2020 PART 1: REGIONAL CONTEXT

UPPER SANTA ANA RIVER WATERSHED

INTEGRATED REGIONAL URBAN WATER MANAGEMENT PLAN

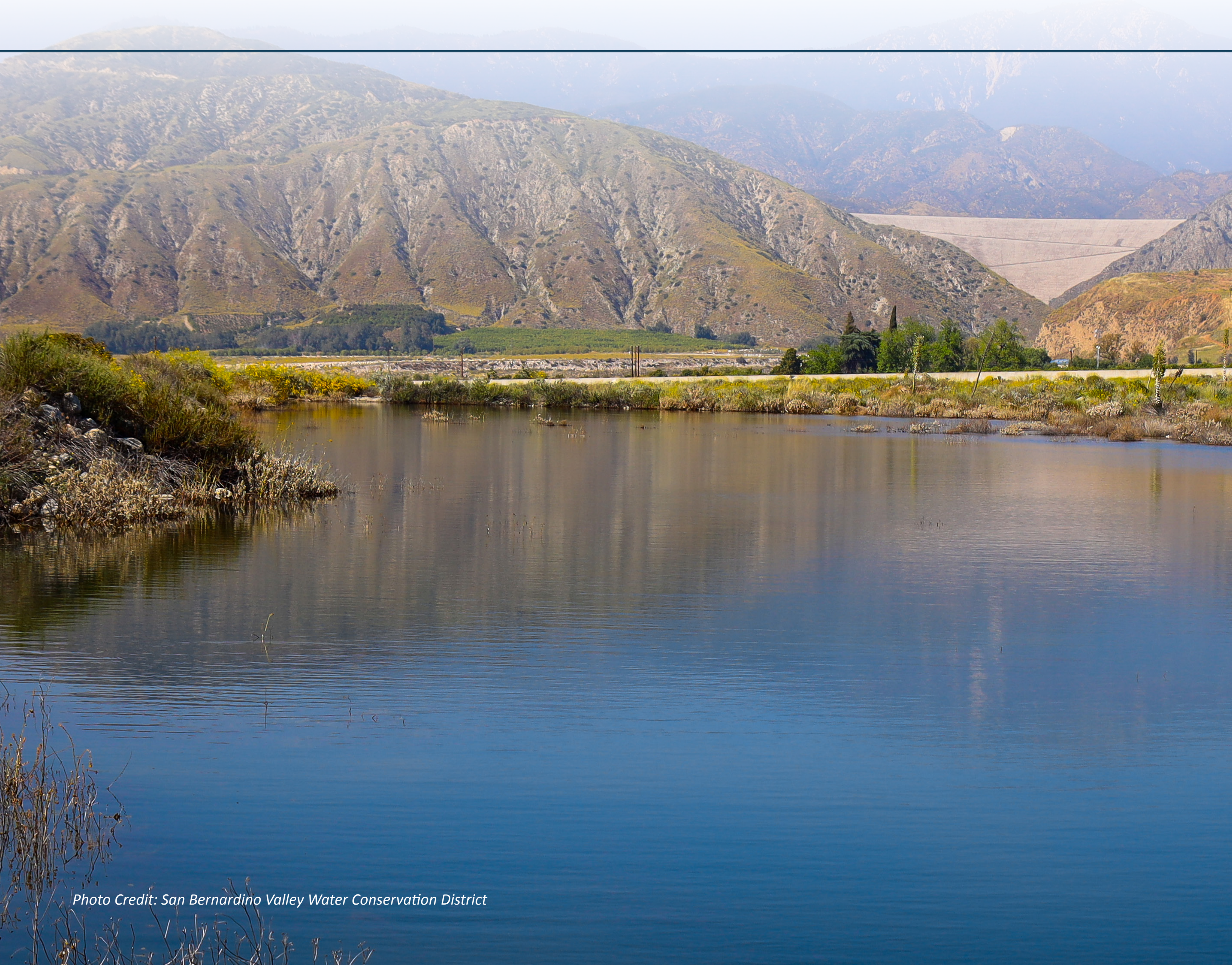

Photo Credit: San Bernardino Valley Water Conservation District

UPPER SANTA ANA RIVER WATERSHED

2020 IRUWMP

Regional Context

JUNE 2021

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ACRONYMS & ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
AB	Assembly Bill
AF	Acre Foot
AFY	Acre Feet per Year
AHHG	Area of Historic High Groundwater
AMR	Automatic Meter Reader
APA	Administrative Procedures Act
AWWA	American Water Works Association
BMP	Best Management Practice
CALWARN	California Water/Wastewater Agency Response Network
CAT	Climate Action Team
CCF	Hundred Cubic Feet
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFS	Cubic Feet per Second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
CUWCC	California Urban Water Conservation Council
DCR	DWR SWP Delivery Capacity Report
DDW	SWRCB Division of Drinking Water
DFW	California Department of Fish and Wildlife
DIP	Ductile Iron Pipe
DMM	Demand Management Measure
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
ERNIE	Emergency Response Network of the Inland Empire
ESA	Endangered Species Act
ET	Evapotranspiration
ETo	Reference Evapotranspiration

GAC	Granulated Activated Carbon
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
IX	Ion Exchange
KAF	Thousand Acre Feet
KAFY	Thousand Acre Feet per Year
LAFCO	Local Agency Formation Commission
MAF	Million Acre-Feet
MCL	Maximum Contaminant Level
MF	Multi-family
MG	Million Gallons
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MSL	Mean Sea Level
MTBE	Methyl Tertiary Butyl Ether
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PCE	Perchloroethylene
PVC	Polyvinyl Chloride
QWEZ	Qualified Water Efficient Landscaper
RIX	Rapid Infiltration and Extraction
RPA	Reasonable and Prudent Alternative
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SBX7-7	Senate Bill 7 of Special Extended Session 7
SF	Single Family
SOC	Synthetic Organic Chemicals
SOI	Sphere of Influence
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TCE	Trichloroethylene
ULFT	Ultra-Low Flush Toilet

UV	Ultraviolet
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
VOC	Volatile Organic Compound
WBIC	Weather Based Irrigation Controller
WSCP	Water Shortage Contingency Plan
WFF	Water Filtration Facility
WSS	Water Sense Specification
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

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PART 1: REGIONAL CONTEXT

Introduction

The 2020 Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan will serve as a roadmap for regional water resource planning for the next 5 years. The first of its kind in California, it combines the common elements of an Integrated Regional Water Management Plan and a Regional Urban Water Management Plan into a single cohesive planning framework for the future. This chapter describes the purpose and organization of the plan, the stakeholders, and the collaborative process to develop the plan.

This document presents the 2020 Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan (Plan or IRUWMP). This Plan combines two of the region's foundational documents, the Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWM Plan) and the San Bernardino Valley Regional Urban Water Management Plan (Regional UWMP).

Valuable synergies are realized by combining these two documents into one, including a single integrated dataset, a consolidated reference document, enhanced collaboration, and truly integrated planning and decision-making.

IN THIS SECTION

- Background and purpose
- Plan organization
- Stakeholder Participation
- Plan adoption
- Relation to other planning efforts

Through careful and thoughtful integrated regional planning, the participation of water managers and stakeholders, and the development of robust water management strategies and implementation tools, the water agencies of the Upper Santa Ana River Watershed (Region) continue to improve their water supply reliability, resilience to drought and climate change and regional self-reliance for future water supplies.

Ongoing implementation and adaptation of this Plan will help the Region continue to increase self-reliance, while providing reliable, high quality water to support economic growth and thriving local communities. The Plan also reflects the Region's dedication to protecting its groundwater basins from water quality degradation and threat of liquefaction, as well as maintaining the Region's valuable natural and recreational water resources, as well as open space and habitat.

Photo Credit: San Bernardino Valley Water Conservation District

1.1 Background and Purpose

1.1.1 IRWM Plan

State lawmakers created the IRWM Planning Act in 2002 to encourage local entities to improve water quality and water supply reliability to meet the state's overall agricultural, domestic, industrial, and environmental water needs. IRWM is an efficient model for inclusive and equitable water management planning and delivers higher value for investments by utilizing early and collaborative stakeholder processes to develop multi-benefit projects that help diversify a region's water management portfolio to achieve multiple social, economic, and environmental benefits and to prioritize funding that may become available from the State.

In 2005, the San Bernardino Valley Municipal Water District (Valley District) and 15 other agencies in the Upper Santa Ana River (SAR) watershed (Region or Upper SAR Region) decided to develop the Region's first IRWM Plan to collaboratively develop water management strategies for the communities of the Upper SAR watershed; the plan was completed in 2007. The agencies that developed the 2007 IRWM Plan formed a Technical Advisory Group (TAG) to implement the plan, which became the Basin Technical Advisory Committee (BTAC) described in the IRWM Plan.

The Region has a history of innovation and has made continuous enhancements to the regional planning process with each cycle, including:

- The unique document structure of each RUWMP and this Plan preserves each agency's ability to independently convey unique water management considerations for their service area while leveraging the regional information and activities that are applicable to all.
- Inclusion of specific, measurable IRWM objectives beginning with the 2015 IRWMP.
- Inclusion of a wet year water budget beginning with the 2015 RUWMP to communicate the importance of utilizing and storing surface water supplies during wet years for later use during dry years.
- Inclusion of a 30-year drought scenario beginning in the 2020 IRUWMP since the region has gone through a 30-year drought in the past and is currently in a drought that has lasted 22 years so far.

The primary purpose of the IRWM Plan is to encourage integrated planning among the agencies in the Region. The IRWM Plan provides a comprehensive look at the area's water resources and includes management strategies to help meet the long-term water needs of the area. The IRWM Plan is a critical document for prioritizing regional investments in water management and facilitating the use of state and federal grant funds for those projects. The IRWM Plan was last updated in January of 2015 and is scheduled to be updated every five years. Each update provides an opportunity to review the objectives and targets laid out in the previous IRWM Plan and determine if they should be revised to reflect the current water resources management setting. This includes the opportunities to add new projects, determine how implemented projects provide benefits to the region, and to develop new, regional projects. These components require significant input from and collaboration among participating agencies.

1.1.2 Regional UWMP

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which are required to be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMP Act) of 1983, including amendments that have been made to the UWMP Act and other applicable regulations. The UWMP Act requires urban water suppliers servicing 3,000 or more connections or supplying more than 3,000 acre-feet (AF) of water annually, to prepare an UWMP. For wholesale water agencies without retail connections, the requirement is triggered by the annual delivery of 3,000 AF or more. Since the original UWMP Act was passed, it has undergone significant expansion in response to droughts, groundwater overdraft, regulatory revisions, and changing climatic conditions that affect the reliability of each water supplier. Implementation of the UWMP Act is overseen by the California Department of Water Resources (DWR).

An UWMP is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers. A UWMP is a long-term, general planning document, rather than 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 a number of factors. From this perspective, it is appropriate to look at a UWMP as a general planning framework, not a specific action plan.

It is an effort to generally answer a series of planning questions including:

1. **What are the potential sources of supply and what is the reasonable probable yield from them?**
2. **What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?**
3. **How well do supply and demand figures match up, assuming that the various probable supplies will be pursued by the implementing agency?**

Using these “framework” questions and resulting answers, the implementing agency may pursue a range of feasible and cost-effective options and opportunities to meet demands.

Water purveyors are permitted by DWR to work together to develop a cooperative regional UWMP. In 2010 and again in 2015, a regional approach was adopted by the San Bernardino Valley Municipal Water District (Valley District), a wholesale water supplier, and nine retail water agencies who coordinated to prepare the San Bernardino Valley Regional UWMP. The purpose of jointly preparing the Regional UWMP was to facilitate a consistent evaluation of water sources common to the various agencies, to take advantage of group knowledge and experience, and to reduce preparation costs. The Regional UWMP is focused on meeting reporting requirements established by DWR to implement the California Water Code. The

Regional UWMP references and duplicates much of the information about regional supplies and water use that was included in the IRWM Plan and is prepared by many of the same agencies.

The Regional UWMP was last updated in June of 2016 and was subsequently amended with minor revisions in 2017. The next update of the Regional UWMP is due to be submitted to DWR by July 1, 2021.

1.1.3 2020 Integrated Regional Urban Water Management Plan

Both the IRWM Plan and the Regional UWMP are due to be updated. Rather than continue updating these overlapping documents independently, Valley District and its partners decided to combine them into a single new, single cohesive document. This combined document is the first of its kind in California. It meets all of the requirements of both the UWMP Act and the IRWM Planning Act and serves as a roadmap for water resource planning within the Region for the next 5 years.

Some of the stakeholders participating in this Plan are not urban water suppliers so the UWMP Act does not apply, while others who are urban water suppliers are preparing separate 2020 UWMPs that are not directly included in this Plan. For those with separate 2020 UWMPs, data from those plans was provided for use in this Plan to maintain alignment with other planning documents and to provide a comprehensive summary of water resources, supplies and demands for the Region.

Table 1-1 provides a summary of previous plan participation for each agency and whether this Plan serves as a particular agency's 2020 UWMP (UWMP Agencies).

Table 1-1. Stakeholder Participation by Plan Development

PARTICIPATING AGENCY	PREVIOUS REGIONAL PLANS: 2007 IRWM PLAN	2015 IRWM PLAN	2010 REGIONAL UWMP	2015 REGIONAL UWMP	2020 IRUWMP: PLAN PARTICIPANT	SERVES AS 2020 UWMP
Big Bear City Community Services District		✓			✓	No
City of Big Bear Lake Department of Water		✓			✓	No
City of Colton	✓		✓	✓	✓	Yes
City of Loma Linda	✓	✓	✓	✓	✓	Yes
City of Redlands	✓	✓	✓	✓	✓	Yes
City of Rialto	✓	✓		✓	✓	Yes
City of Yucaipa		✓				
City of San Bernardino Municipal Water Department	✓	✓	✓	✓	✓	Yes
East Valley Water District	✓	✓	✓	✓	✓	Yes
Elsinore Valley Municipal Water District					✓	No
Fontana Water Company	✓	✓			✓	No
Riverside Highland Water Company				✓	✓	Yes
City of Riverside Public Utilities Department	✓	✓			✓	No
San Bernardino County Flood Control District	✓	✓			✓	N/A
San Bernardino Valley Municipal Water District	✓	✓	✓	✓	✓	Yes
San Bernardino Valley Water Conservation District	✓	✓			✓	N/A
San Gorgonio Pass Water Agency	✓	✓			✓	No
South Mesa Water Company[1]					✓	Yes
West Valley Water District	✓	✓	✓	✓	✓	Yes
Western Municipal Water District					✓	No
Yucaipa Valley Water District	✓	✓	✓	✓	✓	Yes

1. South Mesa Water Company was below the urban water supplier threshold as of 2020 but has elected to prepare a 2020 UWMP.

1.2 Plan Organization

This Plan is organized to meet the requirements of the IRWM Planning Act for the Region and the requirements of the UWMP Act for the eleven agencies identified in Table 1-1. Each participating agency has reviewed, adopted, and will implement the portions of this Plan relevant to their agency.

This Plan is organized into four parts:

Part 1: Regional Context

Part 1 contains the information needed to meet the requirements of the IRWM Planning Act for the Region and a portion of the UWMP Act requirements for the UWMP Agencies. Part 1 is organized into the following chapters:

Chapter 1 Introduction
Chapter 2 Region Description
Chapter 3 Regional Water Sources and Management
Chapter 4 Regional Water Use
Chapter 5 Comparison of Regional Supplies and Demands
Chapter 6 Water Management Goals, Objectives, and Strategies
Chapter 7 Projects
Chapter 8 Implementation, Performance and Adaptive Management

Part 2: Individual Agency UWMPs

Part 2 includes a chapter for each of the eleven UWMP Agencies. Each chapter is supplemental to the regional information presented in Part 1 and contains the additional information and analysis for each agency needed to meet the UWMP Act requirements. Each agency chapter provides service area information, past water use, projections of population, demand, and supply for a 25-year planning period, an evaluation of water supply reliability and drought risk assessment, a description of demand management measures and a summary of the agencies' Water Shortage Contingency Plan. Part 2 is organized into the following chapters:

Chapter 1 San Bernardino Valley Municipal Water District
Chapter 2 City of Colton
Chapter 3 City of Loma Linda
Chapter 4 City of Redlands
Chapter 5 City of Rialto
Chapter 6 East Valley Water District
Chapter 7 Riverside Highland Water Company
Chapter 8 San Bernardino Municipal Water Department
Chapter 9 South Mesa Water Company
Chapter 10 West Valley Water District
Chapter 11 Yucaipa Valley Water District

Part 3: Regional Supporting Information

Part 3 includes all of the supporting documentation referenced in Part 1 that is applicable to the region as well as the regulatory compliance guide that DWR will use to verify that Part 1 meets the IRWM requirements.

Part 4: Local Agency Supporting Information

Part 4 includes a set of supporting documentation for each UWMP Agency corresponding to their respective chapters in Part 2. Documents for each agency will include the regulatory compliance guide that DWR will use to verify the agency has met the UWMP Act requirements, proof of public hearing notices, water supply agreements specific to that agency, the Water Shortage Contingency Plan and the completed tables that are required to be submitted to DWR.

1.3 Regional Governance and Stakeholder Involvement

Stakeholder participation is critical to the success of the Plan. The agencies in the Region and the larger SAR watershed have a long history of working together to solve water resources related issues. These agencies recognize planning efforts such as IRWM and urban water management planning as additional opportunities to work collaboratively to manage water resources on a regional level. The organizational structure of the Region's governance reflects this long history of openly working together. The open nature of the Region's governance structure allows for effective inter- and intra-regional collaboration, and a range of stakeholders that help to provide a balance in interest groups.

1.3.1 Regional Water Management Group

One requirement of the IRWM Program is formation of a Regional Water Management Group (RWMG). Under the IRWM Program, RWMGs are responsible for developing and implementing IRWM Plans, and therefore must have statutory authority over water supply or water management.

Agencies in the Region have a long history of working together to coordinate management of the Region's water resources, evidence of which can be seen in the various legal agreements provided in Chapter 3 related to surface water diversions, groundwater supply, water quality, and habitat preservation. The 2007 IRWM Plan was developed by several agencies that formed the TAG. The TAG later became the BTAC, which was formed through the IRWM planning process to facilitate updates and implementation of the IRWM Plan and serves as the Region's RWMG.

Agencies that participate in the BTAC at the time of this Plan include:

- Bear Valley Mutual Water Company
- City of Colton
- City of Loma Linda
- City of Redlands Municipal Utilities and Engineering Department
- City of Rialto
- City of Riverside Public Utilities Department (Riverside Public Utilities)
- East Valley Water District
- Elsinore Valley Municipal Water District
- Fontana Water Company
- San Bernardino County Flood Control District
- San Bernardino Municipal Water Department
- San Bernardino Valley Municipal Water District (Valley District)
- San Bernardino Valley Water Conservation District
- West Valley Water District
- Western Municipal Water District
- Yucaipa Valley Water District

Since adoption of the original IRWM plan in 2007 and update of the IRWM plan in 2015, the BTAC has been implementing the strategies in the IRWM Plan. Dialogue and cooperation have improved between agencies, improving regional planning. Participation in the BTAC is open to any agency that chooses to participate.

1.3.2 Governance Structure

The Region has a distributed governance structure consisting of the BTAC, whose members provide recommendations to their respective governing bodies who then make decisions regarding water resources planning and projects in the Region, and stakeholders who are encouraged to take part in IRUWMP development and implementation. The IRUWMP document serves as an MOU for those agencies who adopt the Plan, as by adopting they have agreed to implement and use the Plan as a governing document.

The BTAC strives for consensus when making decisions, and in those cases where consensus cannot be reached, has provided a forum for discussion and early resolution of water issues in the region. If disputes cannot be resolved at this level, they are elevated to the policy level (governing bodies). The policy level is continuously informed by BTAC agencies' staff.

1.3.3 Stakeholder Identification and Involvement

In the initial stages of the planning process for the first IRWM Plan completed in 2007, the Region identified a list of stakeholders. In general, the stakeholders for this planning process are described by four categories: (1) members of the BTAC as listed above, (2) other regional stakeholders and water agencies located in the Upper SAR watershed region, (3) watershed-based stakeholders located in the SAR watershed that are part of the larger integrated planning for the region discussed in the SAWPA Plan, and (4) federal and State of California

Other Regional Water Agencies and Stakeholders

- Beaumont-Cherry Valley Water District
- Big Bear Area Regional Wastewater Agency
- Big Bear City Community Services District*
- Big Bear Lake Department of Water and Power*
- Big Bear Municipal Water District
- City of Beaumont
- City of Calimesa
- City of Fontana
- City of Grand Terrace
- City of Highland
- City of Jurupa Valley
- City of Yucaipa
- County of Riverside
- County of San Bernardino
- Inland Empire Resources Conservation District
- Jurupa Community Services District
- Metropolitan Water District of Southern California
- Marygold Mutual Water Company
- Muscoy Mutual Water Company
- Orange County Flood Control District
- Regents of the University of California
- Riverside County Board of Supervisors
- Riverside County Flood Control and Water Conservation District
- Riverside Highland Water Company*
- Rubidoux Community Services District
- San Bernardino County Flood Control District
- San Bernardino County Board of Supervisors
- San Gorgonio Pass Water Agency*
- San Manuel Band of Mission Indians
- South Mesa Water Company*
- Terrace Water Company
- Western Heights Mutual Water Company

Santa Ana Watershed-based Stakeholders

- SAWPA and its other member agencies (Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District

State and Federal Stakeholders

- California Department of Fish and Game
- California Department of Public Health
- California Department of Toxic Substances Control
- California Department of Water Resources
- California State University San Bernardino/Water Resources Institute
- Santa Ana Regional Water Quality Control Board
- State Water Resources Control Board (SWRCB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Forest Service

**Participated in the development of this Plan* agencies that were encouraged to participate throughout development of the Plan. The BTAC has encouraged local agencies to be active in the development of the Plan and to participate in the planning process. Specific steps taken by the BTAC to inform and encourage stakeholders' participation are discussed below.

The BTAC assembled a list of stakeholders in the Region and sent a letter to each stakeholder on behalf of all of the Plan participants, informing them of the planning process and encouraging them to participate. This outreach also served as the 60-day notice to cities and counties in the Plan as required by the UWMP Act.

BTAC meetings continue to be open to stakeholders to attend and contribute to the regional planning process. Meeting announcements and agendas are emailed out to a comprehensive mailing list that includes both BTAC members and stakeholders. Agendas are also posted on Valley District's website in advance so all agencies, other stakeholders, and interested parties can participate throughout the planning process in discussion of the issues in which they were interested. The Region recognizes that stakeholders are necessary for the successful implementation of the Plan, particularly the implementation of projects that will help the Region to meet the objectives and strategies discussed in in later chapters of this Plan.

To obtain additional information on the Region's water supply and water resources planning and management efforts, stakeholders are invited to contact any member of the BTAC to find out more information and get added to the email list.

1.3.4 Disadvantaged Community and Tribal Outreach

In addition to the general stakeholder outreach discussed above, the IRUWMP process included efforts to coordinate with disadvantaged communities (DACs) and Tribes to identify potential water resource needs. Since DAC areas are contiguous portions of each of the water agencies' service areas, they receive equal services to non-DAC areas and are represented by the agencies participating in the Plan. However, these agencies have also noted that DAC issues will be included as an element of future planning efforts. In addition, Tribal representatives of the San Manuel Band of Mission Indians were invited to Plan development workshops that identified the needs and defined objectives for the Plan.

In addition to inviting stakeholders from DACs and Tribes to Plan workshops, a larger watershed wide outreach effort was recently conducted by the Santa Ana Watershed Project Authority to determine the strengths and needs of disadvantaged, economically distressed or underrepresented communities in the Santa Ana River Watershed. This effort, funded through DWR's Disadvantaged Communities Involvement Program, was completed in 2019 and conducted listening sessions with local communities, elected officials, water agencies, and mutual water companies. The findings of this effort are recorded in the Community Water Ethnography of the Santa Ana Watershed (**available on the SAWPA website at this link**), and needs relevant to the Upper Santa Ana River Watershed are incorporated into this Plan.

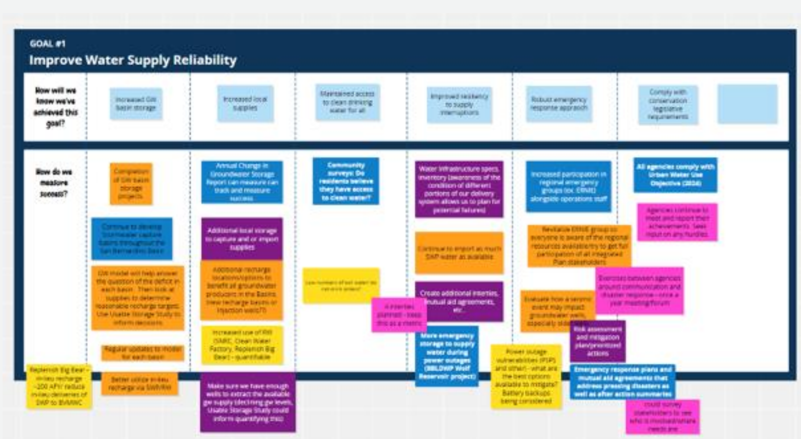
1.4 Plan Preparation Process

1.4.1 Public Participation

Management of water resources in the Region takes place within a complex legal and institutional framework. Development of this IRUWMP, a comprehensive and coordinated regional water management plan, involved the cooperation of many parties interested in water management. The BTAC solicited public involvement in the planning process by presenting updates at regularly scheduled BTAC meetings and at regularly scheduled Board and Council meetings of some BTAC agencies, as well as soliciting public comments on the draft IRUWMP via email announcements and website postings. In addition, workshops were conducted to develop additional information needed for the IRUWMP to meet the requirements of IRWM Plans as described in the 2016 Integrated Regional Water Management Grant Program Guidelines and UWMPs as described in the 2020 Urban Water Management Plan Guidebook. The BTAC encouraged public participation in preparation of this Plan to ensure the public's comments were considered in decisions about water management in the Region.

1.4.2 Stakeholder Workshops

Participating agencies collaborated in the development of the Plan through a series of individual meetings and regional workshops to update elements of the plan and review and provide feedback on preliminary results. A summary of the meetings and workshops that were used to collaborate on development of the Plan are summarized in **Table 1-2**. Meeting presentations and materials for the regional workshops are included in **Part 3**.



Due to the COVID-19 pandemic, stakeholder collaboration for plan development was conducted remotely. Stakeholders participated in a series of interactive virtual workshops where they broke into small groups to provide input on needs, goals and objectives using a virtual whiteboard and sticky notes.

Table 1-2. Plan Development Meetings and Regional Workshops

MEETING OR WORKSHOP	PURPOSE	DATE
Regional Workshop #1	Kickoff Plan and engage stakeholders Define expectations Review plan development process Highlight critical path workplan	October 5, 2020
UWMP Agency Individual Kickoff Meetings	Provide Plan development process overview Review what has changed since 2015 for that may impact the agency's UWMP Review key new requirements for 2020 UWMPs Identify data and coordination needs to address these changes and update the analysis	October – November 2020
Regional Workshop #2	Provide update on workplan and progress Measure Progress Toward 2015 IRWM Plan Goals & Objectives Start discussion to inform updated Goals & Objectives for the 2020 Plan	November 16, 2020
Regional Workshop #3	Update on the results of a reliability study prepared by RAND and how it can support the Plan Discuss Population and Demand Projection Approach for agency UWMP Chapters	January 11, 2021
UWMP Agency Individual Working Sessions	Review outstanding data needs Review preliminary population and demand projections Discuss supply assumptions Discuss Water Shortage Contingency Plan development	February – March 2021
Regional Workshop #4	Gather feedback on draft 2020 Goals and Objectives Discuss the project scoring process and potential updates Initiate a call for projects to be listed in the Integrated Urban Plan Discuss elements of the plan implementation	February 22, 2021
Regional Workshop #5	Review population and Demand Projection Trends Discuss Water Use Efficiency Assumptions Review Key Supply Assumptions Discuss Application of a Reliability Factor Discuss Preliminary Regional Water Budget	March 15, 2021
Regional Workshop #6	Provide an overview of the structure and contents of the Draft Plan Highlight key changes and additions since the last plan and specific areas to focus reviews Discuss the adoption process and schedule for completion of the final Plan	April 12, 2021
UWMP Agency Individual Working Sessions	Discuss comments and refinements needed to draft agency chapters	February – March 2021

1.4.3 Planning, Reports and Technical Analyses

A considerable amount of available information was used to develop this IRUWMP. Table 1-3 shows the data or study used, how the data were analyzed, the results and information derived from the data or study, and how the information was used in the Plan.

Table 1-3: Planning, Reports and Technical Analyses Used in the IRUWMP

DATA OR STUDY	ANALYSIS METHOD	RESULTS/DERIVED INFORMATION	USE IN IRUWMP
Water agency billing and production records	Review of current drinking water supplies and demands, and facilities	Current supplies and demands, quality concerns and facility descriptions	Used to update the water budget, and describe current water supplies and demands, as well as describe current facilities and drinking water quality concerns
Court Judgments and Agreements	Review of current groundwater and surface water management activities	Current groundwater and surface water supply management activities	Used to describe groundwater and surface water management activities and develop strategies
Santa Ana River Watermaster Reports	Review of past and current Santa Ana River flows	Past and current Santa Ana River flows	Used to describe flows in the Santa Ana River, and demands on flows
Groundwater level data	Review of past and current groundwater levels	Groundwater level trends	Used to describe history of groundwater levels and develop strategies
U.S. Geological Survey (USGS) models and reports	Review of models and reports focused on groundwater basins	Descriptions of groundwater basins and groundwater supply	Used to describe groundwater basin areas and groundwater supply; Models used to test management strategies
Contaminant plume(s) data	Review of contaminant plumes in groundwater basins	Current quality impaired groundwater basins and specific areas of concern	Used to describe quality of groundwater basins and develop strategies for management
San Bernardino Valley Water Conservation District Engineering Investigations	Review of groundwater production and storage in Bunker Hill Basin	Current groundwater production and storage	Used to describe groundwater production and storage in Bunker Hill Basin
DWR Population Tool	GIS analysis using census data, agency service area boundary and number of customer connections	Estimated service area population for the year 2020 for UWMP Agencies	Used to verify compliance with 2020 per capita water use targets
Southern California Association of Governments (SCAG) 2020 Connect SoCal Regional Transportation Plan	GIS analysis to intersect Region and UWMP Agency Boundaries with SCAG traffic analysis zones that cover the SCAG region	Population, housing, and employment projections within the service area for years 2020, 2035, and 2045	Used to estimate 2020 population for the region and project future population for the Region and individual UWMP Agencies
Integrated Report and 303(d) List (SWRCB)	Review of 303(d) listed water bodies	Listing of quality impaired waters throughout the State	Used to describe current water quality impairments

DATA OR STUDY	ANALYSIS METHOD	RESULTS/DERIVED INFORMATION	USE IN IRUWMP
2011 Climate Change Handbook for Regional Planning	Review of climate change studies	Summary of climate change impacts, methods for assessing climate change in individual areas	Used to describe the threats to local and regional water resources from climate change in the Region; Methodologies used to assess climate change vulnerabilities in the Region
Valley District's Change in Groundwater Storage Report for the San Bernardino Basin Area, Rialto-Colton, and Yucaipa Basins Area Report	Review storage levels in the SBB (Bunker Hill and Lytle combined), Rialto-Colton, and Yucaipa Basins	Groundwater storage levels	Used to assess storage levels in the SBB, Rialto-Colton, and Yucaipa Basins Area
San Bernardino County Upper Santa Ana River Watershed Stormwater Resource Plan	Review needs, objectives, strategies, and projects	Objectives, strategies, and projects for improving stormwater management	Used to revise needs, objectives, and strategies; Included as an appendix
RAND Analysis (to be published Summer 2021)	Review of analysis and recommendations	Reliability Factor that accounts for uncertainty and variability in future supply and demand projections	Applied to regional demand estimates to incorporate a reliability factor in supply and demand comparisons

1.5 Plan Adoption

Each participating agency has reviewed, adopted, and will implement the portions of this Plan relevant to their agency. Not all parts of the plan are applicable to every participating agency and any subsequent changes made to individual agency UWMP Chapters, if any, should not affect the other agencies who participated in Plan preparation. In recognition of this, the Plan was organized so that agencies could adopt only the parts of the plan that are applicable.

All participating agencies adopted **Part 1** and **Part 3**, which comprise the information needed to meet the requirements of the IRWM Act for every Plan participant and the Region.

In addition to **Part 1** and **Part 3**, UWMP Agencies adopted their respective chapters of **Part 2** and their respective Appendices in **Part 4**. Additional information on each UWMP Agency's adoption process in accordance with the UWMP Act is provided in each agency chapter in **Part 2**.

The Plan participants adopted the relevant parts of the Plan beginning in June 2021. Following adoption, the Plan was submitted to DWR, the California State Library, and a copy was provided to all stakeholders identified in **Section 1.3.3**. Resolutions adopting the IRUWMP are provided in **Part 3**.

1.6 Relation to Other Efforts

The IRWM Region regularly coordinates with neighboring and overlapping entities at the local, regional, and state level. The following is a discussion of how the Region has coordinated with neighboring IRWM regions, water resources planning, and land use planning in the development and on-going implementation of its Plan.

1.6.1 Coordination with Neighboring IRWM Regions and IRWM Planning

1.6.1.1 Santa Ana Watershed Project Authority and One Water One Watershed Plan

SAWPA is a regional agency that has a major role in water resources planning in the SAR watershed. SAWPA was formed in 1968 as a planning agency and was transformed in 1972 through a change in its mission to plan and build facilities that would protect the water quality of the SAR watershed. SAWPA is a Joint Powers Authority, classified as a Special District (government agency) in which it carries out functions useful to its member agencies: Inland Empire Utilities Agency, Eastern Municipal Water District, Orange County Water District, Valley District, and Western. Two of SAWPA's member agencies, Western and Valley District, are part of this IRWM Plan. SAWPA's vision is to have a sustainable SAR watershed that supports economic and environmental vitality as well as an enhanced quality of life. SAWPA's regional leadership is a model of collaboration and cooperation utilizing integrated solutions. To that extent, SAWPA has developed an IRWM Plan for the entire SAR watershed titled the One Water One Watershed (OWOW) Plan.

Photo Credit: San Bernardino Valley Water Conservation District

Water users in the SAR watershed have worked together for decades to develop an integrated regional approach to water management for the entire watershed. In 2002, SAWPA developed a phased planning process called the Santa Ana Integrated Watershed Plan (IWP). In 2005, the IWP was updated as an IRWM Plan to cover the entire SAR watershed. In April 2007, SAWPA launched the OWOW Plan for the Watershed. This broad planning document is the framework for overall water management in the watershed and is largely based upon the planning efforts of its member agencies. The OWOW Plan is a "macro-level" plan that is consistent with DWR's California Water Plan (Bulletin 160) and State Water Resources Control Board's (SWRCB) Strategic Plan, Watershed Management Initiative, and the basin planning process.

This 2020 IRUWMP for the Upper SAR Region is a complementary planning process to the SAWPA process and will be incorporated into the next OWOW Plan update. By focusing on a finer scale, the Upper SAR IRWM Plan reveals that the Upper SAR watershed has several unique water management challenges and issues. The purpose of the Upper SAR planning process is to focus on local issues specific to the upper watershed and to assess water management opportunities in greater detail. This collaborative process addresses some of the long-term water management strategies of the Upper SAR watershed and will greatly contribute to protecting and enhancing reasonable and beneficial uses of the watershed's water resources. This planning process is a part of the overall SAR water management planning process and is in agreement with past and current SAWPA regional planning initiatives. In addition, several agencies in the IRWM Region also take part in SAWPA planning efforts.

1.6.1.2 San Gorgonio IRWM Region and IRWM Plan

The San Gorgonio IRWM Region, formed in 2016, is located in the San Gorgonio Pass area between the Upper Santa Ana River Watershed and the Coachella Valley IRWM Region. The San Gorgonio Pass area is the mountain pass between the San Bernardino Mountains to the north and San Jacinto Mountains to the south. Water management within the San Gorgonio Region has historically been conducted by individual water resource agencies or together as part of specific groups to address specific needs. The San Gorgonio IRWM Region is a rural area that encompasses several small water districts and municipalities. Stakeholders include local and countywide agencies, tribal nations, commercial, and community and industry groups involved in water resource management. Agencies whose service areas may overlap both Regions serve to coordinate projects that may provide interregional benefits.

1.6.1.3 Mojave IRWM Region and IRWM Plan

The Mojave IRWM Region encompasses the entire Mojave River watershed in the California High Desert area of San Bernardino County. A majority of the Mojave IRWM Region is overlapped by the Mojave Water Agency service area, which was originally established in 1959 for the purpose of improved management of declining groundwater levels in the area. Numerous groups participate in IRWM Plan development and ongoing implementation activities within the

Mojave IRWM Region. The Mojave IRWM Region encompasses 58 municipal water purveyors with authority over water supply and management, and which share a common interest in enhancing water resource management to improve the reliability and sustainability of available resources. These water purveyors, along with other numerous public agencies and community groups, are part of the collaborative Mojave IRWM Planning process.

1.6.2 IRUWMP Relation to Local Water Planning and Land Use Planning

The Region's open governance structure allows for ongoing interaction between local planning efforts (both water and land use) and regional water management planning. Within the Region, local planning is conducted by counties, cities, local agencies, and special districts. San Bernardino County, cities, and water agencies within the Region coordinate as part of the San Bernardino Countywide Vision Process. Part of this process involves collaboration between water resource managers and land use planners on the water element to create mutually beneficial opportunities that ensure adequate water supplies and quality to support future population and economic growth within the County.

In addition, existing local, regional, and statewide plans were reviewed for relevant information to include as a part of the Plan update. The relevant plans, listed in Table 1-3, were used to further refine the Region's description, goals, and objectives. Table 1-3 lists each plan and how its information was used in the IRUWMP Plan.

The Region recognizes the importance of collaboration between land use planning and water resources management. The processes in place for updating the Region description, objectives, strategies, and projects incorporates input from land use planners that are a part of the stakeholder group, and those who take part in BTAC meetings. It will be necessary to continue coordination with these land use planners to ensure that the Plan is appropriately implemented.

2

PART 1: REGIONAL CONTEXT

Region Description

The Upper Santa Ana River Watershed originates in the San Bernardino Mountains and covers an area of widely varying forested, rural, and urban terrain in San Bernardino and Riverside Counties.

This chapter describes the region characteristics, including population, land use, and climate. This chapter also describes the many local agencies and water companies that have a role in managing water resources within the Region. Water resources withing the Region are described in **Chapter 3**.

IN THIS SECTION

- Water management agencies
- Population and demographics
- Ecological and Environmental Resources
- Regional climate

2.1 Location

The SAR watershed is the largest stream system in Southern California. The headwaters originate in the San Bernardino Mountains and are discharged to the Pacific Ocean approximately 100 miles to the southwest between Newport Beach and Huntington Beach. The SAR watershed covers over 2,650 square miles of widely varying forested, rural, and urban terrain and covers the more populated urban areas of San Bernardino, Riverside, and Orange Counties, as well as a lesser portion of Los Angeles County. Disputes over the use of water in the SAR led to the subdivision of the watershed into the Upper SAR watershed and Lower SAR watershed just upstream of Prado Dam.

> The Upper SAR watershed covers 852 square miles, approximately 32% of the total SAR watershed, and is primarily located in San Bernardino and Riverside Counties. The Region includes the Big Bear Valley as well as the cities and communities of San Bernardino, Yucaipa, Redlands, Highland, Rialto, Mentone, Colton, Grand Terrace, Loma Linda, Beaumont, and Riverside.

The Region is defined by the area that contributes surface runoff to the Riverside Narrows at U.S. Geological Survey (USGS) Gage 11066460 (**Figure 2-1**). The USGS has operated this site as a continuous record gaging station since March 1970. There are numerous tributaries that contribute flow to the main stem of the SAR in the Region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located just upstream of the San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek. The Upper SAR watershed boundary is shown in Figure 2-1.

2.2 Water Agencies in the Region

The Upper SAR watershed is home to dozens of water districts, mutual water companies, flood control districts, and other local water management agencies (collectively and generally referred to as water agencies in this Plan) with an interest in the responsible management of water supply resources (e.g., storage, conveyance, treatment, flood protection, and recreation) and sustainable stewardship (e.g., water quality and biological resource protection) of the watershed. The challenges facing water agencies in the Upper SAR include the effects of population growth that increase water demand and decrease natural hydrological processes and groundwater recharge, the reduction of imported water availability, and the effects of climate change.

Water agencies in the Region are described in this section and are shown in **Figure 2-2**.

Figure 2-1. Upper Santa Ana River Watershed Boundary

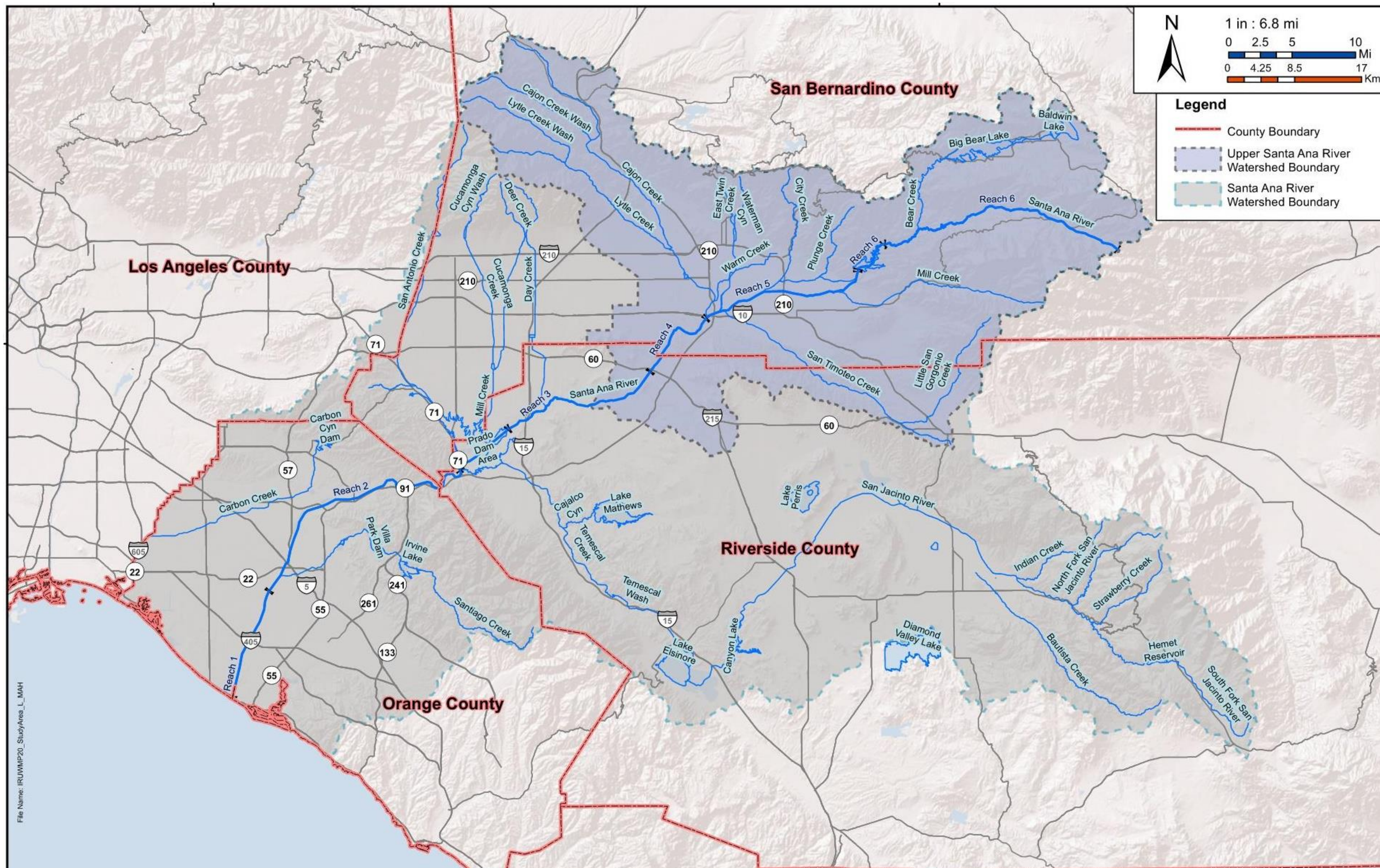
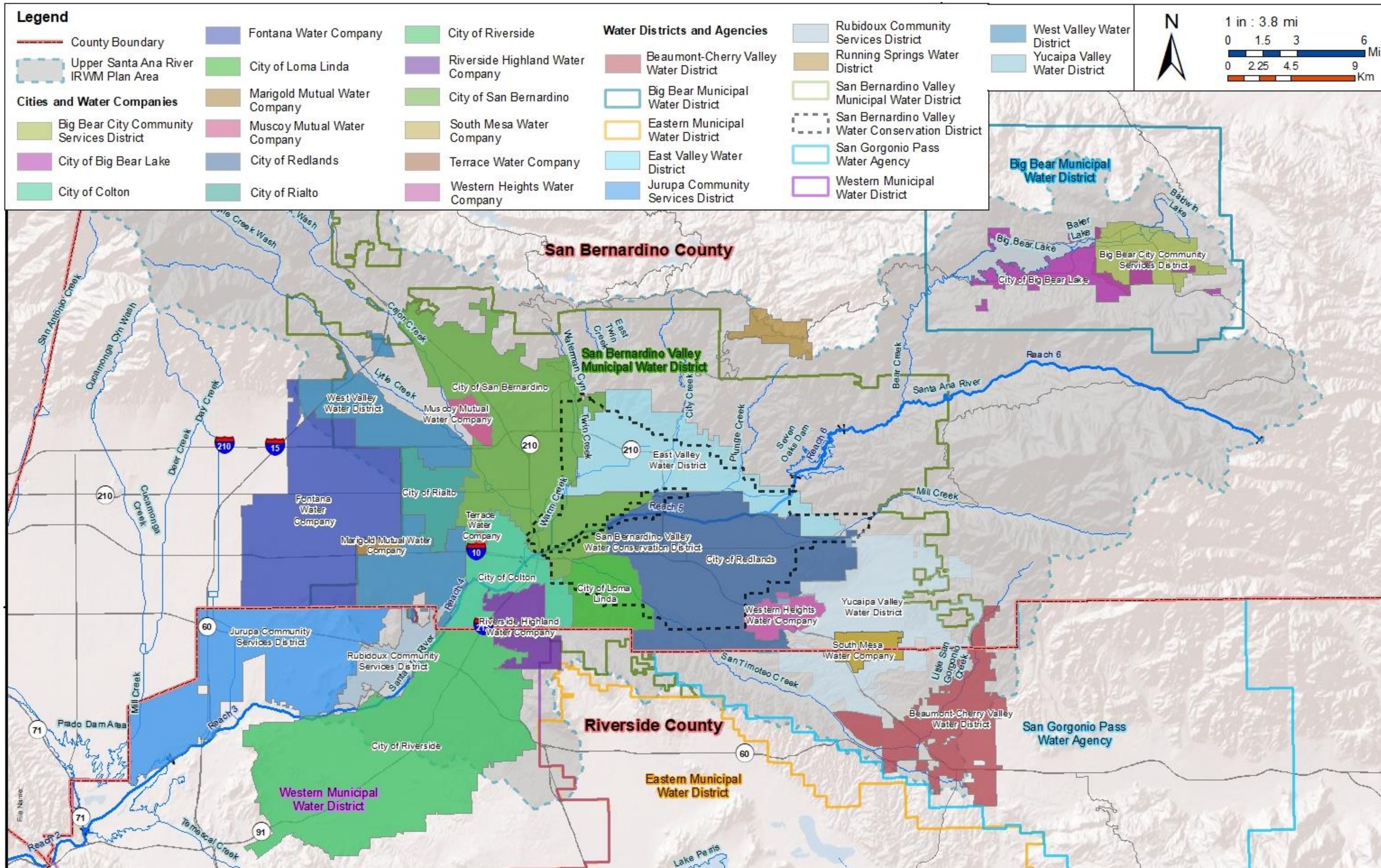


Figure 2-2. Water Management Agencies in the Upper SAR Watershed



2.2.1 Water Supply Managers, Wholesalers and Retailers

2.2.1.1 San Bernardino Valley Municipal Water District (Valley District)

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. Valley District imports water into its service area through participation in the State Water Project (SWP) and manages groundwater storage within its boundaries, its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District does not deliver water directly to retail water customers.

Valley District covers about 353 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles. It spans the eastern two-thirds of the San Bernardino Valley, the Crafton Hills, and a portion of the Yucaipa Valley and includes the cities and communities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Fontana, Bloomington, Highland, East Highland, Grand Terrace, Mentone, and Yucaipa.

Valley District is responsible for long-range water supply management, including importing supplemental SWP water, and is responsible for storage management of most of the groundwater basins within its boundaries and for groundwater extraction over the amount specified in the Orange County and Western Judgments explained below. Valley District has specific responsibilities for monitoring groundwater supplies in the SBB and Rialto-Colton Subbasin, and for a portion of the minimum SAR flow required at the Riverside Narrows.

Valley District has developed a “cooperative recharge program” that is being successfully implemented to help replenish groundwater, using both SWP water and local runoff. Valley District takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within its northern boundary. The SWP water is conveyed 17 miles eastward to various spreading grounds and agricultural and wholesale domestic delivery points. Water is also conveyed westward for direct delivery in the Rialto-Colton Subbasin.

In the 1960s, dry conditions resulted in the over-commitment of water resources in the SAR watershed which led to lawsuits between water users in the upper and lower watersheds regarding both surface flows and groundwater. The lawsuits culminated in 1969 in the Orange County and Western Judgments. Under the terms of the judgments, Valley District became responsible for providing a portion of the specified SAR base flow to Orange County and for replenishing the SBB under certain conditions. If the conditions of either judgment are not met by the natural water supply, including new conservation, Valley District is required to deliver supplemental water to offset the deficiency. The judgments resolved the major water rights issues that had prevented the development of long-term, region-wide water supply plans and established specific objectives for the management of the groundwater basins.

Court-appointed Watermaster committees administer both Judgments; as a member of the Watermaster committees, Valley District is directly responsible for ensuring that groundwater and surface water resources are effectively managed for the benefit of the region.

This Plan includes the Valley District UWMP; see Part 2, Chapter 1 for more information.

2.2.1.2 San Bernardino Valley Water Conservation District

The San Bernardino Valley Water Conservation District (SBVWCD) was created to recharge the Bunker Hill Subbasin in an environmentally and economically responsible way using local native surface water to the maximum extent practicable.

The SBVWCD and its predecessors have conducted water conservation (groundwater recharge) activities for more than 100 years. SBVWCD operates two areas that overlie the Bunker Hill Subbasin in the San Bernardino Valley. These areas are at the upper end of the SAR wash area below Seven Oaks Dam and adjacent to Mill Creek just upstream of the confluence with the SAR. The SBVWCD diverts surface water flows during both storm and normal runoff from the SAR and Mill Creek and channels the flows into two separate systems of recharge basins where it is percolated into the groundwater basin for later pumping and use by local entities and private producers. SBVWCD also recharges SWP water in both its facilities on behalf of the Groundwater Council.

The SBVWCD's boundaries encompass more than 78 square miles and include portions of the communities of San Bernardino, Loma Linda, Redlands, Highland and Colton, as well as the unincorporated county area of Mentone and other unincorporated county "islands" within the incorporated cities.

2.2.1.3 San Gorgonio Pass Water Agency

San Gorgonio Pass Water Agency (SGPWA) was established in 1961 by the California State Legislature. The service area includes the incorporated cities of Calimesa, Beaumont, and Banning, and the communities of Cherry Valley, Cabazon, Poppet Flat, San Timoteo Canyon, Live Oak Canyon, and the Banning Bench.

San Gorgonio Pass Water Agency, a State Water Contractor, purchases water from the State of California and sells it to local retail water agencies in their service area in Riverside County, which use the water either for direct deliveries or for groundwater recharge. Water is imported into the service area by the East Branch of the California Aqueduct.

2.2.1.4 Western Municipal Water District

Western Municipal Water District (Western) is a public agency headquartered in Riverside, California. Western was formed in 1954 to bring supplemental water to the growing western Riverside County. Today, Western provides water wholesale and retail supply, wastewater treatment and disposal, and water resource management to nearly one million people in a service area covering roughly 527-square miles. Western is one of the five member agencies of SAWPA.

As a member agency of the Metropolitan Water District of Southern California (Metropolitan), Western provides wholesale water to the region within their service area, which includes the cities of Corona, Norco and Riverside and the water agencies serving Box Springs, Eagle Valley, Elsinore Valley, Temescal Valley, and Temecula.

Under the terms of the Orange County and Western Judgments, Western represents the Riverside Entities and became responsible for providing a portion of the specified SAR base flow to Orange County and for replenishing the portion of the Riverside Basin Area in Riverside County under certain conditions. If the conditions of either judgment are not met by the natural water supply, including new conservation, Western is required to deliver supplemental water to offset the deficiency.

Court-appointed Watermaster committees administer both Judgments; as a member of the Watermaster committees, Western is directly responsible for ensuring that groundwater and surface water resources are effectively managed for the benefit of the region.

2.2.1.5 Big Bear City Community Services District

The Big Bear City Community Services District (BBCCSD) consists of overlapping Fire, Water, Sewer, Solid Waste (trash collection), and Street Lighting service areas and encompasses a total of 21.1 square miles. One or more services are provided to approximately 16,400 customers.

The water services are run by the Water Department. Major facilities of the Water Department include 82 miles of pipeline ranging from 1.5 to 20 inches in diameter, 11 vertical wells, 2 slant wells, 2 springs, 4 tank reservoirs with a total of 6.25 million gallons of water storage capacity, and 6 water booster stations. This infrastructure provides water to more than 6,140 customers as of 2020.

The sewer services are run by the Sewer Department, which maintains a system consisting of approximately 115 lineal miles of sewer pipeline, 2,842 manholes, and 7 sewer lift stations. The Sewer Department now services almost 12,000 homes and businesses. Sewage treatment and treated wastewater effluent export is handled by the Big Bear Area Regional Wastewater Agency (BBARWA), which is separate from, but partially funded by the Big Bear City Community Services District through fees.

2.2.1.6 City of Big Bear Lake Department of Water and Power

The City of Big Bear Lake Department of Water and Power (BBLDWP) is located in the San Bernardino Mountains at approximately 6,750 feet above sea level. The agency is dedicated to providing the City of Big Bear Lake, Moonridge, Fawnskin, Sugarloaf, Lake William, and portions of Erwin Lake with a safe, reliable source of water for public health and safety.

BBLDWP's water supplies come from snow and rain that percolates into the groundwater basin. BBLDWP does not use lake water for public health and safety and no additional water is imported into the Big Bear Valley.

BBLDWP has an aggressive water conservation program that has significantly reduced summertime consumption. Community outreach programs keep customers informed on current water conditions, and the agency's Technical Review Team monitors, evaluates, and analyzes well and water consumption data on a continual basis. The agency's five-member Board of Commissioners is appointed by the City of Big Bear Lake's City Council and is made up of policy makers committed to safeguarding its water resources.

2.2.1.7 City of Colton

The City of Colton (Colton) is a community founded in 1875 and incorporated in 1887. Colton, through the Water and Wastewater Division of its Public Utilities Department, provides water service to a majority of the residents and businesses located within Colton's corporate boundary, as well as to those in certain adjacent unincorporated areas of San Bernardino County. All of Colton's water supply is local groundwater pumped from the SBB, the Rialto-Colton subbasin, and the Riverside North subbasin.

This Plan includes the Colton UWMP; see Part 2, Chapter 2 for more information.

2.2.1.8 City of Loma Linda

The City of Loma Linda (hereafter Loma Linda) was incorporated in 1970. The Public Works Department provides potable water service to an area of approximately 7.8 square miles that includes the Veterans Administration Hospital and the Loma Linda Community Hospital. Loma Linda does not provide water service to the Loma Linda University Campus or Medical Center facilities, which operate on a separate self-contained system. Loma Linda's primary water supply is groundwater from the SBB. Loma Linda also has two emergency connections to the City of San Bernardino and one to the City of Redlands to meet its supplemental needs. Loma Linda also provides wastewater collection service.

This Plan includes the Loma Linda UWMP; see Part 2, Chapter 3 for more information.

2.2.1.9 City of Redlands

For more than 90 years, the City of Redlands (hereafter Redlands) has been providing high-quality drinking water to the Redlands, Mentone area, Crafton Hills College, and a portion of unincorporated San Bernardino County known as the donut hole. The water utility service area generally coincides with the area designated by the Local Area Formation Commission (LAFCO) as the City and its sphere of influence. The service area encompasses 36 square miles inside the Redlands city boundaries and a relatively small area outside the city boundaries, but within the sphere of influence. Redlands supplies a blend of local groundwater, local surface water, and imported water purchased from Valley District. Redlands also owns and operates a sewer collection system and the Redlands Wastewater Treatment Facility, which produces recycled water for industrial and irrigation purposes, including supplying water to the Southern California Edison Mountainview Power Plant.

This Plan includes the Redlands UWMP; see Part 2, Chapter 4 for more information.

2.2.1.10 City of Rialto

The City of Rialto (hereafter Rialto) is provided water service by three different water agencies: The City of Rialto municipal water system through its water system operator (Veolia, through Rialto Water Services), the West Valley Water District (WVWD), and the Fontana Union Water Company (FUWC). Each agency has its own water supply and resources and must meet its demands through those resources. The City of Rialto municipal water system provides potable, non-potable, and recycled water at retail to customers primarily within the City of Rialto and serves approximately one-half of the population of the City. The service area is essentially the incorporated area of the City of Rialto located between Interstate 10 and State Route 210.

Rialto's water supply sources include local surface water from Lytle Creek, groundwater from four local groundwater basins, and water purchased from Valley District and delivered through the Baseline Feeder. Surface water treatment of Lytle Creek water is provided by the Oliver P. Roemer Water Filtration Facility owned and operated by WVWD. Rialto owns a portion of the capacity of that plant. Rialto also has an agreement to purchase excess SBB water from SBMWD, when available. Rialto provides wastewater collection and treatment services for its residents and some residents of the City of Fontana through an Extra-Territorial Agreement. Rialto currently provides recycled water service to the California Department of Transportation for landscape irrigation.

This Plan includes the Rialto UWMP; see Part 2, Chapter 5 for more information.

2.2.1.11 City of Riverside

The City of Riverside Public Utilities Department (Riverside Public Utilities or RPU) provides potable water, non-potable water, recycled water, and electricity to the City of Riverside, and was established in 1895 (electricity) and 1913 (water). RPU currently serves water to a population of 310,000 people through about 66,000 service connections within an area of approximately 75 square miles within the City of Riverside and unincorporated Riverside County. RPU is committed to providing the highest quality water and electric services at the lowest possible rates to benefit the community. RPU actively participates in regional planning efforts with neighboring agencies to assess regional supplies and demands and develop new sources of supply as needed.

2.2.1.12 East Valley Water District

East Valley Water District (EVWD) is a California Special District, established in 1954, that provides water and wastewater services. EVWD encompasses 30.1 square miles along the foothills of the San Bernardino Mountains within the cities of San Bernardino and Highland, and the county of San Bernardino. As an agency tasked with managing a critical resource, EVWD is committed to innovative leadership and world class public service.

This Plan includes the EVWD UWMP; see Part 2, Chapter 6 for more information.

2.2.1.13 Elsinore Valley Municipal Water District

Elsinore Valley Municipal Water District (EVMWD) is a public non-profit agency created on December 23, 1950 under the Municipal Water District Act of 1911. As a special district, EVMWD's powers include provision of public water service, water supply development and planning, wastewater treatment and disposal, and recycling. Currently, the EVMWD has over 45,000 water, wastewater, and agricultural service connections. EVMWD provides water services to its Elsinore and Temescal Divisions, which comprises the cities of Lake Elsinore and Canyon Lake, and portions of Wildomar Murrieta, Menifee, and unincorporated Riverside County and Orange County land.

