic difference between the two drought maps.

**Figure 7 Drought Monitor January 2023**

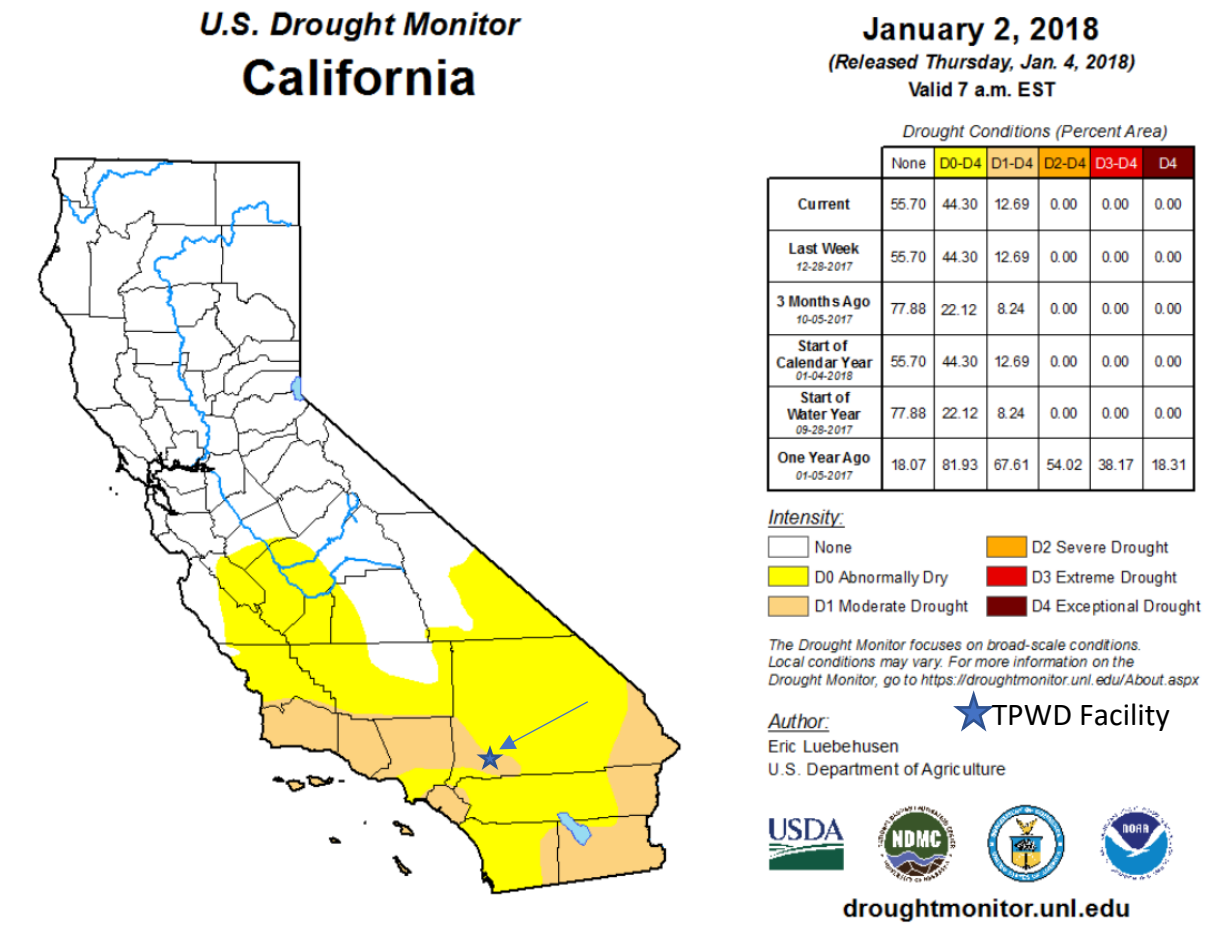


**Figure 8 Drought Monitor October 2023**

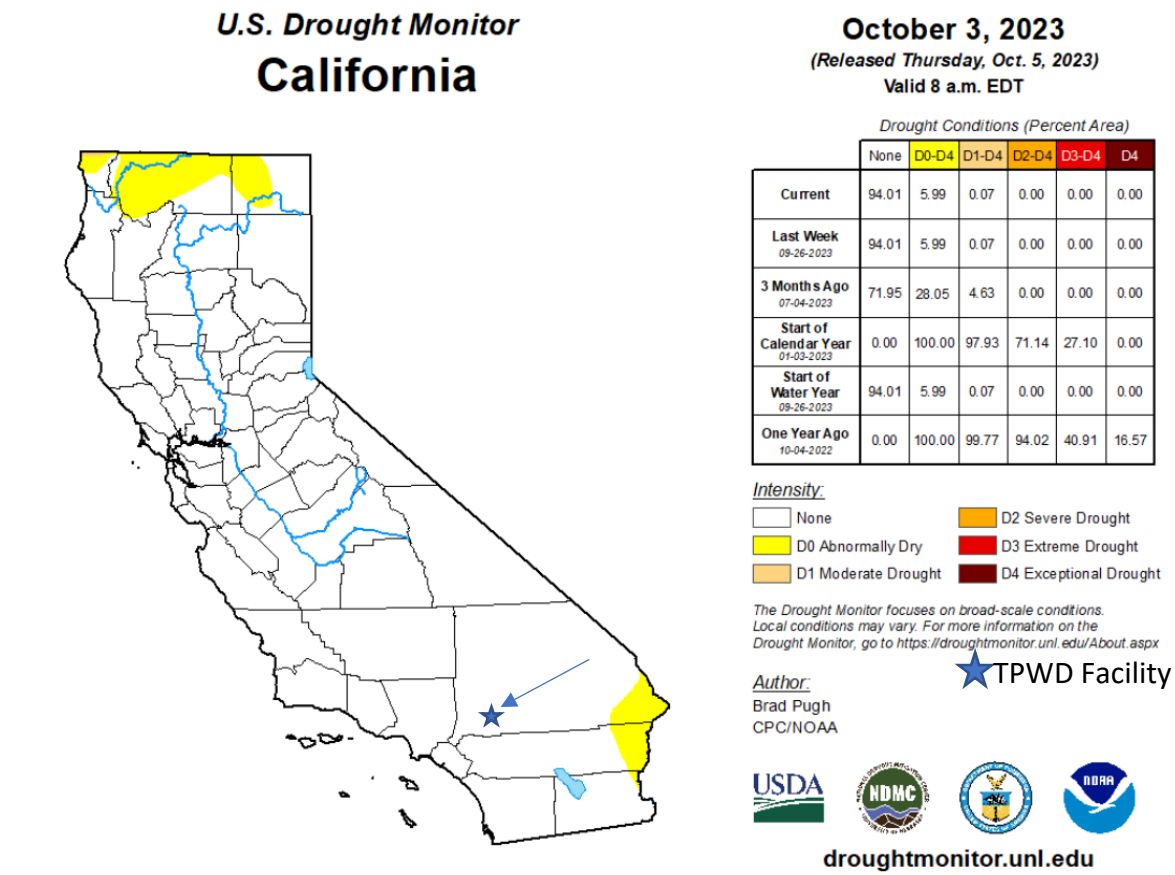


Table 10. U.S. Drought Monitor

| | | |
|---|---|---|
| **D0** | **Abnormally Dry** | Going into drought: short-term dryness slowing planting and growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered |
| **D1** | **Moderate Drought** | Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested |
| **D2** | **Severe Drought** | Crop or pasture losses likely; water shortages expected; water restrictions imposed |
| **D3** | **Extreme Drought** | Major crop/pasture losses; widespread water shortages or restrictions |
| **D4** | **Exceptional Drought** | Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies |

A drought is a regional event not confined to geographic or political boundaries; it can affect several areas simultaneously. It can also range in severity across those areas. Drought is now one of the main concerns in California, as the State has been in a drought period for the last eight years. Northern California experienced some relief in the winter of 2016; however, the El Niño effect expected to relieve the statewide drought did not materialize in Southern California. The lack of rain and, most importantly, the lack of snowfall in the Sierra Nevada Mountain range severely impacted most residents of California. TPWD's service area is at risk of drought occurrence and impacts.