Through ownership of shares in the Meeks and Daley Water Company, EVMWD has water rights in the SBB, totaling 4,680 acre-feet per year. In 2020, EVMWD and Western entered a 20-year agreement allowing Western to lease EVMWD's water rights in the SBB.

2.2.1.14 Fontana Water Company

Fontana Water Company, a division of San Gabriel Valley Water Company, is a public utility regulated by the California Public Utilities Commission. Fontana Water Company's service area covers approximately 52 square miles with boundaries including the San Gabriel Mountains to the north and the Riverside County Line to the south. Fontana Water

Company serves most of the City of Fontana, portions of the Cities of Rialto and Rancho Cucamonga, and unincorporated areas of San Bernardino County. Fontana Water Company serves a population of approximately 237,000 people with over 48,200 active service connections. Each year Fontana Water Company produces between 33,000 – 50,000 AF of water from water supply sources that include surface water from Lytle Creek and SWP water, which is treated at Fontana Water Company's Sandhill Water Treatment Plant, groundwater from the Lytle, Rialto, No-Man's Land (managed through the Rialto Basin), and Chino Basins, and recycled water from Inland Empire Utility Agency. Fontana Water Company diverts and receives Lytle Creek surface water and produces groundwater in the Lytle, Rialto, and No-Man's Land Basins as an agent for Fontana Union, which asserts extensive water rights to these sources of supply pursuant to longstanding court judgments.

2.2.1.15 Riverside Highland Water Company

The Riverside Highland Water Company (RHWC) provides domestic and irrigation water services to the City of Grand Terrace, portions of the City of Colton, and portions of the unincorporated areas of the Counties of San Bernardino and Riverside. RHWC's service area lies partially within the Valley District service area and partially within the service area of Western Municipal Water District (Western). RHWC obtains water from the Lytle Creek Subbasin, the SBB, the Rialto-Colton Subbasin, Riverside North, and Riverside South Basins.

This Plan includes the RHWC UWMP; see Part 2, Chapter 7 for more information.

2.2.1.16 City of San Bernardino

The City of San Bernardino is served by a municipal utility, the San Bernardino Municipal Water Department (SBMWD). SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter. The SBMWD water service area is approximately 45 square miles, providing water to approximately 210,000 persons in the City of San Bernardino and unincorporated areas of San Bernardino County. SBMWD produces all of its water supply from wells in the SBB. In addition to potable water, SBMWD provides wastewater collection and treatment services and is developing a recycled water system for groundwater recharge and non-potable reuse.

This Plan includes the SBMWD UWMP; see Part 2, Chapter 8 for more information.

2.2.1.17 South Mesa Water Company

South Mesa Water Company (SMWC) is a mutual water company, which was established in 1912 as a successor to the earliest land and water companies in the area dating back to 19th Century. SMWC provides domestic and irrigation water service to its shareholders within its service territory, which comprises a portion of the City of Yucaipa in San Bernardino County and a portion of the City of Calimesa in Riverside County. SMWC currently supplies water to just under 3,000 water service connections but anticipates exceeding that level in the very near future. SMWC's water supply includes locally produced groundwater from the Yucaipa Sub-basin (DWR 8-02.07), and also groundwater produced from the adjacent adjudicated Beaumont Basin in accordance with SMWC's adjudicated water rights.

This Plan includes the SMWC UWMP; see Part 2, Chapter 9 for more information.

2.2.1.18 West Valley Water District

West Valley Water District (WVWD) is a County Water District, a public agency of the State of California, organized and existing under the County Water District Law (Division 12, Section 30,000 of the Water Code) of the State of California. WVWD provides domestic water service to customers throughout southwestern San Bernardino County and a small portion within northern Riverside County. The majority of WVWD's service area lies within Valley District's boundaries. WVWD's service area is approximately 31 square miles, serving portions of the Cities of Rialto, Fontana, Colton, and Jurupa Valley, and unincorporated areas of San Bernardino County. WVWD utilizes water from five groundwater basins and treats surface water from Lytle Creek and SWP water at its 14.4-mgd Oliver P. Roemer Water Filtration Facility to serve over 23,000 water service connections.

This Plan includes the WVWD UWMP; see Part 2, Chapter 10 for more information.

2.2.1.19 Yucaipa Valley Water District

Yucaipa Valley Water District (YVWD) is a special district that provides water supply, treatment, and distribution, recycled water supply and distribution services, and wastewater collection and treatment. Formed in 1971, YVWD acquired many of the private water companies serving the Yucaipa Valley. YVWD serves customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino Counties.

This Plan includes the YVWD UWMP; see Part 2, Chapter 11 for more information.

2.2.1.20 Bear Valley Mutual Water Company

Bear Valley Mutual Water Company (Bear Valley Mutual) was formed in 1903 by the citrus growers of the Redlands/Highland area to ensure a dependable water supply under their control. Bear Valley Mutual has pre-1914 water rights to the first 88 cubic feet per second (cfs) of surface flow of the SAR. Bear Valley Mutual has appropriative rights on Bear Creek and a storage right in Big Bear Lake, as well as ownership of all the water inflow to the lake.

2.2.1.21 Beaumont-Cherry Valley Water District

Beaumont-Cherry Valley Water District was formed in 1919 under the Wright Act of 1897 (Water Code Section 20000, et seq.), and serves approximately eight square miles located in Riverside and San Bernardino Counties. Beaumont-Cherry Valley Water District currently serves approximately 35,000 people in the City of Beaumont and the community of Cherry Valley.

2.2.1.22 Big Bear Municipal Water District

Big Bear Municipal Water District (Big Bear Municipal) was formed in 1964 by the people of Big Bear Valley with the express purpose of stabilizing the level of Big Bear Lake. In January 1977, as a result of a stipulated judgment, Big Bear Municipal purchased title to the dam, reservoir lands lying beneath the lake, and the surface recreation rights to Big Bear Lake. As discussed above, Bear Valley Mutual has ownership rights to all water entering Big Bear Lake.

Big Bear Municipal is responsible for the following:

- Stabilization of the level of Big Bear Lake by managing the amount of water released to Bear Valley Mutual
- Watershed/water quality management
- Recreation management
- Wildlife habitat preservation and enhancement
- Bear Valley Dam and Reservoir maintenance

The stipulated judgment allows Big Bear Municipal to maintain a higher water level in the lake by delivering water to Bear Valley Mutual from an alternate source of water instead of from the lake. This alternate source of water is sometimes referred to as in-lieu water and mainly comes from the SWP through Valley District. If Big Bear Municipal does not wish to purchase in-lieu water, it must deliver water from the lake to satisfy Bear Valley Mutual' s demands.

2.2.1.23 Fontana Union Water Company

Fontana Union Water Company (Fontana Union) is a mutual water company and does not directly deliver water to domestic customers. Fontana Union asserts long-standing adjudicated, vested rights to Lytle Creek surface and subsurface flows and Lytle Creek Subbasin groundwater, as well as groundwater rights in Rialto-Colton Basin inclusive of “No Man’s Land.”

Fontana Union delivers its available water to its shareholders in accordance with its Articles of Incorporation, Bylaws, and mutual water company law. Fontana Union is 98% owned by Cucamonga Valley Water District and San Gabriel Valley Water Company. Fontana Water Company, a division of San Gabriel Valley Water Company, diverts and produces water pursuant to its rights as Fontana Union’s agent in accordance with a court-approved agreement. Under court-approved agreements, Fontana Union allocates its Chino Basin pumping rights to Cucamonga Valley Water District, and Cucamonga also retains the option of taking delivery of its share of Fontana Union’s other water sources.

2.2.1.24 Marygold Mutual Water Company

Marygold Mutual Water Company (Marygold) serves customers generally located in the unincorporated community of Bloomington. Marygold obtains water from the Chino Basin through rights to the appropriative pool of Chino Basin, from the SBB and from treated imported water purchased from WVWD.

2.2.1.25 Muscoy Mutual Water Company

Muscoy Mutual Water Company (Muscoy) serves the majority of the unincorporated community of Muscoy. SBMWD serves the remainder of the Muscoy community. The community is located between the cities of San Bernardino and Rialto. All water produced by Muscoy is from the SBB.

2.2.1.26 Meeks & Daley Water Company

Meeks & Daley Water Company was incorporated on September 1, 1885 and is the successor company to three Mutual Water Companies - Meeks & Daley Water Company, Agua Mansa Water Company, and the Alta Mesa Water Company. Meeks & Daley Water Company provides water to its stockholders for agricultural purposes. To fund operating expenses, the company assesses all shareholders twice per year based on the number of shares owed on the date of the assessment.

The company owns water rights in the Bunker Hill Subbasin and pumps water from a series of wells located within the basin, transporting this water through the Riverside and Gage Canals. At the end of the canal systems, Meeks & Daley Water Company operates a pipeline and pump station to deliver irrigation water to users in the southern portion of the City of Corona.

EVMWD, the City of Riverside and Western own stock in the Meeks & Daley Water Company, entitling them to export rights of about 4,860 AF, 3,008 AF and 226 AF respectively from the Bunker Hill Subbasin, as of December 2020. In 2020, EVMWD entered into a long-term agreement to lease its rights to Western.

2.2.1.27 Regents of the University of California

The Regents have rights to water from the SBB, which is used by the University of California Riverside (UCR). The water is delivered to UCR by the RPU.

2.2.1.28 Other Water Providers

Other water purveyors in the Region include:

- **Terrace Water Company Services**, which is an area located between the service areas of Colton Public Utilities and West Valley Water District.
- **Western Heights Mutual Water Company**, which serves the southeast portion of the City of Redlands and a portion of the City of Yucaipa
- **Eastwood Farms Community Water Users Association**, which provides water to a small portion of the City of Highland

- **Arroyo Verde Mutual Water District**, which provides water to a small portion of the City of Highland
- **Victoria Farms Mutual Water Company**, which serves a population of approximately 1,000
- **Inland Valley Development Agency**, a joint powers authority comprised of San Bernardino County and the Cities of San Bernardino, Colton, and Loma Linda
- **Devore Mutual Water Company**, which serves an area near the intersection of Interstate 15 and Interstate 215
- **Running Springs Water District**, which serves the community of Running Springs
- **Arrowhead Park County Water District**, which serves an area adjacent to the Running Springs Water District

2.2.2 Flood Control Agencies

2.2.2.1 San Bernardino County Flood Control District

SBCFCD was formed as a special district in April 1939 after the 1938 floods in the County of San Bernardino. SBCFCD's functions include flood protection from major streams, flood control planning, storm drain management, debris removal programs, right-of-way acquisition, flood hazard investigations, and flood operations. SBCFCD has numerous Master Plans of Drainage for various areas within the county. A Master Plan of Drainage is a coordinated plan of flood control improvements for an area based on its future planned development that identifies existing flood control facilities that are inadequate to convey the 100-year peak storm flows, including needed improvements to existing facilities and new facilities that need to be constructed to provide an adequate level of flood protection. Since its inception, SBCFCD has worked with United States Army Corps of Engineers (USACE) to develop federally funded major flood control facilities in the county. SBCFCD manages its activities through six physical flood control zones. The budget projections are also determined for each zone through an annual budget study with most of the zones also having a 10-year plan. SBCFCD is also participating with Inland Empire Utilities Agency and Chino Basin Water Conservation District on the Chino Basin Recharge Improvement Project.

2.2.3 Other Water Related Entities

2.2.3.1 Water Resources Institute/California State University, San Bernardino

The Water Resources Institute/California State University San Bernardino (WRI-CSUSB) was established by the faculty senate in 1999. The senate and the university administration recognized that water is one of the most precious resources in its service area (San Bernardino and Riverside Counties) and set out to make water an area of distinction at this campus.

The WRI-CSUSB operates an extensive water resource archive that includes maps; aerial photographs; newspaper articles; water and environmental reference books; and federal, State, and local government documents, studies, and reports. This archive is gradually being digitized to make it more accessible to users. It also includes water and environmental data and metadata, thus expanding the concept of an archive beyond the original concept of hard copies of old documents.

The WRI-CSUSB is an interdisciplinary center for research, policy analysis, and education. The full-time staff is engaged in a variety of partnerships providing technical assistance to public and private water stakeholders. The WRI-CSUSB specializes in integrated watershed projects promoting land use practices that minimize the impact of development on watershed functions. The WRI-CSUSB assists the Local Government Commission with presenting the Ahwahnee Water Principles for Resource Efficient Land Use[1] to elected officials and developers on the connection between land use and water. The WRI-CSUSB partners with California Resources Connection, Inc. on the Inland Empire Sustainable Watershed Program developing Green Building Practices and Model Ordinances to overcome obstacles in resource-efficient land use.

[1] The Ahwahnee Water Principles for Resource-Efficiency Land Use are a set of stewardship actions that cities and counties can take that reduce costs and improve the reliability and quality of water resources.

2.3 Population and Demographics

2.3.1 Historic Population and Housing Growth in the Plan Area

The Region covers part of the two-county area of San Bernardino and Riverside, which have both experienced rapid growth. Census population figures for 2000 and 2010 for Riverside and San Bernardino Counties are presented in **Table 2-1**. The 2020 Census data was not available as of the writing of this Plan so California Department of Finance population estimates were used for 2020. Over the decade of the 2000s, both counties experienced substantial increases in population – 41.9% for Riverside County (with an average rate of 4.2% annually) and over 18.8% for San Bernardino County (1.9% annually). Between 2010 and 2020, population growth in both counties slowed to an average annual increase of 1.1% and 0.5%, respectively.

Table 2-1: Riverside and San Bernardino County Population, 2000 to 2020

	POPULATION		
AREA	2000[1]	2010[1]	2020[2]
Riverside County	1,551,943	2,202,361	2,442,304
AVERAGE ANNUAL PERCENT INCREASE		**4.2%**	**1.1%**
San Bernardino County	1,718,312	2,041,626	2,180,537
AVERAGE ANNUAL PERCENT INCREASE		**2.7%**	**0.5%**

The number of housing units contained in the two counties grew from about 1,186,000 in 2000 to 1,509,205 in 2010. This increase of 27.3% took place at an average annual rate of 2.7%. California Department of Finance E-5 Housing Estimates for 2020 estimate total housing units in the two counties to be approximately 1,583,000, indicating lower average annual rate of increase of 0.5%.

The population of the Valley District service area, which covers a majority of the Region, grew by approximately 60,000 between 2010 and 2020, which is about a 0.9% growth annually.

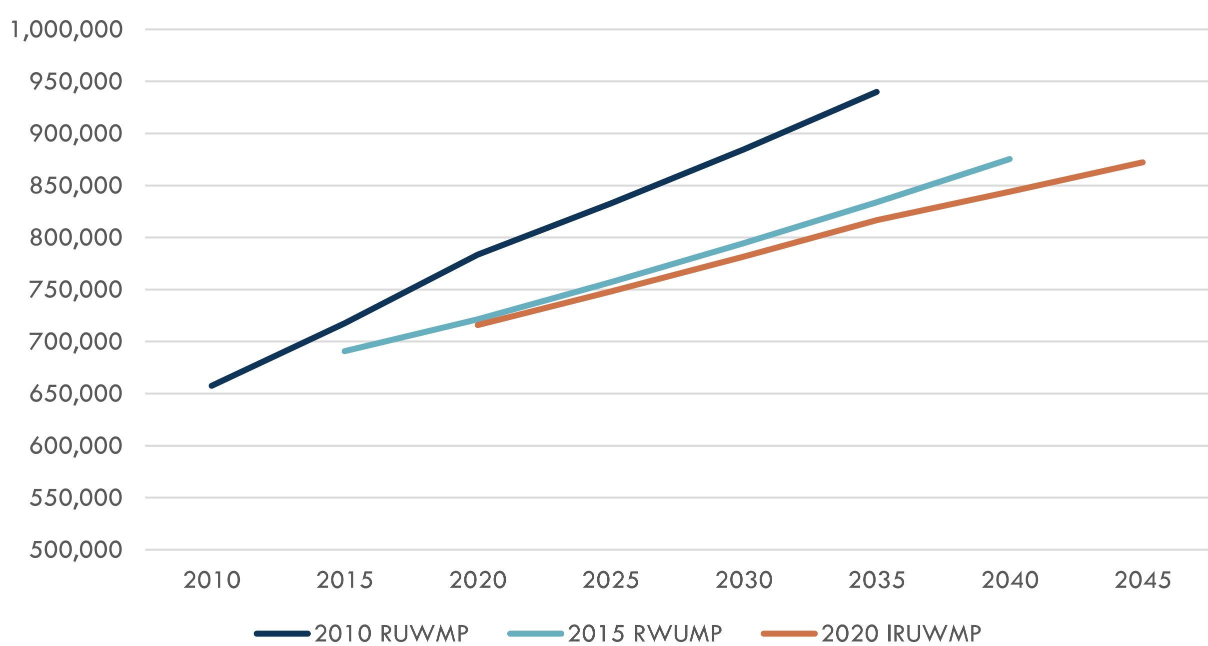
2.3.2 Future Population Projections in the Plan Area

The Southern California Associate of Governments has (SCAG) has developed a demographics and growth forecast for the 2020 Connect SoCal Regional Transportation Plan which includes estimated population, households, and employment in 2020, 2035, and 2045 inside each of the approximately 11,300 traffic analysis zones (TAZs) that cover the SCAG region. The Region boundary (shown in **Figure 2-2** as the Upper Santa Ana Watershed IRWM Plan Area) was intersected with a GIS shapefile of the SCAG TAZs to provide an estimate of population within the service area for years 2020, 2035, and 2045.

SCAG prepares demographic forecasts based on land use data for their region through extensive processes that emphasizes input from local planners and is done in coordination with local or regional land use authorities, incorporating essential information to reflect anticipated future populations and land uses. SCAG's projections undergo extensive local review, incorporate zoning information from city and county general plans, and are supported by Environmental Impact Reports.

SCAG population growth projections have declined significantly in the last 10 years due to a variety of demographic factors described in SCAG's latest 2020 Demographics and Growth Forecast. This trend for the population of the Valley District service area is shown in **Figure 2-3** and is representative of the trend in the Region as a whole.

Figure 2-3. Population Projection Trends for the Valley District Service Area



While SCAG projects slower growth than previous plans, the result is still a substantial increase in population within the Region, which is estimated to reach over 1.25 million by 2045, as shown in **Table 2-2**.

Table 2-2. Projected Population for the Region (2025 to 2045)

PROJECTED POPULATION	2020	2025	2030	2035	2040	2045
Total	1,007,793	1,057,644	1,109,960	1,164,865	1,207,584	1,251,870
% Growth Rate		0.97%	0.97%	0.97%	0.72%	0.72%

2.3.3 Economic Condition and Social and Cultural Composition of the Region

Like most communities in Southern California, the Region has seen a continued increase in population and change in the economic base as agricultural and vacant land is replaced with residential housing, leading to urban and service sector jobs.

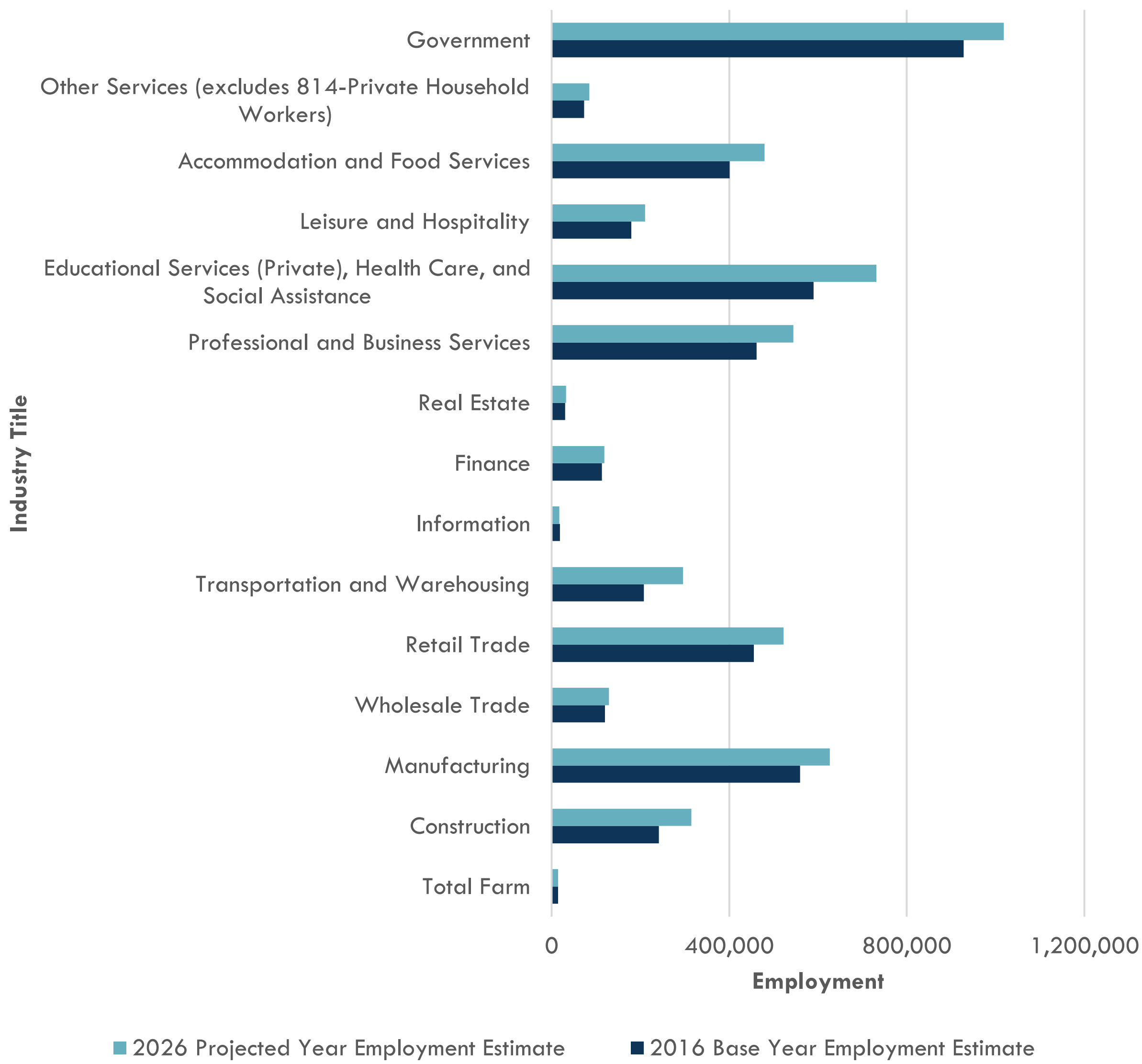
Much of the population growth of the Region since the 1970s is linked with the economies of Los Angeles and Orange Counties because they are within commuter range, and the housing prices in the Region are more affordable. Also, population growth over the past three decades is attributed to a marked increase in immigration from Mexico, Latin America, and the Pacific Rim.

Before the COVID-19 pandemic, employment in the Inland Empire was increasing at a steady pace, according to California's Employment Development Department and U.C. Riverside School of Business Center for Economic Forecasting. The region's nonfarm employment grew 2% adding approximately 31,000 nonfarm jobs from October 2018 to October 2019. This surpassed the 1.8% growth in the state and the 1.4% growth in the nation. Although pre-pandemic the Inland Empire's employment growth remained steady, growth has slowed compared with recent years. From October 2017 to October 2018 total nonfarm employment increased 3.0% and from October 2016 to October 2017 employment grew 3.8%. Figure 2-4 depicts the projected long-term industry employment growth for the Inland Empire by sector from 2016 to 2026.

According to the U.C. Riverside School of Business Center for Economic Forecasting and Development's Inland Empire Regional Intelligence Report Winter 2020/2021: "The Inland Empire's labor market has continued to steadily recover from the COVID-19 pandemic, adding 93,100 jobs since lows in April 2020. Despite the ongoing labor market recovery, year-over-year employment fell 7.1% (-110,600 jobs), one of the largest annual declines on record. Even so, employment growth in the Inland Empire is outpacing that of the state (-7.8%) but has trailed the nation (-6.1%) over the last year."

While unemployment rates remain heightened, 28,300 workers entered the Inland Empire labor force, a 1.4% increase, from October 2019 to October 2020. Over the same period, the state experienced a (-1.1%) decline and the nation experienced a (-2.1%) decline. The largest job losses occurred in the Leisure and Hospitality sector with a 27.6% decline in jobs. Other industries with job losses have occurred in Government, Manufacturing, Retail Trade, and Administrative Support. These sectors were most impacted by government mandates and stay-at-home orders due to the COVID-19 pandemic. However, sectors involving e-commerce such as Transportation and Warehousing as well as Management have grown due to a surge in online shopping in response to stay-at-home orders from the State Government.

Figure 2-4: Long-Term Industry Employment Projections for Riverside and San Bernardino Counties



2.3.3.1 Disadvantaged Communities

In accordance with DWR guidance, the 2016 IRWM Guidelines state that if household income was below 80 percent of the Median Household Income (MHI) for California, the community is considered a DAC. In addition, those areas with an annual MHI that is less than 60 percent of the Statewide annual MHI are considered Severely Disadvantaged Communities (SDAC). The current dataset used by DWR to is the US Census American Community Survey (ACS) 5-Year Data for the period of 2012 to 2016. The statewide MHI for the current dataset is $63,783; therefore, the calculated DAC and SDAC thresholds are $51,026 and $38,270, respectively.

Figure 2-5 shows the DACs and SDACs in the Region. A large number of census tracts in the Region are classified as DAC or SDAC. A central area for DACs and SDACs occurs between the east side of the City of San Bernardino and west side of the City of Highland, a portion of the City of Riverside, as well as the entire Big Bear Valley, and in the South Mesa Water Company service area which serves portions of the Cities of Yucaipa and Calimesa.

The vast majority of DACs and SDACs are connected to public water systems and receive water supplies that meet all state and federal standards for water quality from the water agency which serves the area they live in. In these areas, affordability can be a challenge. Areas with the largest concentrations of DAC and SDAC residents have developed programs to assist the DAC members in paying their water related bills while still ensuring their water and wastewater service are meeting all applicable state and federal regulations.

2.3.3.2 Native American Tribes

Various tribes of Native Americans inhabited the Region in the past. Today, the San Manuel Band of Mission Indians and Morongo Band of Mission Indians are present in the region.

2.4 Land Uses

Figure 2-6 presents the land use within the Region. The total area of the Region is 552,785 acres, of which 303,790 acres, or about 55%, are covered by the national forest located in the easterly and northerly areas of the Region. The large areas of agricultural land use are south of the SAR. Currently, agriculture only represents a little over 3% of the land use of the Region and continues conversion to urban use is anticipated. Urban areas are about 22% of the Region.

A number of local land use agencies have approved general plans and specific plans in the Region. These local land use planning agencies play a major role in zoning and land use decisions in the Region. The California Government Code contains statutes addressing the subject of the applicability of local land use controls on planning and construction of public water facilities. However, it is generally the practice of the water agencies to voluntarily comply with the standards specified in applicable local land use and building code regulations.

Figure 2-5. Disadvantaged and Severely Disadvantaged Communities in the Region

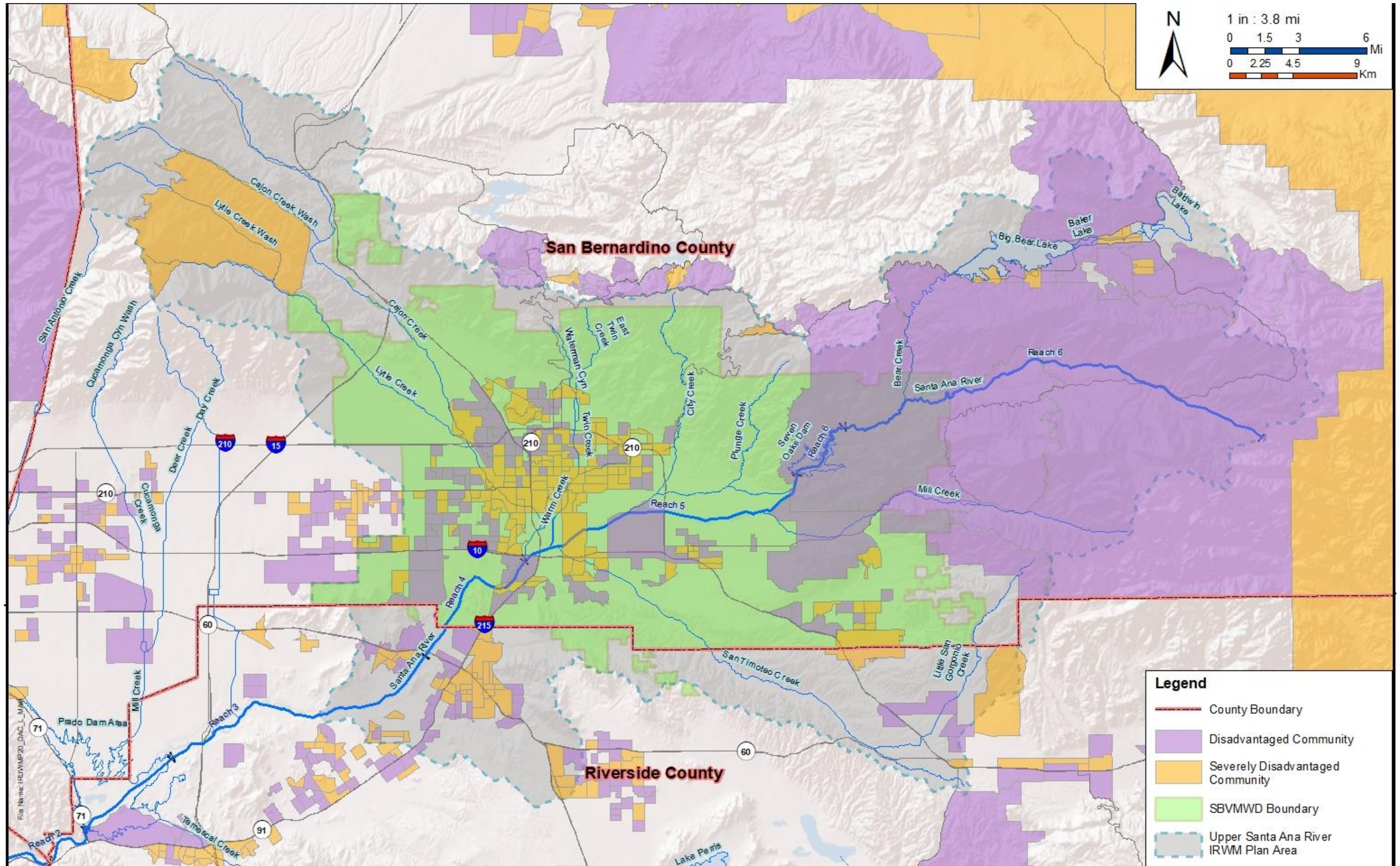
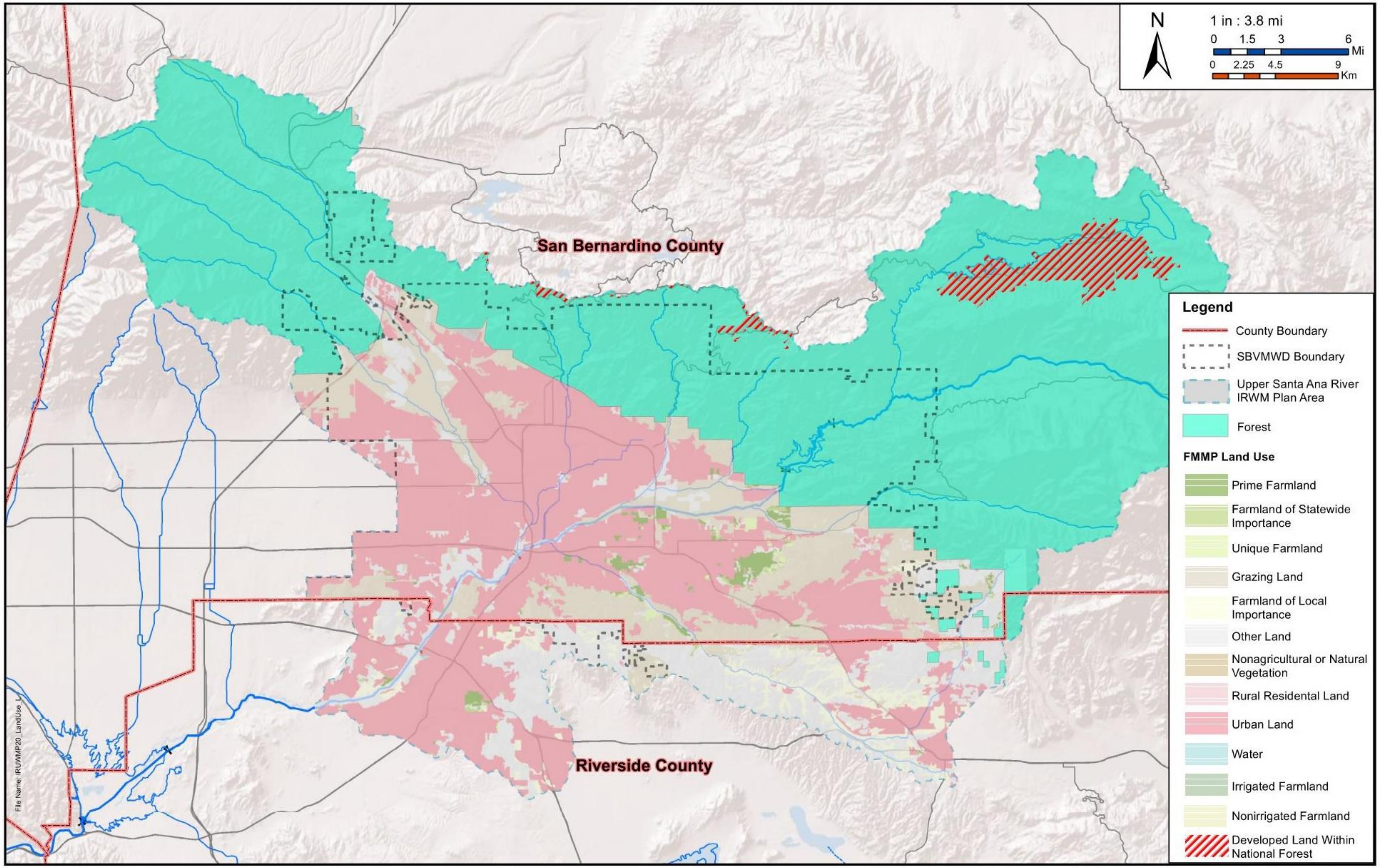
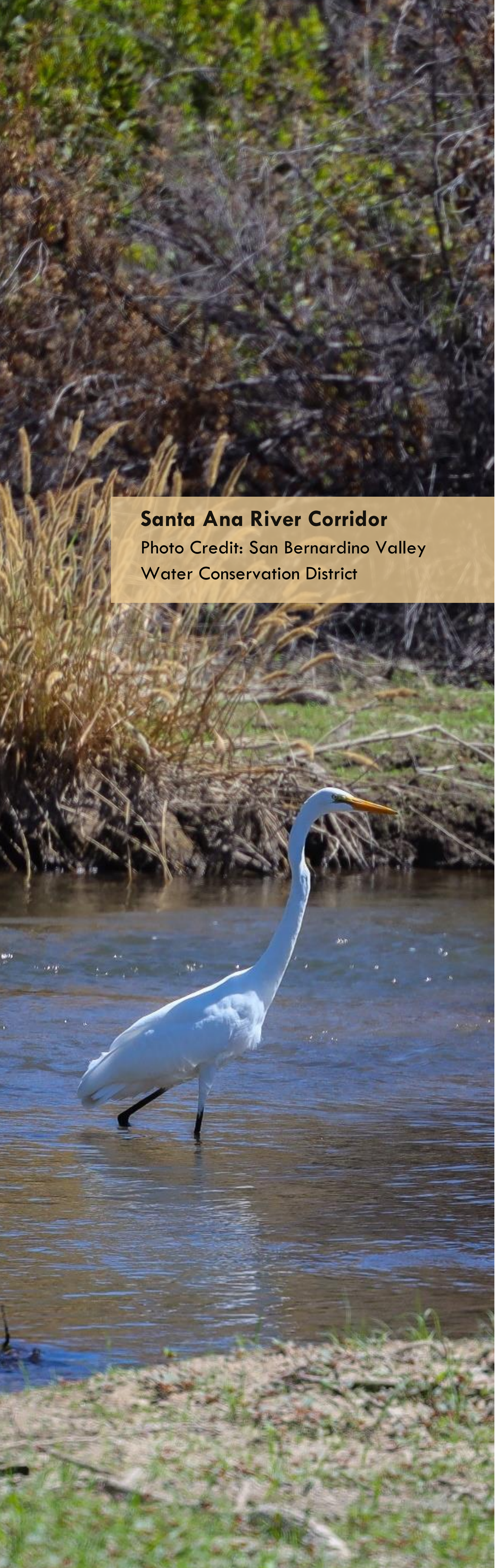


Figure 2-6. Land Uses within the Region





Santa Ana River Corridor
Photo Credit: San Bernardino Valley Water Conservation District

2.5 Ecological and Environmental Resources

The Region contains unique and valuable ecological and environmental resources. The following section will discuss these resources, and the various management plans used to maintain them.

2.5.1 SAR Corridor

The SAR corridor is defined as the area located within the incised channel of the river. Persistent aquatic and riparian habitats are present immediately downstream of the Seven Oaks Dam plunge pool; in oxbows; in fault zones; in areas with manmade or natural water sources, such as a tributary confluence or a storm drain outfall; in areas with perched water tables; and downstream of river mile (RM) 54.5, where groundwater emerges and flows on the surface of the riverbed (USACE 2000). Much of the habitat within the SAR corridor provides optimal foraging opportunities and several areas provide adequate breeding areas for raptors. Trees found in the riparian woodlands provide perches for foraging over the scrub and grassland.

Except during the winter months of December through March, surface flows in the SAR between Seven Oaks Dam and the San Bernardino International Airport are generally absent, and the riverbed is a braided, dry channel. Cottonwood-willow riparian vegetation communities from Cuttle Weir to the airport are uncommon and limited to infrequent isolated patches or individual trees. This stretch is dominated by alluvial fan sage scrub vegetation, a vegetation community typical of alluvial fans with very porous soil types. Downstream from the airport, surface flows are more prevalent and large areas of contiguous, well-developed mesic riparian habitats exist. The nonnative and invasive giant reed (Arundo donax) is also common in spots along the banks of the SAR. Just downstream of the region are Prado Flood Control Basin and Prado Dam. Approximately

2,150 acres of land upstream of Prado Dam are owned by Orange County Water District, the local sponsor for Prado Dam. Within this area are approximately 465 acres of constructed wetlands as well as large areas of mature cottonwood-willow riparian vegetation, naturally occurring wetlands, and freshwater aquatic habitats.

The vegetation communities discussed above provide wildlife habitat throughout most of the SAR corridor. In general, there is a diverse array of wildlife present within the area. This is due to the large amount of connected natural open spaces that link various habitat types from the active river channels to the upmost upstream flood terraces. While a few wildlife species depend entirely on a single habitat type, the mosaic of the diverse vegetative communities within the Region and adjoining areas constitutes a functional ecosystem for a variety of sensitive native species.

The SAR contains a variety of riverine conditions and habitat types that support a number of fish species throughout nearly the entire river when winter and spring flows are present. Portions of the SAR, such as the segment that traverses the alluvial fan, are dry during most of the year and, consequently, offer only temporary habitat for fish.

The scrub, woodland, and riparian habitats in the SAR corridor provide foraging and cover habitat for songbirds including year-round, and seasonal residents, as well as migrating individuals. The overall condition of these communities in the corridor is good but requires long term management due to its location in the middle of the urban matrix. Water, provided by portions of the SAR and its tributaries provide an important resource for these birds.

Seven hundred and sixty acres of land belonging to the U.S. Bureau of Land Management (BLM) land within the Upper SAR wash area downstream from the Greenspot Bridge have been designated by BLM as an Area of Critical Environmental Concern (ACEC) because of the presence of the federally listed species, SAR woolly-star, and the San Bernardino kangaroo rat (U.S. Fish and Wildlife Service (USFWS) 1988) as well as the slender horned spineflower (South Coast Resource Management Plan, 1994).

Wildlife corridors link areas of suitable habitat that are separated by unsuitable habitat such as rugged terrain, development, or changes in vegetation. Riverbeds often provide an appropriate passageway for wildlife movement to otherwise disconnected areas. Historically, the SAR bed likely supported substantial movements by wildlife on a regional scale. In addition, the SAR floodplain may have acted as a hub for wildlife movement with many major tributaries converging in a relatively short section of the river. However, loss of habitat due to development on the floodplain and surrounding lowlands, including two dams, are likely to have greatly reduced the amount of regional movement through this corridor.

2.5.2 San Bernardino National Forest

The U.S. Forest Service (USFS) has jurisdiction over land uses in the San Bernardino National Forest, which is about 1/3 of the land within the Region. The San Bernardino National Forest Land and Resource Management Plan of 1988 (USDA Forest Service 1988) directs the management of the forest. Its goal is to provide a management program that reflects a mix of activities that allows both the use and protection of forest resources; fulfills legislative requirements; and addresses local, regional, and national issues.

The San Bernardino National Forest is divided into 15 management areas based on (1) combinations of watersheds that have similar characteristics, (2) wilderness areas, and (3) potential wilderness areas. The Seven Oaks Dam and adjacent areas are located in the Central Section of the San Gorgonio District of the Santa Ana Management Area. Much of the area in this district is classified as the Santa Ana Recreation Area, a designation designed to provide continued protection of the recreation values for which it was established.

The management for this area emphasizes (1) fire management, (2) recreation (dispersed recreation opportunities in the lower SAR area), and (3) other integrated activities (including wildlife management and non-motorized recreation).

2.5.2.1 San Bernardino National Forest Watershed Management Planning

The upper reaches of the SAR watershed are located in the San Bernardino National Forest. The San Bernardino National Forest is one of 18 national forests in California, collectively referred to as Region 5 of the USFS. In 1981, Region 5 entered into a Management Area Agreement with the SWRCB pursuant to Clean Water Act Section 208. This agreement designates Region 5 as the Water Quality Management Agency (WQMA) for the San Bernardino National Forest.

As the WQMA, Region 5 is responsible for the proper installation, operation, and maintenance of State- and EPA-approved BMPs in the San Bernardino National Forest. Region 5 is tasked with the responsibility of (1) correcting water quality problems in National Forests; (2) perpetually implementing BMPs; and (3) carrying out identified processes for improving or developing BMPs. In the Upper SAR watershed, the San Bernardino National Forest works conjunctively with the RWQCB on water quality issues such as TMDLs.

The San Bernardino National Forest is implementing its 2006 Land Management Plan for the San Bernardino National Forest (amended in 2014). The Forest Plan describes the strategic direction at the broad program-level for managing the San Bernardino National Forest, including watershed management initiatives over the next 10 to 15 years. In 2014, the United States Forest Service, San Bernardino National Forest completed a nonnative, invasive species removal National Environmental Policy Act (NEPA) decision for the Mill Creek drainage. Implementation of the decision is moving forward with various partners including Santa Ana Watershed Association (SAWA) and Southern California Edison (SCE). Additional partnerships and funding opportunities are being pursued to reduce the seed source that ultimately works against forest management.

Valley District has also partnered with the San Bernardino National Forest to plan and ultimately implement important components of the conservation strategy associated with the Upper Santa Ana River Habitat Conservation Plan (River HCP). Collaborative efforts include those related to translocation of species including the Santa Ana sucker and mountain yellow-legged frog. More recently, Valley District has been pursuing a collaborative effort with the San Bernardino National Forest, SAWPA, Inland Empire Resources Conservation District (IERCD), and National Forest Foundation, amongst other potential partners to help increase the pace and scale of forest management. The goal of this collaborative management is to enable the forest to be resilient in the face of disturbances (i.e., catastrophic wildfire, drought, pest infestations, etc.) and other factors (i.e., politics, funding, etc.).

2.5.2.2 Hazardous Tree Removal Program/Fuels Management Program

It is estimated that approximately 90% of the precipitation in the Region falls on the San Bernardino National Forest. Presently, the forest has approximately 10 times more trees than can be supported by local precipitation. These "extra" trees are the result of development within the forest and the accompanying suppression of wildfire, which naturally thins the forest. These extra trees consume extra water and make the forest more susceptible to fire. When fire does occur, the resulting debris flows down the mountains and fills the SBCFCD debris basins, making them ineffective. As a result, Flood Control formed a partnership with the San Bernardino County Fire Protection District in 2005 to implement the Hazardous Tree Removal Program, later the Fuels Management Program, and participate in tree removal in the forest.

The SBCFCD Hazardous Tree Removal Operations Division (HTROD) is given responsibility for the development and contract administration of tree removal and fuels reduction projects on private lands in the vicinity of the San Bernardino National Forest. Tree removal/fuel reduction projects include the felling, removal, and disposal of dead, dying, and diseased trees, and any vegetation which creates a hazardous fuel for fires. In addition, the placement and/or installation of products and materials are required as needed, to prevent erosion and/or displacement of sediment.

Additional hazardous tree removal programs have surfaced in recent years. These efforts have been administered by the likes of Southern California Edison and CALFIRE.

2.5.3 U.S. Bureau of Land Management Area of Critical Environmental Concern

The BLM designated an ACEC in the SAR in 1994. The purpose of the ACEC designation is to protect and enhance the habitat of federally listed species occurring in the area while providing for the administration of valid existing rights (BLM 1996). The species of concern in the SAR area include the SAR wooly-star, the Slender-Horned spineflower, and the San Bernardino kangaroo rat. The BLM manages over 1,100 acres that are part of the ACEC. Although the establishment of the ACEC is important in regard to conservation of sensitive habitats and species in this area, the administration of valid existing rights supersedes BLMs conservation abilities in this area. Existing rights include a withdrawal of federal lands in this area for water conservation through an act of Congress, February 20, 1909 (Pub. L. 248). The entire ACEC is included in this withdrawn land and may be available for water conservation measures such as the construction of percolation basins, subject to compliance with the act.

2.5.4 U.S. Army Corps of Engineers Woolly-Star Preserve Area

Santa Ana River Woolly-Star
Photo Credit: San Bernardino Valley Water Conservation District

To protect significant populations of the SAR woolly-star (a federally protected plant species), lands within the corridor of the SAR and portions of the alluvial fan terraces were set aside as a conservation area.

The Woolly-Star Preserve Area (WSPA) is a 764-acre area located west of the Greenspot Bridge that crosses the SAR.

The WSPA was established by mitigation in the 1990s by the USACE and local sponsors to address impacts related to the construction of Seven Oaks Dam.

Approximately 545 acres of the WSPA area are within the Santa Ana River Wash Plan planning area. As part of the Wash Plan Habitat Conservation Plan (Wash Plan HCP) (see **Section 2.5.7**), the Conservation District will provide additional management of 43.5 acres of land that is being added to the WSPA through the exchange between the Conservation District and a private landowner.

2.5.5 Western Riverside County Multi-Species Habitat Conservation Plan

The Multi-Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional plan that focuses on the conservation of species and their habitats in western Riverside County. The plan area includes all unincorporated land in Riverside County west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of several cities. The MSHCP established a conservation area of more than 500,000 acres and focuses on the conservation of 146 species.

2.5.6 Upper Santa Ana River Habitat Conservation Plan

Water agencies and other stakeholders are in the process of finalizing the Upper Santa Ana River HCP (River HCP) to address the potential effects of local water management agency activities on the sensitive species and habitats in the watershed for purposes of acquiring an incidental take permit (ITP) under Section 10 of the Federal Endangered Species Act (FESA). The River HCP also provides the necessary elements for allowing other and similar permits under applicable California Endangered Species Act (CESA) provisions and addresses coordination efforts with California Department of Fish and Wildlife. The River HCP includes a Conservation Strategy for protecting, enhancing, and restoring the habitat for species either currently listed as threatened or endangered or may become listed during the permit term to mitigate the effects of water supply management activities. The Planning Area encompasses approximately 862,966 acres and was developed to ensure that the natural resources that might be affected by activities covered in the River HCP can be adequately assessed at a regional scale and that sufficient mitigation opportunities are available. When complete, the wildlife agencies will issue permits that will allow the projects in the River HCP to proceed.

More information on the River HCP can be found at www.uppersarhcp.com.

2.5.7 Wash Plan Habitat Conservation Plan

In 1993, representatives of numerous agencies - including water, mining, flood control, wildlife, and municipal interests - formed a Wash Committee to address mining issues local to the upper SAR wash area. The role of the Committee was subsequently expanded, and it began meeting in 1997 to determine how this area might accommodate all the important functions represented by the participating agencies.

The Wash Committee sought to disregard land ownership lines in favor of a "best use" strategy for land use planning. For example, significantly disturbed areas are more appropriate for mining while undisturbed lands are more favorable for wildlife. The primary goal of the Wash Plan HCP is to streamline permitting for the ground-disturbing activities associated with water conservation, aggregate mining, recreational activities, and other public service services in the Wash Plan HCP's Plan Area while balancing these impacts with the conservation of natural communities and populations of special-status plants and wildlife. The Upper Santa Ana River Wash Habitat Conservation Plan was approved in 2020 as part of an Incidental Take Permit application for its 63 projects from the USFWS. The project Planning Area covers approximately 4,900 acres ranging from Greenspot Road in the City of Highland to Alabama Street in the Cities of Redlands and Highland in the upper Santa Ana River wash.

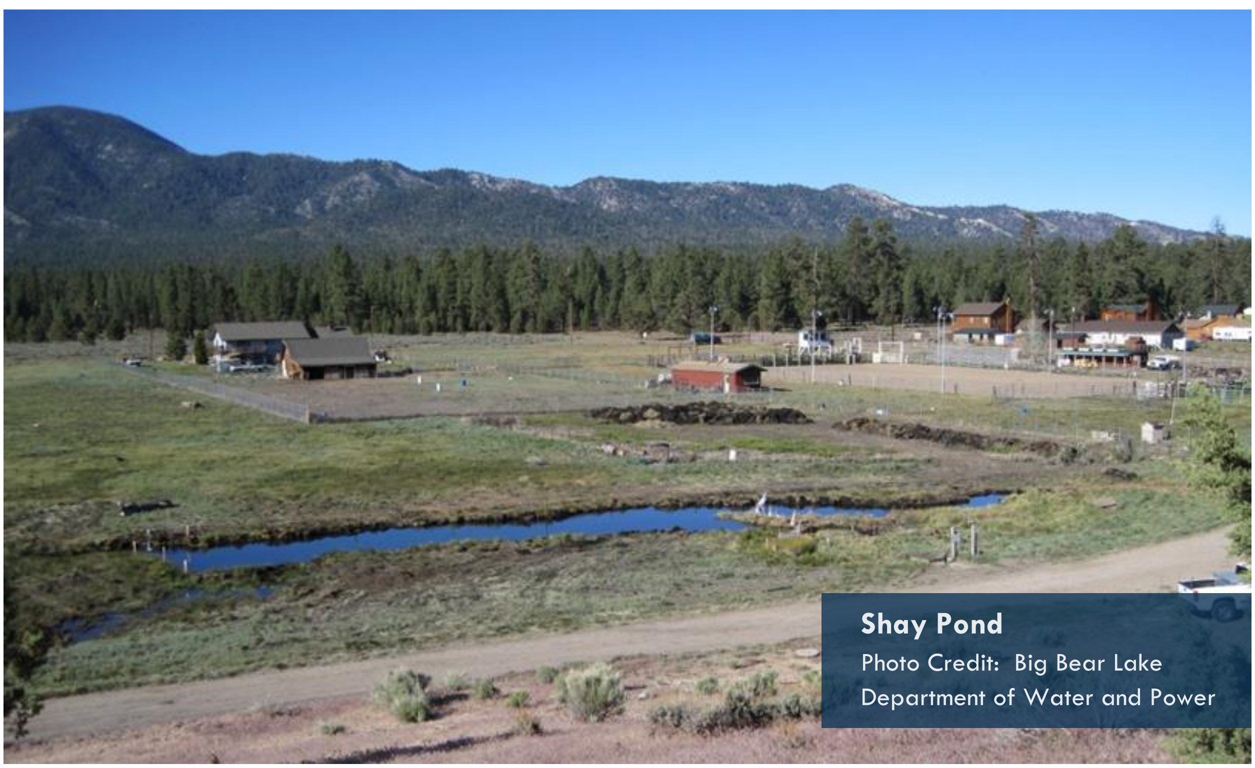
As part of Wash Plan HCP implementation, the Santa Ana Wash Plan Land Exchange was signed into law in 2019 after nearly two decades of negotiation and collaboration among diverse interests. The Santa Ana Wash Plan Land Exchange Act will authorize BLM to exchange land with the Conservation District, allowing agencies to move forward with Wash Plan projects to optimize implement critical water projects while expanding habitat for native and threatened species.

More information on the Wash Plan HCP can be found at https://www.sbvwcd.org/santa-ana-wash-plan

2.5.8 Unarmored Threespine Stickleback Shay Pond Fish Refugium

The unarmored threespine stickleback fish is a federally endangered species occurring in the eastern end of Big Bear Valley in Shay Pond. The refugium was developed to mitigate probable impacts of groundwater development on public and private lands, and to preserve USFS Special Use Permits issued to water and sewer agencies in Big Bear Valley. Collaboration between the BBCCSD, BBLDWP and the Big Bear Area Regional Wastewater Agency purchased 2.25 acres of private land surrounding a surviving population of the fish, and continually supplies up to 65 acre-feet of potable water annually to keep the pond filled. The agencies also supply equipment and operators to clean out the pond to maintain habitable area for the fish as directed by the U.S. Fish and Wildlife Service.

The agencies are in the process of developing a new water supply program called Replenish Big Bear that proposes to provide an alternate source of high-quality recycled water to the pond so that the current potable water source can be used to meet domestic water supply needs.

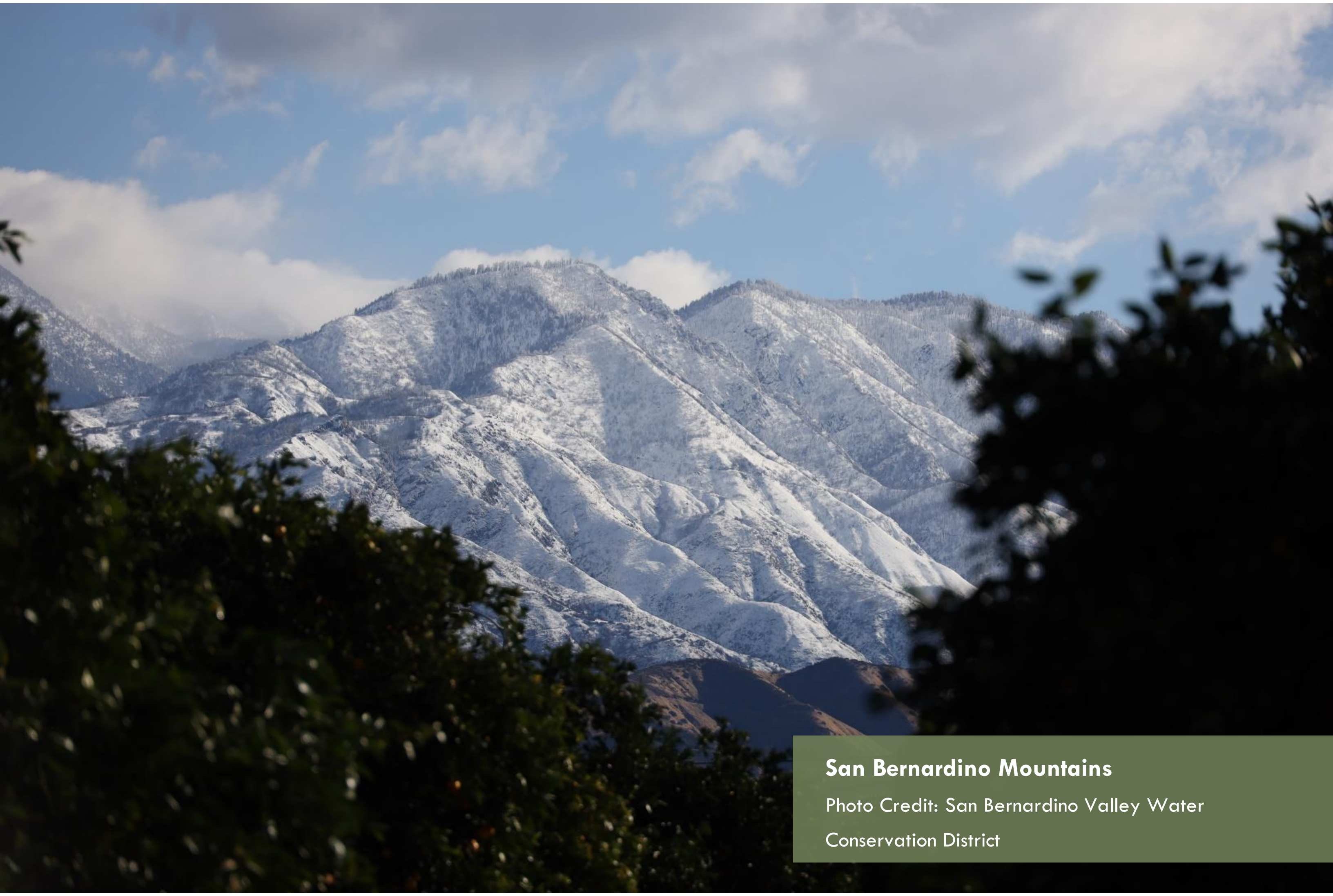


Shay Pond
Photo Credit: Big Bear Lake Department of Water and Power

2.6 Regional Climate

2.6.1 Current Regional Climate

Climate in the Region is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. The largest portion (73%) of average annual precipitation occurs during December through March and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in the lower elevations and mostly in the form of snow above about 6,000 feet mean sea level (msl) in the San Bernardino Mountains. Mean annual precipitation ranges from about 12 inches in the vicinity of Riverside, to about 20 inches at the base of the San Bernardino Mountains, to more than 35 inches along the crest of the mountains.