**Description:** Climate change can be expected to increase drought frequency and severity in the service area. Warmer temperatures cause drought conditions by reducing soil moisture. Increased evapotranspiration and reduced snowpack projected with warmer temperatures is expected to result in reduced flows.

Table 11 Drought History

| Year | Drought History |
|---|---|
| 1841 | The drought was so bad that "a dry Sonoma was declared entirely unsuitable for agriculture." |
| 1864 | This drought was preceded by the torrential floods of 1861-1862, which shows the fluctuation in climate in the 1800s. |
| 1924 | This drought encouraged farmers to start using irrigation more regularly because of the fluctuation in California weather. Consistent water availability was crucial for farmers. |

| | |
|---|---|
| 1929–1934 | This drought was during the infamous Dust Bowl period that ripped across the plains of the United States in the 1920s and 1930s. The Central Valley Project was started in the 1930s in response to drought. |
| 1950s | The 1950s drought contributed to the creation of the State Water Project. |
| 1976–1977 | 1977 had been the driest year in state history to date. According to the *Los Angeles Times*, "Drought in the 1970s spurred efforts at urban conservation, and the state's Drought Emergency Water Bank came out of the drought in the 1980s." |
| 1986–1992 | California endured one of the most prolonged droughts from late 1986 through early 1992. Drought worsened in 1988, and much of the United States suffered severe drought. In California, the six-year drought ended in late 1992 as a significant El Niño event in the Pacific Ocean (and the eruption of Mount Pinatubo in June 1991) most likely caused unusually persistent heavy rains. |
| 2007–2009 | 2007–2009 saw three years of drought conditions, the 12th worst drought period in the state's history, and the first drought for which a statewide emergency proclamation was issued. The drought of 2007–2009 also saw significantly reduced water diversions from the State Water Project. The summer of 2007 saw some of the worst wildfires in Southern California history. |
| 2011-2017 | From December 2011 to March 2017, California experienced one of the worst droughts in the region on record. The period between late 2011 and 2014 was the driest in California history since record-keeping began. |
| 2020 - 2022 | January and February 2020 were dry to record dry in several areas (central CA and Northern CA-NV). The past three combined water years were California's driest period on record. |

Between late 2011 and 2021, the driest in California history since record-keeping began. In May 2015, a state resident poll conducted by Field Poll found that two out of three respondents agreed that water agencies should be mandated to reduce water consumption by 25%.

The 2015 prediction of El Niño to bring rain to California raised hopes of ending the drought. In the spring of 2015, the National Oceanic and Atmospheric Administration (NOAA) named the probability of the presence of El Niño conditions until the end of 2015 at 80%. Historically, sixteen winters between 1951 and 2015 had created El Niño. Six had below-average rainfall, five had average rainfall, and five had above-average rainfall. However, as of May 2015, drought conditions had worsened, and above-average ocean temperatures had not resulted in large storms. The drought led to Governor Jerry Brown's instituting mandatory 25% water restrictions in June 2015.

Approximately 102 million trees in California died from the 2011 – 2016 drought, of which 62 million died in 2016 alone. By the end of 2016, 30% of California had emerged from the drought, mainly in the state's northern half, while 40% remained in the extreme or exceptional

drought levels. Heavy rains in January 2017 were expected to significantly benefit the State's northern water reserves despite widespread power outages and erosional damage in the wake of the deluge.

Winter 2022-23 was the wettest in California, surpassing the previous record set in 1982–83. Governor Newsom declared an official end to the drought in April 2023. All 58 counties are listed in the Governor's severe drought impact. The winter of 2022 has had more rainfall and snow in California than the last 20 years alone.

Within the 2018-2024 timeframe, no federal and/or state declarations were declared for California Climate Change-Induced Drought within the TPWD service area.

**Impact Statement:** Water is also needed to manage structural and wildfires. A lack of, or limited, water supply presents wildfire management vulnerability. Substantial water is needed to fight wildfires, which are more frequent in dry conditions. While water for firefighting is a priority and no restrictions are in place, a lack of availability could slow this capability.

The entire planning area is equally at risk of this hazard. Most drought impacts, however, are not structural but societal in nature. A drought's impact on society, and thus the TPWD's service area, results from the interplay between a natural event and people's demand for water supply. TPWD is the entity in charge of supplying potable and non-potable water within its service area; therefore, it would be greatly impacted, both fiscally and politically, if it could not provide a reliable water supply due to drought conditions. Economically, water restrictions imposed during drought periods could result in lost revenue for TPWD. TPWD has no jurisdiction over land use, development, zoning, socially vulnerable populations, and/or land development within their service area. Water districts nationwide follow the standards set by the American Water Works Association and USEPA governing public water systems.

### 4.3.3 FLOOD

**Probability:** (50-75%) Likely – Historical flood data for TPWD and its region indicate at least two significant floods within the last five years. This equates to an average flood every 2.5 years or a 40 percent chance of a flood in any given year. Based on this data, TPWD determined that future flood occurrence within their boundaries continues to be likely. This section looks at all the hazards affecting the district within its boundaries, which the Planning Team identified.

**Impact:** Critical

**Priority:** Likely

**General Definition:** An unusually heavy rain in a concentrated area, over a short or long period of time, which collects on the ground in low areas of the land. Flooding occurs when large rainfall occurs in areas where the water runs off to lower elevations. Flooding is a very frequent, dangerous, and costly hazard. Globally, it accounts for 40 percent of all-natural disasters and results in an average of over 6,500 deaths annually. In the US, flooding results in an average of 86 deaths annually. Nearly 90 percent of all presidential disaster declarations result from natural events where flooding was a major component. On average, flooding causes more than $2 billion in property damage yearly in the United States. Floods cause utility and outages, infrastructure damage, structural damage to buildings, crop loss, decreased land values, and impeded travel.

Flooding is the most common environmental hazard due to the widespread geographical distribution of valleys and coastal areas and the population density in these areas. The severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography, precipitation, weather patterns, recent soil moisture conditions, and the degree of vegetative clearing and impervious surface. Flooding events can be brought on by severe (heavy) rain.

TPWD is not a member of NFIP. NFIP members are city and county governments that enforce building codes and permits and have authority over construction, planning, zoning, and land use. In contrast, TPWD does not have authority over any of these. TPWD has no properties that are repetitive loss structures.

**Probability:** Wildfires exacerbating flooding conditions are likely to increase the probability of increased flooding. Wildfires can exacerbate flooding conditions when infiltration is affected, and limited vegetation is in place. As wildfire probability increases, so will flooding due to dry conditions and dried foliage, which can be linked to climate change. While the recent drought conditions have resulted in a lack of rain events, the potential for future flooding still exists.

**Flash Flooding:** Flash floods occur within a few minutes or hours of heavy rainfall and can destroy buildings, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides and landslides. Slow-moving or repeated thunderstorms cause most flash flooding in a local area or heavy rains from hurricanes and tropical storms. Although flash flooding often occurs in mountainous areas, it is also common in urban centers where much of the ground is covered by impervious surfaces.

**Climate Change Impacts:**

The following summarizes changes in exposure and vulnerability to the flood hazard resulting from climate change:

**Population—Population vulnerability may increase because of climate change's impacts on flood hazards**. Runoff patterns may change, resulting in flooding in areas where it has not previously occurred.

**Critical facilities—All critical facility exposure and vulnerability may increase because of climate change's** impacts on the flood hazard.

**Vulnerability & Impact:** Underserved and vulnerable populations they serve include socioeconomically disadvantaged people; people with limited English proficiency; geographically isolated or educationally disenfranchised people; people of color as well as those of ethnic and national origin minorities; women and children; individuals with disabilities and others with access and functional needs; and seniors. Those who may live under bridges, in tents, or makeshift housing along waterways. The socially vulnerable populations are most susceptible based on many factors, including how the people respond to the lack of financial ability to purchase supplies. Food, clothing, and safe housing may be manageable for only short periods of time and then fall into extreme poverty, with a lack of resources and the ability to navigate special needs in an emergency or to manage to obtain adequate food, housing, food, clothing, or medical treatment.

In flooding conditions, vulnerable populations may not be able to find adequate, safe, potable water supplies for drinking, cooking, or hygiene needs. Flooding and dangers associated with the flood hazard can lead to vulnerable populations living in waterways, flood control channels, and adjacent to creeks and waterways, losing possessions and further displacement. It can further isolate these vulnerable populations and limit access to local, state, and federal resources.

The following table is a replacement cost estimate for all TPWD-owned critical facilities.

**Table 12. Flood Zone Replacement Cost**

| TPWD 100/500 Year Flood Zones | Replacement Value |
|---|---|
| **500-Year Flood Zone** | |
| **TPWD - All Critical Assets** | $100 Million |
| **100 Year Flood Zone** | |
| **TPWD - All Critical Assets** | $50 Million |

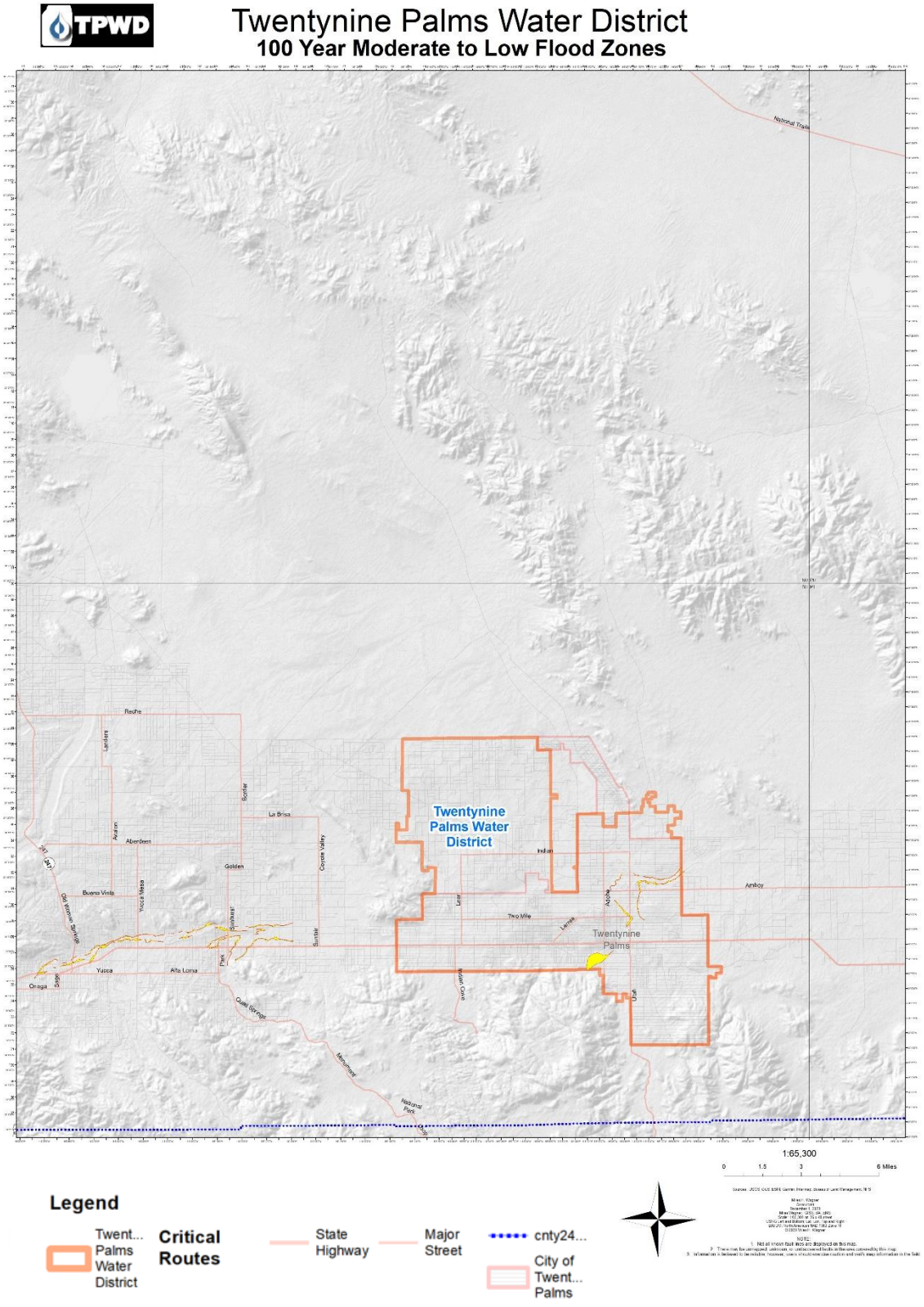
**Description:** Flooding is frequent within the District's service area, particularly during severe rainstorms, which have been known to inundate the surrounding areas. This has not affected

operations; 100-year and 500-year flood maps show potential inundation in the area. There has been no recorded damage caused by flooding within the service area that has affected TPWD infrastructure.

Within the 2018-2024 timeframe, four federal and/or state declarations were declared for flood within the JBWD service area. Notice is hereby given that, in a letter dated January 9, 2023 (EM-3591-CA), later becoming (DR-4683), and March 16, 2023 (EM-3592-CA), later becoming (DR-4699), the President issued an Emergency Declaration and a Major Disaster Declaration under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC 5121-5207 (the Stafford Act), as follows:

> "I have determined that the emergency conditions in certain areas of the State of California resulting from severe winter storms, flooding, and mudslides beginning on January 8, 2023, and continuing are of sufficient severity and magnitude to warrant an emergency declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC 5121 et seq. ("the Stafford Act"). Therefore, I declare that such an emergency exists in California…"

Figure 9 Flood Zones within TPWD Service Area.



**Impact Statement:**

Climate change can increase the impact of flooding. It increases the overall probability of flooding and can increase its impact on the service area. Flooding can cause displacement, leading to changes in population patterns throughout the service area. TPWD has no jurisdiction over land use, development, and zoning, especially during a state and/or federal declared disaster.

- Flooding can result in various impacts, such as death and injury, asset damage, inability to access facilities or assets, and road closures. Normal operations may be interrupted due to flooding. Some impacts from flooding include:
- Floodwater often contains bacteria and chemicals. Flooding of wells or reservoirs may contaminate water, resulting in boil water advisories or reduced service.
- Floodwater can prevent normal access to assets and facilities. This presents a danger when motorists and pedestrians attempt to traverse floodwaters. Motor vehicles and pedestrians can get swept up in flood currents, increasing the risk of drowning. Even in shallow waters, fast-moving currents can carry individuals or vehicles into deeper waters, where pressure from flowing water can prevent drivers from escaping submerged vehicles. As little as six inches of floodwater can move a vehicle, and as little as two inches can move a person.
- Replenishment facilities, including percolation ponds, may be washed out by flooding, resulting in damage.
- Assets with electrical parts or motors may be damaged by flooding if these parts are submerged.
- Structures exposed to flooding, including critical facilities, can be severely damaged. Building contents can be lost, damaged, or destroyed, and floodwaters can compromise structures. Pressure from floodwater, especially as seepage through the soil, can damage foundations.
- Buildings exposed to floodwaters may develop mold or wood rot.