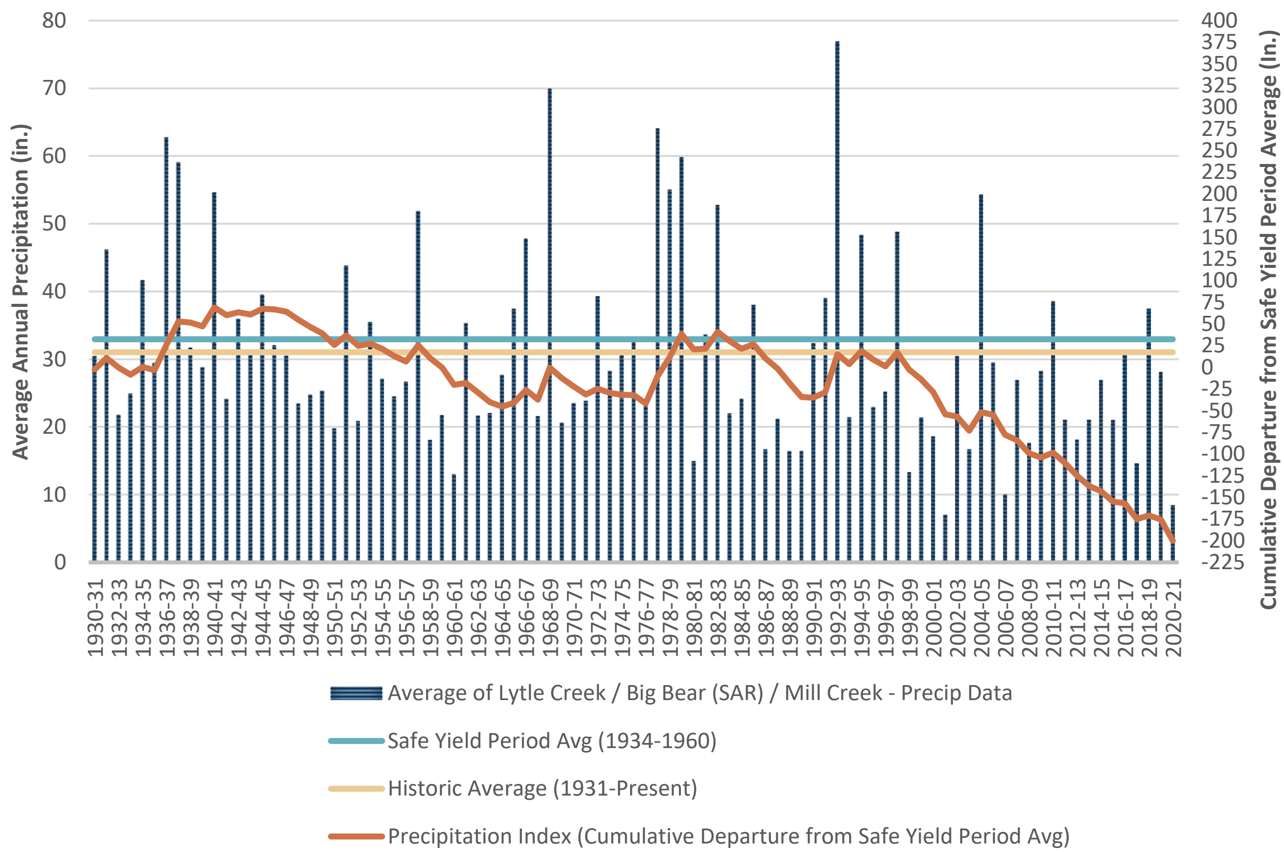


San Bernardino Mountains

Photo Credit: San Bernardino Valley Water Conservation District

The historical record indicates that a period of above-average or below-average precipitation can last more than 30 years, such as the recent dry period that extended from 1947 to 1977. As shown by precipitation data in Figure 2-7, the Region has been experiencing an ongoing drought since 1999.

Figure 2-7. San Bernardino Basin Precipitation Index



Three types of storms produce precipitation in the SAR watershed: general winter storms, local storms, and general summer storms. General winter storms usually occur from December through March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect orographic (i.e., land elevation) influences and are accompanied by widespread precipitation in the form of rain and, at higher elevations, snow. Local storms cover small areas but can result in high intensity precipitation for durations of approximately six hours. These storms can occur any time of the year, either as isolated events or as part of a general storm, and those occurring during the winter are generally associated with frontal systems (a “front” is the interface between air masses of different temperatures or densities). General summer storms can occur in the late summer and early fall months in the San Bernardino area, although they are infrequent.

2.6.2 Potential Effects of Climate Change

Climate change modeling for the SAR watershed conducted in 2015 suggests that a changing climate will have multiple effects on the Region. Adaptation and mitigation measures will be necessary to account for these effects.

2.6.2.1 Predicted Impacts and Effects of Climate Change

The State of California completed the Fourth Climate Change Assessment (Fourth Assessment) in 2019. The Fourth Assessment examines climate-related vulnerability of people, infrastructure, and natural systems, and provides information to build resilience to climate impacts, including temperature, wildfire, sea level rise, and governance.

As part of this effort, the State prepared regional documents in which the region is included under the Los Angeles Region Report. Key projected climate changes from these documents include:

- Continued future warming, with increases in average maximum temperatures.
- Increases in extreme temperature
- Increases in dry and wet precipitation extremes
- Rising sea levels
- Increases in wildfire burned areas

The State's Cal-Adapt website provides a number of tools to use to estimate the effects of climate change at a local level. Cal-Adapt's Extreme Heat tool shows that in the future the number of days over 95°F will increase in multiple locations. The Region chose three cities with different temperature ranges to compare the increase across the entire watershed. The cities of Riverside, San Bernardino and Big Bear were used to see the projections of the number of days that would be above 95°F and the results are shown in **Table 2-3**.

Table 2-3: Average Number of Days per Year Exceeding 95°F

CITY	OBSERVED HISTORICAL (1961-1990)	2050	2070
Riverside	40	80	92
San Bernardino	32	72	80
Big Bear	0	0	0

Source: Cal-Adapt, Extreme Heat Days & Warm Nights tool. https://cal-adapt.org/tools/extreme-heat/. Accessed May 2021. Scenario: RCP 4.5. Threshold temperature: 95°F. Models: Default GCMs.

The numbers of high temperature days in Riverside and San Bernardino are believed to double between the present and 2070. Similar increases in temperature can be anticipated throughout the inland valleys. These increased temperature levels will increase water demands across the watershed mainly for agricultural and irrigation purposes. The higher temperature days in Big Bear have the potential to affect the forest ecosystem and the snow related recreational activities in the area.

The forest ecosystems in the San Bernardino National Forest are currently on the decline. Alpine and subalpine forests are anticipated to decrease in area by fifty to seventy percent by 2100. It is believed that increased greenhouse gas emissions are a primary factor contributing to the decline of these fragile ecosystems. Wildfire risk is anticipated to increase particularly in the urban-wildland interface communities. Wildfires can pose serious threats not only to forest ecosystems, but also to critical water infrastructure. More frequent wildfires may also increase sediment and contaminant flows within the watershed, consequently degrading the quality of surface water bodies that are an important part of the ecosystem and Region's water supply.

Big Bear Lake and Stanfield Marsh in 2016
Photo Credit: Big Bear Municipal Water District

While high elevation ecosystems decrease, the severity of future floods is likely to increase. The likelihood of a 200-year storm event or longer is anticipated to be significantly higher in 2070. This increases the potential for negative impacts on nearby infrastructure. Furthermore, storms are expected to be more severe but less frequent. Despite these assumptions, the aftermath of a severe storm is highly variable. It is known that there are significant variabilities in the results of storm severity.

In addition to changes in ecosystems and storm severity, warmer temperatures may also decrease the annual amount of snow fall and increase the instance of rain in higher elevations. This alteration of precipitation type is likely to cause negative impacts for snow related recreational activities characteristic of the area's ski resorts. From a local standpoint, Big Bear and Snow Valley both lie below 3000 m and are anticipated to experience a decline in snowpack by 2070. Furthermore, it is projected that there will be a decrease in overall winter precipitation of the area by 2070. On a larger scale, the increased temperatures could affect the Sierras in a similar way, threatening the reliability of the SWP. Water quality could also suffer due to changes in precipitation and rising temperatures. Potential impacts such as increased contaminant concentrations and algal growth could increase water treatment needs.

A study was recently completed for the San Bernardino Valley area by RAND Corporation to identify vulnerabilities in demands and supplies according to various uncertainty factors, including climate change. The RAND study is discussed further in **Section 5.1**.

> The vulnerability of the Region's water resources to these climate change effects are discussed further in Chapter 6.

3

PART 1: REGIONAL CONTEXT

Regional Water Sources and Management

This chapter describes the current and planned water resources available within the region for the 25-year period covered by the Plan. Management of the various water sources is also described, including legal judgements and regional management groups.

The Upper SAR watershed is an area with unique hydrological characteristics and complex water management issues. This Region was selected for IRWM planning in large part because of the following factors:

- Rapid population growth in the area and the potential for continued rapid growth in the future.
- Significant institutional issues, hydrological characteristics, and court judgments that separate the Upper SAR watershed from the downstream portion of the watershed at the Riverside Narrows just upstream from Prado Dam. The Orange County Water District v. City of Chino, et al., Case No. 117628 (Orange County Judgment) and the Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426 (Western Judgment), have significant influence on water management of the Upper SAR and dictate, to some degree, how water resources should be managed in the Upper SAR watershed.

IN THIS SECTION

- Regional Water Sources
- Summary of Water Sources Used by Agency
- Local Water Management
- Water Quality
- Major Regional Water Infrastructure

- The Upper SAR watershed is an area with unique physical characteristics. The Upper SAR has widely variable hydrology and challenging water management issues, including the desire to optimize the use of local water supplies. The agencies in the Region coordinate and collectively manage the groundwater spreading and pumping, and work together on this cooperative, integrated plan which gives them the opportunity to regularly evaluate their needs and their management strategies.
- The region has significant groundwater basin storage.

3.1 Surface Hydrology

Surface hydrology of the Region is comprised of the SAR and its tributaries as shown in **Figure 3-1.** A number of surface reservoirs in the Region are operated primarily for agricultural and urban water use but are also regulated for instream flows and recharge of groundwater basins.

3.1.1 SAR Reaches

The IRWM Region is within the boundaries of the Santa Ana Regional Water Quality Control Board (SARWQCB). The SARWQCB has divided the mainstem of the SAR into six reaches. Reaches 1 through 6 have reach numbers beginning at the Pacific Ocean and increasing upstream. Reaches 3 through 6 are located in the Upper SAR watershed. These reaches are described in more detail below, from upstream to downstream.

Reach 6 (River Mile (RM) 70.93 and Above)

This reach includes the river upstream of Seven Oaks Dam where flows consist largely of snowmelt and storm runoff and water tends to be of excellent quality (SARWQCB 1995).

Reach 5 (RM 70.93 to RM 57.68)

This reach extends from Seven Oaks Dam to the Bunker Hill Dike (San Jacinto fault), which marks the downstream edge of the Bunker Hill Subbasin. This reach tends to be dry except during storm flows. The lower end of this reach sometimes has rising groundwater and includes the San Timoteo Creek, which flows on an intermittent basis (SARWQCB 1995).

Reach 4 (RM 57.68 to RM 49.00)

This reach includes the SAR from Bunker Hill Dike downstream to Mission Boulevard Bridge in Riverside. The bridge is the upstream limit of rising groundwater resulting from the constriction at Riverside Narrows. Until about 1985, most water in the reach percolated to the local groundwater leaving the lower part of the reach dry. However, flows in the lower end of this reach may now intermittently contain rising groundwater, RIX, and Rialto discharge, and flows from San Timoteo Creek.

Reach 3 (RM 49.00 to RM 30.50)

This reach includes the SAR from Mission Boulevard Bridge in Riverside to Prado Dam. At the Riverside Narrows, rising groundwater feeds several small tributaries including Sunnyslope Channel, Tequesquite Arroyo, and Anza Park Drain (SARWQCB 1995).

Reach 3 of the Santa Ana River
Photo Credit: San Bernardino Valley Municipal Water District

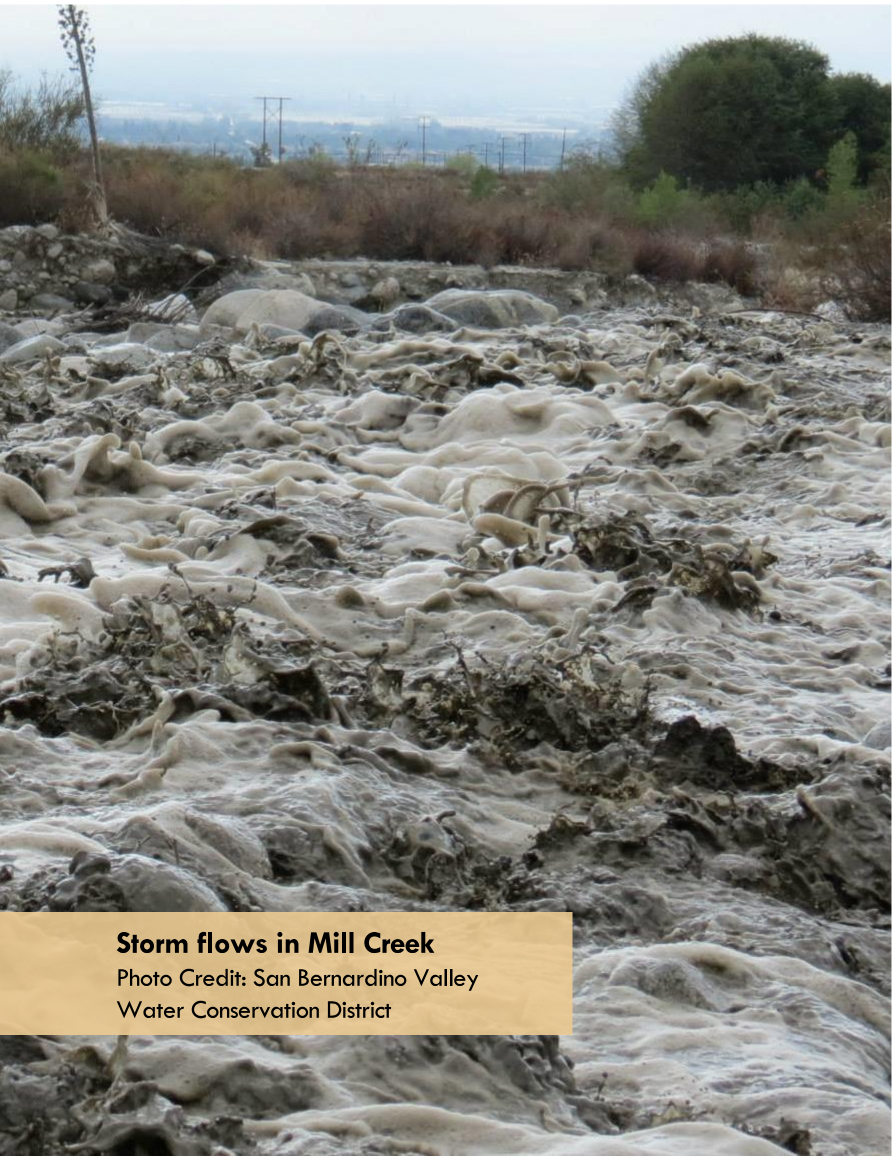
3.1.2 Natural Runoff

Runoff records provide information on the characteristics of flow in the SAR and its tributaries. Such records are available for a number of stream gaging stations located on the mainstem of the SAR and throughout the SAR watershed. The SAR runoff records demonstrate the highly variable nature of river flow, with large floods and long periods of extremely low flow. Three gaging stations provide streamflow data for the USARW. Mentone Gage (USGS record 11051500) is representative of SAR flow near Seven Oaks Dam. There are two other USGS gaging stations located downstream of Seven Oaks Dam, but within the USARW basin—the "E" Street Gage (USGS Gage 11059300) located in the City of San Bernardino at river mile (RM) 57.69 and the Metropolitan Water District Crossing Gage (Metropolitan Crossing) (USGS Gage 11066460) located at RM 45.7 near Riverside Narrows. **Table 3-1** provides the annual median, maximum, and minimum streamflow recorded at the Mentone, "E" Street, and Metropolitan Crossing gages (see **Figure 2-1** for gage locations).

Table 3-1 : Upper SAR Median, Maximum, and Minimum Annual Flow (in AF)

GAGE	MEDIAN ANNUAL FLOW	MAXIMUM ANNUAL FLOW	MINIMUM ANNUAL FLOW
Mentone[a]	8,977	204,812	9
"E" Street[b]	21,202	316,302	567
Metropolitan Crossing[c]	77,166	355,468	21,000

Source: USGS gage data.
[a] USGS Gage 11051500. Period of record is WY 1899-1900 through WY 2019-20.
[b] USGS Gage 11059300. Period of record is WY 1938-39 through WY 1945-46, WY 1947-48 through 1953-54, WY 1966-67 through WY 2019-20.
[c] USGS Gage 11066460. Period of record is WY 1969-70 through WY 2018-19.



Storm flows in Mill Creek
Photo Credit: San Bernardino Valley Water Conservation District

As exhibited in **Table 3-1**, flow in the SAR is highly variable from year to year. Flow in the SAR increases downstream due to inflows from tributaries, rising water[1], and treated water from wastewater treatment plants (WWTPs). SAR flows at the "E" Street Gage include flows from Mill Creek and San Timoteo Creek, but not from Lytle and Warm Creeks, which enter the SAR below the "E" Street Gage. SAR flows at the Metropolitan Crossing include inflows from Lytle and Warm Creeks, two large public WWTPs, and rising water.

Flows in excess of about 70,000 AFY have a frequency of occurrence of only 13% at the River Only Mentone Gage, whereas this same flow has a frequency of occurrence of 62% at the Metropolitan Crossing Gage. Additionally, in the upstream areas, minimum annual stream flows are generally much smaller than minimum annual flows in the downstream areas.

[1] Rising water is used to describe noticeable increases in streamflow in reaches where a subsurface restriction forces groundwater to the surface.

The largest monthly flows typically occurred in February and March, and the lowest monthly flows typically occurred between August and October. Although streamflow increases downstream, the timing of flows (i.e., when the monthly maximums and minimums occur) is similar to the timing of flows observed at the Mentone Gage.

There are numerous tributaries that contribute flow to the mainstem of the SAR in the Region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located upstream of San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek (Figure 3-1). The flow (under 100-year flood conditions[2]) contributed by each of these tributaries is provided in **Table 3-2**. As a reference, during a 100-year flood event, Seven Oaks Dam would release up to 5,000 cfs (USACE 1988).

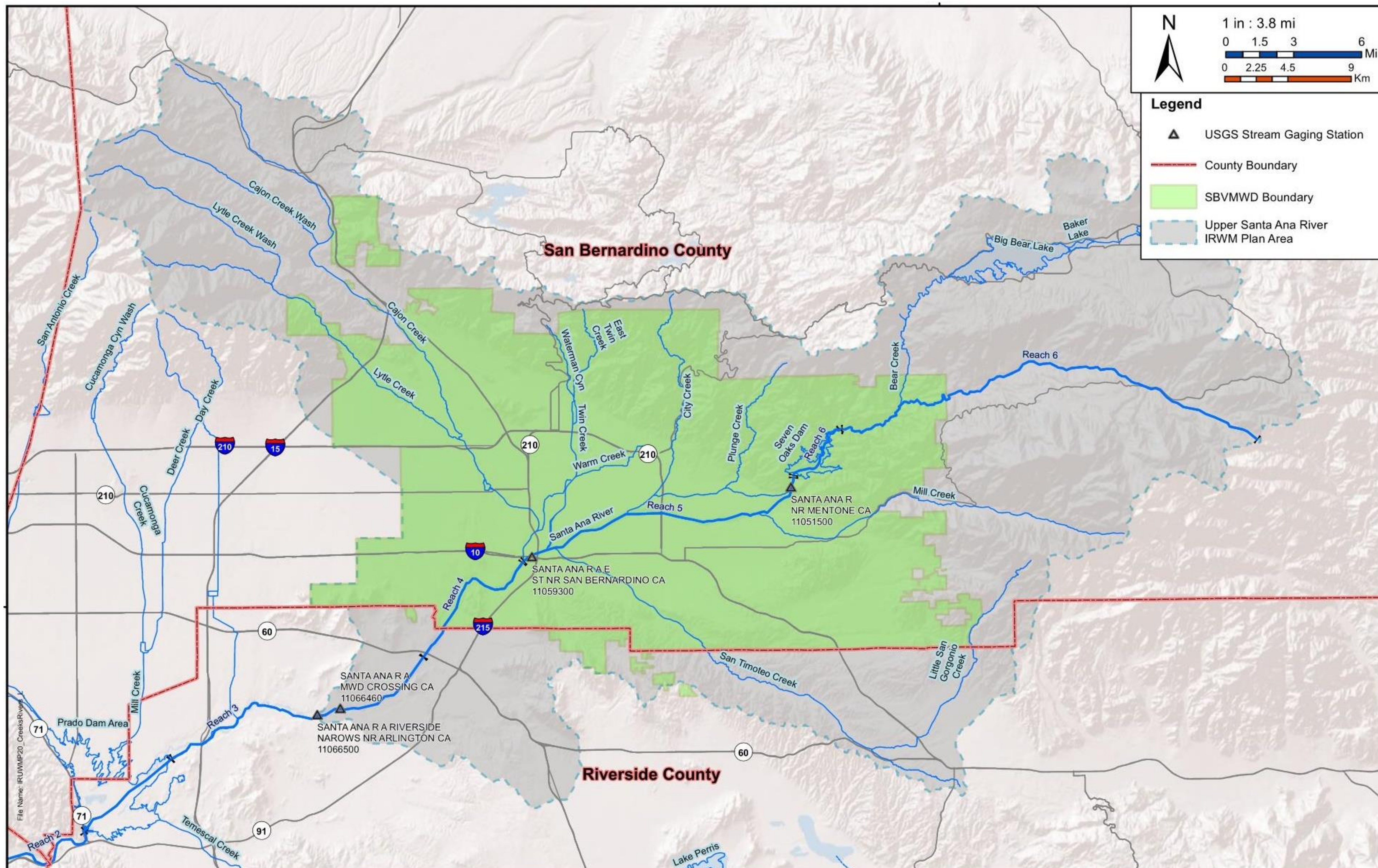
Table 3-2 : Tributary Flow Contribution to the SAR (100-Year Flood Event Discharge in cfs)

TRIBUTARY	INFLOW	RIVER MILE
Mill Creek	23,000	68.67
City Creek & Plunge Creek (Combined)	16,460	62.87
Mission Zanja Creek	6,100	59.08
San Timoteo Creek	19,500	58.44
East Twin Creek	18,000	58.14
Lytle Creek & Warm Creek (Combined)	70,000	56.74

Source: USACE 2000 and SBCFCD 2013

2 A flood as defined under the Standard Flood Insurance Policy is a general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation of runoff of surface waters from any source. A 100-year flood refers to a flood level with a 1 in 100 percent chance of being equaled or exceeded in any given year.

Figure 3-1. Creeks and Rivers in the Region



3.2 Imported Water

Imported water from the California State Water Project (SWP), is available to the Region for the East Branch through the Region's State Water Contractors: Valley District, San Gorgonio Pass Water Agency, and Metropolitan Water District of Southern California (Metropolitan).

Valley District is the fifth (5th) largest State Water Contractor, with an annual entitlement of 102,600 AF. Valley District takes delivery of SWP water at the Devil Canyon Afterbay. From this location, Valley District can deliver water to the west via the San Gabriel Valley Municipal Water District Pipeline (Valley District owns capacity in this pipeline) or to the east to San Gorgonio Pass Water Agency through the East Branch Extension of the SWP.

San Gorgonio Pass Water Agency is downstream of Valley District on the East Branch of the California Aqueduct. See the San Gorgonio Pass Water Agency 2020 UWMP for more information. Valley District and the SGPWA coordinate work as they both share capacity along the East Branch Extension. Two retail water districts included in this plan (YVWD and SMWC) are co-located in the within the Valley District and SGPWA service areas. In addition to operating some mutually used facilities, the Valley District and SGPWA have an agreement in place to share excess imported supplies when available, which is included in **Part 3 Appendix B**.

Metropolitan provides SWP water to portions of the Region through their member agencies, Western and Inland Empire Utilities Agency (IEUA). Western does not currently deliver imported water to its retail agencies within the Region but may in the future. FWC and WVWD are co-located within both the Valley District and IEUA service areas and FWC uses imported water from both IEUA and Valley District.

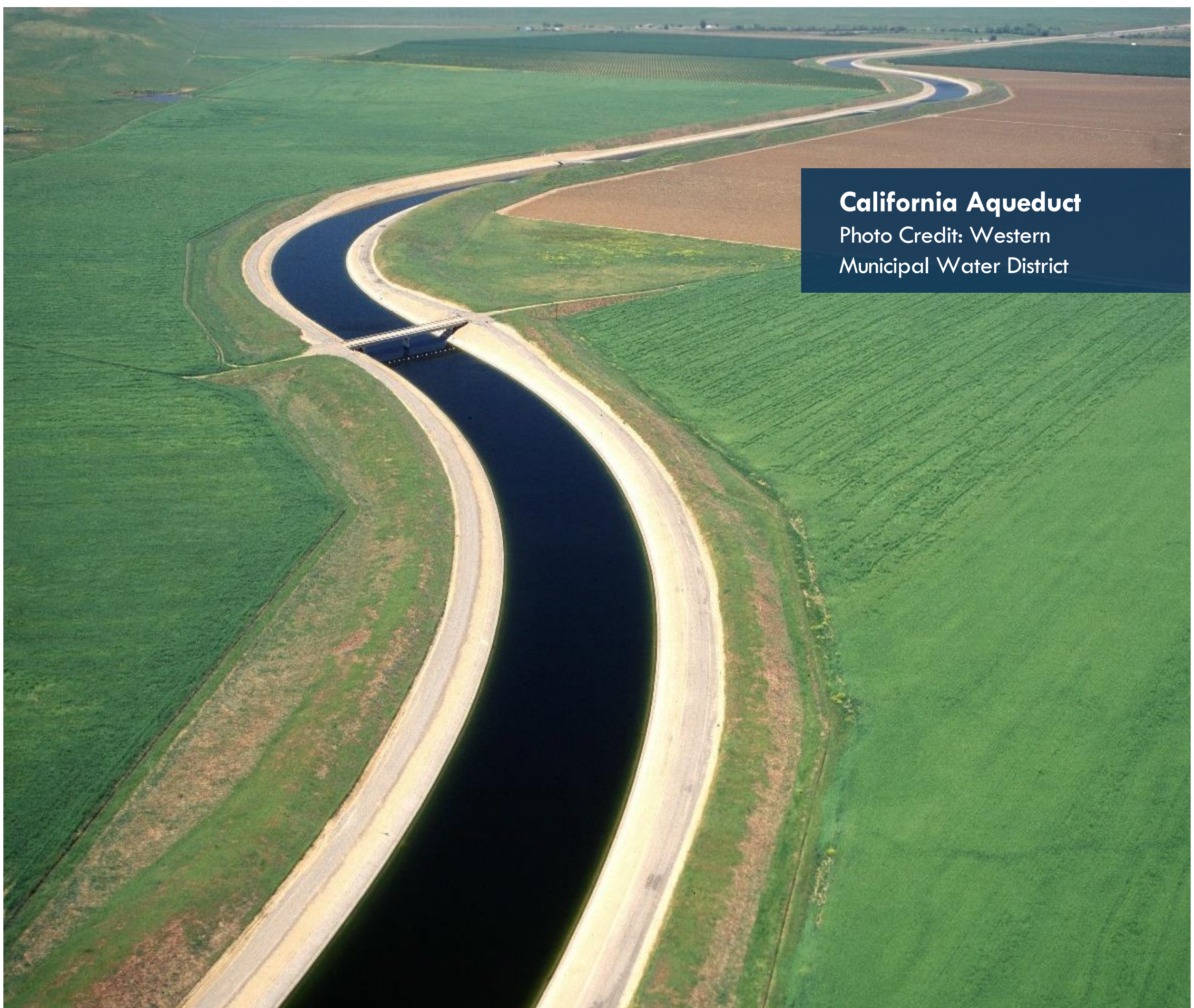
In 2021, Valley District entered into a new Coordinated Operating Agreement (COA) with Metropolitan that would sell them most of Valley District's surplus imported water; this COA replaced the previous version that expired in 2016. One of the terms of the COA requires Metropolitan to offer 50% of any surplus water purchased under this agreement to their member agencies in the SARCCUP Program. The COA is included in **Part 3 Appendix B**. Metropolitan and its member agencies that are part of the SARCCUP have also developed a companion agreement that describes how SARCCUP will function within Metropolitan's existing policies.

3.2.1 SWP Overview

Imported water is available to the Region from the California State Water Project (SWP), which is the largest state-built, multi-purpose water project in the country; it is paid for by the 29 State Water Contractors, including Valley District, SGPWA and MWDSC and operated and maintained by DWR. It was authorized by the California State Legislature in 1959, with the construction of most initial facilities completed by 1973. The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. Its main purpose is to capture and store water at Lake Oroville and distribute it to the 29 State Water Contractors in

Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. Of the contracted water supply, approximately 70 percent goes to urban users and 30 percent goes to agricultural users. The SWP makes deliveries to two-thirds of California's population. The SWP is also operated to improve water quality in the Sacramento-San Joaquin Delta, control Feather River flood waters, provide recreation, and enhance fish and wildlife.

The SWP includes 34 storage facilities, reservoirs, and lakes, 20 pumping plants, four pumping-generating plants, five hydro-electric plants, and approximately 701 miles of aqueducts and pipelines. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Water released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta (Delta). While some SWP supplies are pumped from the northern Delta into the North Bay Aqueduct, the vast majority of SWP supplies are pumped from the southern Delta into the 444-mile-long California Aqueduct. The California Aqueduct conveys water along the west side of the San Joaquin Valley to Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains. The aqueduct then divides into the East and West Branches.



California Aqueduct
Photo Credit: Western Municipal Water District

Each SWP contractor's SWP Water Supply Contract includes a "Table A," which lists the maximum amount of water an agency is entitled to throughout the life of the contract. The Table A amount is each contractor's proportionate share, or "allocation," of the SWP water supply. However, actual deliveries of SWP water each year vary, based mainly on the amount of precipitation (for other factors, see **Section 3.2.2** below).

While the primary supply of water available from the SWP is allocated Table A supply, SWP supplies in addition to Table A water are periodically available, including "Article 56C" carryover water, "Article 21" water, "Turnback Pool" water, and DWR "Dry Year Purchase Programs". Pursuant to the long-term water supply contracts, SWP contractors have the opportunity to carry over a portion of their allocated water approved for delivery in the current year for delivery during the next year (Article 56C) with advance notice when they submit their initial request for Table A water, or within the last three (3) months of the delivery year. The carryover program was designed to encourage the most efficient and beneficial use of water and to avoid obligating the contractors to "use or lose" the water by December 31 of each year. The water supply contracts outline the criteria for carrying over Table A water from one year to the next. Normally, carryover water is water that has been exported during the year, has not been delivered to the contractor during that year, and has remained stored in the SWP share of San Luis Reservoir to be delivered during the following year. Storage for carryover water no longer becomes available to the contractors if it interferes with storage of SWP water for project needs.

Article 21 water (which refers to the SWP contract provision defining this supply) is water that may be made available by DWR when excess flows are available in the Delta (i.e., when Delta outflow requirements have been met, SWP storage south of the Delta is full, and conveyance capacity is available beyond that being used for SWP operations and delivery of allocated and scheduled Table A supplies). Article 21 water is made available on an unscheduled and interruptible basis and is typically available only in average to wet years, generally only for a limited time in the late winter.

In wet periods, the amount of water available may exceed the amount of storage in the SWP system. During these times, State Water Contractors may have excess SWP water. Valley District has agreements, in place, to sell surplus water to SGPWA and Metropolitan Water District of Southern California

3.2.1.1 SWP Contract Amendments

Contract Extension

DWR provides water supply from the SWP to 29 SWP Contractors (Contractors) in exchange for Contractor payment of all costs associated with providing that supply. DWR and each of the Contractors entered into substantially uniform long-term water supply contracts (Contracts) in the 1960s with 75-year terms. The first Contract terminates in 2035, and most of the remaining Contracts terminate within three years after that.

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

Public negotiations to extend the Contracts took place between DWR and the Contractors during 2013 and 2014. An agreement-in-principle (AIP) was reached and was the subject of analysis under the requirements of the California Environmental Quality Act (CEQA) (Notice of Preparation dated September 12, 2104). On December 11, 2018 DWR Director approved the Water Supply Contract Extension Project. In accordance with CEQA, DWR also filed its Notice of Determination for the project with the Governor's Office of Planning and Research. In addition, DWR filed an action in Sacramento County Superior Court to validate the Contract Extension Amendments (**https://water.ca.gov/Programs/State-Water-Project/Management/Water-Supply-Contract-Extension**). After CEQA was completed and contract language was finalized, DWR and 18 contractors have executed the Extension Amendment. The Extension Amendment would extend the contracts through 2085 and improve the project's overall financial integrity and management. The Extension Amendment is the subject to a validation action and two CEQA lawsuits.

Water Management Tools

In a December 2017 Notice to Contractors, DWR indicated its desire to supplement and clarify the water management tools through this public process. Seeking greater flexibility to manage the system in order to address changes in hydrology and further constraints placed on DWR's operation of the SWP, PWAs and DWR conducted public negotiations in 2017 to improve water management tools (WMT Amendment). The goal of the negotiations was to develop concepts to supplement and clarify the existing SWP Contract's water transfer and exchange provisions to provide improved water management amongst the PWAs. Importantly, the transfers and exchanges provided for in the contract amendment are limited to those transfers and exchanges amongst the Public Water Agencies ("PWA's") with SWP Contracts.

In June 2018, PWAs and DWR completed an AIP which included specific principles to accomplish this goal. These principles included adding contract language to include a process for transparency for transfers and exchanges. The principles also include amending existing contract provisions to provide new flexibility for single and multi-year non-permanent water transfers, allowing PWAs to set terms of compensation for transfers and exchanges, and providing for the limited transfer of carryover and Article 21 water.

In October 2018, a Draft Environmental Impact Report (DEIR) was circulated for the contract amendments. The AIP at that time included cost allocation for the California WaterFix project

(WaterFix). In early 2019, the Governor decided not to move forward with WaterFix and DWR rescinded its approvals for WaterFix. After this shift, the PWAs and DWR held a public negotiation session and agreed to remove the WaterFix cost allocation sections from AIP, but to keep all the water management provisions in the AIP. The AIP for water management provisions was finalized on May 20, 2019. In February 2020, DWR amended and recirculated the Partially Recirculated DEIR for the State Water Project Supply Contract Amendments for Water Management and in August 2020, DWR certified the Final EIR. The EIR is being challenged in court. The WMT Amendment is effective when 24 SWP PWAs approve the amendment. The transfer and exchange tools will be available during litigation unless there is a final court order prohibiting their implementation.

Delta Conveyance Project

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

The third set of amendments would allocate Delta Conveyance Project costs and benefits among the SWP PWAs. Public negotiations between DWR and PWA's for the Delta Conveyance Project began in 2019 and were completed in April 2020. These negotiations led to an Agreement in Principle ("AIP") for an Amendment to the State Water Contract regarding the Delta Conveyance Project. The Parties' goal was to equitably allocate costs and benefits of a Delta Conveyance Facility and to preserve State Water Project operational flexibility. A decision by each participating PWA for approving a contract amendment with DWR would not occur until after the environmental review for the Delta Conveyance Project is completed. That decision would likely occur in 2023, at the earliest.

3.2.2 Imported Water Supply Reliability

This section presents the imported water supply reliability assumptions used in Valley District's water supply reliability analysis to meet the requirements of the UWMP Act; these apply only to Valley District. For assumptions and analysis used by San Gorgonio Pass Water Agency, Metropolitan and Western, refer to their respective 2020 UWMPs.

The amount of SWP water delivered to State Water Contractors in a given year depends on a number of factors, including the demand for the supply, amount of rainfall, snowpack, runoff, water in storage, pumping capacity from the Delta, and legal/regulatory constraints on SWP operation. Water delivery reliability depends on three general factors: the availability of water, the ability to convey water to the desired point of delivery, and the magnitude of demand for the water. Urban SWP contractors' requests for SWP water, which were low in the early years of the SWP, have been steadily increasing over time. Regulatory constraints have changed over time, becoming more restrictive.

DWR prepares a biennial report to assist SWP contractors and local planners in assessing the availability of supplies from the SWP. DWR issued its most recent update, the 2019 DWR State Water Project Delivery Capability Report (DCR), in August 2020. In this update, DWR provides SWP supply estimates for SWP contractors to use in their planning efforts, including for use in their 2020 UWMPs. The 2019 DCR includes DWR's estimates of SWP water supply availability under both existing (2020) and future conditions (2040).

DWR's estimates of SWP deliveries are based on a computer model that simulates monthly operations of the SWP and Central Valley Project systems. Key inputs to the model include the facilities included in the system, hydrologic inflows to the system, regulatory and operational constraints on system operations, and contractor demands for SWP water. In conducting its model studies, DWR must make assumptions regarding each of these key inputs.

In the 2019 DCR for its model study under existing conditions, DWR assumed: existing facilities, hydrologic inflows to the model based on 82 years of historical inflows (1922 through 2003), current regulatory and operational constraints including 2018 COA Amendment, 2019 biological opinions and 2020 Incidental Take Permit, and contractor demands at maximum Table A Amounts.

To evaluate SWP supply availability under future conditions, the 2019 DCR included a model study representing hydrologic and sea level rise conditions in 2040. The future condition study used all of the same model assumptions as the study under existing conditions, but reflected changes expected to occur from climate change, specifically, projected temperature and precipitation changes centered around 2035 (2020 to 2049) and a 45 cm sea level rise.

3.2.2.1 Sites Reservoir

Sites Reservoir is a proposed new 1,500,000 acre-feet off-stream storage reservoir in northern California near Maxwell. Sacramento River flows will be diverted during excess flow periods and stored in the off-stream reservoir and released for use in drier periods. Sites Reservoir is expected to provide water supply, environmental, flood and recreational benefits. The proponents of Sites Reservoir include 31 entities including Valley District and SGPWA. Sites Reservoir is expected to compliment the Delta Conveyance Project by providing approximately 240 TAF (Sites Reservoir Value Planning Report, Table 8-1) of additional deliveries during drier years. Sites Reservoir is currently undergoing environmental planning and permitting. Sites was conditionally awarded $816 million in grant funds from the California Water Commission for ecosystem, recreation, and flood control benefits under Proposition 1. Reclamation may also invest in Sites under the Water Infrastructure Improvements for the Nation (WIIN) Act and recently transmitted a final Federal Feasibility Report to Congress for the project.

Both Valley District and SGPWA are proponents of the Sites Reservoir Project and have made financial contributions to its planning and development. As both agencies are financial contributors to the project, both would receive a share of deliveries to South of Delta agencies during average and drier years.

The Sites Reservoir and DCP are critical investments to protect and enhance the reliability of SWP supplies and increase deliveries in dry years. **Section 3.2.3.1** describes how these improvements are incorporated into Valley District's UWMP Analysis. For information on SWP supply reliability for the SGPWA, Metropolitan, IEUA and Western, see their respective 2020 UWMPs.

3.2.3 Valley District SWP Supply Reliability (Review)

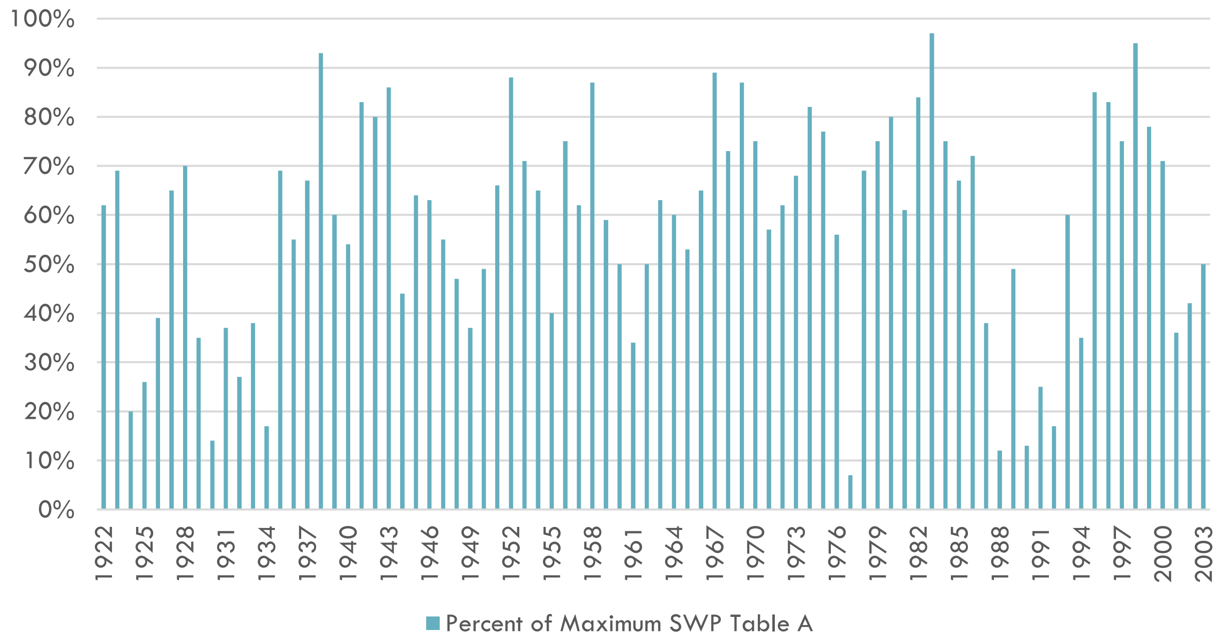
Once the bonds from initial construction of the SWP have been paid off in 2035, the taxpayers in Valley District's service area will have invested over $1.23 billion for their share of the SWP storage and delivery system. **Table 3-3** presents historical total SWP water deliveries to Valley District.

Table 3-3. Historical State Water Project Deliveries to Valley District

CALENDAR YEAR	TOTAL DELIVERIES (AF)
2010	30,310
2011	29,129
2012	40,216
2013	31,020
2014	19,223
2015	35,430
2016	62,600
2017	78,396
2018	44,307
2019	78,478
2020	23,504

Valley District's analysis assumes that the long-term average allocation reported in the 2019 DCR for the existing conditions study provide appropriate estimate of the SWP water supply availability under current conditions. For the long-term planning purposes of the Valley District supply reliability analysis, the long-term average allocations reported for the future conditions study from 2019 DCR are used to estimate future SWP water supply availability. It is assumed that the existing condition allocations will apply until 2035 and the future conditions allocations will apply in 2040 and 2045.

Figure 3-2. Estimated SWP Water Supply Availability from the DWR 2019 DCR Existing Conditions Scenario



The estimated long-term average SWP water supply availability from the 2019 DCR is shown in **Figure 3-2** and **Table 3-4**.

Table 3-4. SWP Table A Water Supplies Available (Long-term Average – 1922-2003)

STATE WATER PROJECT SUPPLIES	2025	2030	2035	2040	2045
% of Table A Amount Available	58%	58%	58%	52%	52%
Anticipated Deliveries (AFY)	59,508	59,508	59,508	53,352	53,352

Source: 2019 DWR Delivery Capability Report

Table 3-5 summarizes estimated SWP supply availability to Valley District in a single-dry year (based on a repeat of the worst-case SWP allocations of 2014 and 2021) and over a multiple-dry year period (based on a repeat of the worst-case historic six-year drought of 1987 to 1992). To further evaluate the range of potential supply conditions, the Region has elected to evaluate supplies under a 30-year drought and a wet year. The wet year reliability is provided in the 2019 DCR. The 30-year drought reliability was calculated using the same methodology DWR uses to determine the six-year drought supplies but extended over a longer period. These values are also shown in **Table 3-5** and the range of water supply availability by year used in each scenario is shown in

Figure 3-3.

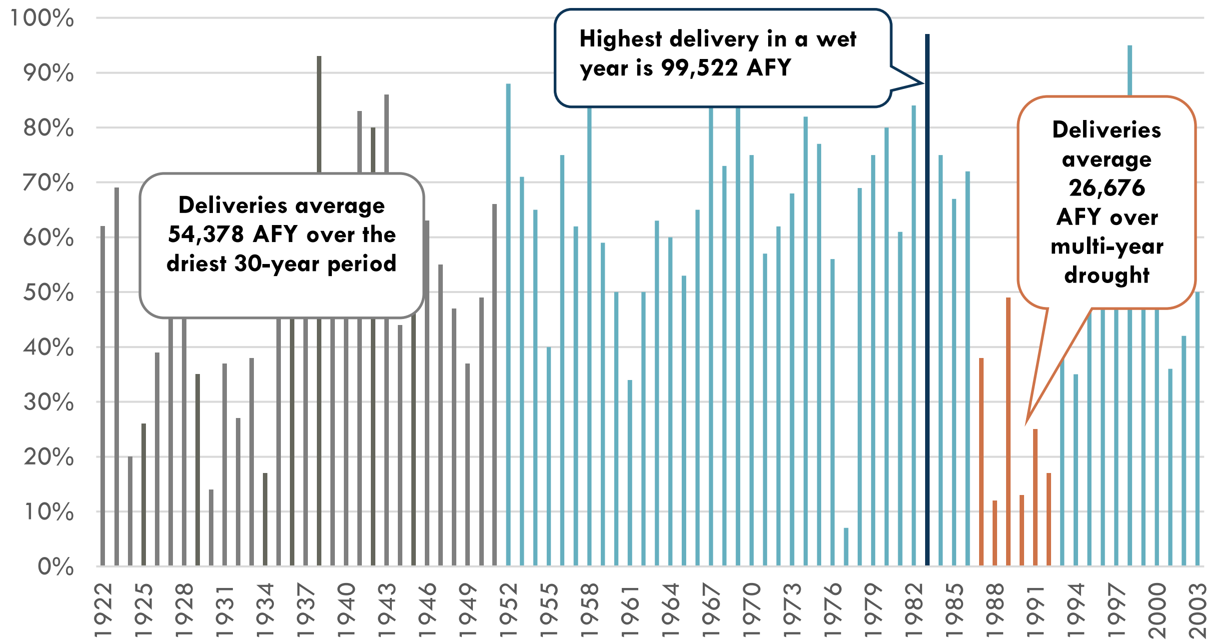
For each condition, it is assumed that the existing condition allocations will apply until 2035 and the future conditions allocations will apply in 2040 and 2045.

Table 3-5 Estimated SWP Table A Supply Reliability

STATE WATER PROJECT SUPPLIES	2025	2030	2035	2040	2045
SINGLE DRY YEAR (2014 AND 2021)					
% of Table A Amount Available	5%	5%	5%	5%	5%
Anticipated Deliveries (AFY)	5,130	5,130	5,130	5,130	5,130
MULTIPLE DRY YEAR (1987-1992)					
% of Table A Amount Available	26%	26%	26%	22%	22%
Anticipated Deliveries (AFY)	26,676	26,676	26,676	22,572	22,572
30-YEAR DROUGHT (1922-1951)					
% of Table A Amount Available	53%	53%	53%	48%	48%
Anticipated Deliveries (AFY)	54,378	54,378	54,378	49,248	49,248
WET YEAR (1983)					
% of Table A Amount Available	97%	97%	97%	97%	97%
Anticipated Deliveries (AFY)	99,522	99,522	99,522	96,444	96,444

Source: 2019 DWR Delivery Capability Report, except for Single Dry Year (see Section 3.2.3.1)

Figure 3-3. Estimated SWP Supply Availability for Wet Year, Multiple Dry Years and a 30-Year Drought



As described in **Section 3.2.1**, there are several programs that give Valley District flexibility to increase deliveries above the Table A allocation in a given year, including the use of carry over water. As urban contractor demands increase in the future, the amount of water turned back and available for purchase will likely diminish. In critical dry years, DWR has formed Dry Year Water Purchase Programs for contractors needing additional supplies. Through these programs, water is purchased by DWR from willing sellers in areas that have available supplies and is then sold by DWR to contractors willing to purchase those supplies. Because the availability of these supplies is somewhat uncertain and do not represent a large quantity of water, they are not included as supplies available to Valley District in this Plan. However, Valley District's access to these supplies when they are available may enable it to improve the reliability of its SWP supplies in extremely dry years to help meet its direct delivery demands. The main strategy Valley District will use to supplement supplies in dry years is wet year water stored in local groundwater basins and water banks. Valley District is already implementing conjunctive use in the SBB and there are plans to develop additional conjunctive use programs.

3.2.3.1 Lowest SWP Water Supply Allocation

DWR's 2019 Delivery Capability Report indicates that the modeled single dry year SWP water supply allocation is 7% under the existing conditions. However, historically the lowest SWP allocations were at 5% in 2014 and initial allocations in 2021. Due to extraordinarily dry conditions in 2013 and 2014, the initial 2014 SWP allocation was a historically low 5% of Table A Amounts, was later reduced to 0% in January 2014, and was later raised back to 5%, the lowest ever final total SWP water supply allocation, at the time. The circumstances that led to the low 2014 SWP water supply allocation was unusual, and although possible, likely have a low probability of frequent occurrence.

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

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

The exceedingly dry sequence from the beginning of January 2013 through the end of 2014 was one of the driest two-year periods in the historical record. As noted above, the circumstances that led to the low 2014 and 2021 SWP water supply allocation were unusual, and likely have a low probability of frequent occurrence in the future.

> For the reasons stated above, Valley District's UWMP uses a more conservative assumption of a 5-percent allocation of SWP Table A amounts instead of the 7% from the DCR.

3.2.3.2 Reliability Improvements from Sites Reservoir and DCP

There are currently four alternatives being evaluated for the Sites Reservoir Project and each would yield a different volume of water for Valley District based on the level of federal participation in the project. Since a final alternative has not been selected, Alternative 3, which yields the lowest deliveries to South of Delta's participants out of all the alternatives, is represented in this section to be conservative. Based on Alternative 3, estimated deliveries from

Sites Reservoir to Valley District during dry and critically dry years and average over the life of the project are shown in **Table 3-6**.

Table 3-6: Estimated Sites Reservoir Deliveries to Valley District

	LONG TERM AVERAGE DELIVERIES (AFY)	DRY AND CRITICALLY DRY YEAR DELIVERIES (AFY)
Alternative 3	12,100	30,400

Source: Sites Reservoir Value Planning Report, Table 8-1

For purposes of this report, it is estimated that the Sites Reservoir Project will come online between in 2040. DWR estimates of SWP supply reliability in its 2019 Delivery Capability Report are based on existing facilities, and do not include the proposed Sites Reservoir. For supply projections made for years 2020 through 2035, it is assumed that SWP reliability is equal to values shown in the 2019 Delivery Capability Report. For supply projections made for years 2040 and beyond, additional SWP supply available from Sites Reservoir is included.

The DCP is still under development and no published yield numbers were available at the time this plan was published.

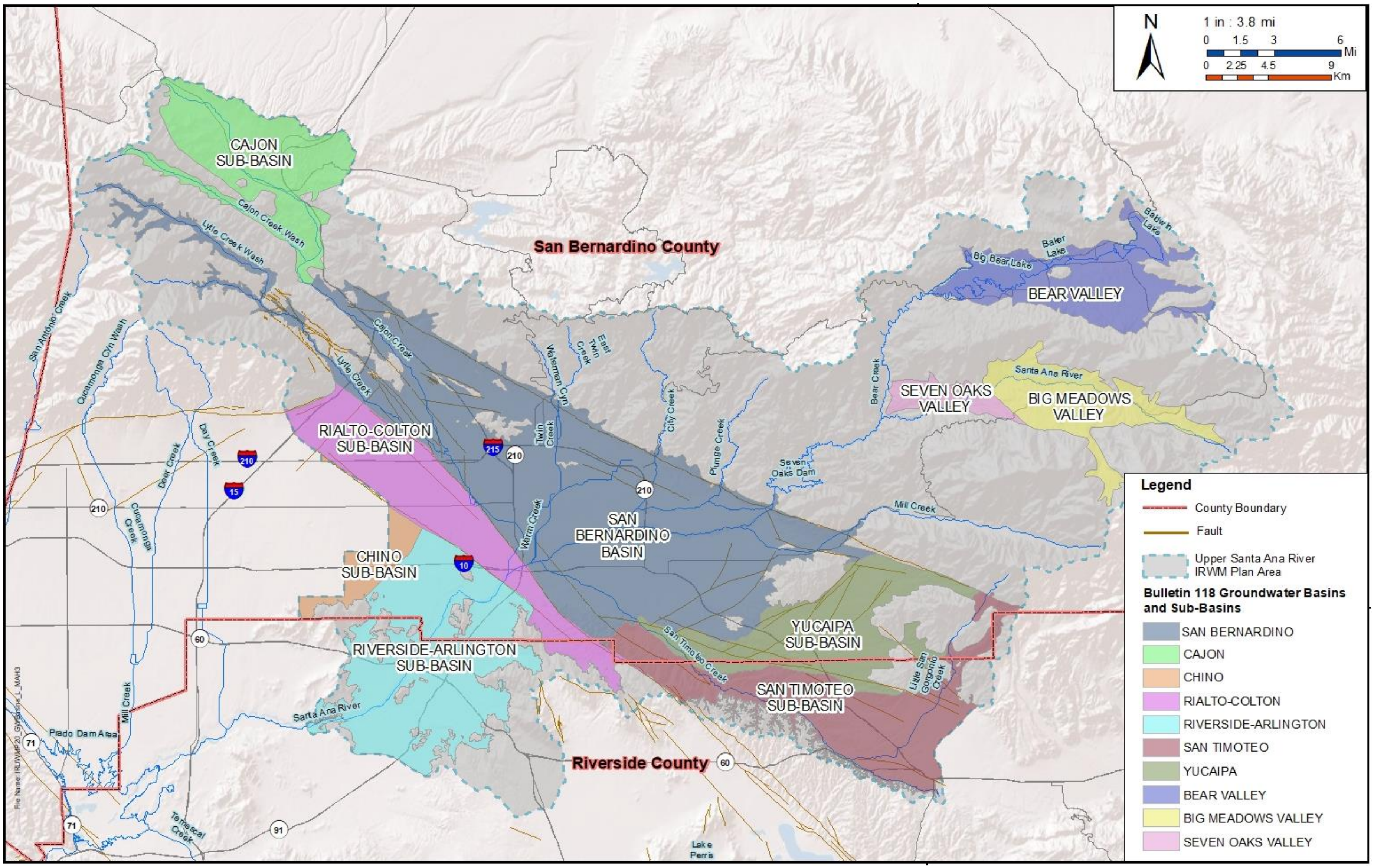
3.3 Groundwater

Local precipitation that runs off as surface water and soaks into the ground, called "groundwater", meets about 60% of the regional demand in an average year. This section provides a description of local surface water and groundwater management in the San Bernardino Valley, including court judgments, groundwater management plans, and groundwater pumping rights.

The groundwater basins utilized by IRUWMP agencies are depicted in Figure 3-4. The figure also shows the San Bernardino Basin (SBB), which encompasses basins previously known as the Bunker Hill and Lytle Creek Basins.

The basins of the IRUWMP area are among the most rigorously managed in the State. Planning and management efforts evaluating needs and supplies have been established for most of the basins within the watershed through the next 20 to 40 years. Groundwater extractions and conditions are monitored and tracked annually by the Western-San Bernardino Watermaster and the Basin Technical Advisory Committee.

Figure 3-4. Groundwater Basins of the Region



3.3.1 San Bernardino Basin

The San Bernardino Basin (SBB), labeled the "San Bernardino Basin Area" in the Judgment, was adjudicated in gross, by the Western-San Bernardino Judgment (Western Judgment) in 1969. The SBB has a surface area of approximately 141 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The SBB encompasses the Bunker Hill sub basin (DWR Number 8.02-06) defined by DWR and also includes a small portion of the Yucaipa Basin (8-02.07) and Rialto-Colton Basin (8-02.04) as defined by DWR.

The Western Judgment calculated the natural safe yield of the SBB to be 232,100 AF per year (AFY) for all extractions, including surface water diversions and groundwater pumping (the Western Judgment is provided in Appendix I). Surface water is diverted from Mill Creek, Lytle Creek, and the SAR.

The Western Judgment allocates 64,862 AFY of the safe yield, which equates to 27.95 percent, to the Plaintiffs. The Plaintiffs include the City of Riverside (the successor to the Riverside Water Company and the Gage Canal Company), Riverside Highland Water Company, Meeks & Daley Water Company, and Regents of the University of California. The Riverside County agencies may not exceed their allocation unless they participate in "New Conservation" (explained below).

The Non-Plaintiffs' (agencies within San Bernardino County) rights were defined in the Judgment as 167,238 AFY, which equates to 72.05 percent of the safe yield. San Bernardino agencies are allowed to extract more than 167,238 AFY from the SBB, as long as they import and recharge a like amount of supplemental water into the SBB. The Western-San Bernardino Watermaster provides an annual accounting of both the plaintiff and non-plaintiff extractions and a comparison to the safe yield. The Judgment requires the non-plaintiffs to provide replenishment water whenever the cumulative extractions exceed the cumulative safe yield. If the cumulative extractions are less than the cumulative safe yield, a "credit" is earned. When cumulative extractions are greater than the cumulative safe yield, a "debit" is taken. To date, the cumulative extractions have been less than the cumulative safe yield since the judgment was signed so that the non-plaintiffs have never been required to recharge the basin.

Recharge is also required to offset the export of water outside the SBB in excess of the amount recorded during the base period (1959-1963). Credits are earned for any new supplies such as stormwater capture. As of the accounting performed for the 2020 Annual Western-San

Bernardino Watermaster Report, the Non-Plaintiffs have 463,168 AF of net credit accumulated in the SBB and are, therefore, not required to recharge. Although there is no recharge requirement under the Judgment, the Non-Plaintiffs have continued to recharge the SBB.

3.3.1.1 Lytle Creek Sub basin

Lytle Creek Basin is part of the SBB, and it is not identified as a separate sub-basin in DWR Bulletin 118-2003; however, the sub basin is an integral part of the Upper Santa Ana Valley Groundwater Basin. Historically, local agencies have recognized Lytle Creek sub basin as a distinct groundwater sub basin. In the Western Judgment, the Bunker Hill and Lytle Creek sub basins are combined into the SBB. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill sub basin are not observed in the Lytle sub basin. Sediments within the Lytle sub basin are, for the most part, highly permeable, and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow).

Lytle Creek sub basin is adjoined on the west by the Rialto-Colton sub basin along the Lytle Creek fault, and on the east and southeast by the Bunker Hill sub basin along the Loma Linda fault and Barrier G. The northwestern border of the sub basin is delineated by the San Gabriel Mountains, and runoff from the mountains flows south/southeast through Lytle and Cajon Creeks into the basin.

Numerous groundwater barriers are present within Lytle Creek sub basin, resulting in six compartments within the sub basin. Barriers A through D divide the northwestern portion of the sub basin into five sub-areas and the southeastern portion of the sub basin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth. When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barrier within the older alluvium but not the younger alluvium.

It is important to note that the water rights in Lytle Creek are set forth in long-standing court judgments governing the rights of the parties in that basin. The Lytle Creek Basin was adjudicated under the 1924 Judgment No. 17,030 from the Superior Court of San Bernardino County and is managed by the Lytle Creek Water Conservation Association, which is made up of the successors to the stipulated parties of the judgment (a copy of the 1924 judgment is provided in Part 3).

3.3.2 Rialto-Colton Sub basin

The Rialto-Colton sub basin (DWR 8-02.04) underlies a portion of the upper Santa Ana Valley in southwestern San Bernardino County and northwestern Riverside County. This sub basin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part. This sub basin is bounded by the San Gabriel Mountains on the northwest, the San Jacinto fault on the northeast, the Badlands on the southeast, and the Rialto-Colton fault on the southwest. The Santa Ana River cuts across the southeastern part of the basin. The basin generally drains to the southeast, toward the Santa Ana River. Warm and Lytle Creeks join near the southeastern boundary of the basin and flow to meet the Santa Ana River near the center of the southeastern part of the sub basin.

The principal recharge areas are Lytle Creek, Reche Canyon in the southeastern part, and the Santa Ana River in the south-central part. Lesser amounts of recharge are provided by percolation of precipitation to the valley floor, underflow, and irrigation and septic returns. Underflow occurs from fractured basement rock and through the San Jacinto fault in younger Santa Ana River deposits at the south end of the sub basin and in the northern reaches of the San Jacinto fault system. Groundwater recharge has been augmented through the use of spreading basins.

The groundwater extractions in the Rialto-Colton sub basin are governed by the Rialto Basin Decree, the Rialto Basin Settlement Agreement, and the Western Judgment. The basin was adjudicated under the 1961 Decree No. 81,264 of the Superior Court of San Bernardino County and is managed by the Rialto Basin Management Association (stipulated parties of the judgment). The Rialto Basin Decree only provides the rights of the stipulated parties to pump out of the Rialto Basin, which is an area defined within the Decree that is smaller than the Rialto-Colton sub basin and includes only a portion of the northwestern half of the Rialto-Colton Basin. The boundary of the Rialto Basin is described in the Rialto Decree as Exhibit 1.

When the basin’s three index wells (WVWD Well No. 11, and 16, and Rialto’s Well 4) average mean groundwater level elevations are above 1002.3 feet msl when measured during March, April, or May, the stipulated parties have no restrictions on yearly extractions. When the average standing water levels in the three index wells (Duncan Well, Willow Street Well, and Boyd Well) falls below 1002.3 feet msl and is above 969.7 feet msl, the Rialto Basin Decree stipulated parties are restricted to total extraction rights of 15,290 AFY distributed amongst the parties as shown in **Table 3-7**.