### 4.3.4 CYBER SECURITY

**Probability:** (50-75%) Likely—Cyber data for TPWD and its region indicate several attempted attacks on the District within the last five years. This equates to a cyber-attack every year on average or a 50 percent chance of a cyber-attack in any given year. Based on this data, TPWD determined that the future occurrences of a cyberattack within their boundaries continue to be likely. This section looks at all the hazards affecting the district within its boundaries, which the Planning Team identified.

**Impact:** Critical

**Priority:** Likely

**General Definition:** An attack via cyberspace, targeting an enterprise's use of cyberspace to disrupt, disable, destroy, or maliciously control a computing environment/infrastructure, destroy the integrity of the data, or steal controlled information.

**Climate Change Impacts:**

The following summarizes changes in exposure and vulnerability to the cyber security hazard resulting from climate change:

- **Population**– Population exposure and vulnerability to cyber security are unlikely to increase due to climate change.
- **Critical facilities –** All critical facilities' exposure and vulnerability will likely increase due to climate change.

**Vulnerability:** A cyber-attack on the water infrastructure would not affect the vulnerable population, as a water district can manually operate the water system if needed.

**Description:** Outside sources access electronic controls and processes to take over all electronic devices. The ability to control and gain access to critical records, information, and confidential data.

**Impact Statement:** Several types of cyberattacks can occur to the district, water, and wastewater control systems. Listed below are a few threats that the District is susceptible to:

- Malware
- Denial-of-Service (DoS) Attacks
- Phishing
- Spoofing
- Identity-Based Attacks
- Code Injection Attacks
- Supply Chain Attacks
- Insider Threats

# SECTION 5. COMMUNITY CAPABILITY ASSESSMENT

## 5.1 INTRODUCTIONS

The capability assessment aims to determine TPWD's ability to implement a comprehensive mitigation strategy and identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects.

The capability assessment has two components:

1. An inventory of the existing relevant plans, ordinances, or programs already in place and
2. An analysis of TPWD's capacity to bring them to fruition. A capability assessment highlights the positive mitigation activities within TPWD and will detect the potential gaps.

## 5.2 EMERGENCY MANAGEMENT

To help mitigate the potential impacts of disasters, TPWD joined CalWARN. The District has a mutual aid agreement with CalWARN covering most California water and wastewater agencies. As a government entity (Special District within California Law), the District can access the Emergency Managers Mutual Aid (EMMA) and the Emergency Management Assistance Compact (EMAC) for national mutual aid. In addition, the National WARN System can be accessed through the American Water Works Association.

CalWARN holds workshops twice a year for water agency members. It has been planning public outreach, so the public better understands hazard mitigation planning in their communities. These workshops promote mitigation and how to prevent hazards' impacts on the utility's infrastructure. CalWARN has access to utility leaders, their experiences during emergencies, and lessons learned on what they should have done differently. Sharing ideas and experiences is key to understanding mitigation in the future.

The District currently employs 24 full-time employees, and by joining CalWARN, the District can have hundreds of mutual aid workers at its disposal within hours of an emergency. Twentynine Palms Water District facilities' pressure zones, reservoirs, wells, fluoride treatment, and maintenance work are operated by certified operators and maintained by various certified technical disciplines. In addition, the District agrees with other water districts to support each other during an emergency by offering labor and equipment for the incident.

The General Manager has over 25 years of experience in water. He has been with TPWD for 17 years. Throughout his career with the District, he has been mitigating earthquake, flood, and drought impacts that face the utility.

Emergency Response Plan (ERP): An emergency response plan outlines responsibility and how resources are deployed during and following an emergency or disaster. The plan's primary objective is to guide the identification of potential emergencies, a timely and effective response, and the protection of the community's health and safety. The ERP guides the process when an

emergency occurs, including blueprinting general operations during a disaster, distributing and managing responsibilities among authorities, and identifying liability.

TPWD Emergency Response Plan was last revised in January 2024 and details how the District will respond to various emergencies and disasters. TPWD must be prepared to respond to a variety of threats that require emergency actions, including:

- Operational incidents, such as power failure or bacteriological contamination of water.
- Outside or inside malevolent acts, such as threatened or intentional contamination of water, intentional damage/destruction of facilities, detection of an intruder or intruder alarm, bomb threat, cyber security, or suspicious mail.
- Natural disasters such as earthquakes or floods result in downed power failures.
- Communications with critical users, media outreach, and public notification process

TPWD is also required to follow the Standard Emergency Management System (SEMS), the National Incident Management System (NIMS), and the Incident Command System (ICS) when responding to emergencies.

Emergency Operations Center (EOC): An EOC provides a location, on or off-site, from which an agency coordinates a disaster response operation. In times of non-disasters, EOCs typically provide a centralized hub for communication and security oversight. TPWD administrative building and operations yard have the potential for two EOCs, one being the primary event center and the secondary being the corporate yard.

Emergency Management Training and Staff: Dedicated emergency management staff and regular training help prepare an agency for events and guide effective response and recovery.

TPWD conducts regular emergency exercises, following their emergency training plan. This training trains staff across departments' divisions to assist with emergency response operations. Additionally, TPWD has a well-developed emergency notification process for critical staff.

## 5.3 PLANNING AND REGULATORY CAPABILITY

Planning and regulatory capability is based on implementing plans, policies, and programs that demonstrate TPWD’s commitment to guiding and managing growth while maintaining the general welfare of the community. This includes emergency response and mitigation planning, master planning, capital planning, and design and construction standards enforcement. Although conflicts can arise, these planning initiatives present significant opportunities to integrate hazard mitigation principles into TPWD’s decision-making process.

The Urban Water Management and Planning Act requires suppliers to estimate water demands and available water supplies. The TPWD updated Urban Water Management Plan (UWMP), which was completed in June 2021. UWMPs are required to evaluate the adequacy of water supplies, including projections of 5, 10, and 20 years. These plans must also include impacts of climate change and water shortage contingency planning for dealing with shortages, including a catastrophic supply interruption.

The Water Supply Reliability Assessment is a section of the plan that aims to understand the ability to satisfy the water demand during different years (e.g., years with average rainfall versus drier years).

**Water Shortage Contingency Plan (WSCP)**

Certain elements of the WSCP are required by the California Water Code (Water Code), including five specific response actions that align with six standard water shortage levels based on TPWD's water supply conditions and shortages resulting from catastrophic supply interruptions; TPWD WSCP was last updated 2021. The WSCP also contains TPWD procedures for conducting an annual water supply and demand assessment, the written decision-making process for determining supply reliability each year, and the data and methods used to evaluate reliability.

The WSCP is implemented through a series of ordinances requiring water use restrictions in different stages. For instance, stage 1 requires a 10% water use restriction, and stage 5 requires a greater than 50% water use restriction. The main method of reducing water use is using water budget-based tiered rate structures and penalties for overuse.

UWMPs are intended to be integrated with other urban planning requirements and management plans. Some of these plans include Water Master Plans, Recycled Water Master Plans, Integrated Resource Plans, Integrated Regional Water Management Plans, Groundwater Management Plans, Emergency Response Plans, and others.

## 5.4 EXISTING PLANS

The following emergency-related plans apply as appropriate:

- CalWARN Emergency Operations Plan – Updated every ten years
- The District's Illness Injury Prevention Plan (IIPP) – Updated annually
- The District's Urban Water Management Plan – Updated every five years
- Water Shortage Contingency Plan (WSCP)– Updated every five years
- San Bernardino County Fire Management Plan- Updated annually
- San Bernardino County Flood Master Plan- Updated annually
- USEPA PSPS SOP for Public Water Systems - Updated every five years

## 5.5 MITIGATION PROGRAMS

This area is in the High Desert east of Joshua Tree. This is a severely disadvantaged community. Most residents do not have air conditioning in their homes. In the desert, homes are cooled with evaporative coolers, and 99 % do not have grass or high water uses. This area is always in drought; therefore, water conservation is a way of life for this community. In addition to mitigating the effects of drought, the District has also implemented the following programs:

- The District participates in community events and speaking engagements, promoting conservation with educational material and explaining the uniqueness of relying solely on groundwater;
- The district stores disaster supply storage sheds in their corporate yard and the district office for employees during an emergency. The following items are stored in the old engineering offices in the Main building: cots, chairs, food bars, MREs, first aid kits, light sticks, batteries, blankets, personal sanitation kits, water, flashlights, etc.
- Each employee is given an emergency survival backpack containing a three-day food and water supply, first aid, and additional emergency supplies.
- The District maintains an Injury and Illness Prevention Plan;
- The District's SPCC Plan is updated annually for local and county fire hazardous materials departments.

## 5.6 FISCAL RESOURCES

The ability of TPWD to act is closely associated with the number of fiscal resources available to implement mitigation policies and projects. This may be outside grant funding awards or District-based revenue and financing. The cost of mitigation policy and project implementation vary widely. In some cases, mitigation actions are tied primarily to staff time or administrative costs associated with creating and monitoring a program. In other cases, direct expenses are linked to an actual project, such as installing backup power generators and sustainable energy resources, which can require a substantial commitment from TPWD and state and federal funding sources. TPWD has made fiscal commitments to mitigate hazards through its Capital Improvement Plan (CIP).

The following is a summary of the District's fiscal capabilities. Several governmental funds and revenue-raising activities can be allocated for hazard mitigation activities. Included below are potential sources of discretionary general funding from local, state, and federal resources.

- New connection fees from industrial users
- State and Federal grants

Through the California Department of Water Resources, local grants and/or loans are available for water conservation, groundwater management, studies, and activities to enhance local water supply quality and reliability. Project eligibility depends on the type of organization(s) applying and participating in the project and the specific type of project. More than one grant or loan may be appropriate for a proposed activity. Completing the LHMP will facilitate the acquisition of grant funding in the future. For instance, Building Resilient Infrastructure Communities (BRIC), Hazard Mitigation Grant Program (HMGP), or Flood Mitigation Assistance (FMA) grants. Grant opportunities will be reviewed annually to ensure funding is available for specific mitigation items.

## 5.7 CAPABILITIES ASSESSMENT

A Capability Assessment examines TPWD's capabilities to detect any existing gaps or weaknesses within ongoing activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for developing a meaningful hazard mitigation strategy. The list below outlines key capabilities TPWD will consider in the Mitigation Strategy.

1. **Coordinate** with the San Bernardino County Emergency Management to achieve interoperability of Web EOC software and representations in appropriate EOCs.
2. **Provide** necessary staffing and software for ongoing asset management program data maintenance.
3. **Add funding** for hazard mitigation actions to the District's Capital Improvement Program planning efforts.
4. **Incorporate** projects from the Capital Improvement Replacement Plan into the mitigation strategy (and vice versa).
5. **Expand** Public outreach and education on emergency management. This allows TPWD to form a plan to continually educate their customers regarding natural hazards and their effects on drinking water systems. They educate the residents on mitigating these hazards to build a more resilient community.
6. **Broaden** staff training: TPWD employees have experience with past hazard mitigation and hazard planning and can improve their hazard mitigation skills by participating in training offered by other agencies or other regional governments. This plan should continue educating grades K-12 in the local schools and on the TPWD website.

# SECTION 6. MITIGATION STRATEGIES

## 6.1 OVERVIEW

TPWD derived its mitigation strategy from the in-depth review of the existing vulnerabilities and capabilities outlined in previous sections of this plan, combined with a vision for creating a disaster-resistant and sustainable system for the future. This vision is based on informed assumptions that recognize mitigation challenges and opportunities and is demonstrated by the goals and objectives outlined below. The mitigation measures identified under each objective include an implementation plan for each measure. The measures were individually evaluated during discussions of mitigation alternatives, and the conclusions were used as inputs when priorities were decided. All priorities are based on the consensus of the Planning Team.

Mitigation measures are categorized generally for all hazards and specifically for the four high-risk hazards extensively examined in the risk assessment section. These hazards include earthquakes, climate change-induced drought, flooding, and cyber security.

## 6.2 MITIGATION GOALS, OBJECTIVES, AND PROJECTS

The process of identifying goals began with reviewing and validating the FEMA Hazard Maps for TPWD and surrounding cities in San Bernardino County. The team completed an assessment and discussion of whether each of the goals was valid. These discussions led to the opportunity to identify Goals and Objectives. In reviewing the mitigation objectives and actions, the Planning Team agreed that the following goals should be included in the LHMP.

Overall, the primary objective is to protect lives and prevent damage to infrastructure that disrupts water services. Global measures that apply across all hazards include:

- Continually improve the community's understanding of potential impacts due to hazards and the measures needed to protect lives and critical infrastructure.
- TPWD communications should provide public outreach to inform the public of the hazards identified to the drinking water system in emergencies, such as how to conserve water in the event of a disaster and obtain drinking water when water is unavailable.
- Continually provide State and Local Agencies with updated information about hazards, vulnerabilities, and mitigation measures at TPWD.
- Review and verify that the District's owned and operated infrastructure meets the minimum standards for safety;
- Review the District's facilities and developments in high-risk areas to verify that these areas are appropriately protected from potential hazards.
- Identify and mitigate imminent threats to life safety and facility damage.
- The four high-profile hazards for TPWD are earthquakes, climate change-induced drought, flooding, and cyber security. While other hazards were profiled in previous sections, TPWD priority and focus for the mitigation projects will be on the four high-profile hazards.

The table below shows the status of mitigation actions from the 2018 LHMP.

**Table 13 Completed Mitigation Actions from 2018 LHMP**

| Title/Mitigation Action | Completed (Year) |
|---|---|
| **Power Failure - Purchased generators with transfer switches** | 2024 |
| **Terrorist Events - Install video cameras at critical facilities** | 2023 - Ongoing |
| **Power Failure - Standardized all emergency generator hook-ups** | 2022 |
| **Terrorist Events – Installed Security Glass** | 2020 |
| **Generator Hook-up** | Completed |
| **Seismic Shout off values** | Ongoing |
| **Tie Down Equipment** | Completed |

## 6.3 EARTHQUAKE

**Goal:** To protect life and property in Twentynine Palms Water District in the event of an earthquake.

**Description:** *The goal is to avoid injury, loss of life, and property damage*. Southern California is susceptible to earthquakes because many earthquake faults dissect the state.

**Mitigation Projects:**

Below is the project's priority, the department responsible for this action, and the funding source. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. All the actions listed for each hazard were the only actions considered by TPWD. As TPWD is a community facing economic challenges, the district and its board must adhere to a stringent budget. Consequently, the District must seek opportunities to save costs or secure grants to finance capital and mitigation initiatives. The identified projects and current cost estimates include:

- Bolt down water reservoir facilities. Maintenance Superintendent or General Manager. (5 Years) $1.5 million. HMGP, BRIC, and CIP. High Priority.
- Seismic shut-off valves on all reservoirs. Maintenance Superintendent or General Manager. (5 Years) $1.5 million. HMGP, BRIC, and CIP. High Priority.
- Protect critical facilities and infrastructures by tying down equipment, strengthening buildings, training on following the emergency response plan, and opening an EOC. $1.5 Million. Maintenance Superintendent (5 Years). HMGP, BRIC, and CIP. High Priority.
- Conduct annual employee training on responding to an earthquake. This includes tabletop exercises, boots-on-the-ground exercises, and SIMS/NIMS training. $30,000 (annually) Safety. CIP. High Priority.