When the average of the three index wells drops below 969.7 feet msl, ground water extractions are reduced for all parties stipulated in the decree by 1 percent per foot below the 969.7-foot level, but not to exceed 50-percent reduction. Historic reductions to adjustable rights are summarized in **Table 3-8**.

Table 3-7: 1961 Decree Adjudicated Rights to the Rialto Basin

MEMBER	ADJUSTABLE RIGHTS	FIXED RIGHTS	TOTAL RIGHTS	WATER RIGHTS ALLOCATION PERCENTAGE
Colton	3,010	890	3,900	25%
Rialto	2,846	1,520	4,366	29%
WVWD	5,594	510	6,104	40%
FUWC	550	370	920	6%
TOTAL	**12,000**	**3,290**	**15,290**	**100%**

Table 3-8: Historic Reductions to Pumping Rights in the Rialto Decree Area

WATER YEAR	% REDUCTION
2009-10	7
2010-11	14
2011-12	19
2012-13	17
2013-14	27
2014-15	32
2015-16	30
2016-17	31
2017-18	38
2018-19	39
2019-20	29

Fontana Water Company and the City of Rialto extract water from a small area referred to as “No Man’s Land” that is outside the boundary of the Rialto Basin in the 1961 Decree but is still believed to be within the Rialto-Colton sub basin. In 2018, Rialto, Colton, WVWD, Valley District, Cucamonga Valley Water District, and Fontana Water Company entered into a Settlement Agreement that resulted in Fontana’s No Man’s Land production of 5,014 acre feet/year being counted as part of the Rialto Basin production limits in the 1961 Decree in addition to the total established decree rights of 15,290 AFY. The rights of the parties of the Settlement Agreement to extract water from the Rialto Basin based on the 1961 Decree and the Settlement Agreement are provided in **Table 3-9**. As part of the Settlement Agreement, these parties also agreed to form a Rialto Basin Groundwater Council (Rialto Basin GC), which was formed in 2021.

The Rialto Basin GC will develop, adopt, and implement a sustainable groundwater management plan, which will include implementing groundwater recharge projects to restore groundwater levels.

Table 3-9: 2018 Settlement Agreement Updated Adjudicated Rights to the Rialto Basin

MEMBER	ADJUSTABLE RIGHTS	FIXED RIGHTS	NO MAN'S LAND ADJUSTABLE RIGHTS	TOTAL RIGHTS	WATER RIGHTS ALLOCATION PERCENTAGE
Colton	3,010	890	0	3,900	19%
Rialto	2,846	1,520	0	4,366	22%
WVWD	5,594	510	0	6,104	30%
FUWC	550	370	5,014	5,934	29%
Total	12,000	3,290	5,014	20,304	100%

The Rialto-Colton sub basin is named the "Colton Basin Area" in the Western Judgment.

The Western Judgment requires the average lowest static water levels in three index wells in the Rialto-Colton Basin and Riverside North Basins to be no lower than 822.04 feet above mean sea level (MSL). If the water levels fall below 822.04 feet above MSL, the non-plaintiffs are obligated to recharge the basin with imported water or reduce extractions. Extractions by the plaintiffs are limited to 3,381 AFY.

The safe yield for the Rialto-Colton Basin was not defined by the Western Judgment or the Rialto Basin decree. Valley District developed an estimate of the safe yield, as shown in Table 3-10. The estimate uses a period when the storage level in the basin starts and ends at nearly the same point, from 1979 through 2014. During that period, the average production from the basin was 15,567 AF which includes water imported from the State Water Project. The estimate adjusts the production by the relative decrease in storage over the period. After adjusting for the decline in storage and the recharge of imported water, the estimated safe yield is estimated to be 13,623 AFY. The Western Judgment set aside 3,381 AFY for Riverside entities, leaving the balance, 10,242 AFY for San Bernardino entities within the Valley District service area.

Table 3-10 Estimated Safe Yield from Rialto-Colton Basin

PARAMETER	VALUE (AF)
Average groundwater production from 1979 through 2014	15,567
Adjustment for average change in storage, 1979 through 2014	(864)
Adjustment for average imported water recharged,1979 through 2014	(1,080)
Estimated Safe Yield	13,623
Portion of Safe Yield reserved for Riverside entities	3,381
Portion of Safe Yield for San Bernardino entities	10,242

3.3.3 Riverside-Arlington Sub-basin

The Riverside-Arlington sub basin, (DWR 8-02.03) underlies part of the Santa Ana River Valley in northwest Riverside County and southwest San Bernardino County. This sub basin is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the community of Bloomington. The Santa Ana River flows over the northern portion of the sub basin. Annual average precipitation ranges from about 10 to 14 inches. The Riverside-Arlington sub basin is replenished by infiltration from Santa Ana River flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino sub basin, return irrigation flow, and deep percolation of precipitation.

The Western Judgment includes the Riverside Basin Area which consists of a portion of the Riverside-Arlington sub-basin upstream of Riverside Narrows. Groundwater extractions in the Riverside North Groundwater Basin (the portion of the Riverside Basin Area in San Bernardino County) are governed by the Western Judgment. Extractions from the Riverside North Basin for use in Riverside County are limited to 21,085 AFY by the Judgment. Extractions for use in San Bernardino County are unlimited, provided that water levels at three index wells in the Rialto-Colton and Riverside North Basins stay above 822.04 feet MSL. The 2015 IRWMP provided an estimate of 30,100 AFY as the sustainable supply from Riverside North for use in San Bernardino County, based on extractions from 1996 to 2005. That value is also used for this Plan. Valley District has budgeted to update the safe yield estimate prior to the next plan update.

3.3.4 Yucaipa Sub basin

The Yucaipa sub basin (DWR 8-02.07) underlies the southeast part of San Bernardino Valley. It is bounded on the northeast by the San Andreas fault, on the northwest by the Crafton fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills. The average annual precipitation ranges from 12 to 28 inches. This part of the San Bernardino Valley is drained by Oak Glen, Wilson, and Yucaipa Creeks south and west into San Timoteo Wash, a tributary to the Santa Ana River.

Dominant recharge to the sub basin is from percolation of precipitation and infiltration within the channels of overlying streams, particularly Yucaipa and Oak Glen Creeks; underflow from the fractures within the surrounding bedrock beneath the sub basin; and artificial recharge at spreading grounds.

The Yucaipa Subbasin is a DWR high-priority groundwater basin and is subject to SGMA. The Yucaipa Groundwater Sustainability Agency was established in 2017 to manage groundwater within the Sub-basin. Valley District, YVWD, Redlands, SGPWA, SMWC, South Mountain Water Company, Western Heights Water Company, and the City of Yucaipa are currently working together as the Groundwater Sustainability Agency, commonly referred to as the Yucaipa Sustainable Groundwater Management Agency (Yucaipa-SGMA) in support of the development of a Groundwater Sustainability Plan, which is currently under development.

A recent study estimates a sustainable yield for the Sub-basin of approximately 9,600 AFY and a storage capacity totaling more than 356,000 AF. From 2007 to 2012, artificial recharge efforts increased the total groundwater storage in the Yucaipa Basin to 1998 levels. Information utilized by the GSA indicates that the Subbasin is currently being sustainably managed. The GSA members are currently working together to develop a GSP to continue sustainably managing the Subbasin.

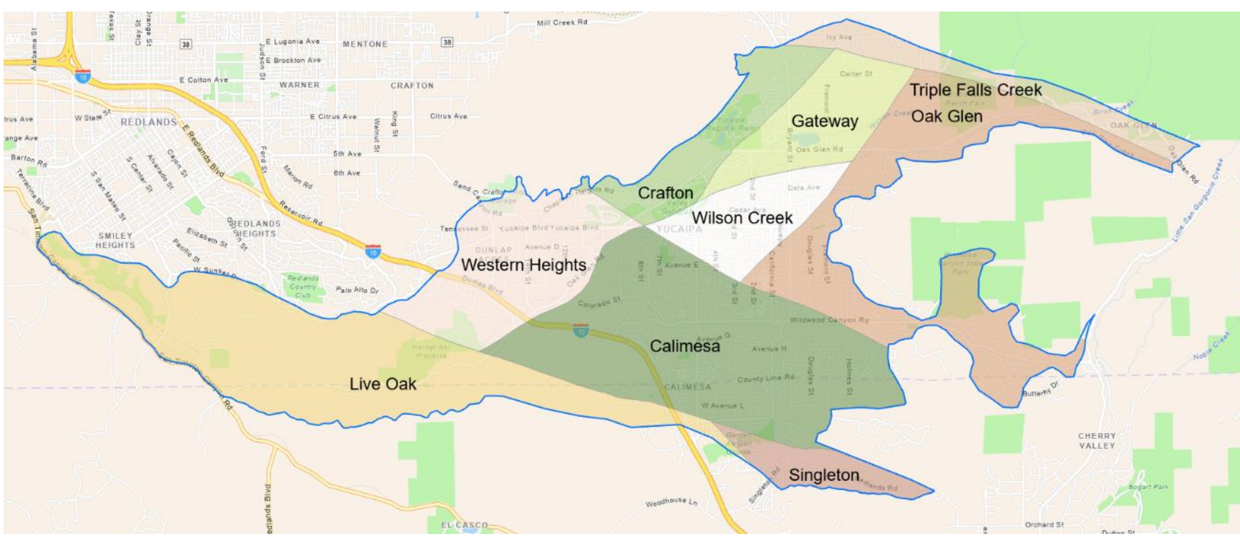


Figure 3-5. Yucaipa Basin Groundwater Management Zones

3.3.5 San Timoteo Sub basin

The San Timoteo Sub basin (DWR 8-02.08) is largely outside of the Valley District service area but is one of the sources used by YVWD and SMWC (SMWC produces groundwater from the adjudicated Beaumont Basin area discussed below). The San Timoteo sub basin underlies Cherry Valley and the City of Beaumont in southwestern San Bernardino and northwestern Riverside counties. The sub basin is bounded to the north and northeast by the Banning fault and impermeable rocks of the San Bernardino Mountains, Crafton Hills, and Yucaipa Hills; on the south by the San Jacinto fault; on the west by the San Jacinto Mountains; and on the east by a topographic drainage divide with the Colorado River hydrologic region. The surface is drained by Little San Gorgonio Creek and San Timoteo Canyon to the Santa Ana River. Average annual precipitation ranges from 12 to 14 inches in the western part to 16 to 18 inches in the eastern part of the sub basin.

Holocene-age alluvium, which consists of unconsolidated clay, silt, sand, and gravel, is the principal water-bearing unit in this sub basin. The alluvium, which is probably thickest near the City of Beaumont, thins toward the southwest and is not present in the central part of the sub basin. The Pliocene-Pleistocene-age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles. The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the sub basin indicate water-bearing gravels to depths of only 700 to 1,000 feet.

The Banning and Cherry Valley faults and two unnamed faults in the northeast part of the sub basin offset impermeable basement rocks, stepping down to the south. Water levels change across the Banning fault, dropping 100 to 200 feet to the south. In the western part of the sub basin, water levels drop to the south about 75 feet across the Loma Linda fault and about 50 feet across the San Timoteo barrier. In the northeastern part of the sub basin, water levels drop to the south across two unnamed faults. Each of these faults appears to disrupt groundwater movement in the sub basin.

Groundwater is replenished by subsurface inflow and percolation of precipitation, runoff, wastewater discharge, and imported water. Runoff and imported water are delivered to streambeds and spreading grounds for percolation. The San Timoteo Subbasin is not adjudicated, and reliable estimates of total groundwater extractions are not available. However, water table elevations within the San Timoteo Subbasin have not declined over the years which is likely due to the constant flow of treated wastewater from YVWD that flows through San Timoteo Creek.

The San Timoteo Subbasin was originally designated by DWR as a medium-priority groundwater basin subject to SGMA. In 2017, the San Timoteo Groundwater Sustainability Agency was formed by a Memorandum of Agreement (MOA) between the City of Redlands, SGPWA, BCVWD and YVWD to manage the non-adjudicated portion of the San Timoteo Subbasin. In 2018, Eastern Municipal Water District submitted a Basin Boundary Modification Request for the San Timoteo Subbasin that was subsequently approved by DWR.

In 2019, the basin was reprioritized as a very low priority by DWR and therefore preparation of a GSP is not required by SGMA, but encouraged and authorized. In 2020, a revised MOA was adopted by YVWD, the City of Redlands, BCVWD and the City of Banning reforming the San Timoteo GSA to further the shared intent of the parties to maximize funding opportunities, increase transparency and foster cooperation. It was agreed by the Parties of the San Timoteo GSA to establish Management Areas for the GSA for each agency's respective boundaries and to initially create separate GSPs for each Management Area that could be consolidated into a single GSP in the event that the priority of the basin is changed by DWR and a GSP is required. The lead agency for each management area, shown in Figure 3-6, is independently responsible for the development of a GSP for their respective Management Areas. The parties agreed to work together and with local stakeholders to carry out the policy, purposes, and requirements of SGMA within the boundaries of the San Timoteo GSA. The parties agreed to initially create separate GSPs for each management zone

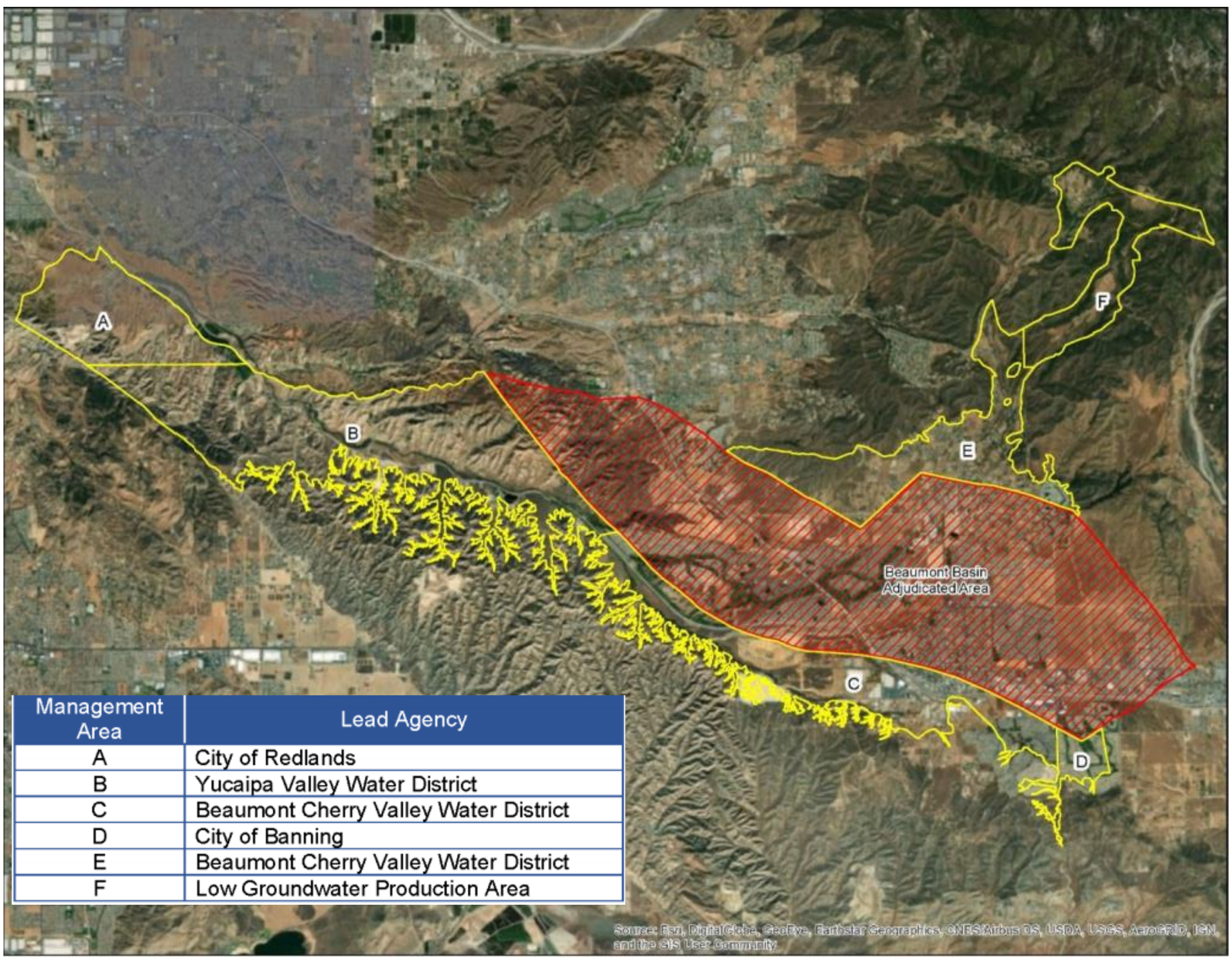


Figure 3-6. San Timoteo Subbasin Management Areas

The adjudicated portion of the San Timoteo Subbasin, the Beaumont Basin Adjudicated Area, is managed by the Beaumont Basin Watermaster and not the San Timoteo GSA, as discussed in the following section.

3.3.5.1 Beaumont Groundwater Basin

DWR considers the Beaumont Groundwater Basin to be composed of three other groundwater basins, primarily the San Timoteo sub basin, the Upper Santa Ana Valley Groundwater Basin (No. 8-02), and the San Gorgonio Pass Sub basin (No. 7-21.04). Locally, the Beaumont Basin is treated as a distinct basin. The Beaumont Basin is one of the sources used by YVWD and SMWC.

The Beaumont Basin is located in northwestern Riverside County, south of the Yucaipa Basin. The basin eventually drains to San Timoteo Creek, a tributary of the Santa Ana River, and covers approximately 26 square miles. Groundwater elevations generally slope from the northeast to southwest in the basin.

Groundwater within the basin is predominantly found in Holocene age alluvium and in the San Timoteo Formation. While the San Timoteo Formation extends to depths in excess of 1,500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1,000 feet. Estimates for total groundwater storage capacity within the basin vary. The Beaumont Basin storage capacity is estimated at approximately 1,000,000 AF.

In February 2004, the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster (BBW) with the authority to manage the groundwater basin. The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, SMWC, and YVWD. The Beaumont Basin Watermaster originally established a long-term yield for the Beaumont Basin of 8,560 AFY. The safe yield is reevaluated every ten years and on April 1st, 2015, the BBW approved the adoption of Resolution 2015-01 (2013 Reevaluation of the Beaumont Basin Safe Yield Report and Redetermination of the Safe Yield of the Beaumont Basin), which reduced the safe yield to 6,700 AFY.

The Beaumont Basin Watermaster Website provides copies of the Judgment, Annual Reports and related information: https://beaumontbasinwatermaster.org/

The Judgement includes a controlled overdraft (temporary surplus) provision that allows extraction up to 160,000 AF over the 10-year period immediately following the Judgement inception. During the first 10 years, the agencies could extract 16,000 AFY; after the first 10 years, extractions are limited to the amount each agency has in storage or credit. Agencies must provide the BBW with funds necessary to replace any amount of overproduction that may have occurred over a 5-year consecutive period.

The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin.

3.3.6 Chino Sub basin

Fontana Water Company, the City of Rialto, and WVWD extract water from Chino Sub basin (DWR 8-02.01), an adjudicated basin managed by the Chino Basin Watermaster. The Chino Sub basin lies in the southwest corner of San Bernardino County. The Chino Sub basin is bordered to the east by the Rialto-Colton fault. In the other three directions, the Chino Sub basin is ringed by impermeable mountain rock, the San Gabriel Mountains to the north, the Jurupa Mountains and Puente Hills to the south and southwest. Average annual precipitation across the basin is 17 inches. This part of the San Bernardino Valley is drained by San Antonio Creek and Cucamonga Creek southerly to the Santa Ana River.

On January 2, 1975, several Chino Basin producers filed suit in California State Superior Court for San Bernardino County (the "Court") to settle the problem of allocating water rights in the Chino Basin. On January 27, 1978, the Court entered a judgment in Chino Basin Municipal Water District v. City of Chino et al. adjudicating water rights in the Chino Basin and establishing the Chino Basin Watermaster. The Judgment adjudicated all groundwater rights in Chino Basin and contains a physical solution to meet the requirements of water users having rights in or dependent upon the Chino Basin. The Judgment also appointed the Watermaster to account for and implement the management of the Chino Basin. The Judgment declared that the initial operating safe yield of the Chino Basin is 145,000 AFY. The Basin is managed through implementation of the Chino Optimum Basin Management Plan. Per the Judgment, WVWD has a minimum of approximately 1,000 AFY of extraction rights. Extractions above that amount must be replenished with SWP water through a program with the Chino Basin Watermaster.

3.3.7 Bear Valley Basin

The Bear Valley Basin (DWR 8-9) encompasses 30.6 square miles under Big Bear Valley, within the San Bernardino Mountains. There are two surface water lakes within the Bear Valley Basin: perennial Big Bear Lake and the ephemeral Baldwin Lake. Surface drainage within the Bear Valley Basin flows to one of the two lakes, typically to Big Bear Lake. Big Bear Lake empties to the west into Bear Creek, which is a tributary of the SAR.

Groundwater from the Bear Valley Basin is primarily found within unconsolidated alluvial deposits. The water-bearing deposits have been divided into upper, middle, and lower aquifers, with the upper and middle aquifers being the primary producers. The Bear Valley Basin is recharged through percolation from precipitation and runoff and underflow from fractured crystalline rocks, adjacent to and beneath the alluvium. Groundwater levels generally correlate with annual fluctuation of precipitation. Storage capacity is estimated by DWR at 42,000 AF (California Department of Water Resources, February 2004). Perennial yield is estimated to be 5,000 AFY basin-wide.

The Bear Valley Basin is not adjudicated and has not been identified by DWR to be in overdraft conditions. The Bear Valley Basin is monitored by Big Bear Lake Department of Water and Power (BBLDWP) and Big Bear City Community Services District (BBCCSD).

BBCCSD, BBLDWP, Big Bear Area Regional Wastewater Agency (BBARWA), and Big Bear Municipal Water District (BBMWD) formed the Bear Valley Basin Groundwater Sustainability Agency (BVBGSA) under a joint power's agreement on April 26, 2017. BVBGSA is governed by one representative from BBCCSD, one representative from BBARWA, one elected representative from BBMWD and one appointed commissioner from BBLDWP. The Bear Valley Basin GSP is under development and is scheduled for completion in January of 2022, in accordance with the SGMA.

3.3.8 Recharge Area Programs

Conjunctive use of surface water and groundwater is a long-standing practice in the IRWM Region. Part of the potable water used in the Region is imported from sources in the Sierra and Northern California through the SWP. Several reservoirs are operated primarily for the purposes of storing surface water for domestic and irrigation use, but groundwater basins are also recharged from the outflow of some reservoirs. The concept is to maintain streamflow over a longer period of time than would occur without regulated flow and thus provide for increased recharge of groundwater basins. Most of the larger basins in this Region are managed with many conjunctive use projects being developed to optimize and manage water supply. Numerous groundwater spreading grounds have been developed to recharge the groundwater basins when adequate surface water supply is available. Management of the water level in the SBB, in general, and the Pressure Zone (see Figure 2-6), in particular, is a focus of the groundwater management of the Region.

3.3.8.1 Groundwater Storage Strategy

Storage of imported water during wet years helps the Region make it through dry periods.

The primary storage location is local groundwater basins. Local groundwater basins are preferable due to the proximity to end users, the significant investment in wells, and the reduction in ongoing evaporation associated with storing the water underground. See Chapters 4 and 5 for a summary of estimated recharge needs for each groundwater basin in the Region and the volume of SWP expected to be available for recharge.

3.3.8.2 Spreading Grounds

Artificial recharge in the IRWM Region's groundwater basins has been occurring as early as 1912. Because of the extremely permeable sand and gravel deposits in the Region's groundwater basins, maximum instantaneous recharge rates are high.. Because of the size of several of the recharge basins and exceptionally permeable material, a larger quantity of water could be imported and recharged along the base of the San Bernardino Mountains, if necessary (i.e., recharge basin capacity and infiltration rates are not currently limiting the amount of imported water that is recharged). Any additional recharge and extraction should be carefully planned and implemented to avoid liquefaction and unacceptable decreases in groundwater levels in the basins

Numerous existing groundwater recharge facilities (spreading grounds or spreading basins) are located in the SBB, Rialto-Colton, and Yucaipa Subbasins. The locations of these facilities are shown in Figure 3-9, and selected characteristics are summarized in Table 3-11.

SBVWCD facilities are used for both native water and SWP recharge. Figure 3-7 shows the native water recharged in SBVWCD facilities since 1913. In addition to native water, existing turnouts provide SWP to most recharge facilities, with the exception of the Cactus Spreading and Flood Control Basins, which is planned to be served by the Cactus Basins Pipeline proposed by Valley District.

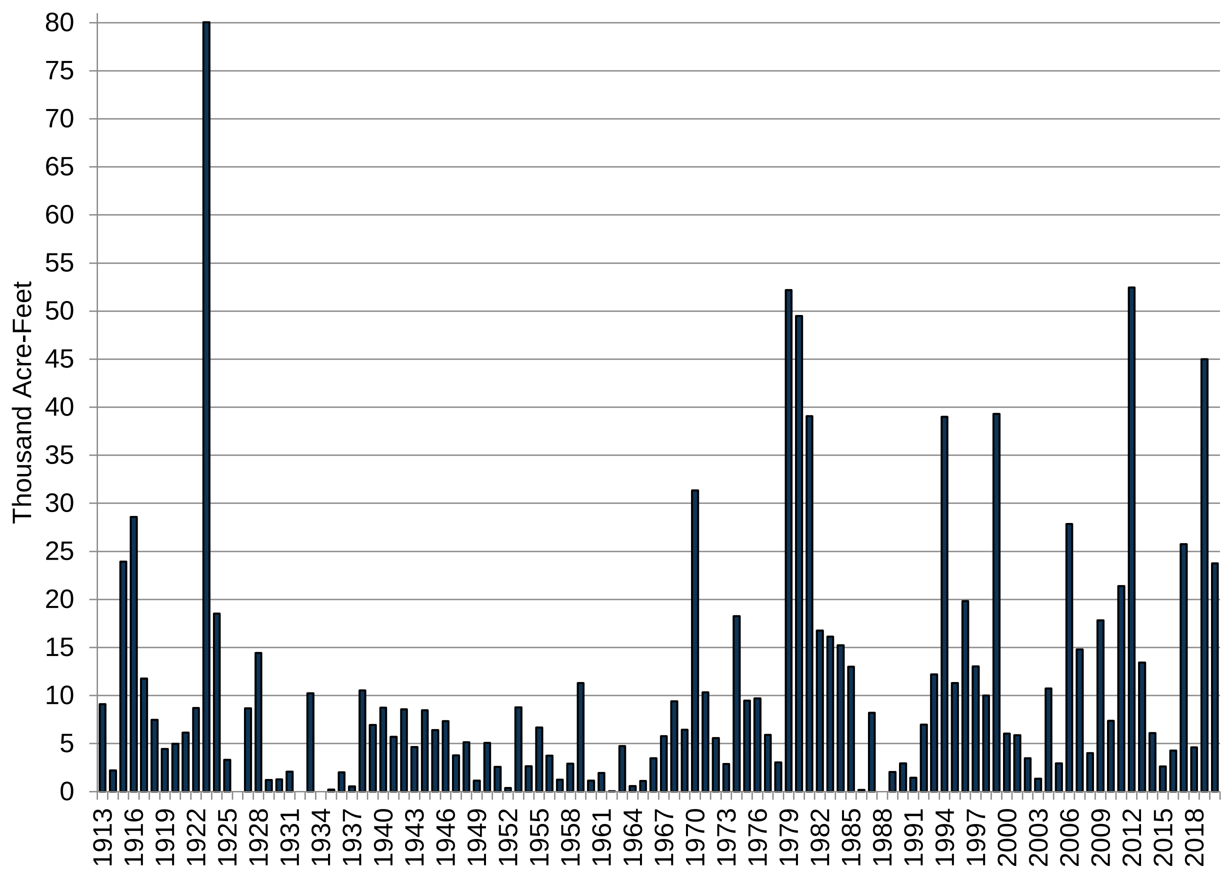


Figure 3-7. Annual Native Recharge in San Bernardino Valley Water Conservation District Facilities

Table 3-11: Regional Recharge Basins

FACILITY NAME	OWNER	UNDERLYING GW BASIN	SWP AVAILABILITY	CONSTRAINTS
Waterman Basin	SBCFCD	Bunker Hill A	Foothill Pipeline	Seasonal restrictions due to storm water
East Twin Creek Spreading Grounds	SBCFCD	Bunker Hill A	Foothill Pipeline	Seasonal restrictions due to storm water
Cactus Basin – 3 and 3a	SBCFCD	Rialto-Colton	Devil Canyon-Azusa Pipeline	Seasonal restrictions due to storm water
Redlands Recharge Basins	Redlands	Bunker Hill B	No	Operation due to WWTP flows
Lytle Creek North WRP Effluent Disposal Ponds	San Bernardino County Special Districts Department (SBCSDD)	Lytle Basin	Potential from nearby Devil Canyon-Azusa Pipeline	Operation due to WWTP flows
Wilson Basin	SBCFCD	Yucaipa Basin	East Branch Extension	Seasonal restrictions due to storm water
Proposed Plunge Basin	Valley District	Bunker Hill B	No	Seasonal restrictions due to storm water
Sweetwater Basins	SBCFCD	Bunker Hill	Foothill Pipeline	Seasonal restrictions due to storm water
Santa Ana	SBVWCD	Bunker Hill	Foothill Pipeline	Seasonal restrictions due to storm water
Santa Ana Low	SBVWCD	Bunker Hill	Greenspot Pipeline	Seasonal restrictions due to storm water
Mill Creek	Valley District, RPU, SBVWCD	Bunker Hill	Greenspot Pipeline	Seasonal restrictions due to storm water
Oak Glen	SBCFCD, YVWD	Yucaipa Basin	No	Seasonal restrictions due to storm water

3.4 Recycled Water

Development of recycled water is a strategy in the IRUWMP. Although it is costly, it is also highly reliable since there will be flows to wastewater plants whether the weather is wet or dry. For that reason, recycled water is often labeled “drought-proof”. Because it is the costliest supply, the region has not heavily developed this supply choosing instead to develop other, less costly supplies first. The recent drought highlighted the advantage of having a drought-proof supply, like recycled water, as a part of the regional water portfolio. This led to Valley District and the agencies within its service area, as well as Western and the City of Riverside, to prepare a Regional Recycled Water Concept Study. This is a collaborative process to identify recycled water projects that maximize regional benefits to water supply reliability, water quality, and habitat sustainability. The stakeholder group is targeting development of 18,023 AFY of new recycled water supply in the near term, however there is an obligation to discharge a minimum of 57,402 AFY to the SAR to sustain the natural habitat. The recycled water projects identified in this process were incorporated into the HCP analysis to ensure that implementation of these projects support both water supply and habitat sustainability.

Currently, some individual agencies are using recycled water for non-potable reuse. Recycled water produced in the Valley District service area that is not currently used for non-potable reuse is discharged to the SAR or its tributaries and has become a critical source of water that sustains habitat in natural rivers and streams, including the Santa Ana Sucker, which is a Federally listed endangered species. Development of new recycled water supplies in the upper SAR watershed must be balanced with the need to conserve and maintain this habitat.

Potential recycled water supplies for each retailer are described in their respective chapters. Anticipated recycled water supplies are included in the regional summary of supplies.

3.4.1.1 Wastewater

There are 12 publicly owned WWTPs located within the Region. Eight of these plants contribute to surface flow of the SAR as shown in the effluent use column of Table 3-12. Between 1970 and 2019, the total volume of treated wastewater contributions to SAR flows increased from 44,000 AFY to 116,000 AFY, with a peak of 188,000 AF in 2004-2005 (SAR Watermaster 2019).

Three wastewater treatment plants (Redlands, Beaumont, and Yucaipa) discharge to the SAR and its tributaries upstream of the City of San Bernardino, but these discharges generally do not flow continuously to the SAR at “E” Street (SAR Watermaster 2013). Two plants, the Rapid Infiltration and Extraction (RIX) WWTP in the City of Colton and the Rialto WWTP in the City of Rialto, discharge directly to the SAR via a discharge channel at RM 53.46. Wastewater discharges from these plants have hydraulic continuity to the SAR above Riverside Narrows.

Table 3-12: Wastewater Treatment Plants in the Region

FACILITY	INFLUENT FLOW SOURCE	CAPACITY (MGD)	2020 AVERAGE FLOW (MGD)[1]	EFFLUENT USE
San Bernardino County Special Districts Department Lytle Creek North WRP	SBCSDD, WVWD	1.75	0.4	Non-potable reuse for Irrigation and Dust Control (336 AF) Remaining discharged onsite disposal ponds
Big Bear Area Regional WWTP	BBCCSD, BBLDWP, SB County	4.9	2.0	Non-potable reuse for irrigation in Lucerne Valley. Remaining discharged to disposal ponds. Future discharge to Big Bear Lake planned
Rialto WWTP	Rialto	11.7	7	Non-potable reuse for irrigation (10 AFY) Remaining discharged to Rialto Channel/SAR
Colton WRP	Colton & RHWC	10.4	5	Conveyed to RIX
SBMWD WRP	SBMWD, EVWD, Loma Linda	33	21	Conveyed to RIX. Planned Tertiary Treatment System will produce RW for groundwater recharge
RIX WWTP	Colton WRP & SBWRP	40	28	100% Discharged to SAR
Riverside RWQCP	Riverside	46	25.3	Non-potable reuse for irrigation (200 AF) Remaining discharged to SAR
Redlands WWTF	Redlands	16.2	6	Non-potable reuse for Irrigation and Industrial (3,032 AF) Remaining discharged to onsite disposal ponds (3,254 AF)
YVWD WRWRF	YVWD	8	3.8	Non-potable reuse for irrigation Remaining discharged to San Timoteo Creek Groundwater recharge (planned)
City of Beaumont WWTP	Beaumont	4	3.6	Discharged to Cooper's Creek and remaining reused for non-potable irrigation
EVWD SNRC	EVWD	8	-	Groundwater recharge (beginning in 2022)
IEUA Regional Treatment Plant No. 4[2]	Fontana, WVWD, other IEUA customers	-	-	Non-potable reuse Groundwater Recharge

1. Flows for the Lytle Creek North WRP and City of Beaumont WWTP are 2015 annual average flow from 2015 Regional Recycled Water Concept Study
2. RP-4 is outside the Region but provides RW to FWC

3.4.1.2 Recycled Water Programs

Despite the likelihood that WWTP discharges will increase in the future, not all of the treated water may enter the SAR. Several cities and utilities are in the process of developing plans to recycle water for non-potable uses, which could decrease discharges to the river. Valley District contracted with the City of San Bernardino and the City of Colton to ensure that the RIX facility continues to release quantities of treated effluent to the SAR adequate to fulfill Valley District service area's obligation to provide 15,250 AF of baseflow each year at the Riverside Narrows as called for in the Orange County Judgment.

A number of other agencies have plans to improve recycled water production capacity and implement projects to use recycled water for non-potable uses in the future. Table 3-13 summarizes the proposed water recycling programs in the IRWM Region. Several agencies have constructed recycled water distribution systems or are in the process of planning and constructing recycled water distribution systems. These systems are discussed below.

Table 3-13: Upper Santa Ana River Water Agencies Recycling Water Programs

WATER AGENCY	RECYCLING PLANT	PRODUCTION CAPACITY	DESCRIPTION
East Valley Water District	Sterling Natural Resource Center	10 MGD	Construction of a tertiary plant to produce recycled water.
Fontana Water Company	IEUA Regional treatment Plant 4	5.4 MGD	Fontana Water Company has completed constructing infrastructure to deliver recycled water in its service area.
City of Redlands Municipal Utilities and Engineering Department	City of Redlands WWTP	7.2 MGD	Recycled water used for basin recharge, irrigation, and industrial purposes.
Rialto	City of Rialto Water Treatment Plant	12.0 MGD	Recycled water used for landscape irrigation on the I-10 and habitat. Additional non-potable use planned.
Riverside Public Utilities	Riverside Regional Water Quality Control Plant	40 MGD	Plans to implement the Riverside Parks and Water Project as part of the HCP.
SBMWD	Tertiary Treatment System	5.0 MGD	Construction of a tertiary treatment system at the existing San Bernardino Water Reclamation Plant to recycle water for plant use, landscape irrigation, and recharge.
Yucaipa Valley Water District	Henry N. Wochholz WWTP	6.7 MGD	Recycled water used for irrigation, in-stream flow requirements and groundwater recharge (planned)
SBMWD, City of Colton, City of Loma Linda, County of San Bernardino, and East Valley Water District	RIX	40 MGD	All the water from the RIX is currently released into the Santa Ana River. The City of San Bernardino and East Valley Water District are currently developing recycled water programs.

WATER AGENCY	RECYCLING PLANT	PRODUCTION CAPACITY	DESCRIPTION
BBARWA, BBCCSD, BBLDWP, BBMWD	BBARWA WWTP	2 MGD	All water from the BBARWA WWTP is currently discharged outside the Region for disposal. Replenish Big Bear is a proposed project to upgrade the BBARWA WWTP to produce recycled water for discharge to Big Bear Lake to increase lake levels, sustain habitat and retain the water in the Region.

3.4.1.2.1 Replenish Big Bear

In an effort to protect Big Bear Valley and the Region from the impacts of drought and variable precipitation, Big Bear Area Regional Wastewater Agency (BBARWA), Big Bear City Community Services District, City of Big Bear Lake Department of Water and Power, Big Bear Municipal Water District, and the Bear Valley Basin Groundwater Sustainability Agency have partnered to develop Replenish Big Bear, a recycled water project that will recover a local water resource currently discharged outside of the watershed. Replenish Big Bear will secure a reliable and sustainable local water supply, protect the local environment, and strengthen the tourism industry that drives the recreation-based economy for a small-disadvantaged community at the top of the Santa Ana River watershed in the San Bernardino National Forest.

Currently, all wastewater generated within Big Bear Valley is treated to secondary standards and disposed of outside the watershed. Replenish Big Bear will recover this lost resource by purifying the water using advanced treatment processes, creating a new drought-resistant source of water for beneficial use in the community. Specifically, Replenish Big Bear includes construction of advanced treatment facility upgrades at the existing BBARWA wastewater treatment plant, more than 7 miles of pipeline for product water and brine, three pump stations, a groundwater recharge facility and monitoring wells.

Replenish Big Bear will provide the following regional and statewide benefits:

- **Maintain and Diversify Water Supplies.** High-quality water produced by Replenish Big Bear will sustain up to 20 percent of the Valley's needed groundwater supply, the community's sole source of drinking water, in times of drought. Currently, municipal wastewater is treated and pumped out of the Valley. Through this practice, 800 million gallons of water leaves the Big Bear Valley each year. Replenish Big Bear will allow us to keep this water in the community for recycling.
- **Support Economic Development and Stability.** Big Bear Valley is home to approximately 23,000 residents and is designated as a Disadvantaged and Severely Disadvantaged Community by the State of California Department of Water Resources. Recovering local water resources strengthens the ability to support a thriving tourism industry, that this small community depends greatly on and is an essential element of the local economy. Replenish

Big Bear will enhance water levels in Big Bear Lake and other area water bodies, supporting year-round recreational activities, wildlife viewing, and scenic landscapes.

- **Protect and Enhance Natural Ecosystems.** Big Bear Valley is rich in wildlife that is heavily responsive to local hydrologic conditions. Retaining local water within the watershed stabilizes and sustains year-round habitat for waterfowl and the high number of plant species known only to this area, including the largest population of wintering bald eagles in southern California and the federally-listed Unarmored Threespined Stickleback fish.

The project is currently in the preliminary design and permitting phase and this Community Project Funding request is critical for the project to move into implementation. Federal funding will enable the project team to leverage existing participating agency contributions and State funding to implement Replenish Big Bear.

Additional information about Replenish Big Bear can be found at www.replenishbigbear.com/.

Big Bear Lake
Photo Credit: Big Bear Municipal Water District

Sterling Natural Resource Center

EVWD is currently constructing a new water recycling facility called the Sterling Natural Resource Center (SNRC). SNRC, which is expected to be completed in 2022, will allow the District to treat wastewater to a point that it can be recharged into the Bunker Hill groundwater basin to supplement the groundwater supply. Initially, the facility will treat up to 8 million gallons per day and will be expandable to be able to treat ultimate buildout of approximately 10 million gallons per day.

EVWD has partnered with Valley District to maximize the regional benefit of the recycled water produced at SNRC to recharge the SBBA groundwater. Given the consistent need for groundwater replenishment compared to the potential uses for recycled water, there are currently no plans to use recycled water for any other purposes in the foreseeable future. For the purposes of this plan, projected recycled water supplies were estimated using the per capita wastewater flow projection methodology used in EVWD's 2019 Sewer Master Plan, adjusted to align with the population projection in this UWMP, which are inclusive of long-term growth plus expected near term developments.

Sterling Natural Resource Center under construction in 2021
Photo Credit: East Valley Water District

Recycled Water Use for Fontana Water Company

Fontana Water Company is working cooperatively with the City of Fontana to design and construct the first phase of a recycled water program. Once recycled water becomes available and the necessary infrastructure is constructed, Fontana Water Company will be the purveyor of recycled water to those customers within its service area who can make use of such water. In the first phase of the recycled water program, Fontana Water Company will provide approximately 1,700 AF of recycled water to schools, parks, commercial customers, and Community Facilities Districts' landscape irrigation locations in the southern portion of the City of Fontana. Ultimate build-out in Fontana Water Company's service area will enable Fontana Water Company to provide approximately 6,000 AF of recycled water. Fontana Water Company supports the use of recycled water where its use is appropriate and where recycled water is available.

Recycled Water Use for City of Redlands

The City is a sewer agency that treats approximately 5.9 million gallons of wastewater daily as of 2020. The City's Wastewater Treatment Plant (WWTP) has the capability of treating 9 million gallons a day (MGD) to a secondary level. Of that, 7.2 MGD can be treated to a Title 22-Recycled Water level.

The City utilizes all wastewater collected and treated at its WWTP in its service area for:

- Distribution to customers
- Percolation into Bunker Hill

Treated wastewater distributed to customers is tertiary treated, known as Title 22-Recycled Water. The City's recycled water customers include Southern California Edison (SCE) Company, a landfill and recycled/non-potable water customers located in the 1350 pressure zone. SCE uses recycled water as cooling water at its Mountain View Power Plant and recycled/non-potable water customers use recycled water for irrigation when supply is available. All remaining wastewater is treated to a secondary level and released into spreading basins located east of the WWTP for recharge back into Bunker Hill ground water basin. Based on 2020 volumes, approximately 1.6 mgd of treated wastewater was used as recycled water supply for customers, and 3.4 mgd was used for recharge. The remaining water was used within the WWTP or accounted for as losses through the process, meter inaccuracies or evaporation.

The expansion of the recycled water system is limited by its supply, as well as infrastructure development and the Title 22-Recycled Water permitting process. However, because the City requires new commercial development to provide dual metering for irrigation systems, to accommodate the use of recycled/non-potable water, all recycled water may be utilized for distribution to recycled/non-potable water customers in the 1350 zone and eventually the 1570 pressure zone, as demand and infrastructure increases. The City's Capital Improvement Plan includes the design and construction of two recycled water reservoirs that will total up to a volume of 2,000,000 gallons of storage, a 1,500 gallons per minute booster pump station, and 9,400 linear feet of pipeline. Construction of these facilities will increase the use of recycled water in the 1350 and 1570 pressure zones by 826 AFY.

Recycled Water Use for City of Rialto and West Valley Water District

The City of Rialto has facilities to provide the California Department of Transportation (Caltrans) with recycled water for 42,000 feet of landscape irrigation for Interstate-10. Caltrans has been using approximately 10 AFY. Currently, there are no other users of the recycled water.

Rialto plans to reduce the amount of treated effluent that is discharged from the Rialto Wastewater Treatment Plant into the Rialto Channel, which is a tributary to the Santa Ana River. The reduction of flow would occur in two parts as infrastructure is constructed, demand for recycled water increases, and certain habitat modifications are implemented within the Rialto Channel. The City of Rialto would recycle/reuse the wastewater by transporting treated wastewater through a pipeline system to recycled water consumers within their service area for direct application.

WVWD has evaluated the feasibility of adding recycled water as a non-potable supply but would rely on the City of Rialto or San Bernardino County to provide the recycled water from their wastewater treatment facilities. In 2012, WVWD prepared a master plan to evaluate potential uses of recycled water within its service area. WVWD does not currently have a recycled water distribution system and is not pursuing recycled water use at this time because it is not cost effective to extend facilities from the wastewater treatment plants to the locations of potential use.

Recycled Water Use for City of Riverside

The City of Riverside Public Works Department operates and maintains the Riverside Regional Water Quality Control Plant (RRWQCP). The daily average wastewater inflow to the RRWQCP is 34 mgd. Construction for an upgrade is currently underway to increase treatment plant capacity to 46 mgd, with the final plant capacity to reach 52 mgd by 2024. The service area of the RRWQCP extends beyond the Riverside Public Utilities service area to include the areas served by Jurupa, Rubidoux, and Edgemont Community Services District. Tertiary-treated effluent (recycled water) is discharged into the SAR.

The SWRCB approved Order WR 2008-0024 in May 2008, in which RRWQCP is required to discharge 25,000 AFY, compared to previous minimum discharge requirements of 15,250 AFY per the 1968 Prado Settlement.

This order changed the place of use and purpose of use of a portion of the treated wastewater discharged into the SAR requested through Wastewater Change Petition WW-0045 as follows:

- **Change of Place of Use:** The Order expanded the place of use to include areas within the City's limits, the City's water service area boundary, and within the boundary of the Jurupa Area Plan to reflect diversion of treated wastewater to recycled water use sites. The point of discharge to the SAR remained the same.
- **Change of Purpose of Use:** The Order modified the purpose of recycled water use to include municipal, industrial, and agricultural purposes.

Recycled Water Use for San Bernardino Municipal Water Department

SBMWD is developing the Tertiary Treatment System (TTS) Project a recycled water project which will be a Title 22-compliant tertiary treatment facility that will supply recycled water for:

- Operational needs within the plant, eliminating in-plant use of groundwater and onsite groundwater storage
- Groundwater recharge of the Bunker Hill Groundwater Basin, which is SBMWD's sole source of water supply
- Supplying potential future recycled water customers.

The TTS project location is sited east of the Unit 1 secondary clarifiers, adjacent to East Twin Creek. The design includes a new pump station and pipelines to convey secondary effluent to new filtration and disinfection processes.

After treatment, the tertiary recycled water will be stored in a rehabilitated existing reservoir that currently stores groundwater. Production of tertiary disinfected recycled water from the TTS will be phased with provisions to allow future expansion of up to 5 mgd (AECOM, 2019) using water in excess of the discharge commitments to the Santa Ana River. The TTS is in the final design phase and is expected to be operational in 2021.

The proposed effluent discharge reduction would occur in two parts corresponding to Phases 1 and 3 of the HCP implementation. In Phase 1 the Water Department will reduce flows from the RIX facility to the Santa Ana River from the baseline of 41.2 cfs (22.2 mgd) to 28 cfs (15.1 mgd). In Phase 3 of RIX, effluent reduction could occur if the HCP demonstrates that the success criteria for mitigation actions in this HCP for Santa Ana sucker are being met or exceeded. If the success criteria are not met until Phase 4, then implementation would be delayed until Phase 4 of the HCP. In this phase the RIX effluent discharge could be reduced to a minimum of 16,651 afy/23 cfs/12.4 mgd.

Recycled Water Use for Yucaipa Valley Water District

YVWD's existing recycled water system went into operation in 2002. The system currently includes 22 miles of pipeline, approximately 460 service connections, and 5 reservoirs capable of storing 12 million gallons (36.8 AF) of water.

Due to an increasing demand of recycled water, YVWD will continue expanding the recycled water system. YVWD will be constructing a Regional Recycled Water Conveyance System to the southernmost service area boundary. This extension would involve the construction of a 24" recycled water pipeline, approximately 18,500 linear feet (3.5 miles) through the City of Calimesa. The purpose of the pipeline is to provide recycled water service to customers residing within the newly developed dual-plumbed community in the City of Calimesa.

Recycled water is currently used to provide about 16 percent of Yucaipa Valley Water District's overall water demands. A significant portion of YVWD's projected future water demands will be met with the use of recycled water for irrigation of golf courses, parks, landscape areas and front-/rear-yard irrigation of residential dwellings.

To serve the projected water demands, YVWD has implemented an extensive dual water distribution system. The dual water system includes a drinking water conveyance system to convey potable water to customers and a separate recycled water distribution system to convey recycled water to customers.

As water becomes an increasingly precious commodity, Yucaipa Valley Water District is stepping up its recycling efforts so that more water can be reused on golf courses, school grounds, roadside medians and for other landscaping purposes -- even the front and rear yards of new homes.

YVWD has already initiated a significant recycled water program within their service area for landscape irrigation. Future homes in the YVWD service area will be constructed with drinking water for interior use and recycled water for exterior use. These improvements will significantly reduce the GPCD for the community and provide the framework for a robust, sustainable and water conscientious community.

3.5 Transfers, Exchanges, and Groundwater Banking Programs

3.5.1 Transfers and Exchanges

Transfers and exchanges are discussed in chapters for each individual agency.

3.5.2 Groundwater Banking Programs

As stated previously, storing water in local groundwater basins during wet years for later use during droughts is one of the primary management strategies in the USARW IRWMP.

> Valley District has been conducting groundwater recharge activities in the SBBA since 1972. The San Bernardino Valley Water Conservation District and its predecessors have conducted water conservation (groundwater recharge) activities since 1912 in areas that overlie the SBBA.

The USARW IRWMP evaluated additional conjunctive use scenarios and concluded that they were feasible. Conjunctive use projects currently under development in the Valley District Service area are described in **Section 3.6.2.**

Phase 1A Enhanced Recharge Project
Photo Credit: San Bernardino Valley Water Conservation District

3.6 Planned Water Supply Projects and Programs

The USARW has collaborated to manage the region's unique water supply, water quality, flood, and habitat challenges. These challenges are key considerations in the implementation of new water supply projects and are reflected in the goals of the USARW IRWMP.

3.6.1 Recycled Water

Planned recycled water projects are described in Section 3.4.

3.6.2 Conjunctive Use Projects

One of the foundational water management strategies in the USARW IRWMP is conjunctive use which has been generally described as using our groundwater basins to store water that is available in wet years so that it is available to be pumped out during dry years (dry year yield). Groundwater modeling for the IRWMP concluded that conjunctive use is feasible up to certain limits.

In February 2012, the BTAC recommended a cumulative total of 40,000 acre-feet per year of dry year yield. This capacity represents an efficient, initial project size with the possibility for expansion, given modeling to support it.

The five regional water agencies in the Santa Ana River Watershed have identified a watershed scale project, the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP), a cooperative program with, Metropolitan and other agencies in the Santa Ana Watershed to store imported water during wet years for use during dry years.

The group includes representatives from the following regional water agencies:

- Valley District
- Western
- Eastern Municipal Water District
- IEUA
- Orange County Water District

The program goals of SARCCUP include:

- Providing watershed-wide benefits based upon regional collaboration
- Creating significant new dry-year yield
- Increasing the resiliency and reliability of the water supply

SARCCUP includes four separate groundwater banks located in different groundwater basins within the Santa Ana Watershed, including a comprehensive conjunctive use program in the SBB. SARCCUP will provide water for the SBB and the companion project, Bunker Hill Conjunctive Use Program (BHCUP) provides the extraction facilities for the SBB.

> Conjunctive use will benefit the retail water agencies with wells in the Region by increasing water levels and reducing pumping costs. The portion of these projects ultimately available to agencies in the Valley District service area is up to 88,500 acre-feet of storage and up to 29,500 acre-feet of dry year yield.

3.6.3 Groundwater Recharge

One of the water supply strategies of the region is to recharge groundwater through spreading of imported water or through direct use of imported water which results in in-lieu recharge, managing floods and increasing stormwater recharge, and percolating recycled water. The region utilizes multiple spreading basins to recharge imported water and excess surface water, percolates effluent from multiple wastewater treatment facilities, and receives some recharge through percolation of stormwater. Proposed new recharge projects under development are shown in **Table 3-14**. In addition to these projects, local flood control districts are repairing and improving existing flood control channels and basins to reduce the velocity of water and allow additional groundwater recharge.

> A goal of the USARW IRWMP is to balance flood management and increase stormwater recharge.

Stormwater management has been an ongoing challenge in the USARW Region and flood control facilities, such as detention basins, have provided much needed control of these flows. While conveying flood water safely through the upper SAR watershed is of critical importance, detaining runoff for recharge is also desirable. The region's groundwater managers are working with flood control agencies to optimize the use of these flood control facilities to increase the recharge of stormwater into the groundwater basin. The goal is to strike a balance between flood control and recharge that will ensure protection from flooding, while providing additional supplies to meet growing future demands and to supplement these supplies during drought years. Valley District has had an agreement with SBCFCD since 1972 which allows Valley District to recharge water in flood control detention basins. The two agencies are currently working on a replacement agreement that will continue to allow Valley District to use flood control basins for recharge when they are not needed for flood control.

Table 3-14: Planned Groundwater Recharge Projects

PROJECT NAME	AGENCY	BASIN	IMPLEMENTATION YEAR/PHASE	ESTIMATED YIELD (AFY)	WATER RECHARGED
SAR TRIBUTARY ACTIVE RECHARGE PROJECTS					
City Creek Basins	Valley District, Western, RPU, SBVWCD	Bunker Hill	Planning	4,660	Stormwater
Mill Creek Basins	Valley District, Western, RPU, SBVWCD	Bunker Hill	Planning	940	Stormwater
Waterman Creek Basins	Valley District, Western, RPU, SBVWCD	Bunker Hill	Planning	1,420	Stormwater
East Twin Creek Basins	Valley District, Western, RPU, SBVWCD	Bunker Hill	Planning	3,310	Stormwater
Plunge Creek and Oak Creek	Valley District, Western, RPU, SBVWCD	Bunker Hill	Planning	3,110	Stormwater
Cable Creek Basins	Valley District, Western, RPU, SBCFCD	Bunker Hill	Planning	2,420	Stormwater
Lytle Creek Basin	Valley District, Western, RPU	Bunker Hill	Planning	3,620	Stormwater
Cajon – Vulcan Basins	Valley District, SBMWD	Bunker Hill	Planning	490	Stormwater
Lytle – Cajon Basin	Valley District, Western, RPU	Bunker Hill	Planning	2,910	Stormwater
Devil Creek Basin	Valley District, SBMWD	Bunker Hill	Planning	1,910	Stormwater
ADDITIONAL RECHARGE PROJECTS					
Enhanced Recharge in Santa Ana River Spreading Basins, Phases 1B & 1C	Valley District, Western, SBVWCD	Bunker Hill	2022	N/A	
Recharge in Cactus Basins	Valley District, SBCFCD	Rialto-Colton	2022	N/A	Imported Water
Riverside North Aquifer Storage & Recovery Project	Valley District, Western, RPU	Riverside-Arlington	Planning	6,000	
Victoria Basin Recharge	Western	Riverside-Arlington	2020	1,800	Stormwater
Riverside Basin Recharge Project	RPU	Riverside-Arlington	Planning	N/A	Stormwater, Imported water
Vulcan Mining Groundwater Recharge Basin	Valley District, SBMWD	Bunker Hill	Planning	N/A	Imported water
Calimesa Recharge Basin	South Mesa Water Company	Yucaipa	2022	N/A	Stormwater

PROJECT NAME	AGENCY	BASIN	IMPLEMENTATION YEAR/PHASE	ESTIMATED YIELD (AFY)	WATER RECHARGED
Calimesa Aquifer Storage and Recovery	Yucaipa Valley Water District	Yucaipa	2022	N/A	Recycled Water
Sterling Natural Resource Center	EVWD	Bunker Hill	2022	8,200	Recycled Water
Tertiary Treatment System	SBMWD	Bunker Hill	2022	5,600	Recycled Water

Sources: Upper SAR HCP October 2020 Stakeholder Draft, Geoscience Integrated SAR Model results for Active Recharge projects and project information submitted by Plan participants in the Call for Projects (see Chapter 7)

3.6.3.1 Santa Ana River Tributary Active Recharge Project

The Active Recharge Project is envisioned to help better manage surface water available to the SBBA.

In 2015, a stormwater flow and capture analysis were performed to determine:

- The volume of surface water which has historically migrated out of the SBBA,
- The volume of surface water that is generated internally within the SBBA as the result of historical and on-going urbanization of the SBBA,
- The quantity of stormwater that is generated by the major tributary creeks to the Santa Ana River,
- The location and preliminary (conceptual) designs of potential new stormwater capture facilities that could maximize the capture and recharge of surface water flows,
- Potential environmental constraints for each of the selected tributaries,
- Potential modifications to existing retention basins and spreading grounds to further increase surface water capture and recharge, and
- The volume of potential additional recharge to the SBBA and the effect to surface water volumes leaving the SBBA that will occur as a result of implementation of an active recharge project (this remaining flow out of the SBBA would be available for recharge in the proposed Riverside North Aquifer Storage and Recovery Project; see Section 3.6.3.4).

The study included preparation of proposed conceptual designs for new and improved existing surface water capture and recharge facilities in areas of the tributary creeks having the greatest stormwater flows and the least number of environmental constraints. The project stakeholders are currently working to refine the conceptual designs. SBVMWD and SBVWCD entered into a Joint Active Recharge Partnership Agreement and SBVWCD and SBCFCD recently signed a planning MOU for the ARTP-E projects.

3.6.3.2 Santa Ana River Enhanced Recharge Project

The Enhanced Recharge Project is located on the Santa Ana River and will divert up to 500 cubic feet per second (cfs) and up to approximately 80,000 AFY. Water will be temporarily captured at the Seven Oaks Dam and diverted flows will flow to recharge basins for recharge into the SBBA or be delivered for direct use through the first phase of the Plunge Pool Pipeline. This project is estimated to provide approximately 7,643 acre-feet per year of new water to the region.

3.6.3.3 Cactus Basin Recharge

Valley District is working cooperatively with the San Bernardino County Flood Control District (Flood Control) to recharge SWP supplemental water in the Cactus Basins, which would recharge high quality water into the Rialto-Colton sub basin. The project includes the construction of new basins 3 and 3A, which are being built for flood control. Basin development will include the construction of a bypass pipeline to manage flood flows. To optimize the joint use of these basins for flood control, the recharge is planned to occur during the dry season, from April to October.

3.6.3.4 Riverside North Aquifer Storage and Recovery

The Riverside North Aquifer Storage and Recovery Project is a proposed storm water capture project located in the southern portion of the City of Colton and north of the City of Grand Terrace. The project consists of proposed in-channel and off-channel recharge. The proposed off-channel recharge facility location is along the west side of the Santa Ana River and proposes the construction of up to eight individual recharge basins encompassing approximately 25 acres. The in-channel recharge basin proposes construction of an inflatable dam across the Santa Ana River channel, which can be raised and lowered depending on the amount of water flowing in the river.

This project is estimated to provide up to 6,000 acre-feet of new water per year. The in-channel and off-channel water captured will be recharged into the Riverside North sub basin and a portion of the retained water will be diverted to the Riverside Canal pipeline for direct use.

3.6.3.5 Arlington Basin Water Quality Improvement

In 2019, Western completed construction of the Victoria Recharge Basin near the intersection of Victoria Avenue and Jackson Street in Riverside (Victoria site). This site will be used to replenish the Riverside-Arlington groundwater basin with up to 1,800 acre-feet of water per year. The project benefits include:

- The Victoria Recharge Basin increases groundwater storage through the capture and recharge of stormwater that would otherwise be lost.
- The project improves groundwater quality and water management of the Arlington Basin, increasing the groundwater supply enabling the Arlington Desalter to operate at capacity.