## 6.4 CLIMATE CHANGE INDUCED DROUGHT

**Goal:** To protect life and property in Twentynine Palms Water District in the event of a drought.

**Description:** *The goal is to avoid injury, loss of life, and property damage*. Due to Climate Change, there are more extremes in the weather, which means the summers can be hotter, the winters colder, and periods of rain can become less wet or wetter, which causes flooding. There is expected to be greater fluctuations in weather patterns, including prolonged dry periods and drought hazards, which can be mitigated over the long term.

**Mitigation Projects:**

Below is the project's priority, the department responsible for this action, and the funding source. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. All the actions listed for each hazard were the only actions considered by TPWD. As TPWD is a community facing economic challenges, the district and its board must adhere to a stringent budget. Consequently, the District must seek opportunities to save costs or secure grants to finance capital and mitigation initiatives. The identified projects and current cost estimates include:

- Improve operational efficiency system leaks and increase water pumping capabilities by installing additional production wells. Collection systems and leak surveys. Looking for water loss in the system, etc. $7 Million (5 Years) Maintenance Superintendent. HMGP, BRIC, CIP. High Priority.

## 6.5 FLOOD

**Goal:** To protect life and property in Twentynine Palms Water District in the event of flooding.

TPWD does not participate in the National Flood Insurance Program (NFIP).

**Description**: *The goal is to avoid injury, loss of life, and property damage*. A localized flood of significant volume and short duration is typically caused by hefty rain in a semiarid area. Floods

can reach their peak volume in a few minutes and often carry large loads of mud and rock fragments.

**Mitigation Projects:**

Below is the project's priority, the department responsible for this action, and the funding source. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. All the actions listed for each hazard were the only actions considered by TPWD. As TPWD is a community facing economic challenges, the district and its board must adhere to a stringent budget. Consequently, the District must seek opportunities to save costs or secure grants to finance capital and mitigation initiatives. The identified projects and current cost estimates include:

- Improve existing facilities and construct new facilities to mitigate flooding (*5 Years*) $2 Million. Maintenance Superintendent. BRIC, HMGP. Medium Priority.
- Install stormwater drainage. Assessment of access roadways and access points leading to facilities. Install diversion walls, block walls, and stem walls. (5 years). $3.5 Million. BRIC, FMA, HMGP, CIP. Treatment/Production Maintenance Superintendent. High Priority.

## 6.6 CYBER SECURITY

**Goal:** To protect life and property in Twentynine Palms Water District in the event of a cyber security attack.

**Description**: *The goal is to avoid injury, loss of life, and property damage*. Cyber-attacks can take many forms, such as malware, phishing, and insider threats. It is up to the District to train and protect against external or internal infiltration. The district will not share its cyber security planning within this LHMP as an added security measure.

**Mitigation Projects:**

Below is the project's priority, the department responsible for this action, and the funding source. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. All the actions listed for each hazard were the only actions considered by TPWD. As TPWD is a community facing economic challenges, the district and its board must adhere to a stringent budget. Consequently, the District must seek opportunities to save costs or secure grants to finance capital and mitigation initiatives. The identified projects and current cost estimates include:

- SCADA Server Upgrade. Communication system upgrade. $1,000,000(5 Years). High Priority. Maintenance Superintendent and Treatment/Production Superintendent. HMGP and BRIC.
- District-wide Video Surveillance Improvement. Update, install, and modernize video cameras and recording devices. $1 million. High Priority. (5 Years). IT, Maintenance Superintendent, Treatment/Production Superintendent. HMGP and BRIC.

## 6.7 MITIGATION PRIORITIES

During TPWD's risk assessment development, the Planning Team proposed and discussed alternative mitigation goals, objectives, and specific mitigation measures that TPWD should undertake to reduce the risk from the District's five high-risk hazards. Priorities from the 2018 LHMP have not changed for the 2024 plan.

The team considered multiple factors to establish the mitigation priorities included in this plan. It assigned the highest priority rankings to those mitigation measures that met three primary criteria:

- Greatest potential for protecting life and safety
- Greatest potential for maintaining critical District functions and operability following a disaster
- Achievability in terms of residents' support and cost-effectiveness

The consensus of the Planning Team determined all rankings. As described in the previous section on hazard and risk assessment, earthquakes can potentially affect the largest number of people, damage critical facilities and buildings, and cause the greatest economic losses. This fact, combined with the relatively high probability of an earthquake in the next several decades, makes increasing disaster resistance and readiness for earthquakes a high priority. Given the extreme importance of maintaining critical functions in times of disaster and the large number of customers who depend and rely on TPWD services and infrastructure, those mitigation measures that improve disaster resistance, readiness, or recovery capacity are generally given higher priority.

Earthquakes, climate change–induced drought, flooding, and cyber security mitigation actions are identified and assigned a priority according to their importance, cost, funding availability, the degree to which project planning has been completed, and the anticipated time to implement the measures.

Using the above rationale for establishing mitigation priorities, each mitigation measure is assigned a priority ranking as follows:

- High – Projects that will be the primary focus of implementation over the next five years
- Medium – Projects that may be implemented over the next five years
- Low – Projects that will not be implemented over the next five years unless conditions change (new program and funding source)

## 6.8 IMPLEMENTATION STRATEGY

The implementation strategy is intended to successfully mitigate the hazards identified in this plan within a reasonable time. TPWD is currently operating within its annual budget. TPWD revenues and capital improvement replacement projects have remained a priority. TPWD staff will review the Hazard Mitigation Plan each year before developing the next year's fiscal budget.

The Board of Directors will also review the plan for items to be included in the new fiscal budget. TPWD staff will also actively explore opportunities to secure Hazard Mitigation Grants annually to mitigate the effects on the fiscal budget and provide some relief to the residents. The following equation is the cost-benefit analysis equation used to ensure that the cost-benefit to the district is within FEMA guidelines. When completing a cost-benefit analysis with FEMA, the formula is all electronic but resembles the formula below.

$$B/C = \left[\frac{B_0}{(1+i)^0} + \ldots + \frac{B_T}{(1+i)^T}\right] \div \left[\frac{C_0}{(1+i)^0} + \ldots + \frac{C_T}{(1+i)^T}\right]$$

**Mitigation Projects Funding Source**

There is currently no mitigation money in the District's budget. When funding becomes available, the district will include mitigation in the budgeting process and consider what mitigation projects could be funded in future budget cycles.

**Timeframe**

Over the next five years, the District will incorporate mitigation into all capital improvement replacement projects it undertakes. The previous 2018 LHMP was incorporated in the CIP and other relevant planning mechanisms, including the Urban Water Management Plan, which incorporates LHMP mitigation projects.

The District will apply for mitigation grants each year as the opportunities become available in the State of California, County of San Bernardino. The District will consider all mitigation items while reviewing the Ten-Year Capital Improvement Replacement Plan and the annual budget workshops.

# SECTION 7. PLAN MAINTENANCE

## 7.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

The General Manager or his/her assignee will evaluate the plan annually and consider whether new hazards have emerged, community vulnerability has changed, and goals are still relevant to current conditions. This will be done by evaluating and recording completed mitigation actions and adding mitigation projects to the current LHMP. The LHMP will be reviewed as part of the Annual Budget Planning in the spring of each year and whenever there are new infrastructure updates within TPWD. The General Manager or his/her assignee will ensure the LHMP is reviewed annually, and any items that have been mitigated will be recorded within the plan. At that time, staff and the elected Board of Directors will review funding and capital improvement replacement projects in the next fiscal year's budget. Annually, the General Manager or his/her assignee and the Controller will review funding and determine the projects to be included in the next fiscal year's Capital Improvement Plan (CIP) budget. The General Manager or his/her assignee will include the LHMP in all budget planning and grant planning meetings. This will allow open discussion, evaluation, and assessment of the LHMP to achieve goals, allowing the addition and removal of mitigated items.