- The project will provide a local water source to help decrease the region's reliance on imported water from Northern California.
- Locally-sourced water provides system reliability in the event of imported water disruption.

At this time, there are no other recharge sites planned; however, Western continues to explore additional recharge sites to continue to increase local supply reliability

3.6.3.6 Riverside Basin

RPU plans to construct new recharge basins and/or repurpose existing retention basins within the northern part of the Riverside Basin. These basins will be used to recharge the Riverside Groundwater Basin and therefore increase the operating yield from the basin. The source of the water will be onsite stormwater, imported water, and/or water from the Riverside North Aquifer Storage and Recovery Project via the existing Riverside Canal and associated delivery systems, if necessary.

3.6.3.7 Vulcan Mining Groundwater Recharge

The Vulcan Mining Groundwater Recharge Basins are located east of Lytle Creek, northerly of Devil Creek Channel, and westerly of Cajon Boulevard within existing aggregate mining pits owned by Vulcan Materials Company. SBMWD proposes to develop groundwater recharge facilities within the basins in conjunction with Vulcan Materials Company for recharge of water supplied through the SWP, which would include construction of an SWP turnout, a metering facility, and the placement of a pipeline. The project will not include water supply from surface water diversions.

3.6.3.8 Calimesa Recharge Basin

The Calimesa Recharge Basin Project is a proposed project by the South Mesa Water Company in cooperation with the City of Calimesa and Riverside County Flood Control and Water Conservation District. The City and Flood Control District are currently designing a road improvement project along County Line Road between Park Avenue and Bryant Street, including just under 1 mile of infrastructure enhancements for traffic control. Additionally, the project will entail construction of the Calimesa Recharge Basin on an adjacent 4-acre parcel to collect stormwater captured from the improved roadway and detain it for percolation into the Yucaipa groundwater basin.

3.6.3.9 Calimesa Aquifer Storage and Recovery

The Yucaipa Valley Water District will be installing four injection wells and two extraction wells as an Aquifer Storage and Recovery Facility in the City of Calimesa. This system will provide for the recharge of fully treated (reverse osmosis) recycled water to provide additional drinking water supplies and to meet peak recycled water demands by reversing the flow of water from the injection wells.

3.6.3.10 Sterling Natural Resource Center

The Sterling Natural Resource Center (SNRC) is a wastewater reclamation facility under construction and scheduled to begin treating raw wastewater from East Valley Water District in 2022. SNRC will treat wastewater to tertiary levels and discharge effluent via pipeline to the proposed Weaver groundwater recharge basin. SNRC is estimated to recharge 8,200 AFY to the Bunker Hill sub basin when it comes online in 2022, and recharge will likely increase over time as the EVWD population grows and more wastewater is treated at the facility.

3.6.3.11 Tertiary Treatment System

The Tertiary Treatment System project is an upgrade to the City of San Bernardino Water Reclamation Plant (WRP). The project includes upgrading treatment processes to produce tertiary effluent at WRP and changing the location of effluent discharge from the Santa Ana River to the Weaver groundwater recharge basins via pipeline. The Tertiary Treatment System is estimated to initially recharge 2,200 AFY to the Bunker Hill sub basin starting in 2022 and will increase to 10,000 AFY by 2040 as the improvements are phased in and the City of San Bernardino population grows.

3.7 Development of Desalination

3.7.1 Opportunities for Brackish Water and/or Groundwater Desalination

Desalination, or desalting, is a process to create drinking water from water containing higher salt levels. Desalination can use a thermal distillation process or a membrane process (such as electrodialysis or reverse osmosis). All desalination processes produce a brine waste stream that must be disposed. Brackish groundwater desalting is not currently needed in the San Bernardino Valley.

Although elevated salts are currently not a concern in the San Bernardino Valley, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin where agencies in this basin are considering implementing desalter operations. The area is fortunate to have a Brine Line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Wastewater Reclamation Plant to the Orange County Sanitation District’s treatment plant.

3.7.2 Opportunities for Seawater Desalination

Because the San Bernardino Valley is an inland area and has developed less costly management strategies to achieve a reliable water supply, the region is not pursuing this option.

3.8 Local Water Management

3.8.1 Western Judgement

The Western Judgment, entered simultaneously with the Orange County Judgment, proportioned the water resources within the upper Santa Ana River watershed amongst the residents of the watershed.

The Orange County Judgment ensures minimum flows in the Santa Ana River to Orange County and the Western Judgment generally provides for:

- A determination of safe yield of the SBBA at 232,100 AFY.
- The amount (64,862 AF) of safe yield from the SBBA by for the plaintiff parties (parties in Riverside County). This is equal to 27.95 percent of safe yield.
- An obligation of the non-plaintiff parties (entities in the Valley District service area) to provide replenishment anytime their cumulative extractions exceed their cumulative amount of safe yield;
- An obligation of Western to replenish the Colton Basin Area and the Riverside North Basins if extractions for use in Riverside County in aggregate exceed 3,381 AF and 21,085 AF respectively; and
- An obligation of Valley District to replenish the Colton Basin Area and Riverside North Basin Areas if water levels are lower than 822.04 MSL in specified index wells.

The Judgments establish a Watermaster to be responsible, on behalf of the numerous parties bound thereby, for ensuring implementation of the judgments. The Watermaster for the Western Judgment is made up of one representative from Valley District and Western. Valley District and Western represent the retail water agencies that pump from the groundwater basins.

The Western Judgment contemplates that the parties will develop "new conservation" which is defined as any increase in replenishment from natural precipitation which results from operation of works and facilities not in existence as of 1969, other than works installed to offset losses from flood control channelization. The Western Judgment specifies that the parties to the Judgment have the right to participate in any new conservation projects, provided they pay the appropriate share of the cost. The net effect of new conservation is an increase in safe yield for both the Plaintiffs and non-Plaintiffs. A copy of the Western Judgment is provided in **Part 3 Appendix B**.

In 2013, both the Plaintiffs and Non-Plaintiffs agreed to participate in the cost to capture some of the water that historically flowed to the ocean. This New Conservation was due to the construction and operation of the Seven Oaks Dam. The 2015 Annual Report for the Western-San Bernardino Annual Report effectively increases the safe yield for both Parties as shown in **Table 3-15**.

Table 3-15. Adjusted SBBA Rights Due to New Conservation Allocation

PARTIES	PERCENTAGE	SAFE YIELD ALLOCATION (AF)	NEW CONSERVATION ALLOCATION (AF)	ADJUSTED RIGHT (AF)
Non- Plaintiffs	72.05%	167,238	5,507	172,745
Plaintiffs	27.95%	64,862	2,136	66,998
City of Riverside		52,199	1,719	53,918
Riverside Highland Water Company		4,294	141	4,435
AM and MD Water Company		7,833	258	8,091
Regents of the University of California		536	18	554
TOTAL SUM OF EXTRACTIONS	**100%**	**232,100**	**7,643**	**239,743**

3.8.2 Orange County Judgement

In 1963, the Orange County Water District (OCWD) filed suit against substantially all water users in the area tributary to Prado Dam seeking adjudication of water rights on the Santa Ana River. The litigation ultimately involved over 4,000 served water users and water agencies, the four largest of which were OCWD, Valley District, Western, and the Chino Basin Municipal Water District (now the Inland Empire Utilities Agency). Given the magnitude of the potential litigation, these four districts and other parties developed a settlement that was approved by the Orange County Superior Court in a stipulated judgment entered on April 17, 1969, Orange County Water District v. City of Chino et al., Case No. 117628 (Orange County Judgment). The Orange County Judgment imposes a physical solution that requires parties in the upper Santa Ana River watershed to deliver a minimum quantity of water to points downstream including Riverside Narrows and Prado Dam. A provision of the Orange County Judgment related to conservation establishes that, once the flow requirements are met, the Upper Area parties “may engage in unlimited water conservation activities, including spreading, impounding, and other methods, in the area above Prado Reservoir.” The Orange County Judgment is administered by the five-member Santa Ana River Watermaster that reports annually to the court and the four representative agencies. Valley District, the Inland Empire Utilities Agency, and Western nominate one member each to the Watermaster, OCWD nominates two members, and members are appointed by the court. A copy of the Orange County Judgment is provided in **Part 3 Appendix B.**

3.8.3 1961 Rialto Basin Decree

The Rialto Basin Decree was described previously in **Section 2.2.2**. A copy of the Rialto Basin Decree is provided in **Part 3 Appendix B.**

3.8.4 Seven Oaks Accord

On July 21, 2004, Valley District, Western, the City of Redlands, EVWD, Bear Valley Mutual Water Company, Lugonia Water Company, North Fork Water Company, and Redlands Water Company signed a settlement agreement known as the Seven Oaks Accord (Accord). The Accord calls for Valley District and Western to recognize the prior rights of the water users for a portion of the natural flow of the Santa Ana River. In exchange, the water users agree to withdraw their protests to the water right application submitted by Valley District on behalf of itself and Western. All the parties to the Accord have agreed to support the granting of other necessary permits to allow Valley District and Western to divert water from the Santa Ana River. By means of the Accord, Valley District agreed to modify its water right applications to incorporate implementation of the Accord. Additionally, the Accord requires Valley District and Western to develop a groundwater spreading program in cooperation with other parties, “that is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation.” In response, local agencies included groundwater management in the USARW IRWMP and have collectively prepared the Basin Technical Advisory Committee Regional Water Management Plan annually since 2008.

3.8.5 SBBA Groundwater Sustainability Council

In 2018, Valley District, the City of Colton, City of Rialto, SBMWD, City of Loma Linda, EVWD, Conservation District, Fontana Water Company, WVWD, YVWD, BVMWC, and Loma Linda University entered into the San Bernardino Basin Area Groundwater Council Framework Agreement to form the SBBA Groundwater Sustainability Council (SBBA GC). The City of Redlands joined the SBBA GC in 2021. The purpose of the SBBA GC is to coordinate and implement groundwater management activities in the Bunker Hill Sub-basin and achieve groundwater sustainability throughout the basin.

The primary function of the SBBA GC is to purchase and recharge imported water into the SBB. The SBBA GC collectively determines the amount of water to purchase and recharge. The current sustainability goal is 28,823 AFY which corresponds to the estimated 2040 need for SWP as determined by the last version of the RUWMP. The SBBA GC created an Equitable Allocation Model (EAM) to proportion each member’s recharge obligation. The EAM takes into consideration an agencies’ investments in water conservation and other supplies and infrastructure, including recycled water supplies and surface water treatment plants.

3.8.6 Yucaipa Sustainable Groundwater Management Agency

In July 2017, Valley District, the City of Calimesa, City of Redlands, San Gorgonio Pass Water Agency (Pass), South Mesa Water Company, South Mountain Water Company, Western Heights Water Company, City of Yucaipa, and Yucaipa Valley Water District formed the Yucaipa Sustainable Groundwater Management Agency (Yucaipa-SGMA) under the Sustainable

Groundwater Management Act (SGMA). The Yucaipa-SGMA is currently developing a Groundwater Sustainability Plan (GSP) that is required to be completed by January 31, 2022. The Yucaipa GSP will evaluate supplies and demands on the basin, establish sustainability goals including recharge obligations to address any shortages between supplies and demands, identify, and evaluate management actions and impacts of the GSP, and establish a framework for how the basin will be managed collaboratively by all entities who rely upon the basin.

> The Yucaipa-SGMA GSP is under development and was not completed by the time this plan was published, however, some findings from the GSP development process have informed supply and demand projections for entities who are included in this plan.

3.8.7 Settlement Agreement with Conservation District

Valley District, Western, and the San Bernardino Valley Water Conservation District entered into a settlement agreement on August 9, 2005 whereby the agencies will work cooperatively to develop an annual groundwater management plan. Since both parties are members of the BTAC, this requirement is being met by the BTAC's Regional Water Management Plan, which largely establishes a recharge threshold to ensure recharge activities do not cause liquefaction or move contamination plumes.

3.8.8 MOUs with Flood Control

The Planning Memorandum of understanding (MOU) by and between the San Bernardino County Flood Control District (SBCFCD) and San Bernardino Valley Water Conservation District (Conservation District) serves as an agreement for stormwater recharge at various flood control facilities. Under this MOU, the Conservation District identified SBCFCD facilities where stormwater may be diverted for recharge purposes, granted that diversion does not impact SBCFCD's facilities functionality and purpose to maintain protection from floods. At this time, the potential for stormwater recharge using SBCFCD facilities is preliminary, and future studies pertaining to eligible facilities, the amount and quality of storm water flows for recharge, the location and capacity of SBCFCD facilities, recharge impacts to groundwater levels, migration of contaminant plumes, sand and gravel extraction or other land uses in the vicinity, subsidence protection, endangered and sensitive species habitat preservation, and any other concerns will need to be evaluated (San Bernardino County Flood Control District, January 2021). This MOU is for planning purposes only and any future projects that may use SBCFCD facilities will be subject to a separate water spreading agreement between both parties and CEQA.

3.8.9 Exchange Plan

On May 3, 1976, the San Bernardino Valley Water Conservation District (Conservation District), Valley District, Bear Valley Mutual Water Company (BVMWC), City of Redlands, Crafton Water

Company, EVWD, Lugonia Water Company, North Fork Water Company (now owned by EVWD), Redlands Water Company, and YVWD entered into the Santa Ana River – Mill Creek Cooperative Water Project Agreement (Exchange Plan). The Exchange Plan provided a way for Valley District to provide SWP water to the Yucaipa area, by exchange, before Valley District had a pipeline to deliver SWP water directly to Yucaipa. Since the construction of the State Water Project East Branch Extension and the Crafton Hills Pump Station, state water deliveries can be made directly to Yucaipa so that Valley District no longer requires the Exchange Plan .

In 2019, the parties to the Exchange Plan began the process of reviewing the plan to determine if there may be a way(s) to amend the agreement that may help the region overcome issues like varying surface water quality, or an outage on the State Water Project. The proposed amendments to the Exchange Plan are under legal review at the time this plan was completed.

3.8.10 1996 Agreement with Big Bear Municipal Water District

Bear Valley Mutual Water Company constructed the original Bear Valley Dam in 1884 to create Big Bear Lake as a storage reservoir for their customers, downstream farmers. In 1964, the residents of Big Bear Lake formed the Big Bear Municipal Water District (Big Bear Municipal) in an effort to eliminate Lake releases to Bear Valley Mutual so that the lake level would remain high for recreational use and tourism. After more than a decade of litigation, a Judgment was executed in 1977 which reduced the amount of Lake releases to Bear Valley Mutual. Under the terms of this Judgment, Big Bear Municipal purchased from Bear Valley Mutual the lake bottom, Bear Valley Dam, and the right to utilize and manage the surface of Big Bear Lake for recreation and wildlife. In return, deliveries to Bear Valley Mutual were capped at a total of 65,000 AF in any ten-year period. These deliveries can be made in the form of Lake releases or can be provided from other sources "in-lieu" of Lake releases (in-lieu deliveries). In-lieu deliveries to Bear Valley Mutual are preferable to Big Bear Municipal since they do not result in water being removed from the lake.

In 1996, Big Bear Municipal Water District entered into a water purchase agreement with Valley District that reduces the amount of water BBMWD must release from Big Bear Lake. For an annual payment to Valley District, Valley District provides SWP water for the downstream water needs that would have historically been met by lake releases whenever the Lake is at specified levels. Valley District may also provide water from other sources when the SWP supply is limited. This historic agreement helped Big Bear Municipal achieve its mission of Lake level stabilization for recreation while providing Bear Valley Mutual with the water it needs for its customers. Under the terms of the Agreement, Bear Valley Mutual may request any amount of delivery for a given year, provided that the total of all their requested deliveries do not exceed 65,000 AF in any ten-year period. Bear Valley Mutual typically limits its request to no more than the ten-year average, or 6,500 AFY.

The Judgment directed the in-lieu water program be monitored through a series of accounts that are managed by the Big Bear Watermaster Committee. The three-member committee consists of one representative from each of the three member agencies: Big Bear Municipal Water District, Bear Valley Mutual Water Company and San Bernardino Valley Water Conservation District. This is a committee whose sole responsibility is to monitor the "physical solution" set forth in the Judgment. The basic premise behind the physical solution is the comparison of Big Bear Municipal's actual Lake management versus Bear Valley Mutual' s historic management. Big Bear Municipal is then responsible for making up any net groundwater deficiency in the San Bernardino basin which may occur as a result of maintaining a higher Lake level than would have occurred under Bear Valley Mutual' s historic operations. The amount of the deficiency or surplus is maintained in the basin make-up water account (commonly referred to as "basin compensation account"). A number of other accounting mechanisms are in place to calculate totals for Lake releases, inflow, spills, evaporation, wastewater export and other related data. An annual Watermaster report is prepared documenting the annual accounting procedures.

3.8.11 Annual Regional Water Management Plan

The BTAC was formed by the first IRWMP to implement the IRWMP and provide a forum to discuss technical issues regarding water management. The BTAC is primarily made up of water agencies that pump from the groundwater basins within the Valley District service area but is open to others who want to participate. BTAC works cooperatively and strives to make decisions by consensus. Currently, BTAC meets quarterly.

Each year, BTAC develops the Regional Water Management Plan that is considered by the two agencies that make up the Western Watermaster: Valley District and Western Municipal Water District. The plan generally establishes a recharge threshold to ensure water levels do not increase liquefaction potential or move contamination plumes

The latest version of the BTAC Regional Water Management Plan is available at **http://www.sbvmwd.com/about-us/local-water-conditions**.

3.8.12 Groundwater Recharge Programs

In addition to the ongoing recharge operations throughout the Valley District service area, this section describes new recharge projects that are currently being developed.

3.8.12.1 Cactus Basin Recharge

Valley District is working cooperatively with the San Bernardino County Flood Control District (Flood Control) to recharge SWP supplemental water in the Cactus Basins, which would recharge high quality water into the Rialto-Colton sub basin. The project includes the construction of new basins 3 and 3A, which are being built for flood control. Basin development will include the construction of a bypass pipeline to manage flood flows. To optimize the joint use of these basins for flood control, the recharge is planned to occur during the dry-season, from April to October.

3.9 Water Quality

3.9.1 Imported Water Quality

DWR has conducted water quality monitoring for the SWP since 1968. Initially, this program sought to monitor eutrophication (an increase in chemical nutrients) and salinity in the SWP. Over time, the water quality program expanded to include parameters of concern for drinking water, recreation, and wildlife. Water quality samples are collected at regular intervals throughout the year for chemical, physical, and biological parameters. The SWP water has moderate total organic carbon levels, resulting in higher disinfection byproduct (DBP) formation, and also has some taste and odor causing compounds. Real time data and forecasting for SWP water quality is available on DWR's website at https://water.ca.gov/Programs/Environmental-Services/Water-Quality-Monitoring-And-Assessment/RTDF-Summary.

The Valley District service area of the IRWM region imports water through the SWP which is Sierra snow melt with consistently low TDS levels of 200 to 300 mg/L (DWR 2003a) except during periods of drought, flood events, reservoir management practices, and salt input from local streams.

Water is imported into the Western service area of the IRWM Region from the Colorado River via the Colorado River Aqueduct (CRA), owned and operated by Metropolitan, and from Northern California via SWP facilities. The TDS level in the CRA water averages approximately 700 mg/L and, during drought years, can increase to above 900 mg/L (Metropolitan and USBR 1999). Salinity projections for wet year conditions show TDS values between 650 and 800 mg/L (Metropolitan and USBR 1999).

In order to protect against any water quality impacts from imported water, the City of Corona, City of Riverside, Eastern Metropolitan Water District, Elsinore Valley Municipal Water District, Orange County Water District, Valley District, San Gorgonio Pass Water Agency, and Western (Recharge Parties) entered into the "Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin" with the SARWQCB in 2007. The initial term of the agreement was 10 years, and it was recently extended to January 18, 2028.

This order states that long-term conjunctive use of groundwater in the Region requires that the quality of water in groundwater basins in the region be managed to meet the water quality objectives for nitrogen and TDS (collectively, the Salinity Objectives) adopted by the SARWQCB in the 1995 Water Quality Control Plan for the Santa Ana River Basin, as amended in 2004 by R8- 2004-0001 (Basin Plan).

The parties that recharge imported water within the Santa Ana Region (Recharging Parties) agree to collect, compile, and analyze the total inorganic nitrogen (TIN) and TDS water quality data necessary to determine whether the intentional recharge of imported water in the region may have a significant adverse impact on compliance with the Salinity Objectives within the Region.

This agreement provides a framework for groundwater recharge of imported water and will facilitate conjunctive management in the region while protecting water quality. A copy of the agreement is included in **Part 3 Appendix B**.

3.9.2 Groundwater Quality

Groundwater quality varies among the Region's groundwater basins, particularly in the subbasins of the Upper SAR due to geology and faulting patterns and recharge points, and from anthropogenic sources of contamination.

3.9.2.1 Ambient Water Quality

The Water Quality Control Plan (Basin Plan) for the Santa Ana River Basin (Region 8) (RWQCB, 2016a) requires the implementation of a watershed-wide total dissolved solids (TDS) and nitrogen groundwater monitoring program to determine ambient water quality in groundwater, assess compliance with groundwater quality objectives, and determine if assimilative capacity exists in groundwater management zones (GMZs). The current Basin Plan requires that the ambient water quality (AWQ) be computed every three years.

According to the Basin Plan (RWQCB, 2016a):

> "TDS and nitrate-nitrogen water quality objectives for each management zone are based on historical concentrations of TDS and nitrate-nitrogen from 1954 through 1973 and are referred to herein as the 'antidegradation' objectives. This period brackets 1968, when the State Water Resources Control Board (State Water Board) adopted the state's antidegradation policy in Resolution No. 68-16, "Policy with Respect to Maintaining High Quality Waters". This Resolution establishes a benchmark for assessing and considering authorization of degradation of water quality.

A requirement of the January 2004 Nitrogen and TDS Basin Plan Amendment (Resolution No. R8-2004-0001) is to perform a recomputation of AWQ for all groundwater management zones in the watershed for which adequate data exist every three years. To date, seven AWQ determinations have been made with the most recently completed for the 1998 to 2018 time period. The triennial AWQ determinations from each current period are used to assess compliance with the new water quality objectives and to determine if assimilative capacity exists for each Groundwater Management Zone (GMZ). By definition, assimilative capacity is determined to be the difference between the objective and the current AWQ: if the current quality of the GMZ is better than the water quality objective, then assimilative capacity exists.

Assimilative capacity does not exist if the current quality of a GMZ is the same as or poorer than the water quality objectives.

According to the Basin Plan (RWQCB, 2016a), when a GMZ has little or no assimilative capacity:

"The Regional Board addresses such situations by providing dischargers with the opportunity to participate in TDS offset programs, such as the use of desalters, in lieu of compliance with numerical TDS limits. These offset provisions are incorporated into waste discharge requirements . . . An alternative that dischargers might pursue in these circumstances is revision of the TDS or nitrogen objectives, through the Basin Plan amendment process. Consideration of less stringent objectives would necessitate comprehensive antidegradation review, including the demonstrations that beneficial uses would be protected and that water quality consistent with maximum benefit to the people of the State would be maintained . . . a number of dischargers have pursued this 'maximum benefit objective' approach, leading to the inclusion of 'maximum benefit' objectives and implementation strategies in this Basin Plan. Discharges to areas where the 'maximum benefit' objectives apply will be regulated in conformance with these implementation strategies."

Table 3-16 shows the water quality objectives for both TDS and Nitrate for the nine (9) groundwater GMZs in the Upper Santa Ana River Watershed. As shown in the table below, the San Timoteo, Yucaipa and Beaumont GMZs have "maximum benefit" water quality objectives that require the implementation of certain projects and programs by specific dischargers as part of their maximum benefit demonstrations is required for the continued application of the "maximum benefit" objectives. The bold red numbers in the table indicate that the 2018 AWQ is above the WQO and assimilative capacity does not exist.

Table 3-16. TDS Water Quality Objectives, Ambient Water Quality, and Assimilative Capacity

GROUNDWATER MANAGEMENT ZONE	DWR BASIN NAME	WATER QUALITY OBJECTIVE	2018 AMBIENT TDS	WATER QUALITY OBJECTIVE NITRATE	2018 AMBIENT NITRATE
Bunker Hill-A	San Bernardino Basin	310	330	2.7	3.9
Bunker Hill-B	San Bernardino Basin	330	280	7.3	5.8
Lytle	San Bernardino Basin	260	240	1.5	2.4
Colton	Rialto-Colton	410	490	2.7	3.3
Rialto	Rialto Colton	230	240	2.0	3.4
San Timoteo, "maximum benefit"	San Timoteo	400	420	5.0	2.0
San Timoteo , "antidegradation"	San Timoteo	300	420	2.7	2.0
Yucaipa, "maximum benefit"	Yucaipa	370	320	5.0	6.2
Yucaipa, "antidegradation"	Yucaipa	320	320	4.2	6.2
Riverside A	Riverside-Arlington	560	440	6.2	5.6
Beaumont, "maximum benefit"	San Timoteo	330	280	5.0	2.7
Beaumont, "antidegradation"	San Timoteo	230	280	1.5	2.7

3.9.3 Known Groundwater Contaminant Plumes

The SBBA has the following groundwater contaminant plumes:

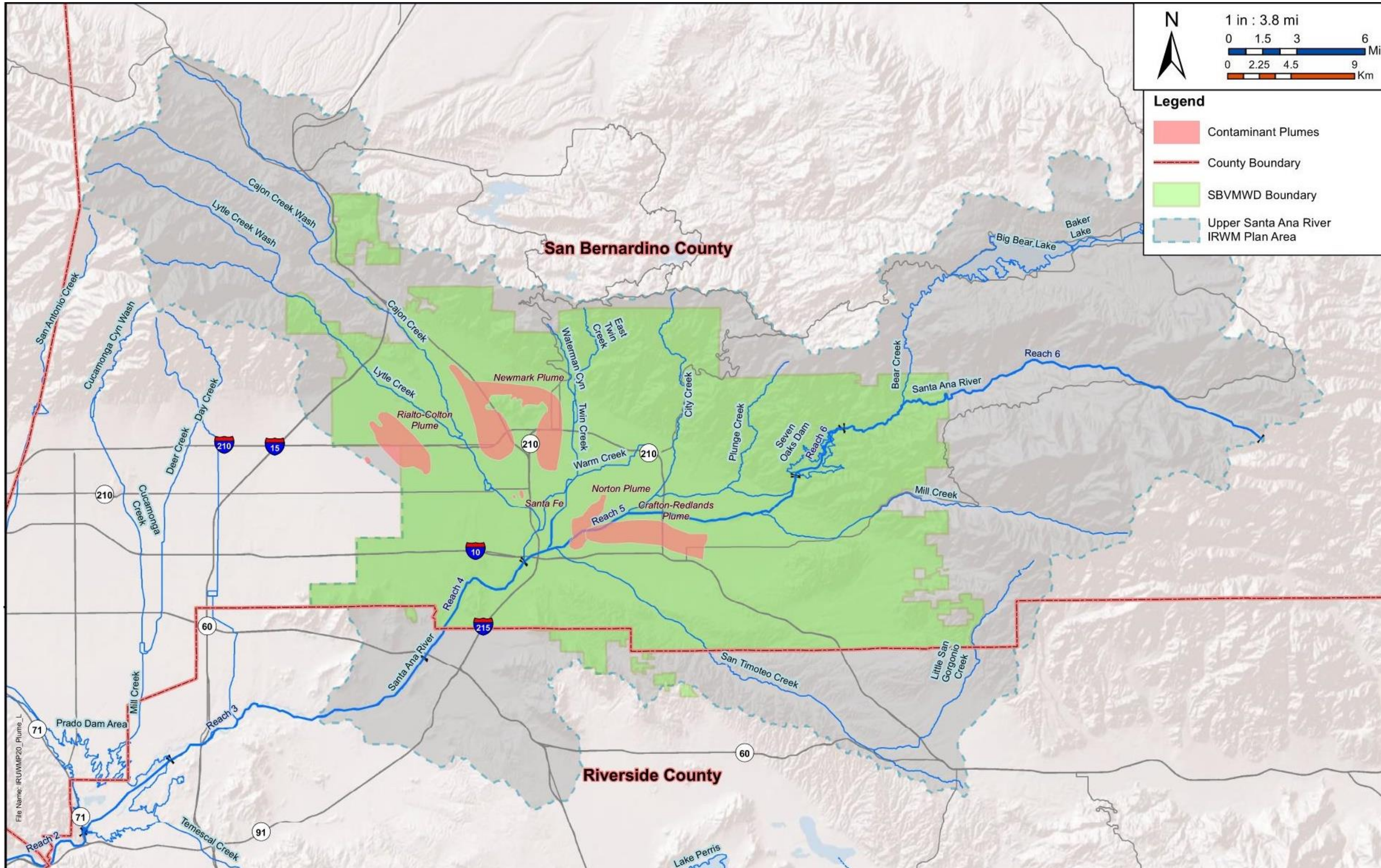
- The Crafton-Redlands plume, with trichloroethylene (TCE) and lower levels of perchloroethylene (PCE), debromochloropropane (DBCP) and perchlorate;
- The Norton Air Force Base TCE and PCE plume, stretching 2.5 miles from its source and contaminating 100,000 AF of groundwater;
- The Muscoy and Newmark plumes near the Shandon Hills, which are Superfund sites with TCE and PCE; and
- The Santa Fe plume with PCE, TCE, and 1,2 dichloroethylene (1,2-DCE)

Other plumes include:

- Rialto Area Perchlorate Plume (Rialto-Colton Basin)
- North Riverside Basin MTBE Contamination (Riverside North Basin)

These plumes are depicted in Figure 3-8.

Figure 3-8. Groundwater Contaminant Plumes in the Region



Separately from the foregoing remediation efforts, Fontana Water Company currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill and corresponding Clean-Up and Abatement Order issued to San Bernardino County by the RWQCB. The 5,000-gallons per minute (gpm) treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including, but not limited to, PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No Man's Land sub basins.

3.9.3.1 Crafton-Redlands Plume

Two commingled plumes, comprising the Crafton-Redlands plume, have impacted water supply wells for the cities of Riverside, Redlands, and Loma Linda, including Loma Linda University wells. One plume contains TCE and the other perchlorate; both are in the upper 300 to 400 feet of groundwater. TCE has been measured in water supply wells at over 100 parts per billion (ppb), over 20 times the MCL of 6 ppb. Currently, however, water supply well concentrations are around 7 ppb. Perchlorate is present in water supply wells at concentrations up to 77 ppb.

As required by the Santa Ana Regional Water Quality Control Board (SARWQCB), the Lockheed Martin Corporation (Lockheed) has prepared contingency plans to address impacts of the plume on water supply wells. These include blending, treatment, and/or providing alternative water supply sources. The plumes are currently being captured by the City of Riverside's Gage Well Field. Lockheed has installed granular activated carbon treatment units at some of the gage wells to remove TCE and has installed ion exchange units on some of these wells for the removal of perchlorate.

3.9.3.2 Norton Air Force Base Plume

The Norton Air Force Base plume, located just to the southwest of the former installation in the City of San Bernardino, is a major contaminant plume, consisting primarily of TCE and PCE. The plume has impaired 10 wells owned by the City of Riverside and the City of San Bernardino. Cleanup efforts by the Air Force, consisting of soil removal, soil gas extraction, and groundwater treatment, have significantly reduced this plume. The treatment plants now operate in a standby mode.

3.9.3.3 Newmark and Muscoy Plumes

Within the City of San Bernardino, the Newmark plume and the Muscoy plume consist primarily of PCE. The plumes have impacted San Bernardino water supply wells. Under the federal Superfund Program, the U.S. Environmental Protection Agency (EPA) has implemented cleanup of these plumes, including use of groundwater extraction and treatment using granulated activated carbon. The treated water is then used to supplement the City of San Bernardino's potable water supply. It appears that cleanup efforts will be adequate to protect 32 down-gradient water supply wells. However, groundwater model simulations suggest that containment of the plume will need additional extraction wells that will result in pumping of at least 14,000 AFY.

3.9.3.4 Sante Fe Plume

The Santa Fe groundwater plume consists primarily of 1,2-DCE, TCE, and PCE. This plume is currently being monitored.

3.9.3.5 Rialto Area Perchlorate Plume

Since 2002, the SARWQCB has been conducting an investigation of groundwater contamination in the area of the City of Rialto. The focus of the investigation has been facilities located on a 160-acre site in Rialto. The site has also been designated as a Superfund site by the US EPA. In 2005 the SARWQCB Executive Officer issued a Cleanup and Abatement Order and subsequent amendments naming a number of responsible parties. Since that time, the Cleanup and Abatement Order has been the subject of challenges in petitions filed by entities named as parties responsible for the contamination.

In September 2010, EPA issued the Interim Action Record of Decision to the Source Area Operable Unit (SAOU) of the B.F. Goodrich Superfund Site, now referred to as the “Rockets, Fireworks, and Flares Superfund Site.” The EPA’s Remedy required Emhart Industries to install, operate, and maintain a groundwater pump and treatment system to intercept and control the spread of contaminated groundwater from the 160-acre parcel. The EPA Remedy is designed to capture and remove perchlorate and Trichloroethylene (TCE) in the groundwater in the Rialto-Colton Groundwater Basin emanating from a 160-acre parcel located in north Rialto.

On August 12, 2015, the Rialto, Colton, the County of San Bernardino and Emhart Industries (Emhart), entered into a Four-Party Implementation Agreement to implement the interim remedial action plan as required by the Consent Decree as entered on July 2, 2013. The remedial action required by the Work Consent Decree was selected and approved and overseen by the EPA. A copy of the Four Party Agreement is included in **Part 3 Appendix B**.

The County and Emhart agreed that the EPA Remedy would be combined with an existing groundwater extraction and treatment remedy designed and constructed by the County to capture and remove perchlorate and TCE in the Basin due to the landfill and required by the SARWQCB. This combined project is referred to as the “Combined Remedy” project.

The Combined Remedy includes:

1. Installing a new extraction well (EW-1), located at the northwest corner of Jerry Eves Park and piping to the water treatment system,
2. Expanding the existing County groundwater treatment system at the Rialto 3 well site to treat extracted water from EW-1,
3. Upgrading the chlorination station at the Combined Remedy site,
4. Constructing an inter-tie between Rialto and Colton to deliver Colton’s water rights produced out of EW-1 and,

5. System improvements to the Colton's drinking water distribution system, specifically modifications made by Emhart to a reservoir and pump station.

3.9.3.6 North Riverside Basin MTBE Contamination

In 1988, the SARWQCB issued a Cleanup and Abatement Order to the SFPP Colton Fuel Terminal (owned by Kinder Morgan) located in Bloomington, California. The Terminal, which is located just south of the I-10 freeway on the east side of Riverside Avenue, is a bulk petroleum storage and distribution facility which was built in the 1950s. It currently occupies 82 acres and contains 32 refined petroleum product tanks and fuel-loading racks where transport tanker trucks are filled.

In response to the Cleanup and Abatement Order, a monitoring and extraction well network for the Terminal was constructed. It consists of 131 wells in and around the Terminal as well as 14 soil vapor extraction wells. The site samples for Benzene, methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA).

3.9.4 Surface Water Quality

Water quality within the Upper SAR watershed is addressed through several plans, regulations and guidelines including the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), which includes beneficial use designations and water quality objectives. Those water bodies not meeting the Basin Plan water quality objectives and determined to have beneficial uses are listed on the State's 303(d) list of impaired water bodies and require a TMDL to be developed. **Table 3-17** shows the water bodies in the Upper SAR watershed that are listed on the State's 303(d) list for water quality impairments.

The SARWQCB states that the quality of the SAR is a function of the quantity and quality of the various components of the flows (SARWQCB 1995). Three components make up the flow of the water in the SAR: (1) storm flows, (2) baseflow, and (3) non-tributary flow. The relative proportion of these components varies throughout the year.

The first component, storm flows, results directly from rainfall, usually occurring between the months of December and April. Much of the rainfall and surface water runoff from the storms is captured and percolated into the groundwater basins. The quality of storm flow water is highly variable.

Table 3-17: 303(d) Listed Water Bodies in the Upper SAR

WATER BODY	IMPAIRMENTS
Big Bear Lake	Mercury, Noxious Aquatic Plants, Nutrients, PCBs
Grout Creek	Nutrients
Knickerbocker Creek	Pathogens
Lytle Creek	Pathogens
Mill Creek, Reach 1	Pathogens
Mill Creek, Reach 2	Pathogens
Mountain Home Creek	Pathogens
Mountain Home Creek, East Fork	Pathogens
Rathbone (Rathbun) Creek	Cadmium, Copper, Nutrients, Sediment/ Siltation
Santa Ana River, Reach 6	Cadmium, Copper, Lead
Santa Ana River, Reach 4	Pathogens
Santa Ana River, Reach 3	Copper (wet weather only), Lead, Pathogens
Summit Creek	Nutrients

Two TMDLs have been adopted to address the above impairments in the Upper SAR.

- **TMDLs for Bacterial Indicators in the Middle Santa Ana River Watershed (February 3, 2005):** Addresses pathogens in the Santa Ana River, Reach 3.
- **Nutrient TMDL for Dry Hydrological Conditions for Big Bear Lake (April 21, 2006):** Addresses nutrients in Big Bear Lake.

Baseflow makes up the second component of water flow in the SAR, a large portion coming from the discharge of treated wastewater into the river in addition to rising groundwater in the basin. This baseflow includes the non-point source discharges as well as the uncontrolled and unregulated agricultural and urban runoff. Water quality objectives are set in relation to the baseflow in the river, not to the total flow in the river (see **Table 3-18**). The intent of these objectives is to protect the river's groundwater recharge beneficial use. Compliance with these objectives is verified by annual measurement of the baseflow quality.

The quantity and quality of baseflow is most consistent during the month of August. At that time of year, the influence of storm flows and non-tributary flows is at a minimum and volumes of rising water and non-point source discharges tend to be low. The major component of baseflow in August is municipal wastewater. For these reasons, this period has been selected by the SARWQCB as the time when baseflow will be measured and its quality determined. To determine whether the water quality and quantity objectives for baseflow in Reach 3 of the SAR are being met, the SARWQCB collects a series of grab and composite samples during August of each year. The results are compared with the continuous monitoring data collected by USGS and data from other sources.

Table 3-18: SAR Basin Surface Water Quality Objectives (WQO)

INLAND SURFACE STREAMS UPPER SAR BASIN	WATER QUALITY OBJECTIVES MILLIGRAMS PER LITER (MG/L)						
	TOTAL DISSOLVED SOLIDS (TDS)	HARDNESS ($CACO_3$)	SODIUM (NA)	CHLORIDE (CL)	TOTAL INORGANIC NITROGEN (TIN)[1]	SULFATE (SO_4)	CHEMICAL OXYGEN DEMAND (COD)
Reach 2 - 17th Street in Santa Ana to Prado Dam	650[c]	---	---	---	---	---	---
Reach 3 - Prado Dam to Mission Blvd. - Baseflow	700	350	110	140	10[2]	150	30
Reach 4 - Mission Blvd. in Riverside to San Jacinto Fault	550	---	---	---	10	---	30
Reach 5 - San Jacinto Fault in San Bernardino to Seven Oaks Dam	300	190	30	20	5	60	25
Reach 6 - Seven Oaks Dam to Headwaters	200	100	30	10	1	20	5

Source: SARWQCB 2019

[1.] Total nitrogen, filtered sample.

The SARWQCB sets discharge requirements on wastewater discharges, the major source of baseflow in the SAR. Waste discharge requirements are developed on the basis of the limited assimilative capacity of the river. Non-point source discharges, generally from urban runoff and agricultural tailwater, are regulated by requiring compliance with Best Management Practices (BMPs), where appropriate.

The third component of flow in the SAR that influences water quality is characterized by the SARWQCB as non-tributary flow. Non-tributary flow is generally imported water released in the upper basin for recharge in the lower basin (SARWQCB 1995).

Streams on the Santa Ana Basin generally have increasing dissolved minerals as one goes downstream. This effect is due to the fact that water is used, recycled, and used again. The magnitude or amount of TDS concentration rises with each use of water. Groundwater also enters basin streams in some reaches, and their sampling indicated that some of the highest TDS (and in some cases nitrates) may occur at sites on the valley floor that are dominated by rising groundwater (USGS 2006). Nitrate concentrations are higher in Santa Ana Basin streams receiving treated wastewater than in streams without treated wastewater. The principal source of nitrate is fertilizer from historic agricultural operations.

Table 3-19 provides a summary of the available historical surface water quality data for TDS and nitrogen at points along the SAR (USGS 2007).

Table 3-19: Average Historic Surface Water Quality for Locations on the SAR (1990-2001)

WATER QUALITY CONSTITUENT	METROPOLITAN CROSSING GAGE (REACH 3)[A]	RIX-RIALTO EFFLUENT OUTFALL (REACH 4)[A]	MENTONE GAGE (REACH 5)[A]
TDS	560[b]	520[c]	230[b]
TDS Basin Plan Objective by Reach	700	550	300
Total Inorganic Nitrogen (TIN)	7.3[b]	8.5[c]	0.3[b]
TIN Basin Plan Objective by Reach	10[d]	10	5

Source: USGS gage data. Data for River Only Mentone Gage begins in October 1998. Data for Riverside Narrows Gage begins in August 1997.

[b] USGS 2004.
[c] The TDS and TIN values assigned for RIX-Rialto are the maximum values that occurred during 2001-2002 as reported in Table 4.4-9 of the SBMWD RIX Facility Recycled Water Sales Program Preliminary Environmental Impact Report (PEIR), March 2003.
[d] Total nitrogen, filtered sample.

3.9.5 Salt and Nutrient Management Plan

The stakeholders in the Upper Santa Ana River Watershed Groundwater Basins are collaboratively investigating the salt and nutrient loading to several of the underlying groundwater basins. The SNMP will focus on the upper Santa Ana River Watershed. Prolonged droughts have highlighted the need for an enhanced water supply portfolio, which includes plans to increase stormwater capture and recycled water use. Without enough assimilative capacity, existing and new wastewater/recycled water projects in the SBBA may be subject to costly salt removal using advanced treatment such as reverse osmosis (RO).

The SNMP will perform a sophisticated analysis through a collaborative process that will involve the Regional Water Quality Control Board (RWQCB). If the modeling demonstrates that higher objectives are warranted, then a Salt and Nutrient Management Plan would be developed and used as backup to request a change in water quality objectives to the GMZ's in the SBBA from the RWQCB.

3.9.6 Water Quality Impacts on Supply Reliability

Water quality is monitored, tracked, and addressed by implementing treatment, as necessary. In addition to the groundwater plumes described above, there are other contaminants in the basin, including but not limited to nitrate and DBCP, which can require treatment. There are also emerging contaminants and new water quality regulations which could increase the level of required treatment.

Per and polyfluoroalkyl substances (PFAS) are manmade fluorinated organic compounds found in and used in the manufacturing of common items such as carpet, clothing, fabric, food packaging, nonstick cookware, and fire retardant foams. PFAS are synthetically made to be resistant to both water and liquids, are not easily broken down and destroyed, and are believed to have adverse health effects. Two common PFAS, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), are regulated by the California Division of Drinking Water and have notification limits of 5.1 ppt and 6.5 ppt, respectively. The Office of Environmental Health Hazard Assessment (OEHHA) is developing the Public Health Goal (PHG) for PFOS and PFOA which are scheduled to be released in 2021. Once the PHGs for PFOS and PFOA are established, the State Water Resource Control Board will develop a maximum contaminant level (MCLs) to regulate PFOS and PFOA concentrations in drinking water, both of which are constituents of emerging concern.

Water agencies are responsible for providing treatment to ensure their potable water supply meets all applicable water quality regulations.

3.10 Major Regional Water Infrastructure

The water-related infrastructure of the Upper SAR watershed reflects the complex water history of the IRWM Region. The predecessors of many of the water agencies that are participating in the IRWM Plan were constructing ditches in the 1800s. The water rights and facilities established in the 1800s have helped determine the structure of today's water agencies and the arrangement of today's infrastructure. After State Water Project (SWP) facilities were extended into the Region in the early 1970s, State Water Contractors receiving deliveries from the East Branch of the SWP – Valley District, San Gorgonio Pass Water Agency, and Metropolitan Water District of Southern California (Metropolitan) – constructed pipelines to take advantage of the imported water. Figure 3-9 shows the major water-related infrastructure in the Region.

3.10.1 Regional Water Supply Infrastructure

Groundwater and local surface water serve as important sources of regional water supply. The SBBA is a major source of water supply for agencies in San Bernardino and Riverside Counties. Three major regional transmission systems exist in the IRWM Region and are used to deliver water to the City of Riverside. These are the Gage Canal, Waterman Pipeline, and Riverside

Canal. The Gage Canal is owned by the Gage Canal Company. As of 2005, the City of Riverside owned approximately 59% of the Gage Canal Company. The canal extends from the SAR near Loma Linda to the Arlington Heights area. The Gage Canal is used to deliver both potable and irrigation water.

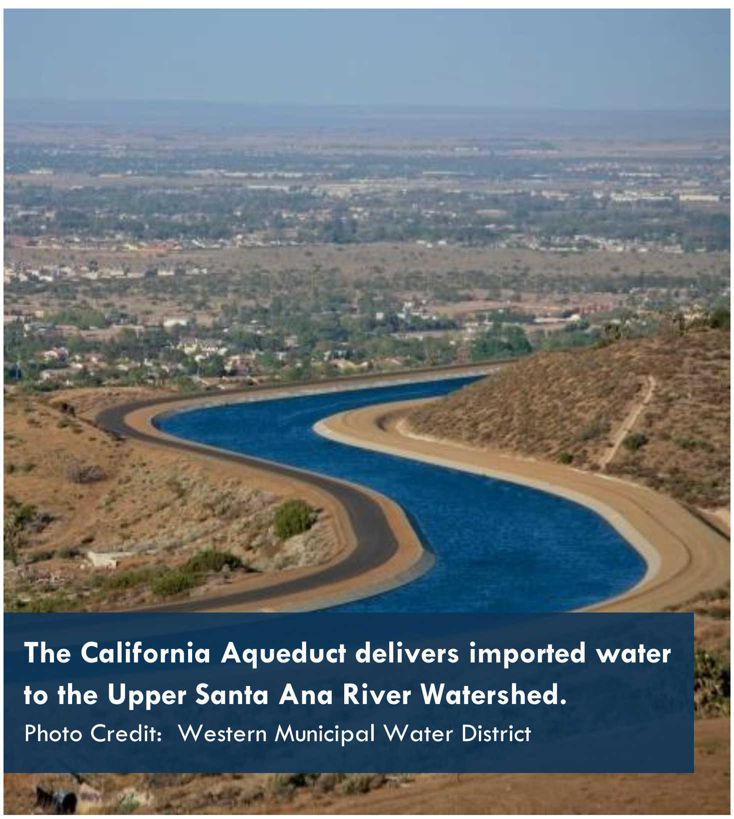
The Waterman Pipeline extends from the Bunker Hill Subbasin (discussed later in this chapter) to the Canyon Crest area and is used to deliver groundwater to portions of the City of Riverside.

The Riverside Canal is a 12-mile canal extending from the City of Colton to Jefferson Street in the City of Riverside. Non-potable groundwater is conveyed in the Flume Pipeline to the Riverside Canal.

3.10.2 State Water Project Facilities

SWP water is imported into the Upper SAR watershed via the East Branch of the California Aqueduct. At the Devil Canyon Power Plant, located at the foot of the San Bernardino Mountains near Interstate 215, SWP water can be delivered in several directions in State facilities or in transmission systems belonging to State Water Contractors.

The SWP's Santa Ana Pipeline extends south from the East Branch, roughly paralleling Lytle Creek and into Lake Perris. Deliveries from the Santa Ana Pipeline can be made to Metropolitan member agencies including Western, Eastern Municipal Water District (Eastern), and the San Diego County Water Authority.



The California Aqueduct delivers imported water to the Upper Santa Ana River Watershed.
Photo Credit: Western Municipal Water District

The East Branch Extension of the SWP is a combination of facilities built by Valley District and the State and funded by Valley District and San Gorgonio Pass Water Agency. Valley District operates these facilities for the State and San Gorgonio Pass Water Agency. The East Branch Extension makes deliveries from Devil Canyon east along the foothills of the San Bernardino Mountains and out to the San Gorgonio Pass Water Agency service area. Phase 2 of the East Branch Extension increased the capacity to 17,300 acre-feet (AF), which is the Agency's official allotment of SWP water, and is enough to supply approximately 35,000 families each year.

3.10.3 State Water Contractors Facilities

Four State Water Contractors have facilities in the IRWM Region: Valley District, San Gorgonio Pass Water Agency, Metropolitan, and San Gabriel Valley Municipal Water District.

Metropolitan's Inland Feeder extends from Devil Canyon to Diamond Valley Lake and the tunnels within the San Bernardino Mountains. Currently, the Foothill Pipeline is being used to make deliveries of SWP water to the completed portions of the Inland Feeder for delivery to Diamond Valley Lake.

Metropolitan's Rialto Pipeline is used to make deliveries from Devil Canyon to Metropolitan's F.E. Weymouth Treatment Plant in the San Gabriel Valley and to its Robert B. Diemer Treatment Plant, which supplies treated water to Western and Eastern. In addition, the Rialto Pipeline makes deliveries to surface water treatment plants owned by Metropolitan's member agencies and to groundwater recharge facilities.

The Devil Canyon-Azusa Pipeline is used primarily to make deliveries for replenishment of the Main San Gabriel Basin. Valley District owns capacity in this pipeline. Through this pipeline, Valley District can deliver SWP water to the western portion of its service area including West Valley and Fontana Water Company as well as the Cactus Spreading Basins.

Many of Valley District's facilities have been integrated into the SWP, as described in Section 2.2.1. In addition, Valley District has three pipelines that are not integrated into the SWP. These are the Baseline Feeder, Baseline Feeder Extension South, and Central Feeder. The Baseline Feeder is a 48-inch pipeline that serves potable water from the SBBA to the City of Rialto, West Valley, and Riverside Highland Water Company.

The Baseline Feeder Extension South is a 78-inch pipeline that was constructed jointly with Western Municipal Water District north/south in alignment from the vicinity of 9th Street and Waterman Avenue in San Bernardino, south past the Antil area where there is a major concentration of production wells, and on to the vicinity of the SAR. This pipeline will ultimately serve water from the SBBA throughout Valley District's service area and on to Riverside County.

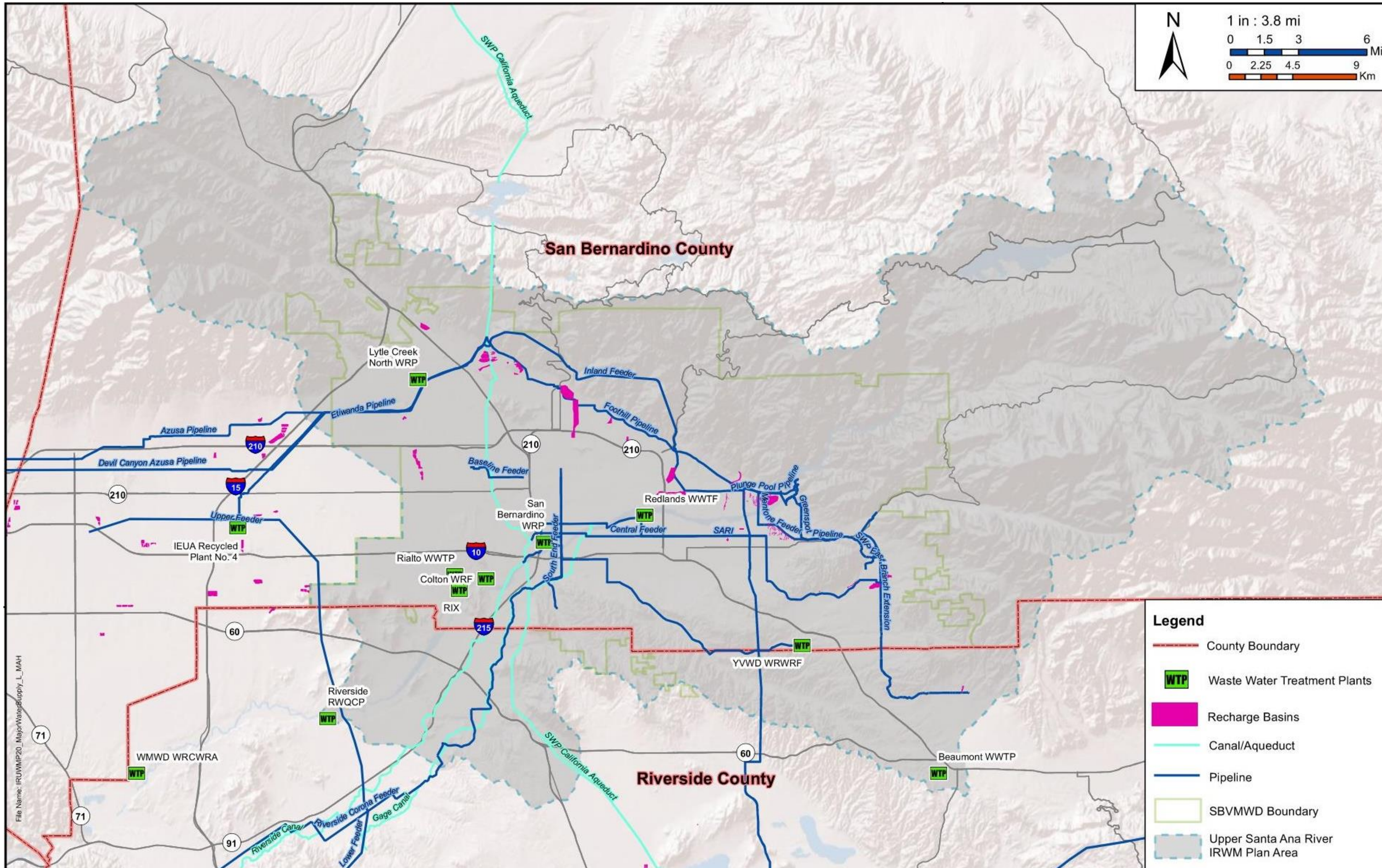
Valley District and their partners completed the construction of a portion of the Central Feeder, in an east/west alignment in San Bernardino Avenue from Opal Avenue Westerly to Texas Street in Redlands. The Central Feeder may eventually be extended and connected to the Baseline Feeder Extension South and possibly to the SWP Santa Ana Pipeline.

3.10.4 Regional Flood Control Infrastructure

The Upper SAR watershed consists of many tributaries flowing to the SAR. These tributaries exhibit a range of development from natural streams to concrete-lined channels. Many of the stream's flow through heavily developed areas. The San Bernardino County Flood Control District (SBCFCD) operates and maintains many of the tributary systems that are deemed "regional" (750 cubic feet per second (cfs) or greater flow and/or 640 acres or greater of watershed as well as portions of the SAR). Smaller-scale control facilities are generally operated by local jurisdictions. Flood control agencies' boundaries follow the county boundaries for those areas which they manage.

The regional flood control facilities have been continually developed and operated by SBCFCD since its establishment in 1939 and are operated for the general safety of the residents of San Bernardino County. Flood control facilities and improvements protect vital roadways and utility corridors along with providing public recreational amenities such as trails and landscaping. Endangered species habitat is protected with various project and non-project related improvements.

Figure 3-9: Major Water Supply Infrastructure



4

PART 1: REGIONAL CONTEXT

Regional Water Use

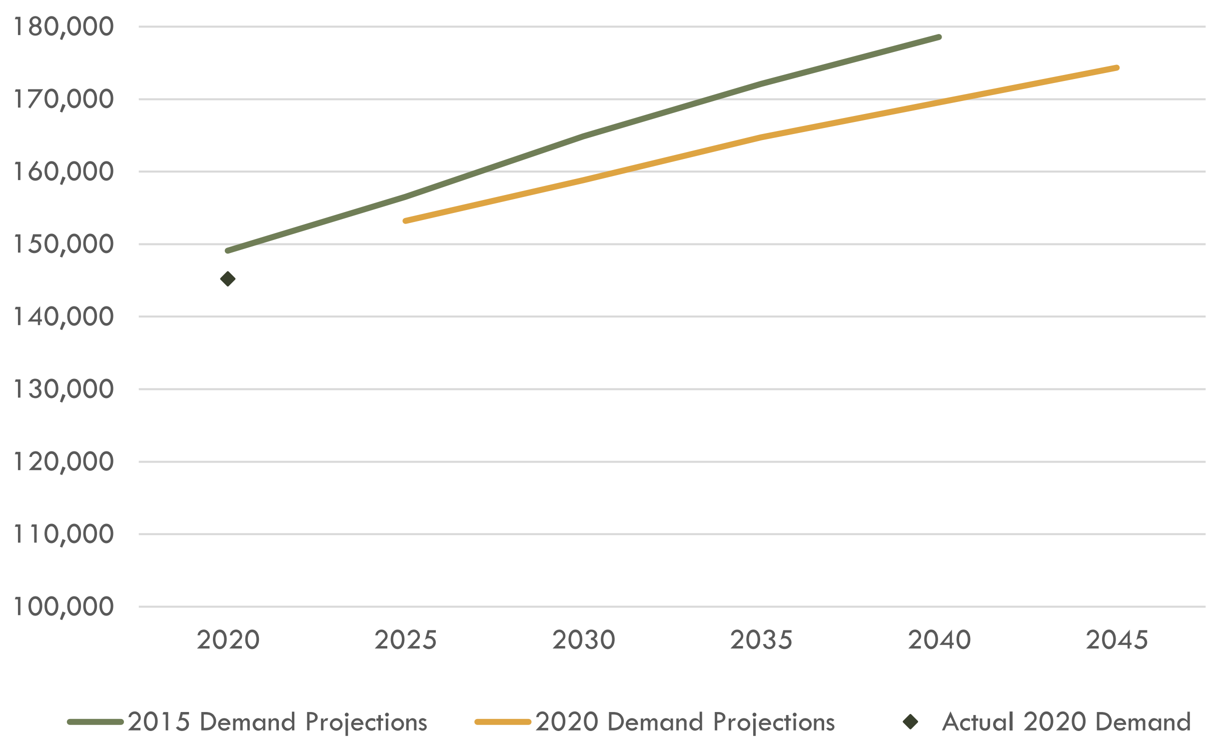
This chapter provides a summary of the projected water demands for the Region through 2045, by agency and source. This chapter also describes the significant improvements in water use efficiency that have been achieved within the Region as well as planned water use efficiency programs.

As described in **Part 1 Chapter 2**, the most recent population projections for the Region show slower growth than projected in previous plans. For the nine (9) agencies participating in the 2015 RUWMP, the total demand projections in this Plan are slightly lower than the projections from 2015 due to slower growth and increased water use efficiency. The 2015 RUWMP demands are a subset of the total demands in the Region, but the general trend illustrated in **Figure 4-1** is reflective of declining demand projections for the Region as a whole.

IN THIS SECTION

- Total Regional Water Demand
- Demand by Source
- Water Use Efficiency

Figure 4-1. Comparison of 2015 and 2020 Demand Projections for Nine 2015 RUWMP Agencies, AFY



4.1 Total Water Demands

The total water use projections for the Region presented in this Plan rely primarily on data provided by the participating agencies as part of their 2020 UWMP updates, some of which are included in **Part 2** of this Plan. Some water agencies (those that provide water to less than 3,000 connections and less than 3,000 AFY) are not required to publish a UWMP. For these agencies, estimates of future water demand were developed using historical water use data from the 2020 Western-San Bernardino Watermaster Annual Report or data prepared for the Yucaipa SGMA analysis.

To summarize the water demands, the Region's water agencies were divided into three groups:

1. Non-Plaintiffs of the Western Judgment (water agencies in San Bernardino (SB) County)
2. Plaintiffs of the Western Judgment (water agencies in Riverside County)
3. Participating water agencies outside the Western Judgment

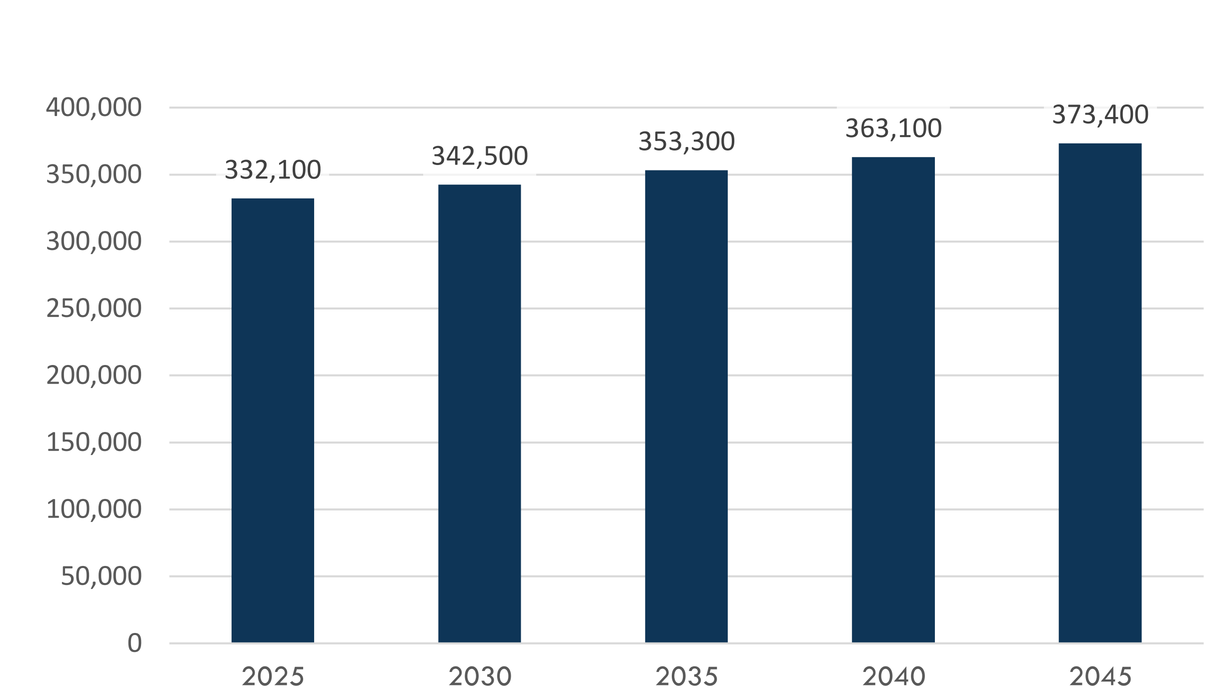
The projected water demands for an average year from 2025 to 2045 are summarized in **Table 4-1** and shown graphically in **Figure 4-2**. The total projected water demands in the Region are expected to increase by approximately 41,000 AFY between 2025 and 2045.

Table 4-1. Projected Average Year Regional Water Demand by Agency 2025 to 2045, AFY

WATER AGENCY	2025	2030	2035	2040	2045
SB COUNTY AGENCIES IN THE WESTERN JUDGEMENT (NON-PLAINTIFFS)					
Colton[1]	9,759	10,283	10,806	11,097	11,388
EVWD[1]	19,702	20,371	21,040	21,661	22,283
Fontana WC[2]	45,161	46,962	48,664	50,320	52,268
Loma Linda[1]	5,628	5,798	5,968	6,130	6,292
Marygold[3]	1,500	1,500	1,500	1,500	1,500
Muscoy[3]	1,600	1,600	1,600	1,600	1,600
Redlands[1]	26,991	28,033	29,075	29,991	30,908
Rialto[1]	9,603	10,215	10,827	11,220	11,613
SBMWD[1]	42,248	43,458	44,667	45,639	46,611
Terrace WC[3]	363	363	363	363	363
WVWD[1]	23,459	25,035	26,611	28,188	29,764
Western Heights WC[4]	2,278	2,629	3,122	3,708	4,404
Yucaipa Valley Water District[1]	12,263	11,886	11,795	11,542	11,321
Bear Valley Mutual Water Company[3]	1,557	1,557	1,557	1,557	1,557
Other/Private[3]	22,276	22,276	22,276	22,276	22,276
SUBTOTAL	**224,386**	**231,964**	**239,871**	**246,791**	**254,146**
RIVERSIDE COUNTY AGENCIES IN THE WESTERN JUDGEMENT (PLAINTIFFS)					
Meeks and Daley WC[5]	5,083	5,083	5,083	5,083	5,083
RHWC[1]	4,545	4,738	4,932	5,031	5,131
RPU [2]	85,012	87,383	89,839	92,387	95,028
Regents of California[5]	554	554	554	554	554
SUBTOTAL	**95,194**	**97,758**	**100,408**	**103,055**	**105,796**
PARTICIPATING WATER AGENCIES OUTSIDE THE WESTERN JUDGEMENT					
SMWC[1]	2,380	2,499	2,624	2,755	2,893
BBCCSD[2]	1,185	1,206	1,227	1,249	1,271
BBLDWP[2]	2,408	2,493	2,582	2,673	2,768
Bear Valley Mutual Water Company (in lieu of Big Bear Lake releases)	6,500	6,500	6,500	6,500	6,500
SUBTOTAL	**12,473**	**12,698**	**12,933**	**13,177**	**13,432**
TOTAL	**332,053**	**342,420**	**353,212**	**363,023**	**373,374**

1. Demand projections prepared as part of this Plan; see the respective agency UWMP chapters in Part 2 of this Plan.
2. Draft 2020 UWMP demands provided by the participating agency
3. Based on the average demands from 2015-2019 as presented in the 2020 Western-San Bernardino Watermaster Annual Report
4. Prepared by Western Heights Water Company as part of the Yucaipa SGMA analysis
5. Demands are assumed to be the party's adjusted rights in the SBBA, except that the RPU rights of 3,008 AFY are deducted from Meeks and Daley because they are included in the RPU total demand.

Figure 4-2. Total Projected Average Year Demand for the Region, AFY



In addition to population and employment, two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The increases vary according to the number of consecutive years of hot, dry weather and the conservation activities imposed.

> For this analysis it is estimated that total regional demands will increase 10 percent during dry periods, including single dry years and a 5-year drought. Although conservation efforts may be effective in reducing demands during the later years of a 5-year drought, a 10% increase is assumed to be constant through the 5-year drought to be conservative.

4.2 Demands for Local Groundwater and Surface Water Supplies

This section summarizes the anticipated demand for each water source based on the planned use by each agency in the Region. For basins subject to the Western Judgement, demands are subtotaled by SB County Agencies and Riverside County Agencies and compared to the respective supplies for each in accordance with the Western Judgement.

As detailed in **Part 1 Chapter 3**, local groundwater sustainability is generally maintained by providing supplemental recharge whenever cumulative extractions exceed cumulative safe yield or when groundwater levels are lower than certain specific water level elevations in specified wells. In the SBB, the amount of supplemental recharge needed is offset by planned recycled water recharge and stormwater recharge as well as any “return flow” from sources outside of the safe yield calculation.

For the SBB, the Western Watermaster assumes a 36% return flow for extractions above safe yield and imported water. To simplify the analysis in this Plan, it will not account for cumulative extractions, credits or groundwater levels. Instead, to estimate the demand for imported water for recharge, whenever the total planned extractions for a given year exceed the estimated safe yield for a basin plus return flow and other sources of recharge for that year, supplemental recharge with imported water will be assumed. The estimated return flow used in the SBB will also be used for the other basins, as shown in the following tables.

Recharge in the Santa Ana River
Photo Credit: San Bernardino Valley Water Conservation District

Table 4-2. Projected Normal Year SBB Groundwater Pumping and Surface Water Diversions (AFY)

AGENCY		2025	2030	2035	2040	2045
SANTA BERNARDINO COUNTY AGENCIES (NON-PLAINTIFFS)						
PLANNED PUMPING AND DIVERSIONS						
Colton[1]	Groundwater	2,962	3,426	3,889	4,119	4,350
EVWD[1]	Groundwater	15,202	15,871	16,540	17,161	17,783
EVWD[1]	Surface Water	2,000	2,000	2,000	2,000	2,000
Loma Linda[1]	Groundwater	5,628	5,798	5,968	6,130	6,292
Redlands[1]	Groundwater	12,911	13,822	14,775	15,691	16,608
Redlands[1]	Surface Water	10,500	10,500	10,500	10,500	10,500
Rialto[1]	Groundwater	5,240	5,795	6,351	6,687	7,023
Rialto[1]	Surface Water	1,241	1,241	1,241	1,241	1,241
SBMWD[1]	Groundwater	41,115	42,325	43,534	44,506	45,478
WVWD[1]	Groundwater	6,433	6,498	7,462	8,426	9,890
WVWD[1]	Surface Water	3,100	3,100	3,100	3,100	3,100
YVWD[1]	Groundwater	750	750	750	750	750
Fontana WC[2]	Groundwater	6,390	6,390	6,390	6,390	6,390
Fontana WC[2]	Surface Water	4,860	4,860	4,860	4,860	4,860
Muscoy MWC[3]	Groundwater	1,600	1,600	1,600	1,600	1,600
Terrace WC[3]	Groundwater	363	363	363	363	363
Bear Valley Mutual Water Company[3]	Surface Water	1,557	1,557	1,557	1,557	1,557
Other/Private[3]	Groundwater	10,878	10,878	10,878	10,878	10,878
SUBTOTAL DEMAND		**132,729**	**136,772**	**141,757**	**145,959**	**150,662**
SUPPLY						
Adjusted Safe Yield with New Conservation		172,745	172,745	172,745	172,745	172,745
Direct Deliveries of SWP Water within SBB[5]		6,700	6,700	6,700	6,700	6,700
Return Flow from Direct Deliveries of SWP Water within SBB[6]		2,412	2,412	2,412	2,412	2,412
Recycled Water Recharge[7]		16,430	16,968	19,770	22,549	23,096
Stormwater Capture (Active Recharge Projects)[8]		12,530	13,209	18,264	25,083	25,083
SUBTOTAL SUPPLY		**204,117**	**205,335**	**213,191**	**222,789**	**223,336**
IMPORTED WATER RECHARGE NEED		**0**	**0**	**0**	**0**	**0**
UNUSED SUPPLY RETAINED IN STORAGE		**71,388**	**68,563**	**71,434**	**76,831**	**72,674**

*Table continues on the next page.

AGENCY		2025	2030	2035	2040	2045
RIVERSIDE COUNTY AGENCIES (PLAINTIFFS)						
PLANNED PUMPING AND DIVERSIONS						
RHWC[1]	Groundwater	1,800	1,800	1,800	1,800	1,800
RPU[2]	Groundwater	57,013	57,013	57,013	57,013	57,013
Meeks and Daley WC[4]	Groundwater	5,083	5,083	5,083	5,083	5,083
Regents of UC[4]	Groundwater	554	554	554	554	554
SUBTOTAL DEMANDS		**64,450**	**64,450**	**64,450**	**64,450**	**64,450**
SUPPLY						
Adjusted Safe Yield with New Conservation		66,998	66,998	66,998	66,998	66,998
Stormwater Capture (Active Recharge Projects)[8]		4,860	5,123	7,084	9,728	9,728
SUBTOTAL SUPPLY		**71,858**	**72,121**	**74,082**	**76,726**	**76,726**
IMPORTED WATER RECHARGE NEED		**0**	**0**	**0**	**0**	**0**
UNUSED SUPPLY RETAINED IN STORAGE		**7,408**	**7,671**	**9,632**	**12,276**	**12,276**

AGENCY	2025	2030	2035	2040	2045
OVERALL SBB SUMMARY					
TOTAL DEMANDS	**197,179**	**201,222**	**206,207**	**210,409**	**215,112**
TOTAL SUPPLY	**275,974**	**277,456**	**287,272**	**299,516**	**300,062**
TOTAL IMPORTED WATER RECHARGE NEED	**0**	**0**	**0**	**0**	**0**
TOTAL UNUSED SUPPLY RETAINED IN STORAGE	**78,796**	**76,234**	**81,066**	**89,107**	**84,950**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided by agency from Draft 2020 UWMP not part of this Plan
3. Estimated based on 2015-2019 average pumping as reported in the 2020 Western San Bernardino Watermaster Annual Report
4. Total adjusted pumping right in the SBB, except Meeks and Daley WC excluded 3,008 AFY for RPU which is included in RPU planned pumping value
5. SWP direct deliveries to EVWD, Redlands and WVWD
6. Western Watermaster estimates return flow to be 36% of direct deliveries of SWP water
7. Existing and planned RW recharge by Redlands, EVWD and SBMWD into SBB
8. The Active Recharge Project is a joint project between Valley District, SBVWCD, Western, SBMWD and RPU. A portion of the yield will be allocated to Riverside County agencies (Plaintiffs), but the amount has not been determined as of the writing of this Plan. All yield from the Active Recharge Project is shown under San Bernardino County Agencies supply in this table. Average yield from River HCP modeling, see Section 5.2.2 for more information.

Table 4-3. Projected Normal Year Rialto-Colton Basin Pumping (AFY)

AGENCY	2025	2030	2035	2040	2045
SB COUNTY AGENCIES (NON-PLAINTIFFS)					
PLANNED PUMPING AND DIVERSIONS					
Colton[1]	2,997	3,057	3,117	3,178	3,238
Rialto[1]	1,912	1,969	2,026	2,083	2,140
WVWD[1]	4,426	4,538	4,650	4,761	4,873
Fontana WC[2]	5,865	5,976	6,087	6,199	6,310
Other/Private[3]	70	70	70	70	70
SUBTOTAL DEMAND	**15,270**	**15,610**	**15,950**	**16,291**	**16,631**
SUPPLY					
Estimated Safe Yield for SB County Agencies[8]	12,186	12,186	12,186	12,186	12,186
Extractions Above Safe Yield	3,396	3,736	4,076	4,417	4,757
Direct Deliveries of SWP Water[5]	3,500	3,500	3,500	3,500	3,500
Return Flow from Extractions above Safe Yield and Direct Deliveries of SWP Water[6]	2,483	2,605	2,727	2,850	2,973
SUBTOTAL SUPPLY	**14,556**	**14,679**	**14,801**	**14,924**	**15,046**
IMPORTED WATER RECHARGE NEED	**714**	**931**	**1,149**	**1,367**	**1,585**
UNUSED SUPPLY RETAINED IN STORAGE	**0**	**0**	**0**	**0**	**0**

AGENCY	2025	2030	2035	2040	2045
RIVERSIDE COUNTY AGENCIES (PLAINTIFFS)					
PLANNED PUMPING AND DIVERSIONS					
RHWC[1]	0	0	0	0	0
RPU[2]	2,728	2,728	2,728	2,728	2,728
Meeks and Daley WC[4]	0	0	0	0	0
SUBTOTAL DEMANDS	**2,728**	**2,728**	**2,728**	**2,728**	**2,728**
SUPPLY					
Pumping Limit[7]	3,381	3,381	3,381	3,381	3,381
SUBTOTAL SUPPLY					
IMPORTED WATER RECHARGE NEED	**0**	**0**	**0**	**0**	**0**
UNUSED SUPPLY RETAINED IN STORAGE	**653**	**653**	**653**	**653**	**653**

*Table continues on the next page.

AGENCY	2025	2030	2035	2040	2045
OVERALL RIALTO-COLTON BASIN SUMMARY					
TOTAL DEMANDS	**17,998**	**18,338**	**18,678**	**19,019**	**19,359**
TOTAL SUPPLY	**17,937**	**18,060**	**18,182**	**18,305**	**18,427**
TOTAL IMPORTED WATER RECHARGE NEED	**714**	**931**	**1,149**	**1,367**	**1,585**
TOTAL UNUSED SUPPLY RETAINED IN STORAGE	**653**	**653**	**653**	**653**	**653**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided by agency from Draft 2020 UWMP not part of this Plan
3. Estimated based on 2015-2019 average pumping as reported in the 2020 Western San Bernardino Watermaster Annual Report
4. Total adjusted pumping right in the SBB, except Meeks and Daley WC excluded 3,008 AFY for RPU which is included in RPU planned pumping value
5. SWP direct deliveries to WVWD as shown in WVWD 2020 UWMP Chapter
6. Assumed return flow to be 36% of direct deliveries of SWP water and extractions over safe yield, same value used by Western Watermaster for SBB
7. Pumping limit for Riverside County agencies, Western Judgement
8. Total Estimated safe yield for SB County agencies (See Table 3-10)

Table 4-4. Projected Normal Year Riverside North Basin Pumping (AFY)

AGENCY	2025	2030	2035	2040	2045
SB COUNTY AGENCIES (NON-PLAINTIFFS)					
PLANNED PUMPING AND DIVERSIONS					
Colton[1]	3,800	3,800	3,800	3,800	3,800
Rialto[1]	1,200	1,200	1,200	1,200	1,200
WVWD[1]	2,500	3,000	3,500	4,000	4,000
RIX Overextraction[4]	2,400	2,500	2,600	2,700	2,700
Other/Private[3]	1,520	1,520	1,520	1,520	1,520
SUBTOTAL DEMAND	**11,420**	**12,020**	**12,620**	**13,220**	**13,220**
SUPPLY					
Estimated Safe Yield for SB County Agencies[7]	9,015	9,015	9,015	9,015	9,015
Extractions Above Safe Yield	2,405	3,005	3,605	4,205	4,205
Return Flow from Extractions above Safe Yield[5]	866	1,082	1,298	1,514	1,514
Stormwater Capture (Riverside North ASR)[8]	2,000	2,000	2,000	2,000	2,000
SUBTOTAL SB COUNTY AGENCY SUPPLY	**11881**	**12097**	**12313**	**12529**	**12529**
IMPORTED WATER RECHARGE NEED	**0**	**0**	**307**	**691**	**691**
UNUSED SUPPLY RETAINED IN STORAGE	**461**	**77**	**0**	**0**	**0**

*Table continues on the next page.

AGENCY	2025	2030	2035	2040	2045
RIVERSIDE COUNTY AGENCIES (PLAINTIFFS)					
PLANNED PUMPING AND DIVERSIONS					
RHWC[1]	2,495	2,688	2,882	2,981	3,081
RPU[2]	10,902	10,902	10,902	10,902	10,902
Other/Private[3]	8,450	8,450	8,450	8,450	8,450
SUBTOTAL DEMANDS	**21,847**	**22,040**	**22,234**	**22,333**	**22,433**
SUPPLY					
Pumping Limit[6]	21,085	21,085	21,085	21,085	21,085
Stormwater Capture (Riverside North ASR)[8]	4,000	4,000	4,000	4,000	4,000
SUBTOTAL RIVERSIDE COUNTY AGENCY SUPPLY	**25,085**	**25,085**	**25,085**	**25,085**	**25,085**
IMPORTED WATER RECHARGE NEED	**0**	**0**	**0**	**0**	**0**
UNUSED SUPPLY RETAINED IN STORAGE	**3,238**	**3,045**	**2,851**	**2,752**	**2,652**

AGENCY	2025	2030	2035	2040	2045
OVERALL RIVERSIDE NORTH BASIN SUMMARY					
TOTAL DEMANDS	**33,267**	**34,060**	**34,854**	**35,553**	**35,653**
TOTAL SUPPLY	**36,966**	**37,182**	**37,398**	**37,614**	**37,614**
TOTAL IMPORTED WATER RECHARGE NEED	**0**	**0**	**307**	**691**	**691**
TOTAL UNUSED SUPPLY RETAINED IN STORAGE	**3,699**	**3,122**	**2,851**	**2,752**	**2,652**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided by agency from Draft 2020 UWMP not part of this Plan
3. Estimated based on 2015-2019 average pumping as reported in the 2020 Western San Bernardino Watermaster Annual Report
4. Groundwater extracted by RIX and discharged to the Santa Ana River, estimates from SBMWD SBWRP 2020 Facilities Master Plan
5. Assumed return flow to be 36% of extractions over safe yield, same value used by Western Watermaster for SBB
6. Pumping limit for Riverside County agencies, Western Judgement
7. Total Estimated safe yield for SB County agencies (See Section 3.3.3)
8. Estimated yield of the Riverside north ASR project is 6,000 AFY. The project is being developed jointly by Valley District, Western and RPU and each are allocated a one-third share of the total yield.

Table 4-5. Projected Yucaipa Basin Pumping (AFY)

AGENCY	2025	2030	2035	2040	2045
PLANNED PUMPING AND DIVERSIONS					
Redlands[1]	1,000	1,000	1,000	1,000	1,000
YVWD[1]	6,000	6,000	6,000	6,000	6,000
South Mesa WC[1]	2,409	2,528	2,656	2,788	2,928
Western Heights WC[2]	2,200	2,200	2,200	2,200	2,200
TOTAL DEMAND	**11,609**	**11,728**	**11,856**	**11,988**	**12,128**
SUPPLY					
Estimated Safe Yield	9,600	9,600	9,600	9,600	9,600
Extractions Above Safe Yield	2,009	2,128	2,256	2,388	2,528
Direct Deliveries of SWP Water[3]	6,828	7,929	8,422	9,008	9,704
Return Flow from Extractions above Safe Yield and Direct Deliveries of SWP Water[4]	2,772	3,145	3,339	3,562	3,821
SWP Recharge[1,5]	2,250	2,500	3,000	3,250	3,500
TOTAL SUPPLY	**14622**	**15245**	**15939**	**16412**	**16921**
TOTAL IMPORTED WATER RECHARGE NEED	**0**	**0**	**0**	**0**	**0**
TOTAL UNUSED SUPPLY RETAINED IN STORAGE	**3,013**	**3,517**	**4,083**	**4,424**	**4,793**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided for the Yucaipa SGMA analysis
3. SWP direct deliveries to YVWD, including water provided to Western Heights Water Company
4. Assumed return flow to be 30% of direct deliveries of SWP water and extractions over safe yield based on preliminary results from Yucaipa-SGMA analysis
5. Planned SWP recharge by YVWD

Table 4-6. Projected Normal Year Use of Other Groundwater and Surface Water Supplies (AFY)

AGENCY	SOURCE	2025	2030	2035	2040	2045
South Mesa WC[1]	San Timoteo Groundwater	328	345	362	380	399
YVWD[1]	San Timoteo Groundwater	1,750	1,750	1,750	1,750	1,750
YVWD[1]	Oak Creek Surface Water	250	250	250	250	250
YVWD[1]	SGPWA Supplies	450	450	500	500	600
BBCCSD[2]	Bear Valley Groundwater	1,185	1,206	1,227	1,249	1,271
BBLDWP[2]	Bear Valley Groundwater	2,408	2,493	2,582	2,673	2,768
WVWD[1]	Chino Groundwater	0	900	900	900	900
Fontana WC[2]	Chino Groundwater	8,846	10,196	11,447	12,651	14,148
RPU[2]	Riverside South Groundwater	16,880	16,880	16,880	16,880	16,880
TOTAL PROJECTED USE OF OTHER SUPPLIES		**32,097**	**34,470**	**35,898**	**37,233**	**38,966**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan.
2. Data provided by agency from Draft 2020 UWMP not part of this Plan

4.3 Demands for Imported Water

In the Region, imported water is used for direct deliveries to several retail water producers, direct delivery to Bear Valley Mutual Water Company in-lieu of releases from Big Bear Lake and groundwater recharge.

4.3.1 Direct Deliveries

Several retail water producers have water treatment plants to treat imported water. The following agencies are planning to continue taking direct delivery of imported water in the future: EVWD, Redlands, WVWD, YVWD, FWC and CLAWA.

4.3.2 In-Lieu Deliveries

In accordance with the 1996 Agreement with BBMWD described in Section 3.9.10, Valley District provides SWP water for the Bear Valley Mutual needs that would have historically been met by lake releases whenever the Lake is at specified levels. Under the terms of the Agreement, Bear Valley Mutual may request any amount of delivery for a given year, provided that the total of all their requested deliveries do not exceed 65,000 AF in any ten-year period. Bear Valley Mutual typically limits its request to no more than the ten-year average, or 6,500 AFY. Valley District may also provide water from other sources, such as groundwater in storage, when the SWP supply is limited.

4.3.3 Storage

One of the primary water management strategies in the Region is to store imported water when it is available so that it can be used during drought periods. Any unused Valley District SWP water is available to be stored in the regional groundwater basins for later pumping.

4.3.4 Total Imported Water Demands

Requests for delivery of supplemental imported water in the Valley District service area are subject to approval as set forth in Resolution 888. **Table 4-7** summarizes potential total demands for imported water during the period of this Plan. In addition, to imported water provided by Valley District, FWC can also receive imported water from IEUA and RPU can receive imported water from Western.

Table 4-7. Estimated Normal Year Demands for Imported Water (AFY)

AGENCY	2025	2030	2035	2040	2045
VALLEY DISTRICT SWP SUPPLIES					
DEMANDS - DIRECT DELIVERY					
EVWD[1]	2,500	2,500	2,500	2,500	2,500
Redlands[1]	700	700	700	700	700
WVWD[1]	7,000	7,000	7,000	7,000	7,000
YVWD[1]	6,828	7,929	8,422	9,008	9,704
CLAWA[3]	60	60	60	60	60
Marygold MWC[3]	320	320	320	320	320
Fontana WC[2]	3,200[5]	3,200[5]	3,200[5]	3,200[5]	3,200[5]
SUBTOTAL DIRECT DELIVERIES DEMAND	**20,608**	**21,709**	**22,202**	**22,788**	**23,484**
Bear Valley Mutual Water Company In-Lieu[3]	6,500	6,500	6,500	6,500	6,500
SUBTOTAL DIRECT DELIVERIES DEMAND + IN-LIEU	**27,108**	**28,209**	**28,702**	**29,288**	**29,984**
DEMANDS - GROUNDWATER RECHARGE[6]					
SBB Replenishment	0	0	0	0	0
Rialto-Colton Replenishment	714	931	1,149	1,367	1,585
Riverside North Replenishment	0	0	307	691	691
Yucaipa Replenishment	2,250	2,500	3,000	3,250	3,500
SUBTOTAL REPLENISHMENT DEMAND	**2,964**	**3,431**	**4,456**	**5,309**	**5,776**
TOTAL DEMAND	**30,072**	**31,641**	**33,158**	**34,597**	**35,760**
SUPPLY – TABLE A NORMAL YEAR					
Valley District SWP Table A Amount	102,600	102,600	102,600	102,600	102,600
EXPECTED ALLOCATION[4]	**59,934**	**59,934**	**59,934**	**53,740**	**53,740**
UNUSED ALLOCATION AVAILABLE FOR STORAGE	**29,862**	**28,294**	**26,776**	**19,143**	**17,980**
DEMANDS - OTHER SWP					
Fontana WC (From IEUA)[2]	15,000	15,000	15,000	15,000	15,000
RPU (From Western) [2]	2,000	3,000	3,000	3,000	3,000
SUBTOTAL OTHER SWMP DEMAND	**17,000**	**18,000**	**18,000**	**18,000**	**18,000**
TOTAL DEMAND	**47,072**	**49,641**	**51,158**	**52,597**	**53,760**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided by agency from Draft 2020 UWMP not part of this Plan
3. Estimated based on previous SWP orders from Valley District
4. Based on DWR estimates, see Table 3-4
5. Requested pursuant to Resolution 888 and Subject to the 2019 Settlement Agreement between San Bernardino Valley Municipal Water District et al. and San Gabriel Valley Water Company et al.
6. Amounts from Table 4-2, Table 4-3, Table 4-4, Table 4-5. Agencies may elect to recharge additional water in these basins.

4.4 Demands for Recycled Water

Some water agencies in the Region are currently using recycled water to meet non-potable demands and for groundwater recharge. Additional recycled water production and use is planned in the future. **Table 4-8** summarizes the anticipated future uses of recycled water.

Table 4-8. Projected Uses of Recycled Water (AFY)

AGENCY	2025	2030	2035	2040	2045
DIRECT USE (NON-POTABLE USE)					
Redlands[1]	2,100	2,100	2,100	2,100	2,100
Rialto[1]	10	10	10	10	10
Fontana WC[2]	1,000	1,340	1,680	2,020	2,360
YVWD[1]	1,605	1,860	2,365	2,670	2,975
SBMWD[1]	1,133	1,133	1,133	1,133	1,133
RPU[2]	5,700	13,420	13,420	13,420	13,420
SUBTOTAL DIRECT USE OF RECYCLED WATER	**11,548**	**19,863**	**20,708**	**21,353**	**21,998**
GROUNDWATER RECHARGE (ALL IN SBB)					
Redlands[1]	3,766	4,015	4,275	4,513	4,760
SBMWD[1]	4,472	4,472	6,714	8,956	8,956
EVWD[1]	8,200	8,490	8,790	9,090	9,390
SUBTOTAL RECHARGE OF RECYCLED WATER	**16,438**	**16,977**	**19,779**	**22,559**	**23,106**
TOTAL PROJECTED RECYCLED WATER USE	**27,986**	**36,840**	**40,487**	**43,912**	**45,104**

1. Data from agency 2020 UWMP chapter in Part 2 of this Plan
2. Data provided by agency from Draft 2020 UWMP not part of this Plan

4.5 Water Losses

Distribution system water losses are the physical potable water losses from the water system, calculated as the difference between water produced and the amount of water billed to customers plus other authorized uses of water.

Sources of water loss include:

- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however, these small leaks contribute to the overall water loss. Aging pipes typically have more leaks.
- Water used for flushing and fire hydrant operations
- Unauthorized uses or theft of water
- Customer Meter Inaccuracies - Customer meters can under-represent actual consumption in the water system

In accordance with DWR requirements, the individual retail agencies have quantified their water losses, using the American Water Works Association (AWWA) Water Audit process, in their respective UWMPs. Water lost through leaks represents a loss of revenue for the retail agencies and increases the amount of groundwater or surface water that must be produced. Because the region relies so heavily on groundwater, this water is not permanently lost; it eventually contributes to recharge of the local groundwater basin.

The State Water Board is in the process of developing a water loss performance standard for each urban water supplier. These future standards are still being reviewed and finalized with stakeholder input and will be incorporated into the total water use projections in 2025 planning cycle. Suppliers will be required to demonstrate compliance with their supplier-specific water loss standards in 2028 and every 3 years thereafter.

Each supplier's 2020 UWMP includes a discussion of actions that are being taken to reduce water loss.

4.6 Water Use Efficiency

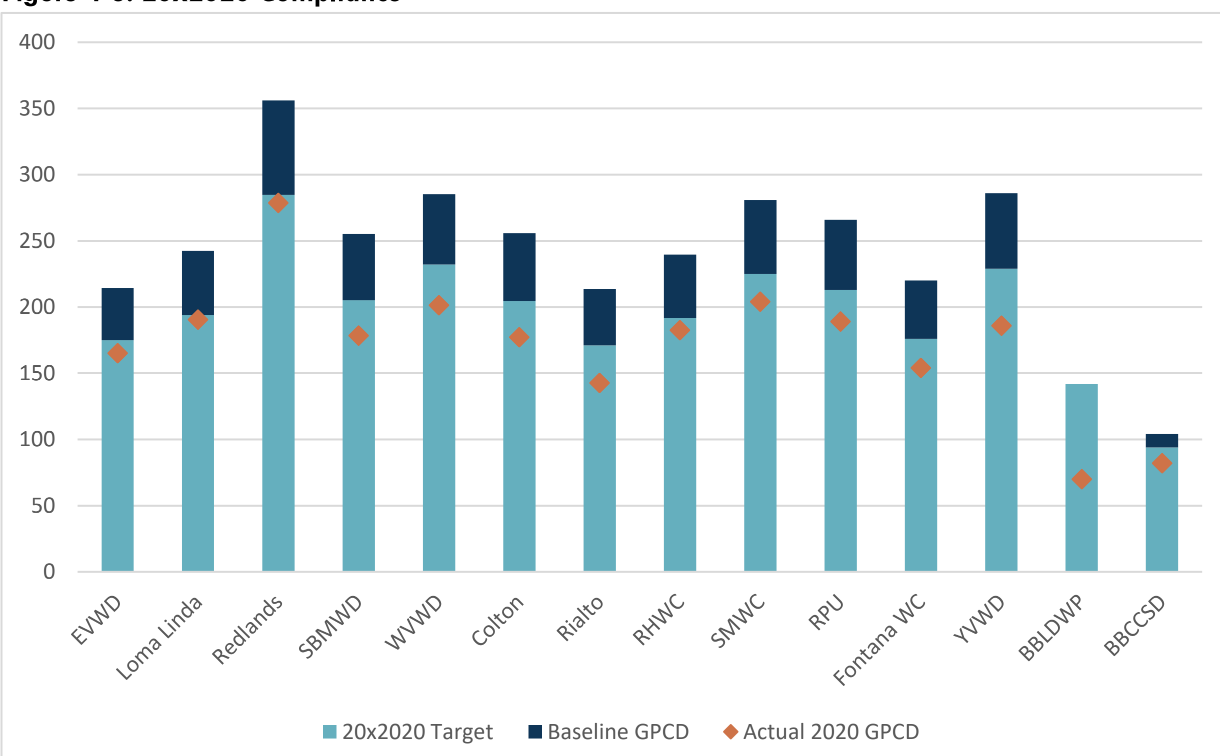
In recent years, water conservation has become an increasingly important factor in water supply planning in California. Since 2005, there have been several regulatory changes related to conservation including new standards for plumbing fixtures, a new landscape ordinance, a state universal retrofit ordinance, metering and billing requirements, new Green Building standards, demand reduction goals and more.

4.6.1 Reducing Per Capita Water Use (SB X7-7)

The Water Conservation Act of 2009 (SB X7-7) requires a 20-percent reduction in urban per capita water use in California by December 31, 2020 (20 by 2020). The bill requires each urban retail water supplier to determine their baseline per capita water use (gallons per capita per day or gpcd), develop an urban water use target for year 2020 and set a 2015 interim urban water use target. Each of the agencies participating in this Plan have met their 2020 targets, as shown in **Figure 4-3**.

These significant reductions in per capita water use have essentially created a new supply for the Region by reducing use of local groundwater supplies.

Figure 4-3. 20x2020 Compliance



4.6.2 New Water Conservation Legislation

In 2018, new water conservation legislation was signed into law. Together, AB 1668 and SB 606, lay out a new long-term water conservation framework for California.

To implement the new framework, DWR and the State Water Board are developing new standards for:

- Indoor residential water use
- Outdoor residential water use
- Commercial, industrial, and institutional (CII) irrigation of landscape areas with dedicated meters
- Performance measures for CII water use
- Variances for unique uses that have a significant effect
- Water losses

These standards, variances, and methodologies will become effective after June 2022, following the Water Board's adoption of the recommendations through a public rulemaking process. These future regulations and potential variances are still being reviewed and finalized with stakeholder input.

Beginning in 2023, each year urban retail water suppliers will have to calculate their 'urban water use objective' and assess whether they met their objective. This objective is based on an aggregate estimate of efficient water use for the previous year (calendar or fiscal) based on the adopted water use efficiency standards and local service area characteristics for that year.

The standards will be in effect prior to the 2025 update of this Plan and will be incorporated into future demand projections.

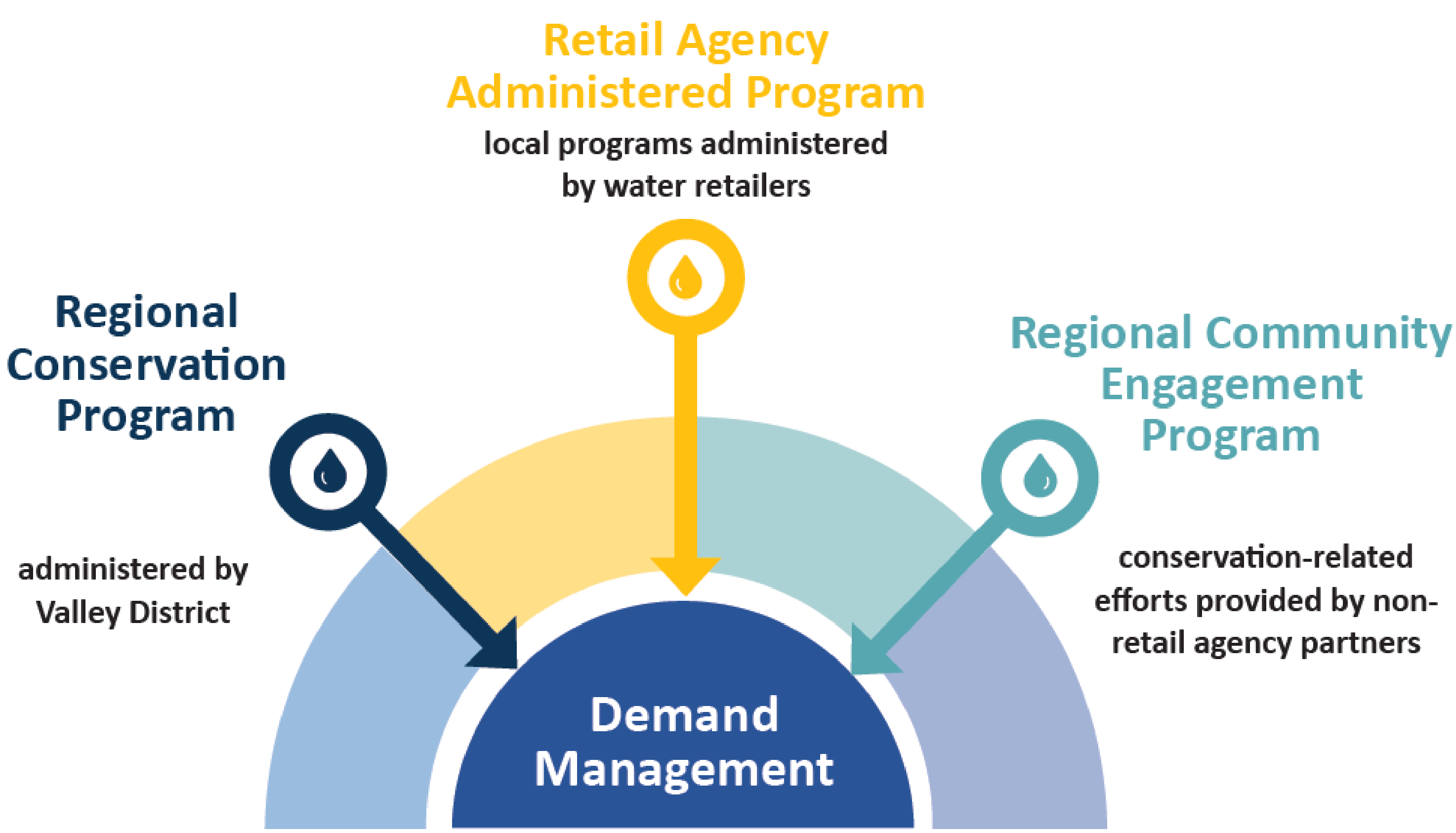
4.6.3 Regional Demand Management Program

Valley District has consistently invested in water conservation efforts since its Water Conservation Master Plan was first adopted in 2007. The demand reduction measures in the Master Plan were incorporated into the 2010 RUWMP and the 2015 RUWMP update and are making a measurable impact on demand reduction.

In 2021, Valley District developed a proposed Demand Management Program that will use demand management measures (DMMs) as the basis for funding and assessing the performance of water conservation measures, programs, and incentives within the Region. This data-oriented and performance-based approach will allow Valley District to fund a wide range of water conservation measures, programs and incentives proposed by retail suppliers that will have a greater impact on reducing the total amount of water use. It will also fund complementary efforts by cities, utilities, resource management entities, and community organizations.

The overarching goal is consistent demand management into the future. The proposed program will include both demand-side and supply-side conservation and will be cost effective through economies of scale and leveraging grant funding for the service area. The program will focus on enhancing the technical, managerial, and financial capacity of retail agencies to deliver on urban water conservation and utilize broad-based partnerships and public engagement to help the retail agencies meet their upcoming water use objectives. While each agency's conservation objectives will not be developed until 2023, the retail water agency's first reports will require the specific DMMs they will implement to meet their objectives. As such, the Valley District Demand Management Program should support the retail agencies and help them achieve their goals.

Demand Management Measures being implemented by individual retail agencies are described in their respective UWMPs.



5 PART 1: REGIONAL CONTEXT

Comparison of Regional Supplies and Demands

This chapter compares the total supplies and demands in the Region under various hydrologic scenarios, including an average (or "normal") year, single dry year, 5-year drought and 30-year drought. The analysis concludes that the Region has sufficient supplies to meet demands through 2045 and beyond, including a 15% Reliability Factor that accounts for uncertainties in the projections.

The UWMP Act requires urban water suppliers to assess water supply reliability by comparing total projected water use with the projected water supply over the next twenty years or beyond in 5-year increments. The UWMP Act also requires an assessment for a single-dry year and 5-year drought. In addition, the Plan participants have elected to assess a wet year scenario and a 30-year drought scenario to help support the goal of maximizing the use and storage of wet year supplies for later use during dry periods, even a 30-year drought.

IN THIS SECTION

- Reliability Factor
- Water Supply Reliability
- Summary of Regional Supplies and Demands

Chapter 3 provided information about regional water supplies during a normal year, while **Chapter 4** provided information on total demands. This section compares the total supplies and demands in the Region under the different hydrologic conditions listed above. A discussion of the supplies and demands for each participating retail agency are described in their respective chapters in **Part 2** or in their own separated 2020 UWMPs, if not included in this Plan.

5.1 Reliability Factor

The 2015 RUWMP accounted for uncertainty in supply and demand projections by planning for at least a 10% redundancy in supplies. This 10% redundancy is referred to as the “Reliability Factor”.

In February 2019, Valley District hired the RAND Corporation (RAND) to perform an independent analysis of the uncertainty related to water supplies and demands in the 2015 RUWMP.

> An initial RAND Study evaluated the demands in the RUWMP by subjecting them to plausible variations in (1) future population growth, (2) water conservation and (3) temperature and generally concluded that the entire 10% Reliability Factor would be consumed by their list of plausible uncertainties. RAND then performed an evaluation of the water supplies in the RUWMP by subjecting them to plausible variations in (1) change in precipitation, (2) variability in precipitation, (3) change in temperature, (4) State Water Project (SWP) infrastructure configurations, (5) SWP environmental regulations and (6) local surface water availability. The results of the combined study suggest that the Reliability Factor be increased to **15%** to account for the combined, plausible uncertainties in both demand and supply. A **15% Reliability Factor** is applied in this analysis.

The RAND study is currently being finalized and is expected to be published in a peer reviewed journal in Summer 2021.

5.2 Water Supply Reliability

5.2.1 Imported Water Supply

Imported water supply reliability is discussed in detail in **Section 3.2**. According to the DWR 2019 Delivery Capability Report, Valley District expects their SWP Table A allocation to vary depending on the type of year, as shown in **Table 5-1**. For single dry years, Valley District anticipates taking delivery of 10,000 AF of carryover water stored from previous years to supplement Table A deliveries. Valley District prioritizes direct deliveries to surface water treatment plants when supplies are limited and coordinates with the requesting agencies to allocate available supplies if full delivery requests cannot be met. As described in **Section 3.2**, Valley District has invested in the Sites Reservoir, which is anticipated to be complete by 2040 and will provide additional imported water supplies during single and multiple dry years.

Table 5-1. Valley District Anticipated SWP Supplies

STATE WATER PROJECT SUPPLIES	2025	2030	2035	2040	2045
NORMAL YEAR (1922-2003)					
% of Table A Amount Available	58%	58%	58%	52%	52%
Anticipated Table A Deliveries (AFY)	59,508	59,508	59,508	53,352	53,352
Storage from Sites Reservoir	-	-	-	12,100	12,100
Total Normal Year SWP Supply	59,508	59,508	59,508	65,452	65,452
SINGLE DRY YEAR (2014 AND 2021)					
% of Table A Amount Available	5%	5%	5%	5%	5%
Anticipated Table A Deliveries (AFY)	5,130	5,130	5,130	5,130	5,130
Anticipated Carryover Water	10,000	10,000	10,000	10,000	10,000
Storage from Sites Reservoir	-	-	-	30,400	30,400
Total Single Dry Year SWP Supply	15,130	15,130	15,130	45,530	45,530
MULTIPLE DRY YEAR (1987-1992)					
% of Table A Amount Available	26%	26%	26%	22%	22%
Anticipated Table A Deliveries (AFY)	26,676	26,676	26,676	22,572	22,572
Storage from Sites Reservoir	-	-	-	30,400	30,400
Total Multiple Dry Year Supply	26,676	26,676	26,676	52,972	52,972
30-YEAR DROUGHT (1922-1951)					
% of Table A Amount Available	53%	53%	53%	48%	48%
Anticipated Table A Deliveries (AFY)	54,378	54,378	54,378	49,248	49,248
Storage from Sites Reservoir	-	-	-	12,100	12,100
Total 30-Year Drought Supply	54,378	54,378	54,378	61,348	61,348
WET YEAR (1983)					
% of Table A Amount Available	97%	97%	97%	97%	97%
Anticipated Table A Deliveries (AFY)	99,522	99,522	99,522	96,444	96,444

FWC and RPU can also receive imported water from IEUA and Western, who are both member agencies of Metropolitan. Metropolitan's 2020 UWMP projects that they will be able to meet all member agency demands under all hydrologic conditions due to significant storage. Therefore, this analysis assumes that imported water deliveries to FWC and RPU will remain constants under all scenarios. See the Metropolitan 2020 UWMP for more information. For the purposes of this Plan, supplies provided to YVWD by SGPWA are included under Other Supplies, as some supplies may come from sources other than SWP; see SGPWA 2020 UWMP for more information on supplies.

5.2.2 Local Water Supply

During multi-year and single-year droughts, total SWP supplies, and local surface water supplies are reduced so the Region is more reliant upon groundwater.

Although local and imported surface water supplies are highly dependent on local and statewide hydrology, the Region benefits from more than 12 million acre-feet of available groundwater storage that can be used to store water when supplies are plentiful and then be pumped during extended droughts. By maximizing deliveries of SWP water in wet years when those supplies are available, and supplementing that with other local supplies like stormwater capture and recycled water, the Region can accrue sufficient storage to enable a high level of water supply reliability, even during a 30-year drought.

In May 2020, Geoscience completed a study on behalf of Valley District and Western entitled Usable Groundwater in Storage Estimation for the San Bernardino, Rialto-Colton, Riverside, and Arlington Groundwater Basins – Summary Report. The goal of this study was to determine the usable amount of groundwater storage that is available to get through prolonged drought and identify any impacts associated with declining storage levels, which may include the need to deepen some wells. Figure 5-1, Figure 5-2, and Figure 5-3 depict the usable storage and groundwater in storage as of 2019 in the SBB, Rialto-Colton and Yucaipa Basins.

As shown for the SBB, the total water in storage as of 2020 was over 4,800,000 AF. During the period from 1972-2019, Valley District recharged a total of 789,000 AF of SWP water into the SBB, which has been a significant contribution to maintain storage levels. In the year 2017 alone, Valley District recharged over 78,000 AF of imported water into the SBB.

Annual change in storage evaluations prepared by Valley District and SBVWCD show that the SBB experiences significant increases in storage during wet years such as 2005, 2011 and 2019, as shown in Table 5-2.

Table 5-2. SBB Storage Increases in Wet Years

YEAR	INCREASE IN GROUNDWATER IN STORAGE (AF)
2005	223,178
2011	158,805
2019	160,552

Source: Valley District Change in Storage Analysis

In addition to existing recharge programs, Valley District, SBVWCD, Western, SBMWD and RPU are currently developing the Active Recharge Project, a collection of basins throughout the SBB that will capture and recharge additional stormwater. For the River HCP, Geoscience used the Integrated SAR Model to assess the potential hydrologic response of the Upper Santa Ana River Groundwater Basin to the Covered Activities with hydrologic effects, including streamflow diversions, recharge basins (new basins and modifications), effluent reductions, and new discharge locations to determine the effects on wetland and riparian habitat, groundwater levels, and streamflow. For the Active Recharge Project, Geoscience used the Integrated SAR Model to project annual increases in stormwater capture for each of the individual basins included in the Active Recharge Project over a 25-year simulation period representing 2020 – 2045. The Geoscience model results were evaluated for this Plan to estimate the volume of projected stormwater capture for the Active Recharge Project under the different scenarios evaluated in this Plan. Valley District provided the list of projects and estimated implementation years. Table 5-3 shows the results of the analysis and the year type it was applied to in this Plan.

The % of Average Yield values determined in this analysis, shown in Table 5-3, were applied to the average yield estimates for the Enhanced Recharge and Riverside North Aquifer Storage and Recovery projects to estimate yield for those projects in each year type.

Storing local surface water and imported SWP water in the local groundwater basins in wet years for later use during dry periods will continue to be one of the foundational water management strategies in the Region. As a result of this strategy and the demonstrated success, the available supply from the local groundwater basins in this analysis is not reduced in dry and multiple dry years, or in a 30-year drought.

Table 5-3. Active Recharge Project Projected Yield (AFY)

CONDITION (YEAR TYPE)	PROJECTED YIELD (AFY)					
	2025[1]	2030[2]	2035[3]	2040[4]	2045[5]	% OF AVERAGE YIELD
Average yield over 25-year model period (used for Normal Year scenario)	9,747	10,690	17,705	27,168	27,168	100%
Minimum annual yield over 25-year model period (used for Single Dry Year scenario)	2,644	2,644	4,028	5,010	5,010	21%
Lowest 5 consecutive year yield during model period (Used for 5-Year Drought and 30-Year Drought scenario)	4,992	5,163	8,363	10,779	10,779	43%
Maximum annual yield over 25-year model period (Used for Single Wet Year scenario)	30,380	33,893	56,027	99,872	99,872	346%

1. 2025 includes projected yield from Devil Creek, Waterman Basins, East Twin Creek, Plunge Creek and Oak Creek
2. Projected yield from previous projects plus Mill Creek
3. Projected yield from previous projects plus City Creek
4. Projected yield from previous projects plus Cajon Creek, Lytle Creek, Cajon-Vulcan 1, Vulcan 2 and Lytle-Cajon In Channel

Figure 5-1.San Bernardino Basin Storage as of 2020 (AF)

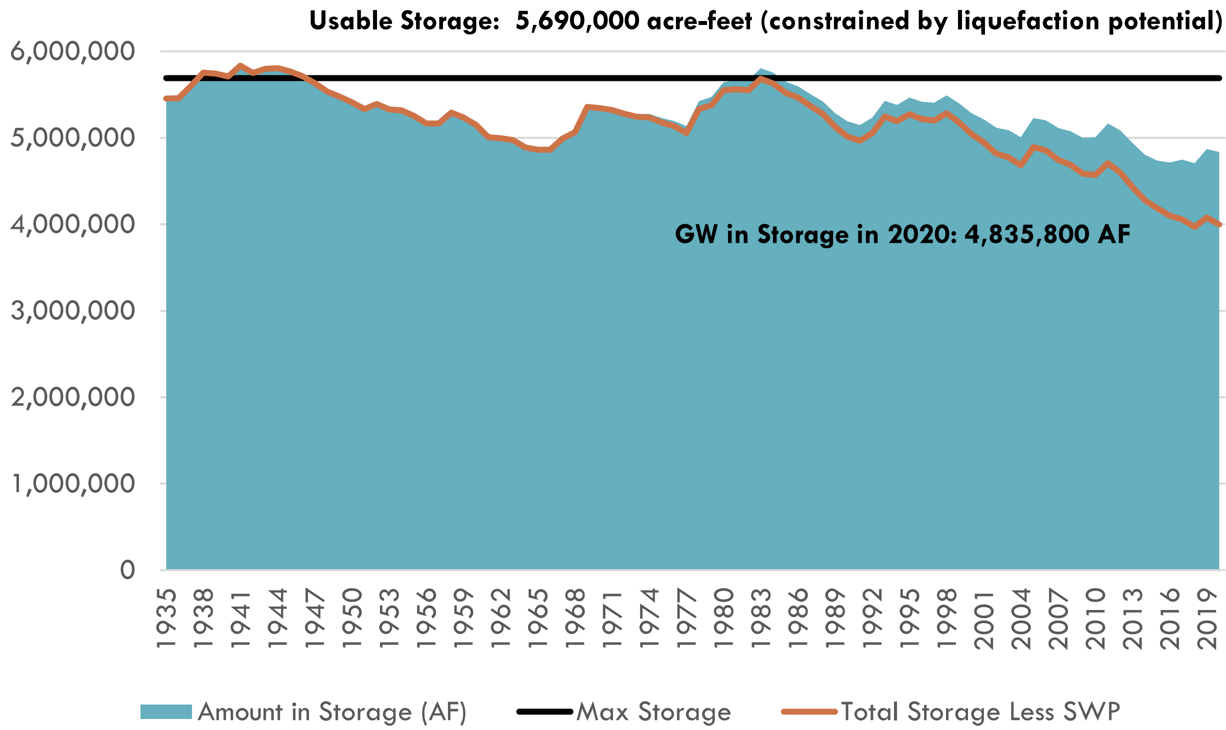


Figure 5-2. Rialto-Colton Basin Storage as of 2020 (AF)

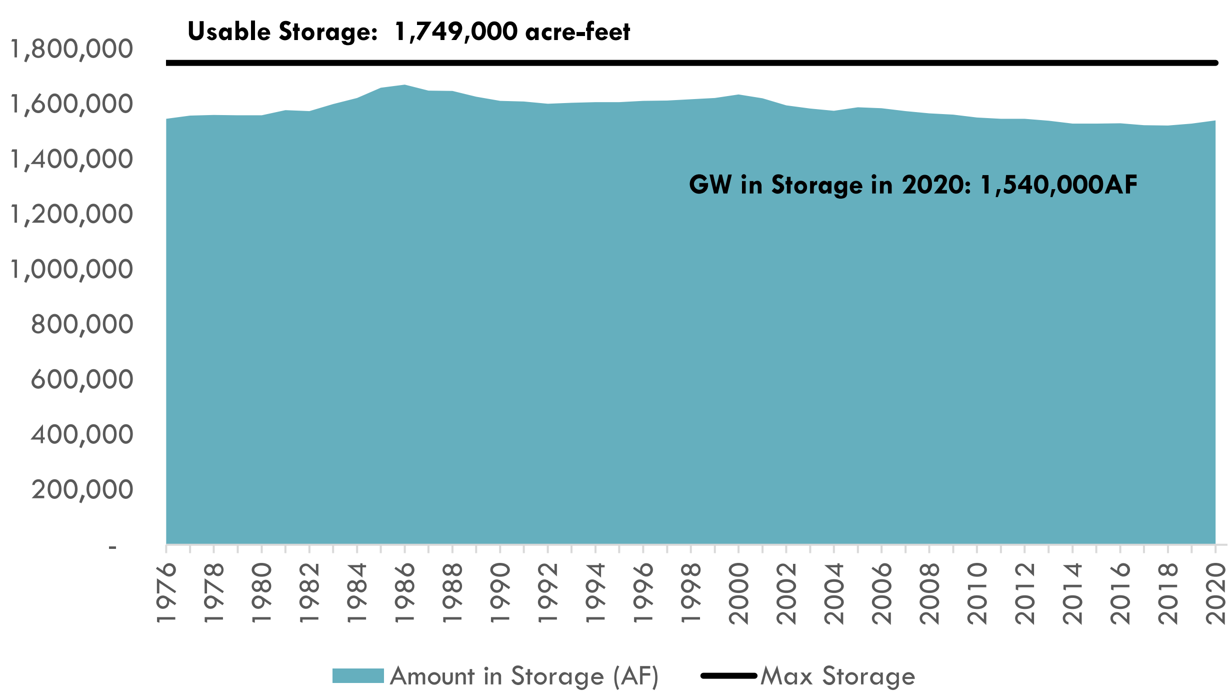
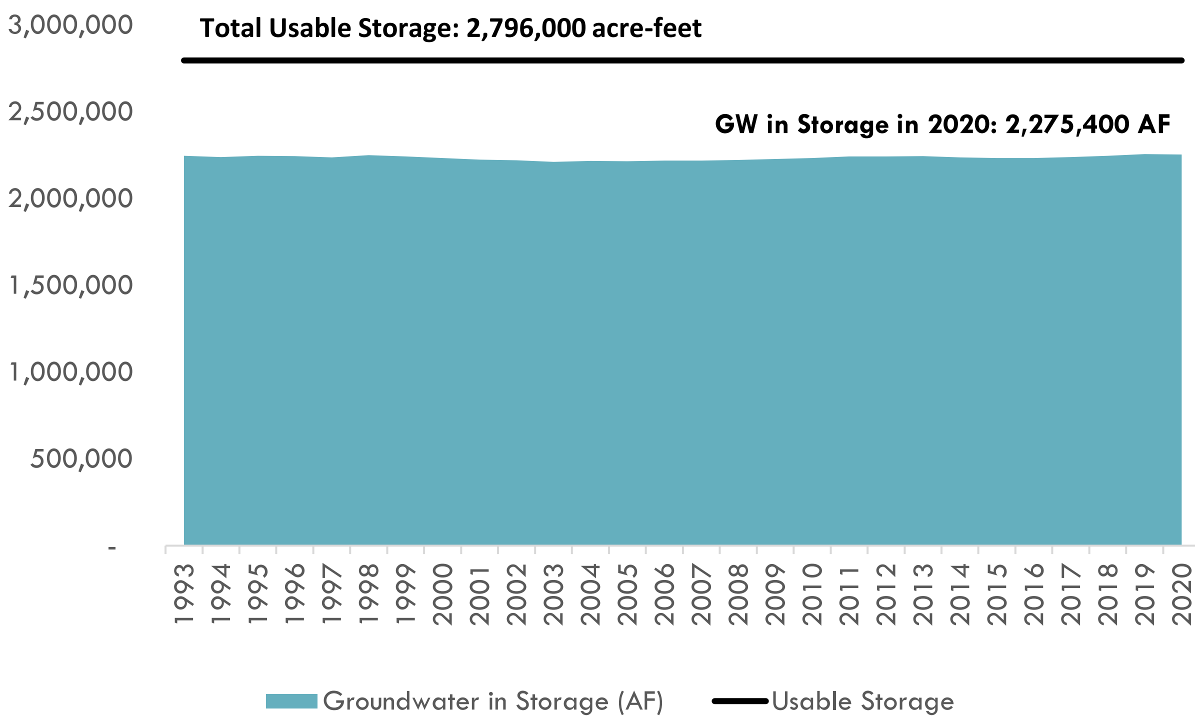


Figure 5-3. Yucaipa Basin Storage as of 2020 (AF)



5.3 Summary of Regional Supplies and Demands

5.3.1 Normal Year

In a normal year, SWP and local surface water supplies are used at retail agency treatment plants and any unused SWP supply is available to be recharged. Some non-potable demands in the region are met with recycled water and additional recycled water is recharged into the SBB. The remaining demands are met from local groundwater sources. **Table 5-4** and **Figure 5-4** provide a comparison of regional water supplies and demands for a normal year and demonstrate that adequate regional supplies are anticipated for years 2025 to 2045 under normal/average conditions. In a normal year, there is a surplus of supply, which results in accumulated storage in local groundwater basins for use in dry years.