The General Manager or his/her assignee leads a full review of the LHMP at a three-and-a-half-year interval like the initial LHMP. At this time, the planning team headed by the operations department and including the general manager or their assignee will address progress in reaching mitigation goals, assessment of new and existing hazards, using the new revised FEMA review tool, cross referencing hazards from the county, and development of new mitigation strategies and goals will be addressed by the Planning Team headed by the Operations Department that will include the General Manager or his/her assignee.

The consumers within Twentynine Palms Water District and the District's personnel will be asked to participate in the LHMP update process. There has not been any substantial development within the service area in the last 5 years. In the 2018 LHMP, the plan was incorporated into planning documents for updates on water mains.

## 7.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

Once the State of California OES and FEMA approve the LHMP, TPWD will incorporate the LHMP into capital improvement replacement projects, capital replacement programs, building design, and any updates or repairs to the water distribution system. Information gathered from hazard profiles, such as flood maps and facility vulnerabilities, will be used as a resource document and support the plans, projects, and programs that will benefit the water system and building within the service area. TPWD will submit a Notice of Intent to the State of California to help facilitate opportunities in obtaining FEMA and State funding to mitigate hazards within the water system. The General Manager or his/her assignee will be responsible for implementing the LHMP and working toward the LHMP-recommended goals and objectives that are met. The

General Manager or his/her assignee will be responsible for placing the LHMP on the District's website and incorporating the LHMP into the annual budget planning meetings. The General Manager or his/her assignee will verify that the LHMP is updated and rewritten over a 5-year cycle. TPWD will start the update process one and a half years before the expiration date on this document.

## 7.3 CONTINUED PUBLIC INVOLVEMENT

The approved LHMP will be continuously posted with contact information on the TPWD's Website. The General Manager or his/her assignee is responsible for ensuring the LHMP is brought before the Board of Directors each year during Budget Planning. Public comments will be taken regarding the LHMP when the plan is updated in 2029, and projects that could be included in next year's budget will be considered. As new facilities are incorporated into TPWD, the LHMP will be updated to include new facilities and new hazards, if warranted. When the LHMP is rewritten and updated, the public can review it and coincide with the document's changes. It is the General Manager or his/her assignee's responsibility to ensure the LHMP is updated throughout the year and every 5 years.

The plan is reviewed annually. TPWD Operations Department and General Manager will conduct outreach with the nonprofit organizations, including community-based organizations, to represent the community's input into the updates. TPWD can also learn how community priorities have changed since the last update by conducting outreach to the public on construction, infrastructure improvements, and overall abilities.

# Appendix A
# Planning Team Meeting Matrix and Agendas

Table 14. Meeting Attendees

| Meeting Matrix/ Attendees | 10/12/23 Introduction meeting (In-Person) | 11/27/23 Working Session (In-Person) | 12/19/23 Working Session (In-Person) | 1/9/23 Citizens Advisory Committee Meeting Public Review Session (In-Person) | 1/15/24 Final Planning Meeting (Zoom) |
|---|---|---|---|---|---|
| Matt Shragg | X | X | X | X | X |
| Mike Minatrea | X | X | X | X | X |
| Cindy Fowlkes | X | X | X | X | X |
| Robert Shelton | X | X | X | X | X |
| Austin Murphy | X | X | X | X | X |
| Larry Bowden | X | X | X | X | X |
| Jane Rogers | X | X | X | X | X |
| Jayna Olsen | X | X | X | X | X |
| Gary Sturdivan | X | X | X | X | X |

**Twentynine Palms Water District**
**Local Hazard Mitigation Plan**
**February 27, 2024**
**In person**
**9:00 11:00**

1. Introductions Internal
2. Why are we here
3. What is a Local Hazard Mitigation Plan
4. CalOES and FEMA Approval
5. What must be included in the new LHMP since June of 2023
6. LHMP Review Tool
7. Public Involvement
8. At-Risk Population
9. Next Meeting Date and Time

**Twentynine Palms Water District**
**Local Hazard Mitigation Plan**
**March 21, 2024**
**ZOOM Meeting**
**10:00 – 11:30**

1. Introductions Internal
2. Sections 1-4 of the LHMP were sent to all
3. Sections 5-7 are under development
4. Start thinking of past events that have caused damage to the water system
5. What hazards are we going to include in the LHMP
6. What has been mitigated in the old plan, and what items will carry from the old plan to the new plan/What new items will be included
7. What damage incidents have been reported in the last five years
8. Reaching out to the public: how will this be done
9. Posing on the Website, customers billing, what else
10. Next meeting date and time

**Twentynine Palms Water District**
**Local Hazard Mitigation Plan**
**February 27, 2024**
**In-person**
**9:00 11:00**

1. Introductions Internal
2. Why are we here
3. What is a Local Hazard Mitigation Plan
4. CalOES and FEMA Approval
5. What must be included in the new LHMP since June of 2023
6. LHMP Review Tool
7. Public Involvement
8. At-Risk Population
9. Next Meeting Date and Time

**Twentynine Palms Water District**
**Local Hazard Mitigation Plan**
**March 21, 2024**
**ZOOM Meeting**
**10:00 – 11:30**

1. Introductions Internal
2. Sections 1-4 of the LHMP were sent to all
3. Sections 5-7 are under development
4. Start thinking of past events that have caused damage to the water system
5. What hazards are we going to include in the LHMP
6. What has been mitigated in the old plan, and what items will carry from the old plan to the new plan/What new items will be included
7. What damage incidents have been reported in the last five years
8. Reaching out to the public: how will this be done
9. Posing on the Website, customers billing, what else
10. Send me any comments within three weeks
11. Next meeting date and time

**Twentynine Palms Water District**
**Local Hazard Mitigation Plan**
**April 23, 2024**
**In-Person Meeting**
**10:00 – 11:30**

1. Introductions
2. Sections 1-7 of the LHMP were sent to all members
3. LHMP was posted on the District Website, and customer's bills
4. No comments from the team members
5. Any other questions or concerns
6. No other meetings will be scheduled at this time
7. A draft plan will be shared after it is formatted, revised, and reposted on the District's Website for a 30-day public comment period before going to CalOES.
8. Thank you for your time and efforts