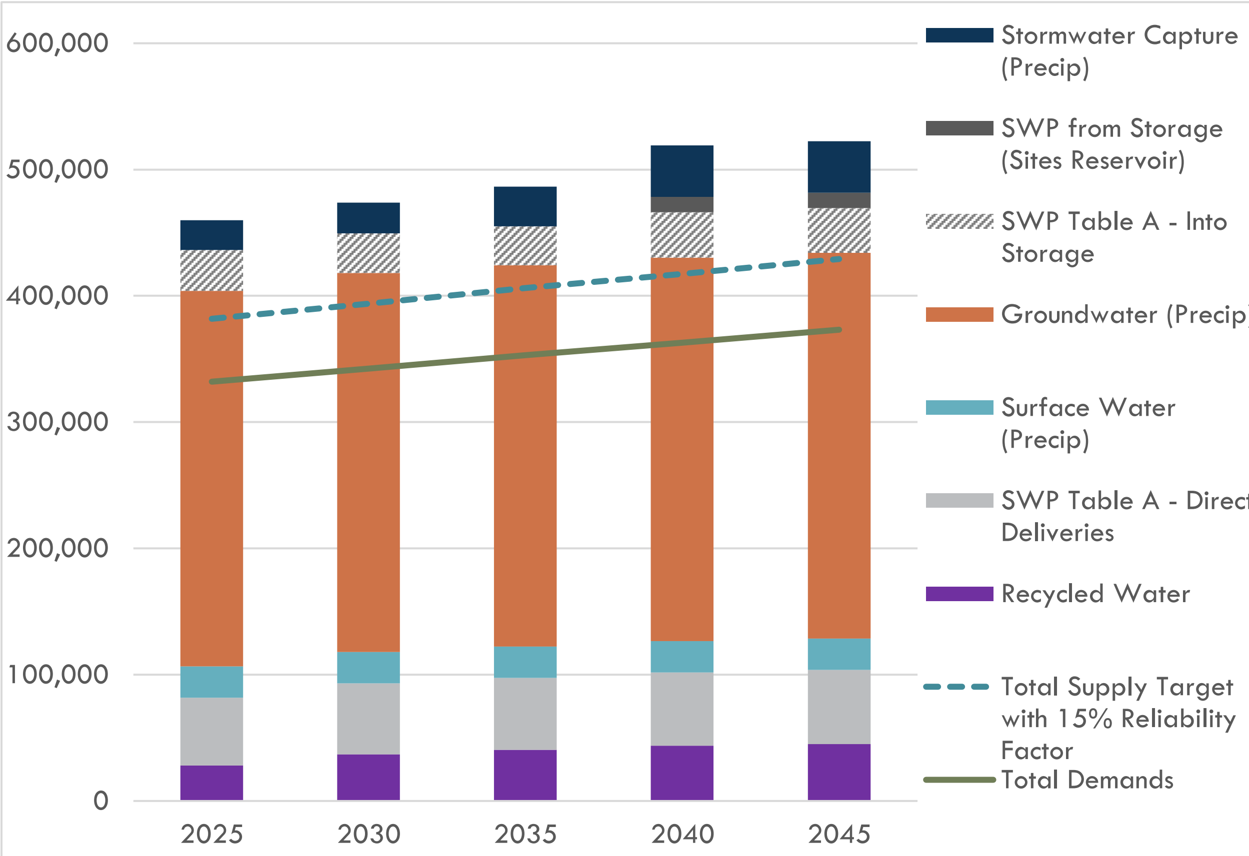
Table 5-4. Regional Water Budget Summary for a Normal Year (AFY)

SOURCE	2025	2030	2035	2040	2045
SURFACE WATER[1] (PRECIP)					
SBB Surface Water	24,615	24,615	24,615	24,615	24,615
Oak Creek Surface Water	250	250	250	250	250
SUBTOTAL	**24,865**	**24,865**	**24,865**	**24,865**	**24,865**
STORMWATER CAPTURE (PRECIP)[2]					
Enhanced Recharge	7,643	7,643	7,643	7,643	7,643
Active Recharge[1]	9,747	10,690	17,705	27,168	27,168
Riverside North Aquifer Storage and Recovery	6,000	6,000	6,000	6,000	6,000
SUBTOTAL	**23,390**	**24,333**	**31,348**	**40,811**	**40,811**
GROUNDWATER (PRECIP)					
SBB Groundwater[3]	207,485	207,485	207,485	207,485	207,485
Return Flows from Extractions above safe yield[4]	2,699	3,080	3,465	3,851	4,024
Rialto-Colton Groundwater[5]	15,567	15,567	15,567	15,567	15,567
Riverside North Groundwater[6]	30,100	30,100	30,100	30,100	30,100
Yucaipa Groundwater[7]	9,600	9,600	9,600	9,600	9,600
Other Supplies[8]	31,847	34,220	35,648	36,983	38,716
SUBTOTAL	**297,298**	**300,053**	**301,865**	**303,586**	**305,493**
RECYCLED WATER[9]					
Direct Use	11,548	19,863	20,708	21,353	21,998
Groundwater Recharge	16,430	16,968	19,770	22,549	23,096
SUBTOTAL	**27,978**	**36,831**	**40,478**	**43,902**	**45,094**

SOURCE	2025	2030	2035	2040	2045
SWP WATER					
DIRECT DELIVERIES					
Direct Deliveries – SBVMWD[10]	20,608	21,709	22,202	22,788	23,484
Big Bear Municipal Water District/Big Bear Lake[11]	6,500	6,500	6,500	6,500	6,500
Return Flow Direct Deliveries – SBVMWD[12]	9,759	10,155	10,333	10,544	10,794
Direct Deliveries – Other[13]	17,000	18,000	18,000	18,000	18,000
SUBTOTAL DIRECT DELIVERIES	**53,867**	**56,365**	**57,035**	**57,832**	**58,779**
STORAGE					
SWP into Storage – SBVMWD[14]	32,400	31,299	30,806	36,164	35,468
SWP from Storage (Sites Reservoir)15	0	0	0	12,100	12,100
SUBTOTAL STORAGE	**32,400**	**31,299**	**30,806**	**48,264**	**47,568**
SUBTOTAL SWP WATER	**86,267**	**87,663**	**87,841**	**106,096**	**106,346**
SUMMARY					
TOTAL SUPPLIES	**459,798**	**473,745**	**486,396**	**519,261**	**522,609**
TOTAL DEMANDS	**332,053**	**342,420**	**353,212**	**363,023**	**373,374**
TOTAL SUPPLY TARGET WITH 15% RELIABILITY FACTOR[16]	**381,861**	**393,783**	**406,194**	**417,477**	**429,380**
SURPLUS (DEFECIT) SUPPLY ABOVE TOTAL SUPPLY TARGET	**77,937**	**79,962**	**80,203**	**101,784**	**93,229**

1. Planned surface water use from retail agency 2020 UWMPs
2. Projected yield for planned projects, see Section 5.2.2 and Table 5-3
3. SBB total safe yield less the volume planned to be diverted for surface water use (shown under Surface Water section in this table)
4. Total of return flows from production over safe yield, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
5. Total Estimated safe yield for Rialto-Colton basin (See Table 3-10)
6. Total Estimated safe yield for Riverside North basin (See Section 3.3.3)
7. Estimated safe yield of Yucaipa basin
8. Total of Other Supplies from Table 4-6.
9. From Table 4-8
10. From Table 4-7
11. From Table 4-7
12. Total of return flows from SWP direct deliveries, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
13. SWP supplies from IEUA and Western, from Table 4-7.
14. Valley District SWP supplies from Table 5-1 less direct deliveries and in-lieu deliveries in this table
15. Valley District long term average deliveries from Sites Reservoir from Table 3 6.
16. Total Demands increased by 15% to account for plausible uncertainties in both demand and supply projections. See Section 5.1.

Figure 5-4. Regional Water Budget Summary for a Normal Year (AFY)



5.3.2 Single Wet Year

Table 5-4 and **Figure** 5-5 provide a comparison of supplies and demands for a single wet year. This demonstrates that a greater supply surplus is anticipated in wet years, which presents an opportunity to store this excess supply for use in dry years. Recently, wet years have occurred in 2005, 2011 and 2019 locally.

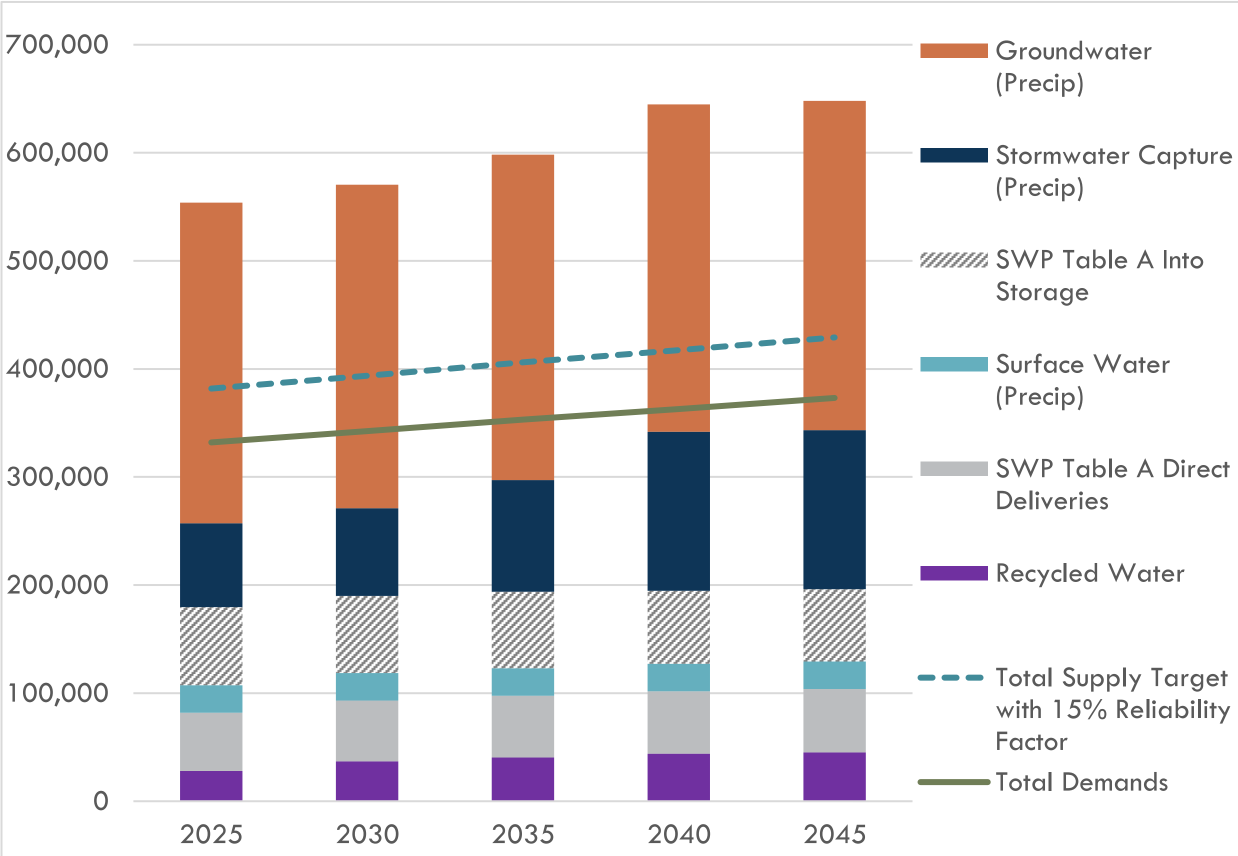
Table 5-5. Regional Water Budget Summary for a Wet Year (AFY)

SOURCE	2025	2030	2035	2040	2045
SURFACE WATER (PRECIP)[1]					
SBB Surface Water	25,259	25,259	25,259	25,259	25,259
Oak Creek Surface Water	250	250	250	250	250
SUBTOTAL	**25,509**	**25,509**	**25,509**	**25,509**	**25,509**
STORMWATER CAPTURE (PRECIP)[2]					
Enhanced Recharge	26,451	26,451	26,451	26,451	26,451
Active Recharge	30,380	33,893	56,027	99,872	99,872
Riverside North Aquifer Storage and Recovery	20,765	20,765	20,765	20,765	20,765
SUBTOTAL	**77,596**	**81,109**	**103,242**	**147,087**	**147,087**
GROUNDWATER (PRECIP)					
SBB Groundwater[3]	206,841	206,841	206,841	206,841	206,841
Return Flows from Extractions above safe yield[4]	2,699	3,080	3,465	3,851	4,024
Rialto-Colton Groundwater[5]	15,567	15,567	15,567	15,567	15,567
Riverside North Groundwater[6]	30,100	30,100	30,100	30,100	30,100
Yucaipa Groundwater[7]	9,600	9,600	9,600	9,600	9,600
Other Supplies[8]	31,847	34,220	35,648	36,983	38,716
SUBTOTAL	**296,654**	**299,409**	**301,221**	**302,943**	**304,849**
RECYCLED WATER[9]					
Direct Use	11,548	19,863	20,708	21,353	21,998
Groundwater Recharge	16,430	16,968	19,770	22,549	23,096
SUBTOTAL	**27,978**	**36,831**	**40,478**	**43,902**	**45,094**
SWP WATER					
DIRECT DELIVERIES					
Direct Deliveries – SBVMWD[10]	20,608	21,709	22,202	22,788	23,484
Big Bear Municipal Water District/Big Bear Lake[11]	6,500	6,500	6,500	6,500	6,500
Return Flow Direct Deliveries – SBVMWD[12]	9,759	10,155	10,333	10,544	10,794

SOURCE	2025	2030	2035	2040	2045
Direct Deliveries – Other[13]	17,000	18,000	18,000	18,000	18,000
SUBTOTAL DIRECT DELIVERIES	**53,867**	**56,365**	**57,035**	**57,832**	**58,779**
STORAGE					
SWP into Storage – SBVMWD[14]	72,414	71,313	70,820	67,156	66,460
SUB-TOTAL STORAGE	**72,414**	**71,313**	**70,820**	**67,156**	**66,460**
SUB-TOTAL SWP WATER	**126,281**	**127,677**	**127,855**	**124,988**	**125,238**
SUMMARY					
TOTAL SUPPLIES	**554,018**	**570,535**	**598,305**	**644,428**	**647,777**
TOTAL DEMANDS	**332,053**	**342,420**	**353,212**	**363,023**	**373,374**
TOTAL SUPPLY TARGET WITH 15% RELIABILITY FACTOR[15]	**381,861**	**393,783**	**406,194**	**417,477**	**429,380**
SURPLUS SUPPLY ABOVE TOTAL SUPPLY TARGET	**172,157**	**176,752**	**192,111**	**226,952**	**218,397**

1. Planned surface water use from retail agency 2020 UWMPs
2. Projected yield for planned projects, see Section 5.2.2 and Table 5-3
3. SBB total safe yield less the volume planned to be diverted for surface water use (shown under Surface Water section in this table)
4. Total of return flows from production over safe yield, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
5. Total Estimated safe yield for Rialto-Colton basin (See Table 3-10)
6. Total Estimated safe yield for Riverside North basin (See Section 3.3.3)
7. Estimated safe yield of Yucaipa basin
8. Total of Other Supplies from Table 4-6.
9. From Table 4-8
10. From Table 4-7
11. From Table 4-7
12. Total of return flows from SWP direct deliveries, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
13. SWP supplies from IEUA and Western, from Table 4-7.
14. Valley District SWP supplies from Table 5-1 less direct deliveries and in-lieu deliveries in this table
15. Total Demands increased by 15% to account for plausible uncertainties in both demand and supply projections. See Section 5.1.

Figure 5-5. Regional Water Budget Summary for a Wet Year (AFY)



5.3.3 Single Dry Year

In a single dry year, SWP supplies, and local surface water supplies are reduced so the groundwater use increases, relying on water stored in normal and wet years. Demands are assumed to increase by 10% due to increased outdoor water use. **Table 5-6** and **Figure 5-6** provide a comparison of regional water supplies and demands for a single dry year.

As shown, regional supplies are sufficient to meet projected demands; some water may need to be withdrawn from storage if there is variability in supplies or demands, as reflected by the Total Supply Target with 15% Reliability Factor.

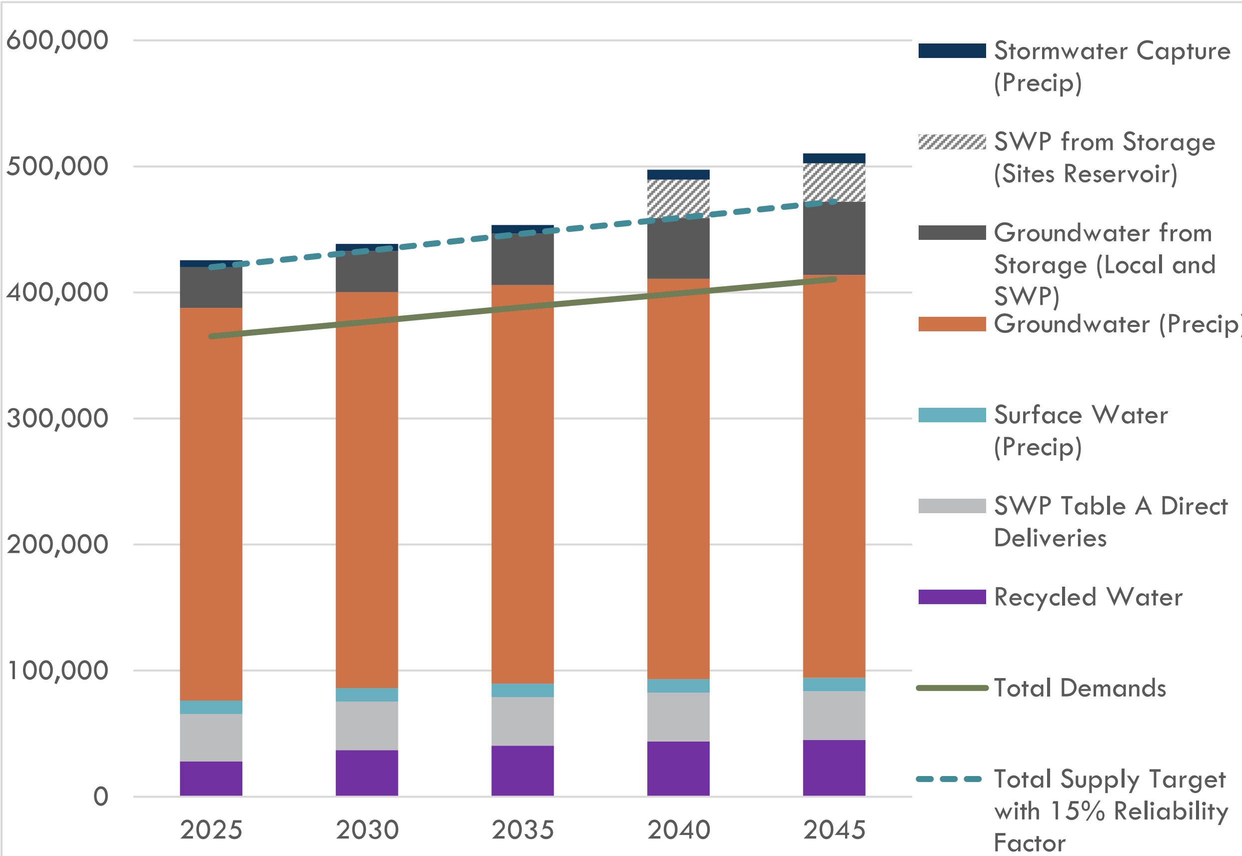
Table 5-6. Regional Water Budget Summary for a Single Dry Year (AFY)

SOURCE	2025	2030	2035	2040	2045
SURFACE WATER (PRECIP)[1]					
SBB Surface Water	10,425	10,425	10,425	10,425	10,425
Oak Creek Surface Water	250	250	250	250	250
SUBTOTAL	**10,675**	**10,675**	**10,675**	**10,675**	**10,675**
STORMWATER CAPTURE (PRECIP)[2]					
Enhanced Recharge	1,598	1,598	1,598	1,598	1,598
Active Recharge	2,644	2,644	4,028	5,010	5,010
Riverside North Aquifer Storage and Recovery	1,255	1,255	1,255	1,255	1,255
SUBTOTAL	**5,497**	**5,497**	**6,881**	**7,863**	**7,863**
GROUNDWATER (PRECIP)					
SBB Groundwater[3]	221,675	221,675	221,675	221,675	221,675
Return Flows from Extractions above safe yield[4]	2,699	3,080	3,465	3,851	4,024
Rialto-Colton Groundwater[5]	15,567	15,567	15,567	15,567	15,567
Riverside North Groundwater[6]	30,100	30,100	30,100	30,100	30,100
Yucaipa Groundwater[7]	9,600	9,600	9,600	9,600	9,600
Other Supplies[8]	31,847	34,220	35,648	36,983	38,716
SUBTOTAL	**311,488**	**314,243**	**316,055**	**317,777**	**319,683**
RECYCLED WATER[9]					
Direct Use	11,548	19,863	20,708	21,353	21,998
Groundwater Recharge	16,430	16,968	19,770	22,549	23,096
SUBTOTAL	**27,978**	**36,831**	**40,478**	**43,902**	**45,094**

SOURCE	2025	2030	2035	2040	2045
SWP WATER					
DIRECT DELIVERIES					
Direct Deliveries – SBVMWD[10]	15,130	15,130	15,130	15,130	15,130
Big Bear Municipal Water District/Big Bear Lake (met with groundwater)[11]	0	0	0	0	0
Return Flow Direct Deliveries – SBVMWD[12]	5,447	5,447	5,447	5,447	5,447
Direct Deliveries – Other[13]	17,000	18,000	18,000	18,000	18,000
SUBTOTAL DIRECT DELIVERIES	**37,577**	**38,577**	**38,577**	**38,577**	**38,577**
STORAGE					
Groundwater from Storage (Local and SWP)[14]	32,298	32,775	40,937	48,169	58,130
SWP from Storage (Sites Reservoir)[15]	0	0	0	30,400	30,400
SUBTOTAL STORAGE	**32,298**	**32,775**	**40,937**	**78,569**	**88,530**
SUBTOTAL SWP WATER	**69,874**	**71,352**	**79,514**	**117,146**	**127,107**
SUMMARY					
TOTAL SUPPLIES	**425,543**	**438,658**	**453,694**	**497,487**	**510,581**
TOTAL DEMANDS	**365,258**	**376,662**	**388,533**	**399,326**	**410,712**
TOTAL SUPPLY TARGET WITH 15% RELIABILITY FACTOR[16]	**420,047**	**433,161**	**446,813**	**459,224**	**472,318**
SURPLUS SUPPLY ABOVE TOTAL SUPPLY TARGET	**5,497**	**5,497**	**6,881**	**38,263**	**38,263**

1. Planned surface water use from retail agency 2020 UWMPs
2. Projected yield for planned projects, see Section 5.2.2 and Table 5-3
3. SBB total safe yield less the volume planned to be diverted for surface water use (shown under Surface Water section in this table)
4. Total of return flows from production over safe yield, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
5. Total Estimated safe yield for Rialto-Colton basin (See Table 3-10)
6. Total Estimated safe yield for Riverside North basin (See Section 3.3.3)
7. Estimated safe yield of Yucaipa basin
8. Total of Other Supplies from Table 4-6.
9. From Table 4-8
10. From Table 4-7. In dry years when Valley District SWP supplies are limited, the region prioritizes direct deliveries requests for surface water treatment plants and the retail agencies pump stored groundwater to meet any remaining water demands.
11. From Table 4-7. Valley District can meet Bear Valley Mutual in-lieu needs with stored groundwater in dry years
12. Total of return flows from SWP direct deliveries, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
13. SWP supplies from IEUA and Western, from Table 4-7. Metropolitan's 2020 UWMP projects that all demands will be met under all hydrologic conditions, therefore, water deliveries to FWC and RPU remain constants under all scenarios
14. In dry years, the Region uses local groundwater that was stored in wet years. For the purposes of this Plan, this value is calculated as the Total Supply Target with 15% Reliability Factor less available supplies (excluding stormwater capture and SWP Storage from Sites Reservoir to be conservative).
15. Valley District dry year deliveries from Sites Reservoir from Table 3-6.
16. Total Demands increased by 15% to account for plausible uncertainties in both demand and supply projections. See Section 5.1.

Figure 5-6. Regional Water Budget Summary for a Single Dry Year (AFY)



5.3.4 5-Year Drought

For a 5-year drought, SWP and local surface water supplies are reduced, but average supplies are higher than a single dry year because some years in the 5-year period have greater precipitation than others. Demands are assumed to increase by 10% due to increased outdoor water use. Although demands may reduce in the later years of the drought due to increased conservation measures, a 10% increase is assumed for the entire period to be conservative. **Table 5-7** and **Figure 5-6** provide a comparison of regional water supplies and demands for a 5-year drought.

As shown, regional supplies are sufficient to meet projected demands; some water may need to be withdrawn from storage if there is variability in supplies or demands, as reflected by the Total Supply Target with 15% Reliability Factor.

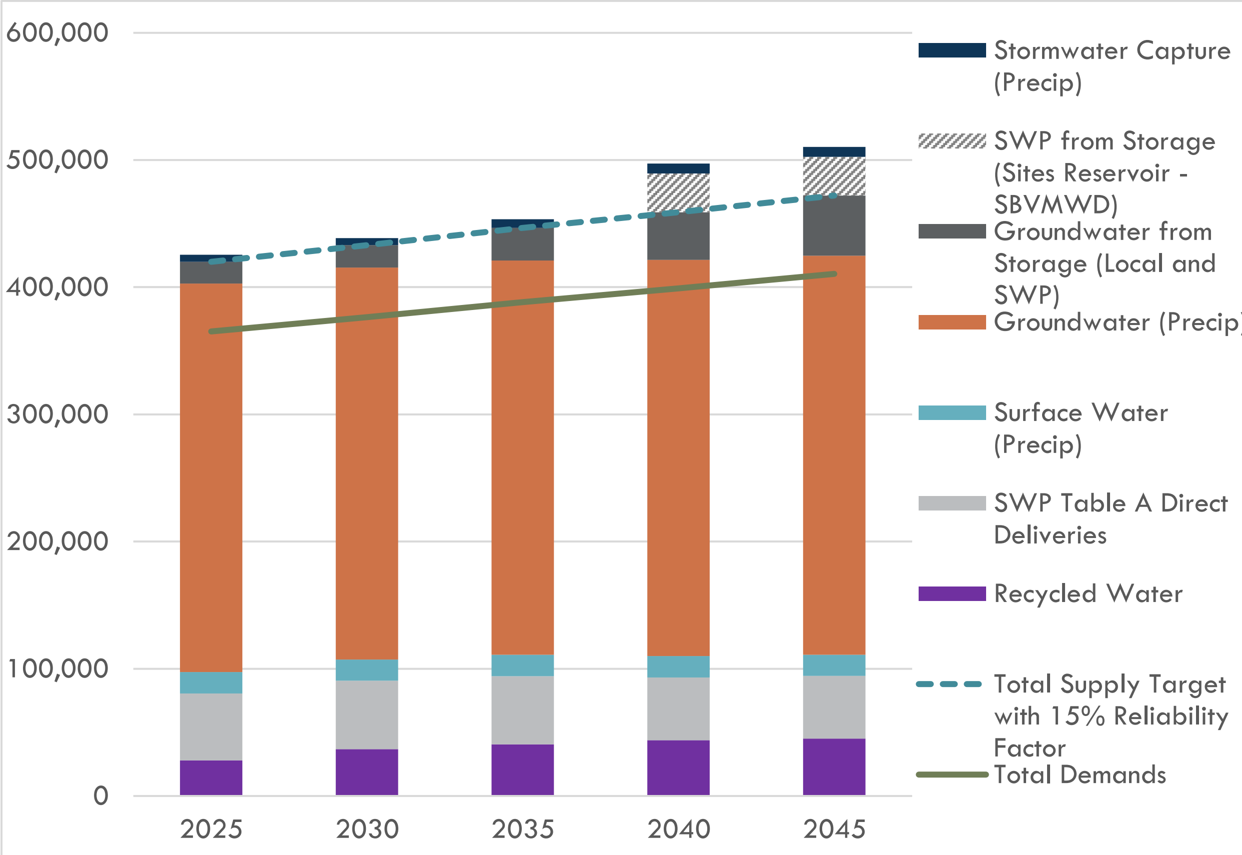
Table 5-7. Regional Water Budget Summary for a 5-Year Drought (AFY)

SOURCE	2025	2030	2035	2040	2045
SURFACE WATER (PRECIP)[1]					
SBB Surface Water	16,455	16,455	16,455	16,455	16,455
Oak Creek Surface Water	250	250	250	250	250
SUBTOTAL	**16,705**	**16,705**	**16,705**	**16,705**	**16,705**
STORMWATER CAPTURE (PRECIP)[2]					
Enhanced Recharge	3,312	3,312	3,312	3,312	3,312
Active Recharge	4,992	5,163	8,363	10,779	10,779
Riverside North Aquifer Storage and Recovery	2,600	2,600	2,600	2,600	2,600
SUBTOTAL	**10,905**	**11,076**	**14,276**	**16,692**	**16,692**
GROUNDWATER (PRECIP)					
SBB Groundwater[3]	215,645	215,645	215,645	215,645	215,645
Return Flows from Extractions above safe yield[4]	2,699	3,080	3,465	3,851	4,024
Rialto-Colton Groundwater[5]	15,567	15,567	15,567	15,567	15,567
Riverside North Groundwater[6]	30,100	30,100	30,100	30,100	30,100
Yucaipa Groundwater[7]	9,600	9,600	9,600	9,600	9,600
Other Supplies[8]	31,847	34,220	35,648	36,983	38,716
SUBTOTAL	**305,458**	**308,213**	**310,025**	**311,746**	**313,653**
RECYCLED WATER[9]					
Direct Use	11,548	19,863	20,708	21,353	21,998
Groundwater Recharge	16,430	16,968	19,770	22,549	23,096
SUBTOTAL	**27,978**	**36,831**	**40,478**	**43,902**	**45,094**

SOURCE	2025	2030	2035	2040	2045
SWP WATER					
DIRECT DELIVERIES					
Direct Deliveries – SBVMWD[10]	20,608	21,709	22,202	22,788	23,008
Big Bear Municipal Water District/Big Bear Lake (portion met with groundwater)[11]	6,068	4,967	4,474	0	0
Return Flow Direct Deliveries – SBVMWD[12]	9,455	9,455	9,455	8,283	8,283
Direct Deliveries – Other[13]	17,000	18,000	18,000	18,000	18,000
SUBTOTAL DIRECT DELIVERIES	**52,720**	**53,720**	**53,720**	**49,291**	**49,291**
STORAGE					
Groundwater from Storage (Local and SWP)[14]	16,595	17,072	25,235	38,048	48,009
SWP from Storage (Sites Reservoir)[15]	0	0	0	30,400	30,400
SUBTOTAL STORAGE	**16,595**	**17,072**	**25,235**	**68,448**	**78,409**
SUBTOTAL SWP WATER	**69,874**	**71,352**	**79,514**	**117,146**	**127,107**
SUMMARY					
TOTAL SUPPLIES	**430,952**	**444,237**	**461,089**	**506,316**	**519,410**
TOTAL DEMANDS	**365,258**	**376,662**	**388,533**	**399,326**	**410,712**
TOTAL SUPPLY TARGET WITH 15% RELIABILITY FACTOR[16]	**420,047**	**433,161**	**446,813**	**459,224**	**472,318**
SURPLUS SUPPLY ABOVE TOTAL SUPPLY TARGET	**10,905**	**11,076**	**14,276**	**47,092**	**47,092**

1. Planned surface water use from retail agency 2020 UWMPs
2. Projected yield for planned projects, see Section 5.2.2 and Table 5 3
3. SBB total safe yield less the volume planned to be diverted for surface water use (shown under Surface Water section in this table)
4. Total of return flows from production over safe yield, included in Table 4 2, Table 4 3, Table 4 4, and Table 4 5
5. Total Estimated safe yield for Rialto-Colton basin (See Table 3-10)
6. Total Estimated safe yield for Riverside North basin (See Section 3.3.3)
7. Estimated safe yield of Yucaipa basin
8. Total of Other Supplies from Table 4 6.
9. From Table 4 8
10. From Table 4 7. In dry years when Valley District SWP supplies are limited, the region prioritizes direct deliveries requests for surface water treatment plants and the retail agencies pump stored groundwater to meet any remaining water demands.
11. From Table 4 7. Valley District can meet Bear Valley Mutual in-lieu needs with stored groundwater in dry years
12. Total of return flows from SWP direct deliveries, included in Table 4 2, Table 4 3, Table 4 4, and Table 4 5
13. SWP supplies from IEUA and Western, from Table 4 7. Metropolitan's 2020 UWMP projects that all demands will be met under all hydrologic conditions, therefore, water deliveries to FWC and RPU remain constants under all scenarios
14. In dry years, the Region uses local groundwater that was stored in wet years. For the purposes of this Plan, this value is calculated as the Total Supply Target with 15% Reliability Factor less available supplies (excluding stormwater capture and SWP Storage from Sites Reservoir to be conservative).
15. Valley District dry year deliveries from Sites Reservoir from Table 3 6.
16. Total Demands increased by 15% to account for plausible uncertainties in both demand and supply projections. See Section 5.1.

Figure 5-7. Regional Water Budget Summary for a 5-Year Drought (AFY)



5.3.5 30-Year Drought

In a 30-year drought, SWP supplies, and local surface water supplies are lower on average, but based on historic hydrology and DWR estimates of future SWP availability, it is anticipated that there will be periodic wet years within the 30-year drought period, as occurred in 2005, 2011 and 2019 locally. The average expected SWP availability during a 30-year drought is not substantially less than a normal year and provides opportunities to recharge excess supplies. As a result of the Region's strategy and demonstrated ability to capture excess supply in these wet years for storage, it is anticipated that the region will have sufficient supplies to last during a 30-year drought.

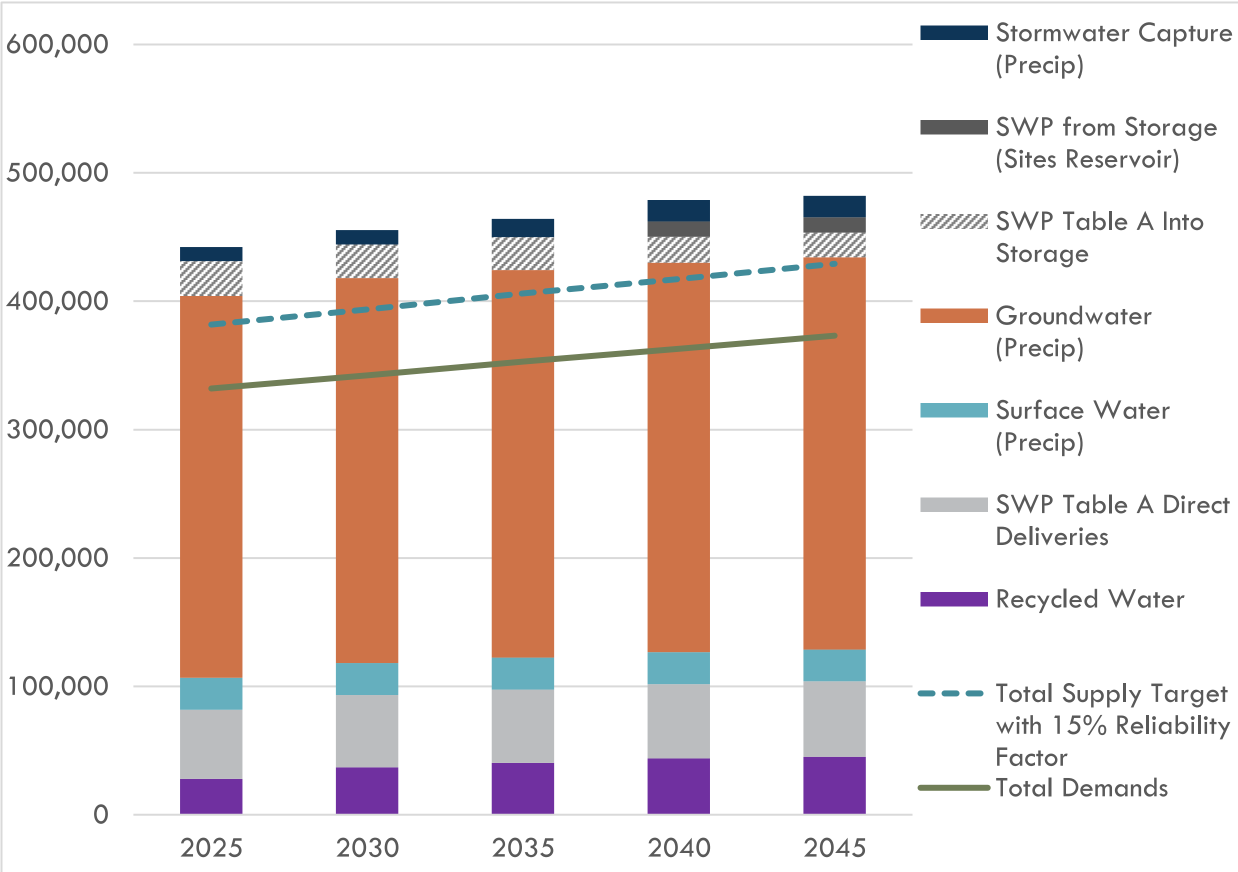
Table 5-8. Regional Water Budget Summary for a 30-Year Drought (AFY)

SOURCE	2025	2030	2035	2040	2045
SURFACE WATER (PRECIP)[1]					
SBB Surface Water	24,615	24,615	24,615	24,615	24,615
Oak Creek Surface Water	250	250	250	250	250
SUBTOTAL	**24,865**	**24,865**	**24,865**	**24,865**	**24,865**
STORMWATER CAPTURE (PRECIP)[2]					
Enhanced Recharge	3,312	3,312	3,312	3,312	3,312
Active Recharge	4,992	5,163	8,363	10,779	10,779
Riverside North Aquifer Storage and Recovery	2,600	2,600	2,600	2,600	2,600
SUBTOTAL	**10,905**	**11,076**	**14,276**	**16,692**	**16,692**
GROUNDWATER (PRECIP)					
SBB Groundwater[3]	207,485	207,485	207,485	207,485	207,485
Return Flows from Extractions above safe yield[4]	2,699	3,080	3,465	3,851	4,024
Rialto-Colton Groundwater[5]	15,567	15,567	15,567	15,567	15,567
Riverside North Groundwater[6]	30,100	30,100	30,100	30,100	30,100
Yucaipa Groundwater[7]	9,600	9,600	9,600	9,600	9,600
Other Supplies[8]	31,847	34,220	35,648	36,983	38,716
SUBTOTAL	**297,298**	**300,053**	**301,865**	**303,586**	**305,493**
RECYCLED WATER[9]					
Direct Use	11,548	19,863	20,708	21,353	21,998
Groundwater Recharge	16,430	16,968	19,770	22,549	23,096
SUBTOTAL	**27,978**	**36,831**	**40,478**	**43,902**	**45,094**

SOURCE	2025	2030	2035	2040	2045
SWP WATER					
DIRECT DELIVERIES					
Direct Deliveries – SBVMWD[10]	20,608	21,709	22,202	22,788	23,484
Big Bear Municipal Water District/Big Bear Lake (portion met with groundwater)[11]	6,500	6,500	6,500	6,500	6,500
Return Flow Direct Deliveries – SBVMWD[12]	9,759	10,155	10,333	10,544	10,794
Direct Deliveries – Other[13]	17,000	18,000	18,000	18,000	18,000
SUBTOTAL DIRECT DELIVERIES	**53,867**	**56,365**	**57,035**	**57,832**	**58,779**
STORAGE					
SWP into Storage – SBVMWD[14]	27,270	26,169	25,676	19,960	19,264
SWP from Storage (Sites Reservoir)[15]	0	0	0	12,100	12,100
SUBTOTAL STORAGE	**27,270**	**26,169**	**25,676**	**32,060**	**31,364**
SUB-TOTAL SWP WATER	**81,137**	**82,533**	**82,711**	**89,892**	**90,142**
SUMMARY					
TOTAL SUPPLIES	**442,183**	**455,358**	**464,194**	**478,937**	**482,286**
TOTAL DEMANDS	**332,053**	**342,420**	**353,212**	**363,023**	**373,374**
TOTAL SUPPLY TARGET WITH 15% RELIABILITY FACTOR[16]	**381,861**	**393,783**	**406,194**	**417,477**	**429,380**
SURPLUS SUPPLY ABOVE TOTAL SUPPLY TARGET	**60,322**	**61,575**	**58,001**	**61,461**	**52,906**

1. Planned surface water use from retail agency 2020 UWMPs
2. Projected yield for planned projects, see Section 5.2.2 and Table 5-3
3. SBB total safe yield less the volume planned to be diverted for surface water use (shown under Surface Water section in this table)
4. Total of return flows from production over safe yield, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
5. Total Estimated safe yield for Rialto-Colton basin (See Table 3-10)
6. Total Estimated safe yield for Riverside North basin (See Section 3.3.3)
7. Estimated safe yield of Yucaipa basin
8. Total of Other Supplies from Table 4-6.
9. From Table 4-8
10. From Table 4-7
11. From Table 4-7
12. Total of return flows from SWP direct deliveries, included in Table 4-2, Table 4-3, Table 4-4, and Table 4-5
13. SWP supplies from IEUA and Western, from Table 4-7.
14. Valley District SWP supplies from Table 5-1 less direct deliveries and in-lieu deliveries in this table
15. Valley District long term average deliveries from Sites Reservoir from Table 3-6.
16. Total Demands increased by 15% to account for plausible uncertainties in both demand and supply projections. See Section 5.1.

Figure 5-8. Region Wide Supply and Demand Comparison for a 30-Year Drought



PART 1: REGIONAL CONTEXT

6 Water Management Goals, Objectives, and Strategies

The primary purpose of the IRUWMP is to provide a roadmap for the management of water resources to ensure long-term, reliable water supply availability for the Region.

The first step in developing this roadmap is the formulation of broad water management goals and more specific water management objectives that can help achieve those goals. The goals and objectives described in this chapter shape the desired outcomes of implementation of the IRUWMP.

2015 Report Cards

The Region has made great strides in meeting its objectives through the implementation of projects and programs since development of the 2015 IRWM Plan. Many of these projects and programs are ongoing, but all activities support the achievement of the objectives established in the Region's 2007 IRWM Plan. Progress made in the last 5 years demonstrates that the 2015 IRWM Plan is working as intended and should continue to be updated and adapted as goals and objectives change. Specific efforts made by the Region towards each goal and objective listed in the 2015 IRWM Plan are summarized in the following 2015 Report Cards.

IN THIS SECTION

GOAL #1
IMPROVE WATER SUPPLY RELIABILITY

OBJECTIVES	PROGRESS	COMPLETED PROJECTS/PROGRAMS
1a: Reduce demand 20% by 2020	Objective met	• All retailers met 2020 targets by 2015
1b: Increase utilization of local supplies by 23,000 AFY	Objective partially met	• Enhanced Recharge Project has increased the amount of stormwater recharged • YVWD's Wilson Creek Basin's recycled water recharge project has increased the amount of recycled water recharged
1c: Increase storage by 10,000 AF	Objective met	• Enhanced Recharge 1B has increased the amount diverted from the SAR Diversion. • Approximately 78,000 AF of SWP water was recharged in 2019 which also increased groundwater storage. • SBVMWD plans to increase groundwater storage in the SBBby 64,000 AF under SARCCUP, though the program has not yet received approval by local water agencies.
1d: Prepare for disasters by implementing 2 new interties between water agencies	Objective met	• Five new interties between water systems were constructed (between City of Colton and City of Rialto, City of Redlands and Western Heights Water District, City of Redlands and City of Loma Linda, BBLDWP and Big Bear City Community Services District, SBMWD and Devore Water Company) • SBMWD completed seismic upgrades for four steel reservoirs (College, Cajon, Ridgeline, and Terrace No. 2 Reservoirs) with an approximate total volume of 8.8 MG in 2020

CONTINUED ON NEXT PAGE...

= Objective met = Objective partially met = Objective not met

GOAL #1

IMPROVE WATER SUPPLY RELIABILITY

OBJECTIVES	PROGRESS	COMPLETED PROJECTS/PROGRAMS
1e: Monitor and adaptively manage climate change impacts by implementing 3 projects that reduce energy demands		**Energy Reduction:** • East Valley, Yucaipa Valley, Big Bear Lake DWP are implementing smart meter retrofits to help reduce water waste and the associated energy use • Agencies have implemented projects to improve energy efficiency within the system such as through pump replacement, pipe replacement, and other projects to increase efficiency and reduce water leaks **Energy Generation:** • East Valley installed a Hydroelectric facility at Plant 134 in 2017. • WVWD installed a Hydroelectric facility at the Roemer treatment plant in 2018. • BBLDWP installed solar panels to power their Division Well Field. • Valley District and the City of San Bernardino are installing a hydroelectric facility at the Waterman Basin.
1f: Ensure equivalent water supply services for DACs		• The majority of the SBVMWD is classified as a DAC under DWR definition. Retailers continue to support ongoing water service and support services to DACs.

EXAMPLE PROJECT

YVWD WILSON CREEK BASINS WATER RECHARGE PROJECT

YVWD implemented the Wilson Creek Basins Water Recharge Project to recharge the Yucaipa subbasin with highly treated recycled water from the Wochholz Regional Water Recycling Facility and increase recharge of SWP water. The project connected to existing recycled water pipelines to recharge approximately 1,250 AFY of recycled water and increase SWP recharge from 560 AFY to 3,750 AFY. Through implementation of this project, YVWD continues efforts towards resolving regional water supply challenges in a cost effective and environmentally responsible manner.

GOAL #2

BALANCE FLOOD MANAGEMENT AND INCREASE STORMWATER RECHARGE

OBJECTIVES	PROGRESS	COMPLETED PROJECTS/PROGRAMS
2a: Utilize 500 acres of flood control retention/detention basins that are not currently used for recharge	Objective partially met	• SBVWCD implemented the Plunge Creek Water Recharge and Habitat Improvement Project, which is 5.9 acres, to manage flows from water transmission canals • Two MOUs currently underway between SBVWCD and SBCFCD, and between SBVMWD and SBCFCD (expected early 2021)
2b: Reduce FEMA reported flood area	Objective not met	• Data is not currently available to show whether this objective has been met.
2c: Ensure equivalent implementation of flood projects in DAC areas and implement at least 1 flood control project in a DAC area	Objective met	• The San Bernardino County Flood Control District completed 17 projects to improve flood control basins, flood control channels and flood walls/levees, some of which benefit DAC areas adjacent to channels

= Objective met = Objective partially met = Objective not met

EXAMPLE PROJECT

SBVWCD PLUNGE CREEK WATER RECHARGE AND HABITAT IMPROVEMENT PROJECT

In August 2020, the SBVWCD completed the Plunge Creek Water Recharge and Habitat Improvement Project that returns a 2.5-mile stretch of Plunge Creek, south of Greenspot Road and east of Orange Street, back to its historic braided-streambed after decades of rerouting the creek's water flow created a swifter, narrower streambed. The project, completed with funds from the Safe Drinking Water, Water Quality and Supply, Flood Control and Coastal Protection Bond Act of 2006 (Proposition 84), improved alluvial habitat, created 3.25 of new wetlands, improves transmission of surface water through the channel, and recharges stormwater.

GOAL #3
IMPROVE WATER QUALITY

OBJECTIVES	PROGRESS	COMPLETED PROJECTS/PROGRAMS
3a: Ensure no violations of drinking water quality standards		• East Valley is in the process of implementing treatment upgrades at Plant 134 to address a TTHM violation in 2017
3b: Improve surface and groundwater quality by treating 3,000 AFY of water supply		• The City of San Bernardino, WVWD and the City of Colton are using ion-exchange treatment to remove perchlorate from their groundwater sources.
3c: Manage total dissolved solids and nitrogen in groundwater		• The region has just begun work on a Salt and Nutrient Management Plan for the Upper Santa Ana River Basins.
3d: Ensure equivalent water quality services for DACs		• The water served to DACs through a municipal water district must meet or exceed drinking water standards set forth by the Division of Drinking Water. • Water providers offer numerous programs for low-income households.

= Objective met = Objective partially met = Objective not met

EXAMPLE PROJECT

WEST VALLEY WATER DISTRICT PERCHLORATE TREATMENT

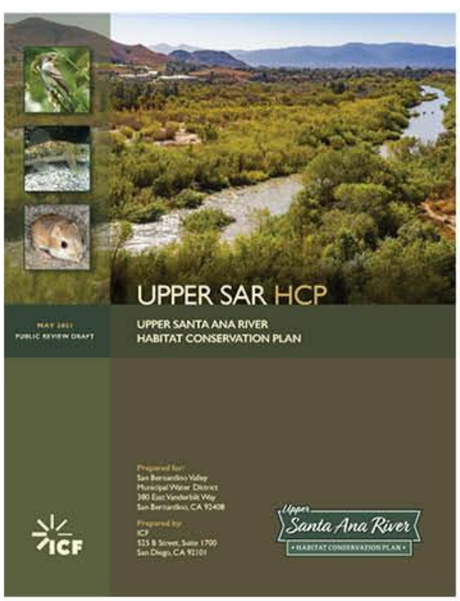
WVWD constructed a specialized water treatment plant that attacks and breaks apart perchlorate and also removes nitrate. The highly innovative system, called a fluidized bed reactor (FBR) works by pulling oxygen out of the perchlorate anion, rendering it harmless. The FBR water treatment facility allows customers access to water previously unavailable due to contamination. WVWD also constructed a second treatment facility using a similar technology called a fixed bed reactor (FXB), also to remove perchlorate.

GOAL #4
IMPROVE HABITAT AND OPEN SPACE

OBJECTIVES	PROGRESS	COMPLETED PROJECTS/PROGRAMS
4a: Improve habitat and open space by 1,200 acres		• SBVWD implemented the Plunge Creek Water Recharge and Habitat Improvement Project • Upper Santa Ana River Habitat Conservation Plan includes a total of 1,400 acres of preserve • SBMWD implemented RIX Expansion Wells Project in 2018 to provide a supplemental water source to the Santa Ana River for protection of fish and habitat
4b: Identify "multi-use" opportunities to increase recreation and public access and identify at least 1 multi-use project		• City of Big Bear Lake Department of Water and Power implemented a xeriscape demonstration garden for the local community • City of Redlands and City of Highland updated their General Plans reclassifying the Wash as open space

= Objective met   = Objective partially met   = Objective not met

EXAMPLE PROJECT



UPPER SANTA ANA RIVER HCP

The Upper Santa Ana River Habitat Conservation Plan (HCP), in Public Review Draft as of May 2021, is a regional, comprehensive program that would provide a framework to protect, enhance, and restore the habitat for Covered Species while streamlining permitting for Covered Activities. Within this framework, the Upper SAR HCP would achieve conservation goals and objectives and comply with the Federal Endangered Species Act while streamlining planning and permitting for anticipated water resource management projects needed to serve the water resource needs of the public. The HCP will achieve the conservation goals and objectives through the establishment of the HCP Preserve System and implementation of conservation actions.

6.2 Regional Needs Identification

A key element of the IRWM planning process is the development of water management objectives that will help address the needs of the Region, while also speaking to the water management strategies outlined in the California Water Plan and the Integrated Regional Water Management Grant Program Guidelines. The needs of the Region must first be identified, then goals and objectives are developed to address those needs.

The current issues and needs of the Region were updated through a combination of workshops with the Region's stakeholders, a review of progress in meeting the 2015 objectives, and planning document review. Below is a summary of the issues and needs that were identified.

6.2.1 Diversify Supply Portfolio

Imported water plays an important role in the Region's water supply portfolio, but is subject to reliability issues due to vulnerabilities such as:

- Susceptibility to interruption during catastrophic conditions
- Periods of statewide drought
- Environmental protection goals and mandates in the Delta
- Climate change
- Imported water quality
- Imported water cost increases

State and federal regulations have limited the SWP's ability to pump and convey water from the Delta to southern California. In addition to environmental challenges, aging Delta levees are not expected to withstand the impacts of catastrophic earthquakes, floods and rising sea levels. Diversifying water supplies will improve overall water supply reliability and reduce pressures from population and demand increases.

Valley District is concerned that the Delta Stewardship Council's approach toward assessing "reduced reliance" on the Delta focuses on the quantity of SWP water being exported rather than the goal of the original legislation which was to diversify the overall water portfolio by investing "…in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts." Valley District and the local retail agencies have invested and will continue to invest in all of the strategies included in the legislation and Valley District is also planning to fully utilize its $1 billion investment in the SWP by importing all of its contracted SWP supplies.

6.2.2 Improved Groundwater Management

Precipitation stored as groundwater is a major source of water supply in the Region. Valley District and Western recently completed a study (Usable Groundwater in Storage Estimation for the San Bernardino, Rialto-Colton, Riverside, and Arlington Groundwater Basins, Geoscience

2020) to determine the usable amount of groundwater storage that is available to get through prolonged drought and identify any impacts associated with declining storage levels. The study also showed that the basins have available capacity to store additional water in wet years. At times, parts of the Region can experience high groundwater levels that must be managed to reduce the risk of liquefaction. Additionally, preserving and improving water quality in the groundwater basins is important to maintaining safe drinking water quality. Groundwater management can be improved to promote recharge, manage liquefaction risk, and protect water quality.

The following three groundwater management needs were established for the Region:

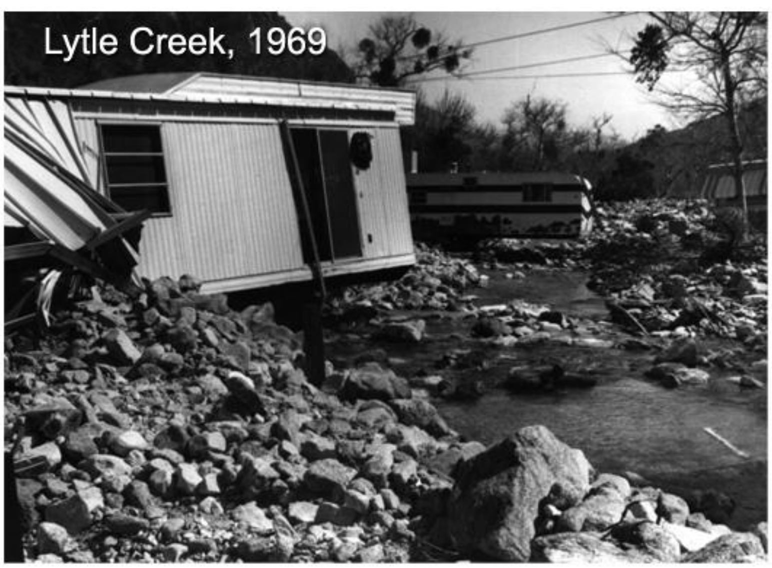
- **Maximize Conjunctive Use:** The BTAC has developed Conjunctive Use Guidelines for the SBBSBB that are intended to optimize the storage potential in this basin. Conjunctive use potential should also be evaluated for the other basins in the Region. The use of groundwater models in conjunction with available supplies can help maximize storage of water during wet years across all basins in the Region.
- **Reduce the Risk of Liquefaction:** A significant portion of the SBB—generally, the downtown and southern portions of the City of San Bernardino—is an area of historically high groundwater. Groundwater levels in this area have been artesian in the past. When high groundwater is combined with the thick layer of sand in the aquifer it can cause liquefaction in an earthquake. The BTAC produces a report each year that evaluates the risk of liquefaction in the SBB and establishes a recharge threshold for the year.
- **Protect Groundwater Quality:** There are some contamination plumes within the Region. Most of these plumes resulted from historic military and industrial operations in the Region. Most of these plumes have been remediated and the remainder are in the process of being remediated.

In addition to contamination plumes from historic activities, stormwater from urban areas can also carry contaminants. As stormwater capture projects are implemented, groundwater quality impacts will need to be a consideration.

6.2.3 Protection of Water Quality

Groundwater quality in the Upper SAR watershed is generally good, though there are a number of contamination plumes in the upper watershed that are in the process of remediation, as discussed in Chapter 3. Water quality impacts in the Region are largely due to the presence of the defense industry and agriculture. In the past, the defense industry routinely dumped solvents onto the ground which soaked into the groundwater. Agriculture resulted in an accumulation of salts that are now in the unsaturated soils overlying groundwater basins (now defined in the Basin Plan as groundwater management zones). These salts will degrade groundwater quality over time.

Currently, the primary groundwater quality concerns in the Region include TDS, nitrogen, PCE, TCE, and perchlorate. Additionally, contaminants of emerging concern (CECs), such as Per- and polyfluoroalkyl substances (PFAS) are a concern as future regulations of CECs may require additional treatment. Finally, as discussed in Chapter 3, thirteen water bodies in the Region are on the State's 303(d) list for impairments that include pathogens, nutrients, metals, sediment, and/or PCBs. Implementing projects that protect and improve water quality in the Region is important to protecting drinking water quality as well as protecting water quality in downstream areas.



6.2.4 Flood Management with Recharge Benefits

The management of storm waters that flow through the San Bernardino Valley has been an ongoing challenge since the SBCFCD was created in 1939. Multiple flooding events, some with the loss of life, have occurred in the intervening years. One of the primary purposes of the SBCFCD is to manage flood waters and natural stream flow for the protection of residents, public and private properties, and the utilities that are vital for the communities. A stronger understanding of the area's most in need of flood improvements was identified by stakeholders in the region and will help to better define project needs and reduce flood risk.

The SAR Wash was historically a natural floodplain and alluvial fan that provided a place to convey frequent devastating flood waters and to deposit sediment. The alluvial deposit provided excellent conditions for percolating surface water to the groundwater basin.

The United States Geological Survey estimates that most of the recharge of rainfall occurs in the bottoms of the creeks, rivers, and unlined channels.

Protecting open space areas for flood protection is critical. Retaining stormwater for recharge, a secondary mission of SBCFCD, is also needed to help meet future water supply needs. The Region has identified several flood control basins to be used for recharge of water when they are not needed for flood control.

6.2.5 Habitat and Open Space Preservation

The Region contains extraordinary natural resources, including the San Bernardino National Forest in its headwaters, and unique habitat types, endangered or threatened species in the San Bernardino Valley. Recently completed habitat conservation plans identify targets for preservation of wetland and riparian habitat in the Santa Ana River and tributaries.

> The Region desires to be proactive in working with Federal and State agencies to improve habitat, preserve open space, and increase recreational areas while maximizing the protection, enhancement and beneficial use of the Region's water resources.

6.2.6 Disaster Preparedness

The Region is in a seismically active area of Southern California. Four major fault zones are found in the Region, including the San Jacinto Fault, the Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the San Andreas Fault. Numerous other minor faults associated with these larger fault structures may also present substantial hazards.

While not the only cause for a catastrophic water supply interruption, the postulated magnitude 8.0 earthquake on the San Andreas Fault is one of the most likely disasters that could occur in the Region. The effects of a large magnitude earthquake on water supply were estimated based on post-earthquake surveys, earthquake planning reports included in purveyor's UWMPs, and available reports prepared by State and federal agencies. Other catastrophic interruptions caused by regional power failure, terrorist attack, or other man-made or natural catastrophic event could cause similar conditions and issues to water supply systems in the Region.

A conceptual level analysis (Vulnerability to Catastrophic Interruption of Water Supply and Disaster Preparedness, included in Part 3, Appendix E) has been performed to assess possible impacts due to seismic activity, including the following:

- An earthquake literature search of major earthquake events and what has been learned from such events
- Evaluation of catastrophic interruption of regional facilities
- Vulnerabilities of the Region's water supply system to SWP supply interruption

- Vulnerability of local purveyors' systems to an earthquake
- Summary of Findings and Recommendations
- Water Shortage contingency planning

As additional data and information becomes available, a more detailed analysis should be conducted to determine needs related to disaster preparedness. In addition, the region's water providers have prepared Water Shortage Contingency Plans (WSCPs) as part of their UWMPs and have their own Emergency Response Plans. For the UWMP Agencies within this Plan, their WSCPs are summarized in the respective agency chapters in **Part 2** and attached in **Part 4**. The Emergency Response Plans include sensitive information, so they are not provided to the public.

6.2.7 Sustainability

The Region recognizes the need to make water management decisions that ensure resources are maintained for future generations. This includes incorporating economic, social, land use, environmental sustainability into water resource management decisions. DACs and SDACs are often more vulnerable to water supply, flood, and water quality issues. The Region has made ensuring equivalent services to DACs and SDACs a priority and intends to maintain these services through the planning horizon of the IRUWMP.

6.2.8 Climate Change Resilience

The BTAC previously conducted a vulnerability assessment using the Vulnerability Assessment Checklist available in DWR's 2011 Climate Change Handbook for Regional Planning to identify the potential impacts to the Region's water resources due to climate change.