# Appendix B
# Public Outreach

**Figure 10. TPWD Public Outreach through Website**

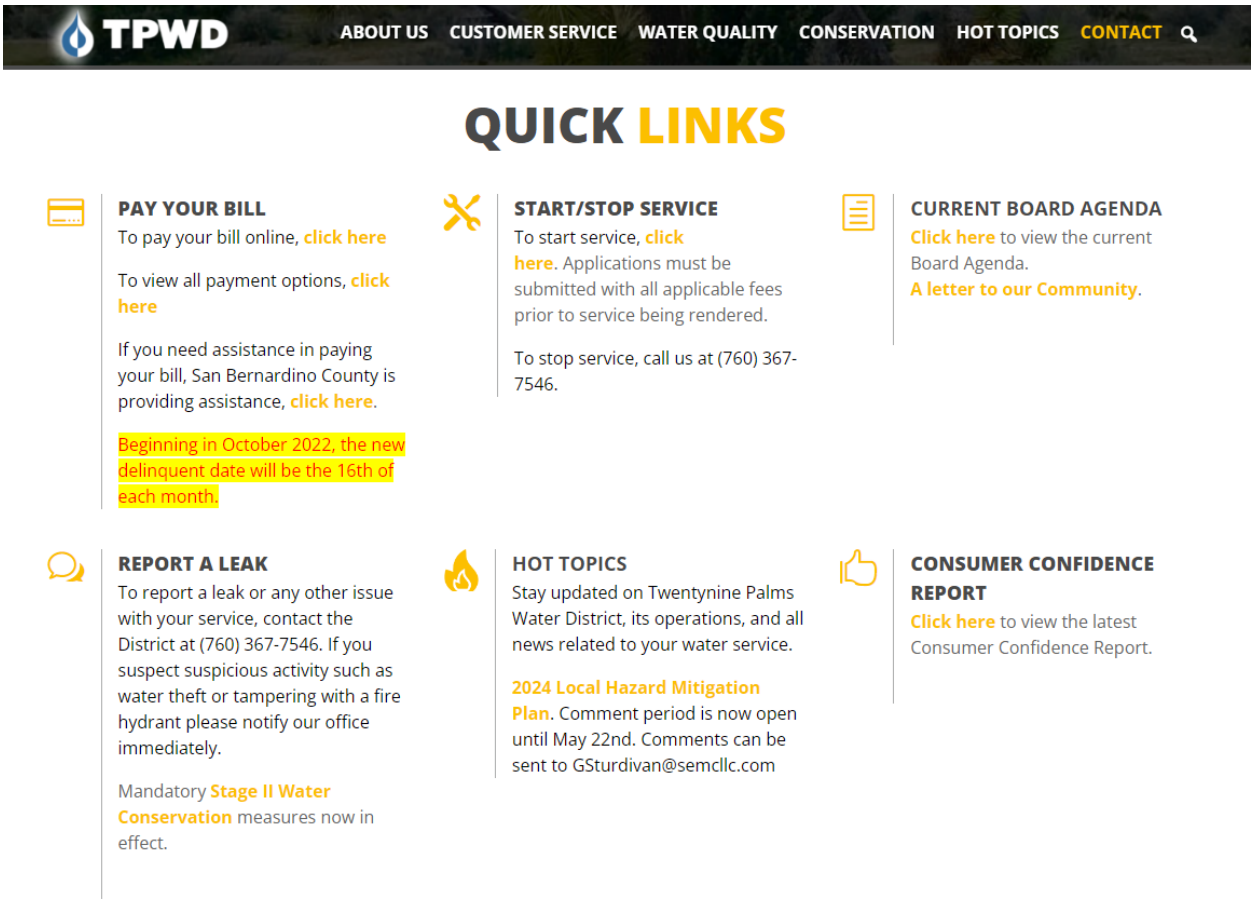
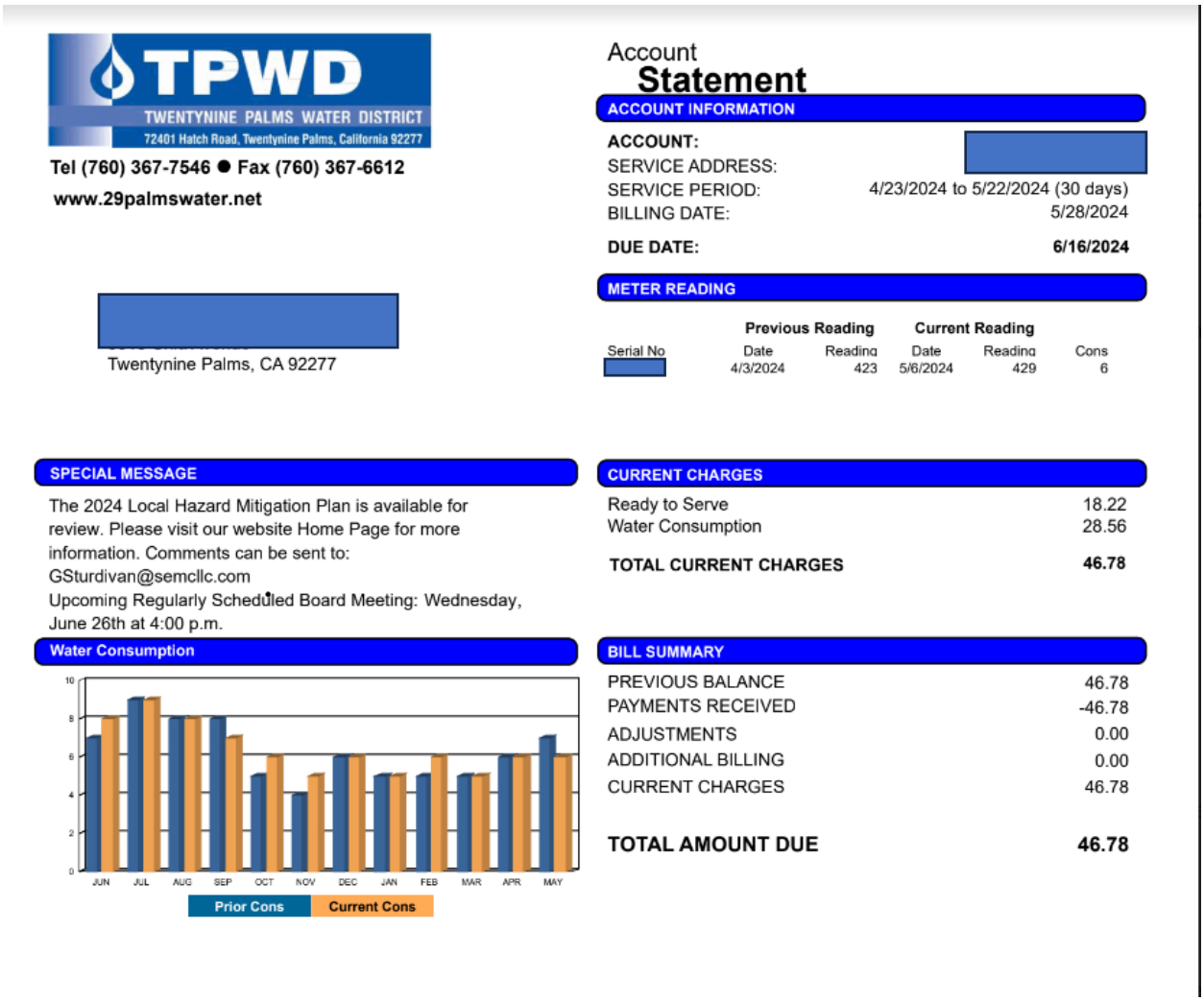


**Figure 11. Bill Insert to Customers**



TPWD
TWENTYNINE PALMS WATER DISTRICT
72401 Hatch Road, Twentynine Palms, California 92277
Tel (760) 367-7546 ● Fax (760) 367-6612
www.29palmswater.net

[redacted]
Twentynine Palms, CA 92277

Account
**Statement**

**ACCOUNT INFORMATION**

**ACCOUNT:** [redacted]
SERVICE ADDRESS:
SERVICE PERIOD: 4/23/2024 to 5/22/2024 (30 days)
BILLING DATE: 5/28/2024

**DUE DATE:** **6/16/2024**

**METER READING**

| | Previous Reading | | Current Reading | | |
|---|---|---|---|---|---|
| Serial No | Date | Reading | Date | Reading | Cons |
| [redacted] | 4/3/2024 | 423 | 5/6/2024 | 429 | 6 |

**SPECIAL MESSAGE**

The 2024 Local Hazard Mitigation Plan is available for review. Please visit our website Home Page for more information. Comments can be sent to: GSturdivan@semcllc.com
Upcoming Regularly Scheduled Board Meeting: Wednesday, June 26th at 4:00 p.m.

**CURRENT CHARGES**

| | |
|---|---|
| Ready to Serve | 18.22 |
| Water Consumption | 28.56 |
| **TOTAL CURRENT CHARGES** | **46.78** |

**Water Consumption**




**BILL SUMMARY**

| | |
|---|---|
| PREVIOUS BALANCE | 46.78 |
| PAYMENTS RECEIVED | -46.78 |
| ADJUSTMENTS | 0.00 |
| ADDITIONAL BILLING | 0.00 |
| CURRENT CHARGES | 46.78 |
| **TOTAL AMOUNT DUE** | **46.78** |




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