A list of primary concerns identified using the Vulnerability Assessment Checklist that should be addressed to protect the Region from potential climate change impacts includes:

- Reliance on imported water
- Processes that require cooling water
- Climate sensitive agriculture
- Wildfires that affect water quality
- Threatened beneficial uses of water bodies

Based on the concerns above, the following vulnerabilities were identified for the Region. The vulnerabilities were listed in rank order by the BTAC subcommittee updating the Plan. In all cases, actions identified in the IRWM address vulnerabilities.

Uncertainty around the Sacramento-San Joaquin Bay Delta make imported supplies less reliable.

Increasingly stringent environmental regulations and changing runoff patterns in Northern California are projected to continue to reduce the reliability of imported supplies. However, the proposed Sites Reservoir Project and Delta Conveyance Project are expected to restore nearly all of the supply that has been lost due to environmental regulation.

The Region's ability to capture additional stormwater and store it in the large underlying groundwater basins will also help diversify the region's supplemental water portfolio and increase reliability. The Region is also able to optimize its imported water by importing more water in wet years, when it is available, and storing it in the large underlying groundwater basins which will also help offset vulnerabilities.

Existing groundwater capture facilities may not have the capacity or operational ability to capture less frequent, but more intense storm events.

As much of the Region's water supply ultimately relies on precipitation, either as rain or snow in the local mountains, the ability to capture more intense storm flows is crucial. As these flows are often intense and of short duration, further development of additional facilities to capture and recharge the tail end of an intense storm would increase water supply for the Region. Plans for these facilities are discussed elsewhere in the Plan. Additionally, through a partnership between SBVWCD and Valley District, capacity to recharge water released from the Seven Oaks Dam will be increased. As the dam serves to attenuate flood flows, this project is well suited to increase the Region's capacity to recharge water.

More frequent drought periods will result in more frequent and intense wildfires. Water quality and the ability to capture storm flows will be reduced.

Wildfires are already a concern in the Region and have historically caused water quality and flood control issues. Should climate change increase drought periods and result in more frequent and intense wildfires, water quality and flood control will be further impacted.

Increased surface water temperatures will degrade water quality and negatively impact aquatic life, especially in mountain areas.

High gradient stream systems located in the mountainous areas support several species that exist in a narrow geographic range limited by altitude. Some of the more sensitive species, such as the mountain yellow-legged frog, are listed by the U.S. Fish and Wildlife Service and active restoration and recovery programs are underway. Increases in surface water temperature will negatively impact aquatic life and may eliminate sensitive species habitats altogether.

Uncertainty related to managing intense winter storms to protect downstream life and property will make holding water in the flood system for recharge more difficult.

As seasonal storms become less frequent and more intense, flood water capture for recharge may become more complex. Most efforts are focused on "scalping" the tail of a storm flow which is how the current flood control system is operated. The high-volume flows move downstream and the tailing, less intense flows can be collected by rubber dams or increased detention volume.

Increased temperatures would result in increased water demand for landscape irrigation.

As days with highs over 95 degrees increase in frequency, absent any intervention, landscape irrigation demands could increase. Recent programs by local water retailers, including a popular public-private partnership called Water Saving Garden Friendly, have provided education and resources for homeowners and businesses to reduce irrigation demand using drought tolerant plants in landscaping. A recent partnership with California State University resulted in a drought tolerant demonstration garden where the public can see and better understand the benefits of drought tolerant landscaping. Additionally, like in most parts of California, numerous incentive programs are underway to increase water use efficiency by the homeowner, especially outdoor use. These programs will need to be continued or even expanded to counteract increasing temperatures in the future.

Decreased runoff and subsurface flows from the mountain front areas as the result of more frequent and severe droughts.

As drought conditions become more frequent, it becomes more important to capture storm flows when they are available. Further development of recharge facilities within the Region and imports of water during wet years for underground storage allows the Region to store water for use during periods of drought. The Bunker Hill Subbasin is a valuable resource, and the cooperative management of the basin has created the potential to store more water in wet years.

As summarized above, most of the Region's vulnerabilities are addressed by work already occurring in the upper watershed. More active stormwater capture, investment in the Sites Reservoir Project and Delta Conveyance Project and continued recharge of imported water in wet years, when it is plentiful, will help prepare the Region for changed climatic conditions.

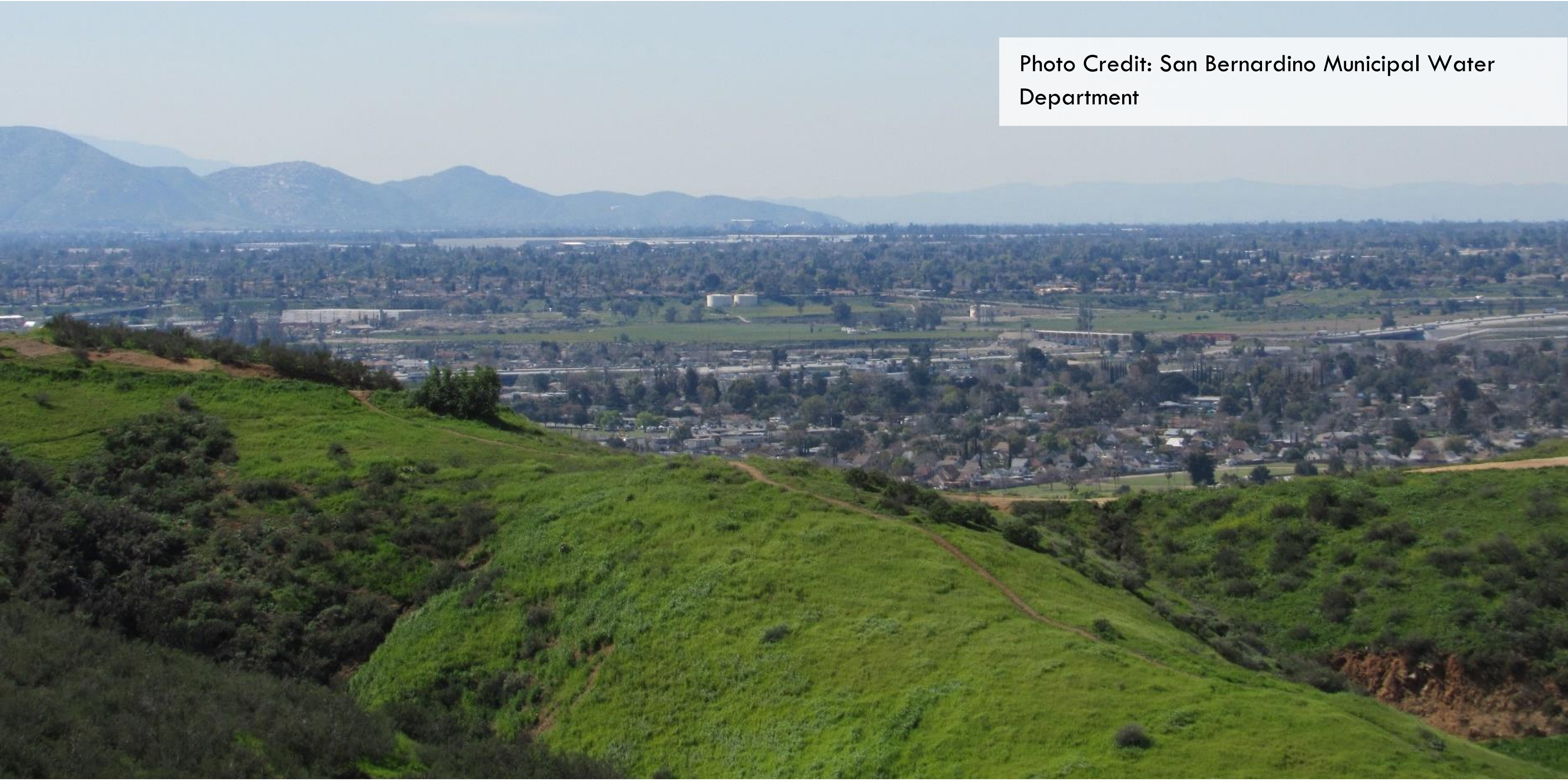


Photo Credit: San Bernardino Municipal Water Department

6.3 Water Management Goals and Objectives

Using the needs of the IRWM Region described in the previous section, the Region confirmed the 4 goals from the 2015 IRWM Plan and established a new goal relating to climate change.

This Plan establishes following five goals:

1. Improve Water Supply Reliability
2. Balance Flood Management and Increase Stormwater Recharge
3. Improve Water Quality
4. Improve Habitat and Open Space
5. Address Climate Change through Adaptation and Mitigation

The Region established measurable objectives for each of the five goals. The resulting 16 objectives consider the State's planning guidance in the 2016 Integrated Regional Water Management Grant Program, as well as the priorities and opportunities unique to the IRWM Region. These objectives are described in the sections that follow.

6.3.1 Goals and Objectives Development

Water management goals are the broad statements that drive water management planning in the Region. Water management objectives are the more specific and measurable ways of achieving these goals. The objectives in this Plan are tailored to the Region's needs and priorities as well as the priorities of the State. Water management strategies are the methods the Region plans to use to achieve its objectives. These strategies are described in detail later in this chapter.

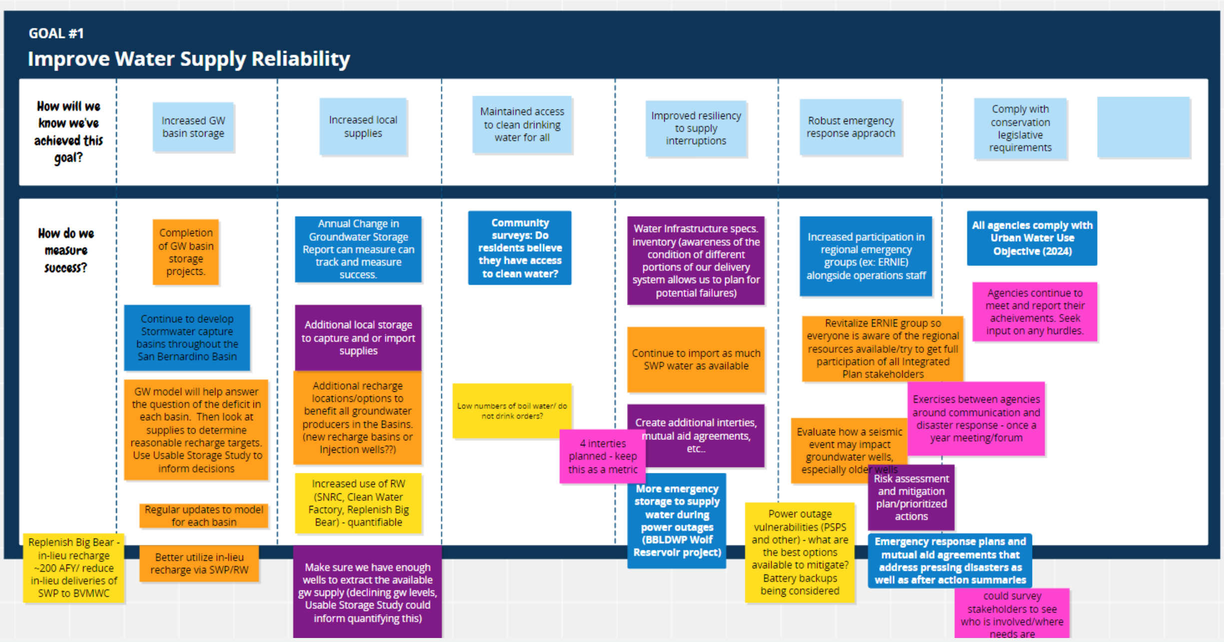
Figure 6-1. Hierarchy of Goals, Objectives, and Strategies

6.3.1.1 Objectives Development Process

The BTAC is responsible for preparing and updating the IRUWMP, including reviewing and refining the objectives to ensure they remain relevant to current needs of the IRWM Region. The objectives for the 2020 IRUWMP were developed based on a combination of current water resources-related needs, progress in meeting the 2015 IRWM Plan objectives, and current Statewide planning, policies, and regulations. The water resources management entities in the Region will strive to complete projects and programs that meet these objectives over the next five years.

Information regarding regional needs and progress in meeting the 2015 IRWM Plan objectives was solicited from stakeholders at a workshop held on November 16, 2020 and via email. Proposed changes to the Region's objectives were developed and provided to stakeholders via email and reviewed at a workshop held on February 22, 2021.

Part 3 Appendix F contains a matrix of how feedback received at the February 2021 workshop was incorporated into Chapter 6 of this Plan. The 2020 IRUWMP objectives were then refined to reflect stakeholder comments and are described in **Section 6.3**.



Stakeholders participated in a series of interactive virtual workshops where they broke into small groups to provide input on needs, goals and objectives using a virtual whiteboard and sticky notes.

IRWM Region Goals and Objectives for the Next 5 Years

GOAL #1
IMPROVE WATER SUPPLY RELIABILITY

1a: Comply with conservation legislation requirements (AB1668 and SB606)

1b: Increase utilization of local supplies by 20,000 AFY

1c: Implement the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) to increase storage in the SBB by 64,000 AF

1d: Improve system resiliency and the ability to respond to emergency supply interruptions by increasing back-up facilities, increasing interties, adding redundant power sources and treatment facilities

1e: Continue to ensure equitable access to clean drinking water for all communities

1f: Complete groundwater management plans for the San Bernardino, Rialto-Colton and Yucaipa Basins

GOAL #2
BALANCE FLOOD MANAGEMENT AND INCREASE STORMWATER RECHARGE

2a: Complete necessary agreements to use flood control retention/detention basins for recharge in the San Bernardino, Rialto-Colton and Yucaipa Basins when not needed for flood control

2b: Implement 20 acres of integrated flood projects that also provide multiple benefits, where possible

2c: Continue to ensure equivalent implementation of flood projects in DAC areas and implement at least 1 flood control project in a DAC area

2d: Identify 4 urban stormwater capture projects to increase recharge and improve surface water quality

GOAL #3
IMPROVE WATER QUALITY

3a: Ensure no violations of drinking water quality standards

3b: Proactively address new constituents of concern as MCLs are developed

3c: Manage total dissolved solids and nitrogen in groundwater

GOAL #4
IMPROVE HABITAT AND OPEN SPACE

4a: Preserve or improve habitat by conserving or restoring 150 acres of riparian, wetland and permanent water areas by implementing projects in the Wash HCP and River HCP.

4b: Identify "multi-use" opportunities to increase recreation and public access and identify 4 multi-use projects

GOAL #5
ADDRESS CLIMATE CHANGE THROUGH ADAPTATION AND MITIGATION

5a: Implement local supply and flood control projects to help offset the impacts of climate change

5b: Implement 4 projects to reduce or offset energy consumption or reduce GHG emissions associated with water and wastewater systems

5c: Complete the SBVMWD Climate Adaptation and Resilience Plan (CARP)

6.3.2 Goal #1: Improve Water Supply Reliability

Water supply reliability can generally be improved by reducing demand and/or by increasing supply. Demand reduction is required by two California State Legislature policy bills passed in 2018 (Senate Bill (SB) 606 and Assembly Bill (AB) 1668). Water supply for the Region can be developed by increasing use of local supplies such as recycled water, groundwater, and stormwater.

True reliability occurs when there is a redundancy, or "reliability factor", in supplies that allows the Region to adapt to changing conditions. For example, developing additional stormwater capture may overcome a deficit in the amount of precipitation assumed into the future. The reliability factor will help the Region adapt to unknowns such as future precipitation amounts, future imported water availability, climate change impacts, changes in demand patterns and other unknowns.

RAND Corporation studied the plausible uncertainty in both supplies and demands in the region based upon climate change and other factors and determined that a 15% reliability factor will help overcome the plausible uncertainties. RAND also developed a methodology for calculating the reliability factor that can be used to evaluate the reliability factor during each planning cycle.

Several objectives were identified to improve water supply reliability in the Region. These include managing demands, increasing local supplies, increasing overall water storage, preparing for potential disasters, managing climate change impacts, and ensuring DACs receive equivalent services.

Additionally, continued work on the proposed Sites Reservoir Project and Delta Conveyance Project are expected to restore nearly all of the supply that has been lost due to environmental regulation.

6.3.2.1 Objective 1a: Comply with conservation legislation requirements (AB1668 and SB606)

Water conservation programs in the Region have grown over the past several years in response to both drought and conservation legislation such as SBX7-7. In 2018, the State Legislature passed SB 606 and AB 1668 in response to Governor Brown's Executive Order B-37-16. These two bills establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting and more intense droughts in California. To accomplish this, the bills provide "complementary authorities and requirements that affect water conservation and drought planning for urban water suppliers, agricultural water suppliers, and small water suppliers and rural communities." (DWR and SWRCB, 2018)

This conservation legislation will require that retail water suppliers meet numerical water use efficiency standards for indoor and outdoor residential use, and commercial/industrial/institutional (CII) outdoor landscaping. While the only numeric standard that is available is residential indoor use (set at 55 gpcd before January 1, 2030 and 50 gpcd after January 1, 2030), the remaining standards have not yet been set by the State. It is expected that urban retail water suppliers will begin submitting annual reports on urban water use objectives and actual use in November 2023. Annual urban water use reporting is discussed further in Section 4.6.2.

Metrics:

- Volume of water used in each supplier's service area (to be defined by water use objectives to be set by the State)

6.3.2.2 Objective 1b: Increase stormwater capture and recycled water use by 20,000 AFY

Increasing the use of stormwater and recycled water to meet demand helps the Region develop a more diverse water supply portfolio that adds resiliency against interruptions in imported water deliveries. In addition, increasing local supply use will help to reduce dependence on the Delta.

Metrics:

- Volume of stormwater to be captured by new or expanded recharge basins
- Volume of recycled water used through new non-potable uses or for new recharge projects

6.3.2.3 Objective 1c: Implement the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) to increase storage in the SBB by 64,000 AF

Storing water, primarily in groundwater basins, in wet years for later use during dry periods (conjunctive use) is a foundational strategy to help improve water supply reliability.

Valley District, Western and other agencies in the Santa Ana Watershed are implementing SARCCUP, a cooperative program with Metropolitan to store imported water during wet years for use during dry years. The initial phase is expected to increase storage in the SBB by 64,000 AF.

In addition, through the Valley District Cooperative Recharge Program, retail agencies in the Valley District service area store imported water during wet years so that it is available in dry years. The area will need to increase recharge over time to help offset increasing demands and other uncertainties. The preferred storage location is in local groundwater basins to reduce evaporative losses and transportation costs, though storage can also occur in upstream locations or the Central Valley.

Metrics:

- Volume of water recharged under SARCCUP

6.3.2.4 Objective 1d: Improve system resiliency and the ability to respond to emergency supply interruptions

Improving the Region's water system resilience against disasters such as earthquakes and other catastrophic events that could cause damage to water supply systems is an important priority for the Region's water suppliers. Earthquakes can displace pipelines, interrupt power supply to pump stations and treatment facilities, and cause water service outages of local and SWP water. While increasing storage can provide reserves if there is an interruption of SWP water, facilities must be capable of delivering the water to customers. Projects such as back-up facilities and interties can be used during an emergency to supply water from water systems that are not damaged. Adding redundant power sources and treatment facilities will ensure that clean, safe water is delivered to customers during emergencies. Finally, agreements for mutual aid and participation in regional emergency preparation exercises (such as the Great Shakeout) can help agencies to prepare for, respond to and recover from local and regional disasters. Programs such as the Emergency Response Network of the Inland Empire (ERNIE) are currently in place and several agencies in the Upper Santa Ana River Watershed are members.

Metrics:

- Number of new interties constructed
- Number of back-up facilities constructed
- Number of emergency power sources installed
- Number of redundant treatment systems implemented
- Volume of new emergency storage constructed
- Number of mutual aid agreements in place
- Number of emergency preparedness exercises participated in by agencies

6.3.2.5 Objective 1e: Continue to ensure equitable access to clean drinking water for all communities

Supporting water supply projects that benefit DACs and SDACs is an important aspect in maintaining water supply reliability. The Region strives to maintain equitable water supply services for DACs and SDACs and will continue to do so in the future.

Metrics:

- Number of households participating in low-income support programs provided by retailers

6.3.2.6 Objective 1f: Complete Groundwater Management Plans for the San Bernardino, Rialto-Colton, and Yucaipa Basins

The Region's groundwater basins serve as a valuable water supply source to meet water demands as well as a local location to store water for use in droughts or emergencies. Agencies are planning to develop groundwater management plans for the San Bernardino, Rialto-Colton, and Yucaipa Basins to ensure the sustainable use of the basins into the future.

Metrics:

- Groundwater management plans completed

6.3.3 Goal #2: Balance Flood Management and Increase Stormwater Recharge

While conveying flood water safely through the Region is of critical importance, detaining runoff for recharge is also desirable. This goal represents the Region's need to balance the use of flood control basins and channels to reduce flood risk while using of these same flood control facilities to enhance stormwater capture and recharge.

6.3.3.1 Objective 2a: Complete necessary agreements to use flood control retention/detention basins for recharge in the San Bernardino, Rialto-Colton and Yucaipa Basins when not needed for flood control.

The Region's water agencies desire to continue to wisely utilize the natural streams and local groundwater for the benefit of all the residents. Using flood control basins to capture stormwater for recharge will increase groundwater supplies. The Region is actively pursuing these types of projects. For example, Valley District and SBCFCD are developing an agreement to allow continued use of flood control basins for recharge that will support implementation of this objective.

Metrics:

- Number of MOUs implemented to use flood control retention/detention basins for recharge

6.3.3.2 Objective 2b: Implement 20 acres of integrated flood projects that also provide multiple benefits, where possible

Preserving flood plains will reduce the risk of flood waters damaging municipal and private property. The Region recognizes the importance of preserving flood plains to decrease flood risk, but also that these areas may provide multiple benefits such as increased open space and habitat, particularly in "park poor" areas.

Metrics:

- Acres of new integrated flood projects constructed

6.3.3.3 Objective 2c: Continue to ensure equivalent implementation of flood projects in DAC areas by implementing at least one flood control project in a DAC area

The Region recognizes the importance of supporting flood management projects in DACs and will continue to ensure equivalent implementation of flood projects in DAC areas. As a first step, it will be necessary to conduct a mapping exercise to identify areas that currently experience flooding issues to prioritize projects that most effectively reduce flood risk and determine whether DAC areas will benefit.

Metrics:

- Development of a map of areas experiencing flooding issues
- Number of flood control projects implemented in DAC areas

6.3.3.4 Objective 2d: Identify 4 urban stormwater capture projects to increase recharge and improve surface water quality

While large, centralized stormwater recharge and flood management projects can provide significant benefits, smaller, urban stormwater capture projects can provide multiple benefits. Urban areas have historically increased the impervious surfaces in municipalities, which reduces the ability to recharge groundwater basins and increases the pollutant loads reaching receiving waters. Capturing stormwater in urban areas for either recharge or direct use can increase groundwater recharge and improve surface water quality, as well as provide additional benefits such as increased open space, reduced localized flooding, increased habitat, and many other benefits.

Metrics:

- Number of urban stormwater capture projects implemented

6.3.4 Goal #3: Improve Water Quality

Improving water quality in the Region is critical for ensuring safe and sustainable surface and groundwater, human health and preserving aquatic species.

6.3.4.1 Objective 3a: Ensure no violations of drinking water quality standards

The retail water agencies in the Region must comply with water quality regulations. These regulations require routine sampling of water supplies to ensure compliance. Overall water quality is reported to customers in annual consumer confidence reports. The Region is not recommending any additional water quality monitoring requirements beyond what is already required by state and federal regulations.

Metrics:

- Number of drinking water quality standard violations reported in Consumer Confidence Reports and/or to the SWRCB
- Number of boil water or ”do not drink” orders

6.3.4.2 Objective 3b: Proactively address new constituents of concern as MCLs are developed

Local groundwater is an important water supply source for the Region. Maintaining and improving the water quality of supplies ensures safe water for human health and aquatic life. Several contaminant plumes are present throughout the Region, and include the Newmark-Muscoy, Redlands-Crafton, Santa Fe, former Norton Air Force Base, Rialto-Colton Subbasin, and No-Man's Land plumes. Cleanup of the Newmark-Muscoy and former Norton Air Force Base Plumes is progressing under the EPA Superfund Program. While these plumes are known and managed, there may be future groundwater quality contamination issues due to new MCLs under development by the US EPA and the SWRCB. By tracking MCLs currently under development, such as PFAS/PFOA and Chromium-6, pumpers can proactively address the new constituents of concern to ensure uninterrupted use of groundwater.

Metrics:

- Volume of groundwater treated to address contaminant plumes
- Pounds of contaminants removed from groundwater through treatment

6.3.4.3 Objective 3c: Complete Salt and Nutrient Management Plan for the Region.

Long-term historic land use practices have caused the accumulation of salts and nitrates in the soils overlying the groundwater basins in the Region, resulting in TDS and nitrate contamination in the basins. The construction and operation of groundwater desalters to extract and treat poor-quality groundwater has been and continues to be an essential component of salt and nutrient management in the Santa Ana watershed. Such projects will be increasingly important in the USARW to protect local water supplies and provide supplemental, reliable sources of potable supplies. In addition, Valley District is planning to develop a Salt and Nutrient Management Plan for the area to improve management of TDS and nitrate.

Metrics:

- Progress made in developing a Salt and Nutrient Management Plan

6.3.5 Goal #4: Improve Habitat and Open Space

Improving habitat and open space areas has multiple benefits for the Region including improving water supply, water quality, flood management, ecological resources, and recreational opportunities. The Region recognizes the potential to improve water resources management by protecting and improving open space areas.

6.3.5.1 Objective 4a: Preserve or improve habitat by conserving or restoring 150 acres of riparian, wetland, and permanent water areas by implementing projects in the River HCP and Wash HACP

Habitat and open space provide multiple benefits including ecological protection and stewardship; creation of recreational opportunities; protection of water source and quality through promotion of natural recharge, attenuation of runoff and reduction of erosion; and improvement of quality of life. Restoration projects can also protect threatened and endangered species. Restoring and improving habitat through integrated water resources projects and programs will help the Region to maintain and improve habitat benefits. Based on the Upper Santa Ana River HCP and the Upper Santa River Wash HCP, over the next five years, approximately 150 acres of riparian, wetland and permanent water habitat will be conserved.

The San Bernardino National Forest is home to extraordinary natural resources that Region strives to protect and enhance for the benefit of the environment and communities.

Metrics:

- Acres of riparian, wetland and permanent water areas preserved or improved

6.3.5.2 Objective 4b: Identify "multi-use" opportunities to increase recreation and public access and identify 4 multi-use projects

The Region recognizes the need to balance between growth of urban areas and the environment to maintain a viable habitat for native plant and wildlife species, and to maintain a high quality of life for watershed residents and visitors. An effective way to establish this balance is the development of open space corridors that allow for multiple species habitat, wetlands, storm flow capture for aquifer recharge, water quality improvements, as well as passive and active recreational facilities and open spaces.

Metrics:

- Acres of multi-use projects implemented

6.3.6 Goal #5: Address Climate Change through Adaptation and Mitigation

6.3.6.1 5a: Implement local supply and flood control projects to help offset the impacts of climate change

Climate change may have wide-ranging impacts on the Region's water resources. Generally, there is great uncertainty in the magnitude, timing, and location of precipitation and runoff changes associated with climate change. However, it is generally agreed that climate change could change runoff patterns. There is also a great level of uncertainty in the reduction, if any, in water supply due to climate change for Southern California and for the Upper SAR watershed in particular. Various strategies planned for implementation in the Region may also help to address potential climate change impacts. For example, potential reductions in imported supply reliability due to climate change can be addressed by increasing use of local supplies. The Region will continue to adaptively manage its water resources while implementing "no regret" strategies that will provide benefits under both current climate conditions while also addressing climate change impacts.

Metrics:

- Projects implemented that address or manage climate change impacts

6.3.6.2 5b: Implement 4 projects to reduce or offset energy consumption or reduce GHG emissions associated with water and wastewater systems

In addition to adapting to the effects of climate change, the Region recognizes the need to mitigate against future climate change by reducing or offsetting the energy consumption or GHG emissions associated with water and wastewater systems. The region recognizes that during hot periods when water is in high demand, the electricity system is also experiencing peak demand. Projects such as solar panels, microgrids, hydroelectric power and improving energy efficiency of facilities can help to reduce the energy consumption of water facilities. This mitigation objective is consistent with the California Air Resources Board AB 32 Scoping Plan which aims to reduce GHG emissions in the State to 1990 levels by 2020. Project proponents are encouraged to consider the strategies adopted by CARB in its AB 32 Scoping Plan when developing projects to identify potential "no regret" strategies.

Metrics:

- Number of projects implemented that reduce or offset non-renewable energy use or GHG emissions associated with water or wastewater systems
- Decrease in the energy intensity of water supplies in kWh/AF

6.3.6.3 5c: Complete the SBVMWD Climate Adaptation and Resilience Plan (CARP)

SBVMWD is planning to develop the CARP to serve as a comprehensive policy and strategy document for addressing the undesirable impacts of climate change on SBVMWD and will identify targeted policies, programs and projects that will both mitigate SBVMWD's contribution to GHGs and increase SBVMWD's adaptive capacity.

Metrics:

- Completion of the CARP

6.3.7 Prioritization of Objectives

Given that this Plan is intended to be a truly integrated plan, the Region elected not to prioritize the objectives with the understanding that each objective is equally important relative to the others. The Region may prioritize objectives as funding opportunities become available to align projects with the goals of each funding program.

6.4 Water Resource Management Strategies

This section considers the water resource management strategies the Region can use to meet the goals and objectives discussed in Section 6.3.

6.4.1 Consideration of Strategies

The Region considered several strategies for implementing the goals and objectives described above. The IRUWMP largely uses the Resource Management Strategies (RMS) described in the California Water Plan (CWP) but considers additional strategies that are relevant to the Region. To be consistent with the CWP, the Region adopted the terminology used in the 2016 CWP Update[1]. The RMS included in the IRUWMP are those that have synergies with the Region's goals and objectives. Additional water management strategies specific to the Region were developed by stakeholders for the 2007 IRWM Plan and reviewed during the BTAC Workshop on Objectives and Strategies held on September 16, 2014. These additional water management strategies are still relevant to the Region and have been preserved in this Plan update.

The following RMS were not considered feasible or applicable for implementation in the Region:

[1] The 2018 CWP did not provide further updates to the RMS.

- **Precipitation Enhancement:** The Santa Ana Watershed Project Authority is planning a pilot study of cloud seeding. Depending upon the outcome of that study, the region may choose to consider this water resource management strategy sometime in the future.
- **Surface Storage – CALFED/State:** The Seven Oaks Dam was built primarily for flood control but could be used for seasonal storage, if authorized. Valley District, on behalf of the region, is working to get seasonal storage authorized for the dam. Should that occur, the region will work together to best utilize that asset to enhance water supply reliability.
- **Develop Desalination:** The region is located inland, and therefore would not benefit directly from ocean desalination. The region may consider a regional project that provides in-lieu exchange of supplies for desalinated water if it became available in the future.
- **Other Strategies (crop idling for water transfer, dew vaporization/atmospheric pressure desalination, fog collection, irrigated land retirement, rainfed agriculture, snow fences, and waterbag transport/storage technology):** Many of these RMS are either infeasible or use relatively new and unproven technologies; therefore, they would not be favored unless all other strategies presented in this chapter have been exhausted. Specific characteristics of the Region that make several of these strategies impractical include low amounts of rain, fog, and agriculture.

In many instances, regional strategies can address multiple planning objectives and goals. For example, protection of recharge areas could help meet the objectives to increase storage, reduce flood risk, improve water quality, and restore and improve habitat and open space. The remainder of this section describes the strategies selected for inclusion in the Plan, shown in **Table 6-1**, as well as the integration of these strategies. These strategies are grouped by general topic, but often can provide additional benefits.

Table 6-1: Water Resource Management Strategies

STRATEGIES	GOALS: IMPROVE WATER SUPPLY RELIABILITY	BALANCE FLOOD MANAGEMENT AND INCREASE STORMWATER RECHARGE	IMPROVE WATER QUALITY	IMPROVE HABITAT AND OPEN SPACE	ADDRESS CLIMATE CHANGE THROUGH ADAPTATION AND MITIGATION
REDUCE WATER DEMAND					
Implement Urban Water Use Efficiency*	✓				✓
Implement Agricultural Water Use Efficiency *	✓				✓
INCREASE WATER SUPPLY					
Increase Recharge	✓	✓			✓
Increase Surface Water and Groundwater Storage Inside and Outside the Region*	✓				✓
Optimize Wet Year Storage and Dry Year Pumping (Conjunctive Management & Groundwater)*	✓				✓
Increase Recycled Water Use*	✓				✓
Increase Stormwater Capture	✓	✓	✓		✓
Support Bay Delta Conservation Project	✓				✓
IMPROVE OPERATIONAL EFFICIENCY AND TRANSFERS					
Operate Existing Facilities to Increase Recharge		✓			✓
Implement System Reoperation*	✓				✓
Improve Supply Conveyance – Delta*	✓				✓
Improve Supply Conveyance – Regional/ Local*	✓				✓
Identify Water Transfer Opportunities*	✓				✓
IMPROVE WATER QUALITY					
Match Water Quality to Use*			✓		
Improve Drinking Water Treatment and Distribution*			✓		
Implement Pollution Prevention Measures*			✓		
Manage Salt and Salinity*	✓		✓		
Manage Sediment*			✓	✓	
Manage Urban Runoff*			✓		
Remediate Groundwater Contamination Plumes*			✓		

*Table continues on the next page

STRATEGIES	GOALS: IMPROVE WATER SUPPLY RELIABILITY	BALANCE FLOOD MANAGEMENT AND INCREASE STORMWATER RECHARGE	IMPROVE WATER QUALITY	IMPROVE HABITAT AND OPEN SPACE	ADDRESS CLIMATE CHANGE THROUGH ADAPTATION AND MITIGATION
IMPROVE FLOOD MANAGEMENT					
Manage Flood Risk*		✓			
PRACTICE RESOURCES STEWARDSHIP					
Continue Basin Management in Local Groundwater Basins	✓				✓
Develop Watershed Management Projects and Programs*			✓	✓	✓
Identify Corridors for Species				✓	
Restore Ecosystems*		✓		✓	✓
Protect Recharge Areas*	✓	✓	✓	✓	
Implement Agricultural Lands Stewardship*		✓			
Continue Forest Management and Hazardous Fuels Reduction*		✓	✓	✓	✓
Coordinate Land Use Planning and Management with Water Resources Management*		✓	✓	✓	
Incorporate Environmental Opportunities and Constraints into the Design Process for Facilities				✓	
Incorporate Opportunities to Improve Habitat and Increase Recreation and Public Access During the Facilities Design Process				✓	
Participate in the SAWPA Basin Management Task Force			✓		
PEOPLE AND WATER					
Provide Economic Incentives*	✓	✓	✓	✓	
Support the Bay-Delta Conservation Plan	✓		✓		
Increase Outreach and Engagement*	✓		✓	✓	✓
Maintain and Improve Water-Dependent Recreation*				✓	
Consider Water and Culture*	✓		✓	✓	

* CWP RMS

6.4.2 Description of Water Management Strategies

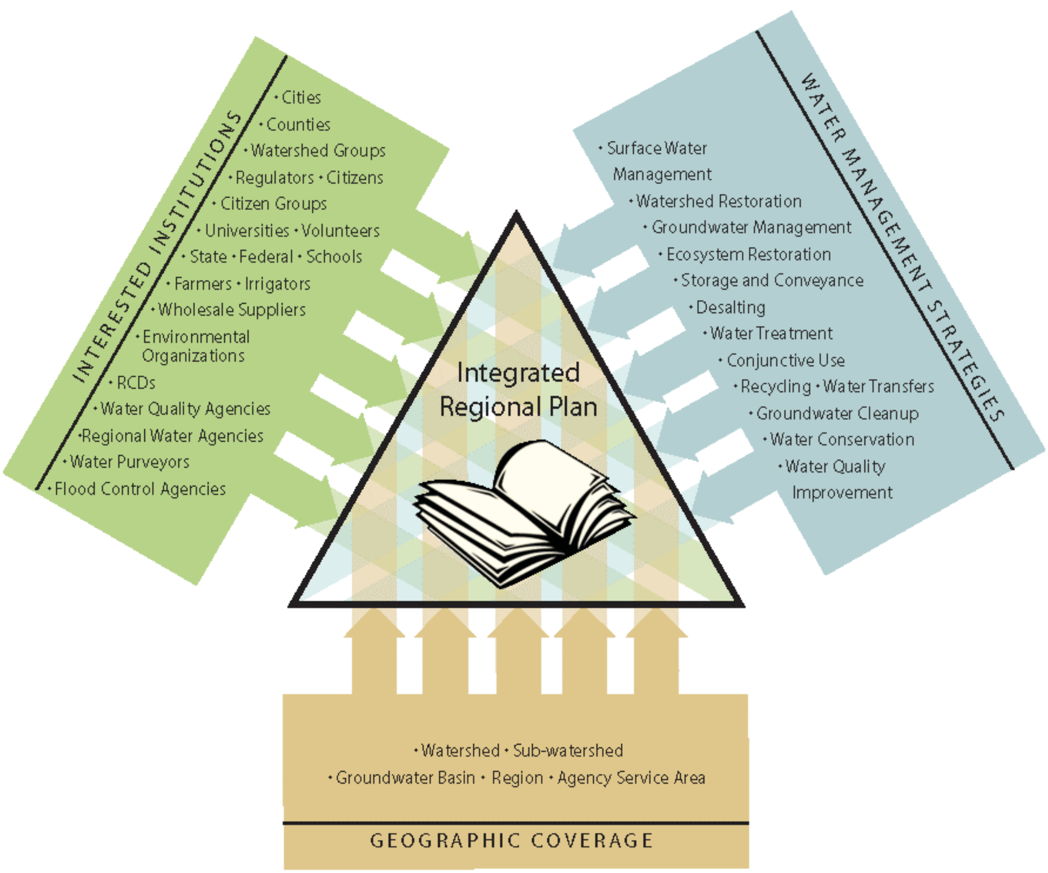
The water management strategies selected for inclusion in the IRUWMP are described in detail in **Part 3 Appendix I**.

6.4.3 Integration of Water Management Strategies

Integrated planning encourages broad investigation of the interrelated strategies and implementation of projects that provide multiple benefits. Integrated regional water management planning brings various water interests, stakeholders, and institutions together to plan for future management and use of resources in a large geographic area (**Figure 6-2**). The BTAC recognized from the beginning of the planning process that management of groundwater resources, surface supplies, stormwater, and imported water are inseparable and intrinsically interrelated. It is also recognized that water quality plays a critical role in management of groundwater basins and groundwater conjunctive use implementation.

As described throughout this Section, several strategies can provide multiple benefits to the Region. In addition, interrelated water management strategies can be incorporated into planning and project implementation so that they work together in an integrated fashion. Some examples of such integrated planning are discussed below.

Figure 6-2: Integrated Planning



6.4.3.1 Integration of Local Surface Water and Groundwater Resources Strategies

Groundwater provides most of the water supply to the Region and groundwater basins are used for water storage to augment the highly variable local surface water supplies during dry periods. To maintain water supply reliability in the Region, surface water and groundwater resources must be integrated and optimized. When surface water is available it should be used for recharge as well as direct use. In addition, the Region should work to capture and recharge more surface water in any given year. These goals can be achieved through integration of surface water and groundwater strategies.

6.4.3.2 Integration of Stormwater Management, Flood Management, Water Supply Reliability, and Surface and Groundwater Quality

Although stormwater can cause flooding, with proper management it could provide a source of water supply to the Region. Improvement in the management of stormwater can help the region achieve multiple objectives while integrating multiple strategies. Generally speaking, stormwater is captured and conveyed to detention basins to reduce peak flood flows and reduce flood damage. However, these detention basins can also be designed to settle the suspended sediment and pollutants out of the water, increase groundwater recharge, and possibly provide wildlife habitat. Use of stormwater for groundwater recharge and use of flood control detention basins for groundwater recharge during the non-flood seasons are strategies that have been used within the Region and should be further enhanced to improve water supply reliability and groundwater quality.

The San Bernardino County Santa Ana River Watershed Stormwater Resource Plan (SWRP), prepared in 2018, is a regional, watershed-based plan for management and improvement of stormwater resources within the Santa Ana River Watershed portion of San Bernardino County. The SWRP was prepared in line with guidance set forth by the SWRCB and has been reviewed and approved by SWRCB staff. The SWRP largely covers the same area covered by this IRUWMP, and relevant information has been incorporated into this IRUWMP.

The SWRP is included as Part 3 Appendix D.

Figure 6-3. Integration of Flood and Stormwater Managements Strategies

6.4.3.3 Integration of Water Supply and Reliability and Water Quality Strategies

Contamination plumes present a challenge and constraint for management and use of groundwater resources in the Region. An integrated approach has been taken to clean the plumes, which will eventually remove them as a constraint and improve water supply reliability for water users. Wherever possible, cleanup projects should seek to speed the cleanup of a contamination plume by pumping and treating water from key locations in the plume. This type of strategy can expedite the clean-up process.

6.4.3.4 Integration of Imported Water and Local Water Supplies and Strategies

The Region has a significant public investment in, and is dependent upon, imported water to meet its water needs into the future. However, the SWP can be unreliable. To improve the reliability of SWP water supply, the Region should take delivery of its entire Table A amount each year and store any “leftover” amount that is not used directly by the local water agencies. The water could be stored within local groundwater basins or in a “water bank.” By storing as much SWP water as possible during “wet” years, the Region will have that water available during drought periods.

6.5 Consistency with Statewide Objectives

As mentioned throughout this IRUWMP, the planning process has been developed and implemented taking into consideration DWR’s IRWM 2019 Guidelines. The Region’s objectives are consistent with the Statewide Priorities laid out in the Guidelines, as shown in **Table 6-2**.

Table 6-2: Comparison between Plan Objectives and Statewide Priorities

OBJECTIVES	STATEWIDE PRIORITIES[1] MAKE CONSERVATION A CALIFORNIA WAY OF LIFE	INCREASE REGIONAL SELF-RELIANCE AND INTEGRATED WATER MANAGEMENT	ACHIEVE THE CO-EQUAL GOALS FOR THE DELTA	PROTECT AND RESTORE IMPORTANT ECOSYSTEMS	MANAGE AND PREPARE FOR DRY PERIODS	EXPAND STORAGE CAPACITY AND IMPROVE GROUNDWATER MGMT	PROVIDE SAFE WATER FOR ALL COMMUNITIES	INCREASE FLOOD PROTECTION	INCREASE OPERATIONAL AND REGULATORY EFFICIENCY
1a. Comply with conservation legislative requirements (AB 1668 and SB 606)	●	●			●				
1b: Increase utilization of local supplies by 20,000 AFY		●	●		●	●		○	
1c: Implement the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) to increase storage in the SBB by 64,000 AF		●			●	●			○
1d: Improve system resiliency and the ability to respond to emergency supply interruptions by increasing back-up facilities, increasing interties, adding redundant power sources and treatment facilities.		●			●	○	○		
1e: Continue to ensure equitable access to clean drinking water for all communities		●			●		●		
1f: Complete groundwater management plans for the San Bernardino, Rialto-Colton, and Yucaipa Basins		○	○		○	○	○		
2a: Implement 4 MOUs to use flood control retention/detention basins for recharge when not needed for flood control		●	○		●	●		●	
2b: Implement 20 acres of integrated flood projects that also provide multiple benefits, where possible				○	○	○		●	
2c: Continue to ensure equivalent implementation of flood projects in DAC areas and implement at least 1 flood control project in a DAC area							○	●	
2d: Identify 4 urban stormwater capture projects to increase recharge and improve surface water quality		●			●	○		●	
3a: Ensure no violations of drinking water quality standards							●		
3b: Proactively address new constituents of concern as MCLs are developed				○	○	●	●		
3c: Manage total dissolved solids and nitrogen in groundwater					○	●			
4a: Preserve or improve habitat by conserving or restoring 150 acres of riparian, wetland, and permanent water areas.				●				○	
4b: Identify "multi-use" opportunities to increase recreation and public access and identify 4 multi-use projects.				●				○	
5a. Implement local supply and flood control projects to help offset the impacts of climate change	○	●	○	○	●	●		○	
5b. Implement 4 projects to reduce or offset energy consumption or reduce GHG emissions associated with water and wastewater systems.	○		○						
5c. Complete the SBVMWD Climate Adaptation and Resilience Plan		○	○	○	○			○	

Plan objective directly supports the listed Priority ○ Plan objective indirectly supports the listed Priority

1. Identify Sustainable and Integrated Financing Opportunities was removed because this Statewide Priority is directed towards State agencies and the legislature.

7

PART 1: REGIONAL CONTEXT

Projects

This chapter describes the projects that have been identified to help meet the Region's objectives and the process that will be used to evaluate new projects once the Plan has been adopted.

IN THIS SECTION

- New Project Submittal
- Prioritization and Screening Process

Many projects have been proposed by project sponsors in the Region to implement the water management strategies identified in this Plan to help achieve goals and objectives formulated during the planning process. Most of these projects are integrated and serve multiple strategies. Together, these projects help develop a regional system that would integrate the use of groundwater, SWP water, flood and stormwater, and local surface water to meet the Region's goals and objectives.

A "snapshot" of the project list at the time of this Plan update is presented in **Part 3 Appendix G**. Valley District maintains the project list on behalf of the BTAC and will post the latest version to the Valley District website for public viewing.

7.1 Existing Project List Review

For this Plan update, the existing project list was reviewed by the stakeholders and minor changes to some projects were made to update the name, contact person or estimated cost. Some projects that are no longer being pursued were removed from the list.

The existing project list included some projects that were previously placed on this list as a placeholder and were unranked. These projects were associated with the Upper SAR HCP and are still important to the Region so they were kept on the list as placeholders and will be updated and ranked once the projects are further developed. Any other projects on the existing list that were not updated or deleted by the project sponsor were also kept on the list.

The existing project list was reviewed and updated to reflect minor changes. All existing projects were carried forward unless removed by the project proponent.

7.2 New Project Submittal

A Call for Projects was also conducted to solicit new or updated projects for inclusion in the Plan. The project submittal form is included in **Part 3 Appendix G**. The project submittal process is an ongoing process that allows for updating projects and including new projects at any time.

7.3 Project Screening and Scoring Process

The BTAC Project Review Subcommittee (Subcommittee) is currently responsible for project screening and prioritization. Water agencies within the area that are not part of the BTAC are also encouraged to participate in development of the project list. The BTAC Subcommittee meets as needed to screen and prioritize any new project submittals based upon the IRUWMP screening and prioritization criteria (**Table 7-1**). At regular meetings of the BTAC members of the full BTAC review the list of projects and provide additional input and collectively decide the Region's priorities for the construction of regional facilities.

To facilitate this task, a two-step prioritization and ranking process was developed. The first step is shown in **Figure 7-2** and consists of a review of the projects to ensure that each project has a sponsor, has stakeholder support, and meets the planning objectives. The projects that do not pass the first step will not be eligible for inclusion on the project list. Project sponsors should self-perform this screening prior to submitting a project. The second step is to prioritize the projects that pass the first step. This is accomplished by scoring the projects using the criteria outlined in **Figure 7-2**. It is important to note that project ranking is a "snapshot in time" and that project rankings may adjust as the projects are further developed.

After being scored, projects are prioritized in order of score. The 2015 IRWM Plan included a third process to rank the projects into categories; however, the stakeholders decided to eliminate that step and allow the project scores alone to indicate priority.

Highly scored projects generally meet many of the following criteria, which will result in a higher score based on the criteria shown in **Table 7-1**.

A detailed list of projects available at the time this Plan was finalized are provided in **Part 3** Appendix **G**.

Figure 7-1: Project Submittal and Review Process

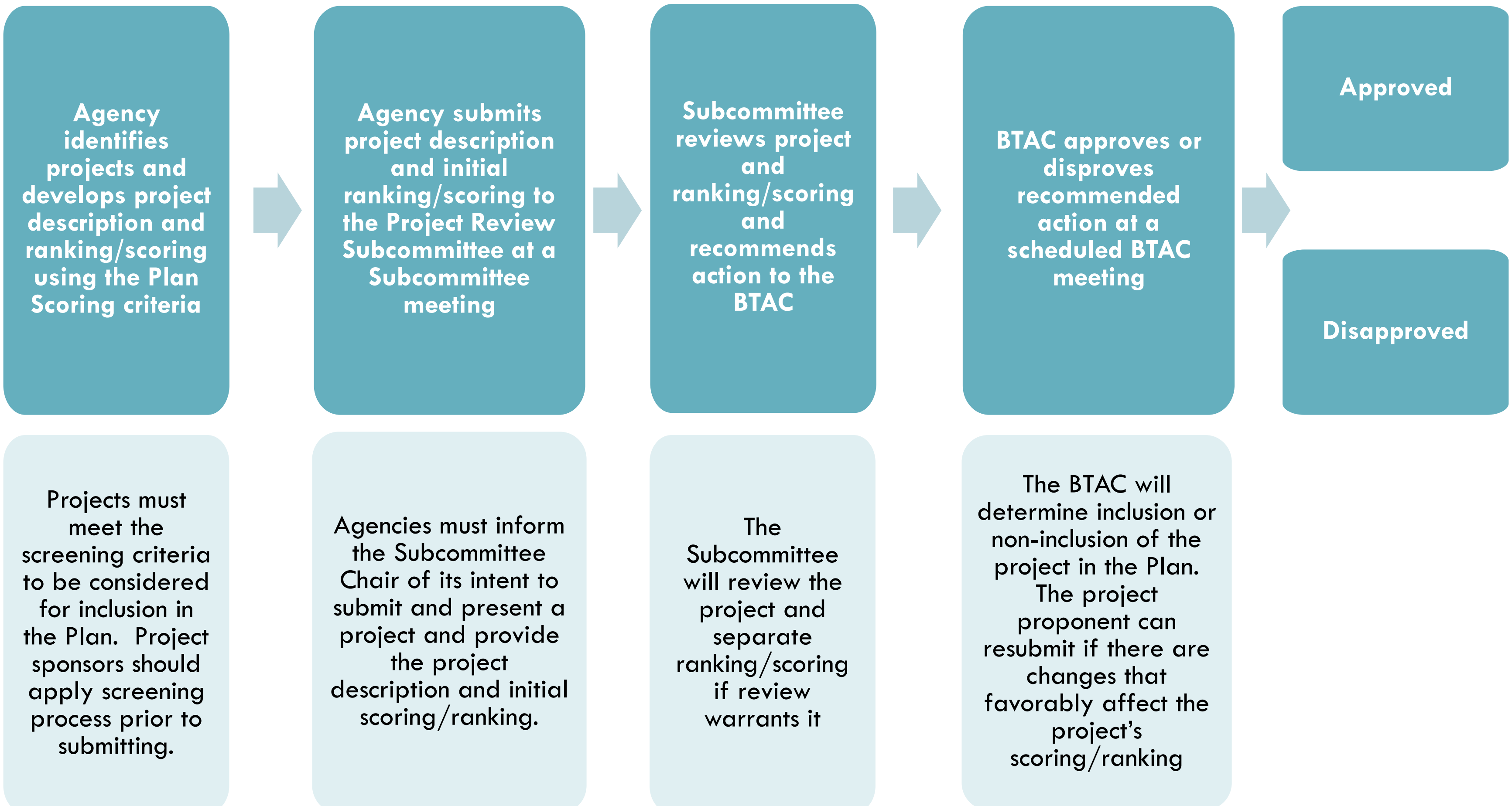


Figure 7-2: Project Screening Process

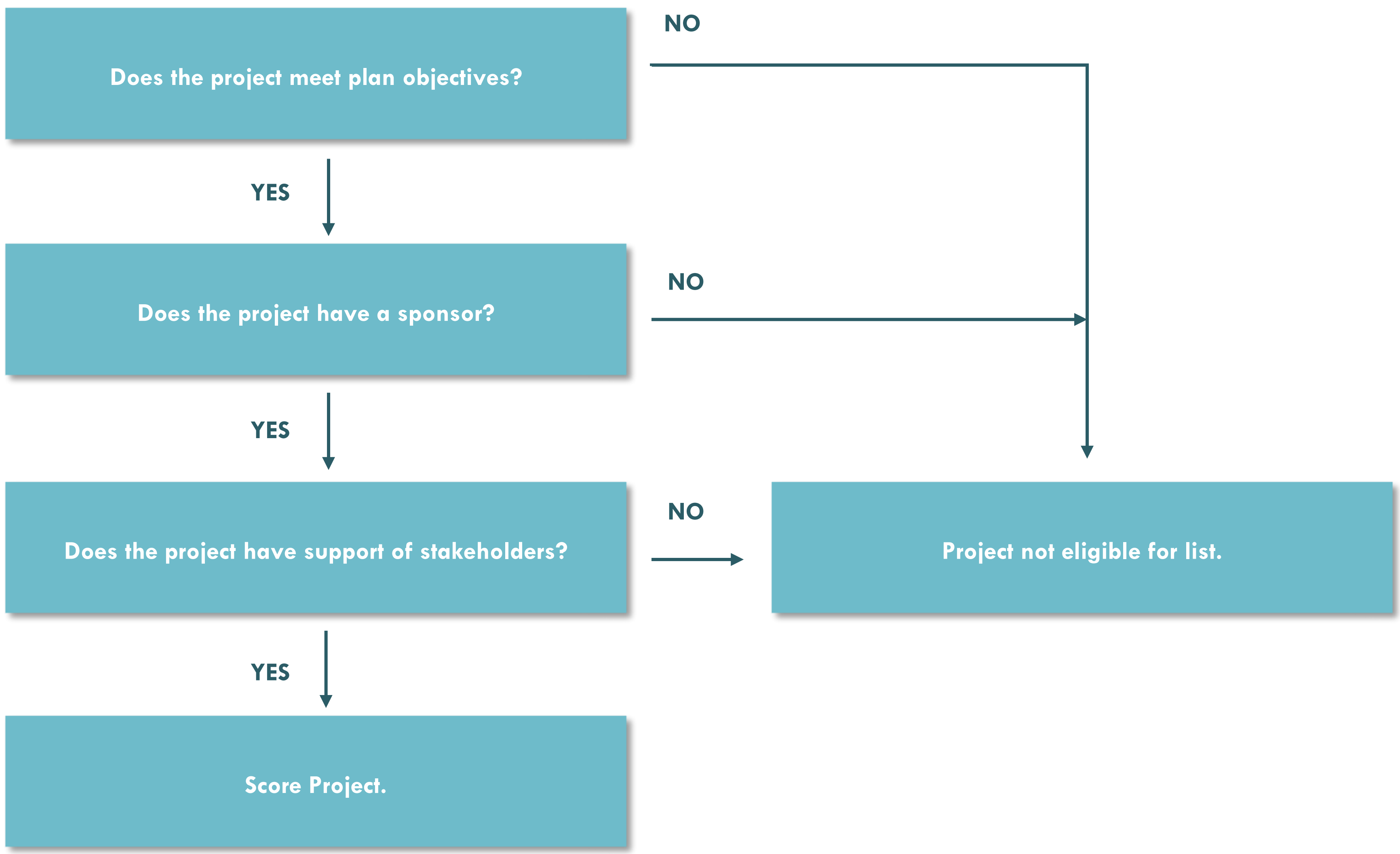


Table 7-1: Project Scoring Criteria

	CRITERIA	SCORING
PROJECT EFFECTIVENESS	1 – Meet Plan Objectives	+1 for one objective +2 for each additional objective (up to four additional objectives)
	2 – Supports Integration and Multiple Water Resource Management Strategies	+1 for single strategy +5 if integrated (the projects has multiple benefits) +8 if integrated and supports multiple strategies
	3 – Technical Feasibility of the Project	+1 if knowledge of location and of the water system is demonstrated, or +4 if knowledge of location, of the water system, and the material, methods, or processes proposed to be employed in the project is demonstrated based on the project description. +6 if plans or reports have been prepared that demonstrate project feasibility.
	4 – Regionality/Multiple Agencies	+0 project that only serves single agency +3 project that combines the projects of up to three agencies +5 project that combines projects from more than three agencies
PROJECT COMMITMENT	5 – Project Status	+1 limited information +3 completed feasibility or pre-design documents +5 environmental and feasibility and detailed scope of work and budget completed
	6 – Project Costs and Financing	+0 no funds +2 10% funding +3 50% funding +5 90% or more funding

OTHER CRITICAL PROJECT CONSIDERATIONS		
	7 – Economic Feasibility	+1 limited information +3 completed feasibility and cost benefit analysis +5 strong tie to water quality and water supply benefits and other benefits and costs
	8 – Has Project Proponent Adopted or Plan to Adopt the Latest Updated Plan	+0 No +3 Yes
	9 – Consideration of Environmental Justice Concerns (Tribes/DACs)	+2 demonstrates specific benefits to critical DAC water issues, or +2 demonstrates specific benefits to critical Native American tribal communities, or +2 demonstrates consideration of Environmental Justice concerns. A total of +6 if project addresses all three.
	10 – Adapting to the Effects of Climate Change	+0 increases energy usage +2 no increase in energy usage +4 reduces energy usage
	11 – Reducing Greenhouse Gas (GHG) Emissions	+0 no reduction in GHG emissions +2 consideration of options for carbon sequestration +4 demonstration of significant reduction in GHG emissions through a GHG emissions analysis
	12 – Reduce dependence on Delta[1]	+0 no reduction in Delta water +2 demonstration of some reduction in Delta dependence +4 demonstration of significant reduction in Delta dependence

1. This criterion is required by the IRWM Guidelines. The Region's approach to meeting this criterion is to diversify the overall water portfolio by investing in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.

7.4 Coordination with SAWPA OWOW Project Submittal Process

The Project submittal process for this Plan is independent of the SAWPA OWOW Project Submittal process.

If SAWPA releases a Call for Projects related to a specific grant funding opportunity (such as the upcoming Proposition 1 IRWM Round 2 Implementation Grant), proponents will need to submit information to SAWPA that meet the requirements of the specific funding program.

8

PART 1: REGIONAL CONTEXT

Implementation, Performance and Adaptive Management

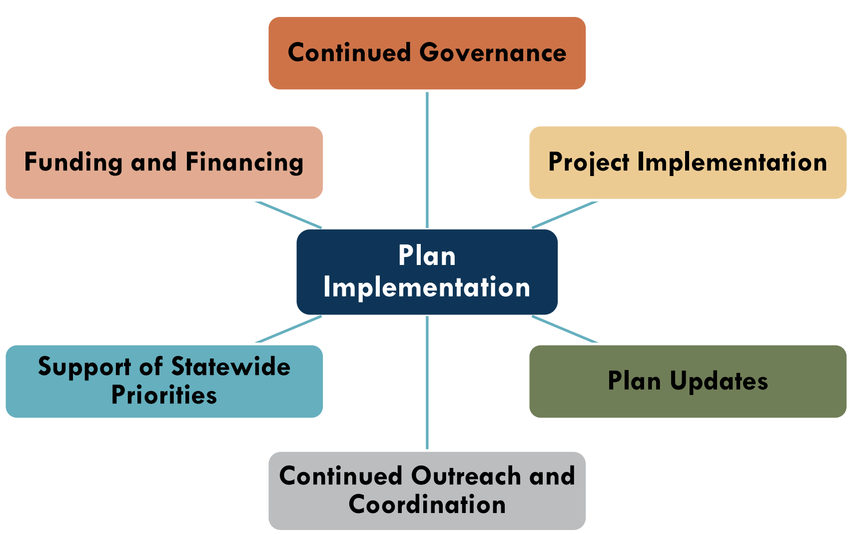
This chapter provides the roadmap for accomplishing the Region's objectives and implementing projects included in the Plan.

The BTAC has already made significant progress implementing the Plan. To date, the agencies located within the Region have been successfully implementing their strategies along with projects and are continuously monitoring progress toward their goals and objectives. The Region plans to continue within its current governance structure and in some cases improve upon Plan implementation as described in the sections below. The elements of plan implementation are shown in Figure 8-1.

IN THIS SECTION

- Governance, Outreach and Coordination
- Project Implementation
- Impacts and Benefits

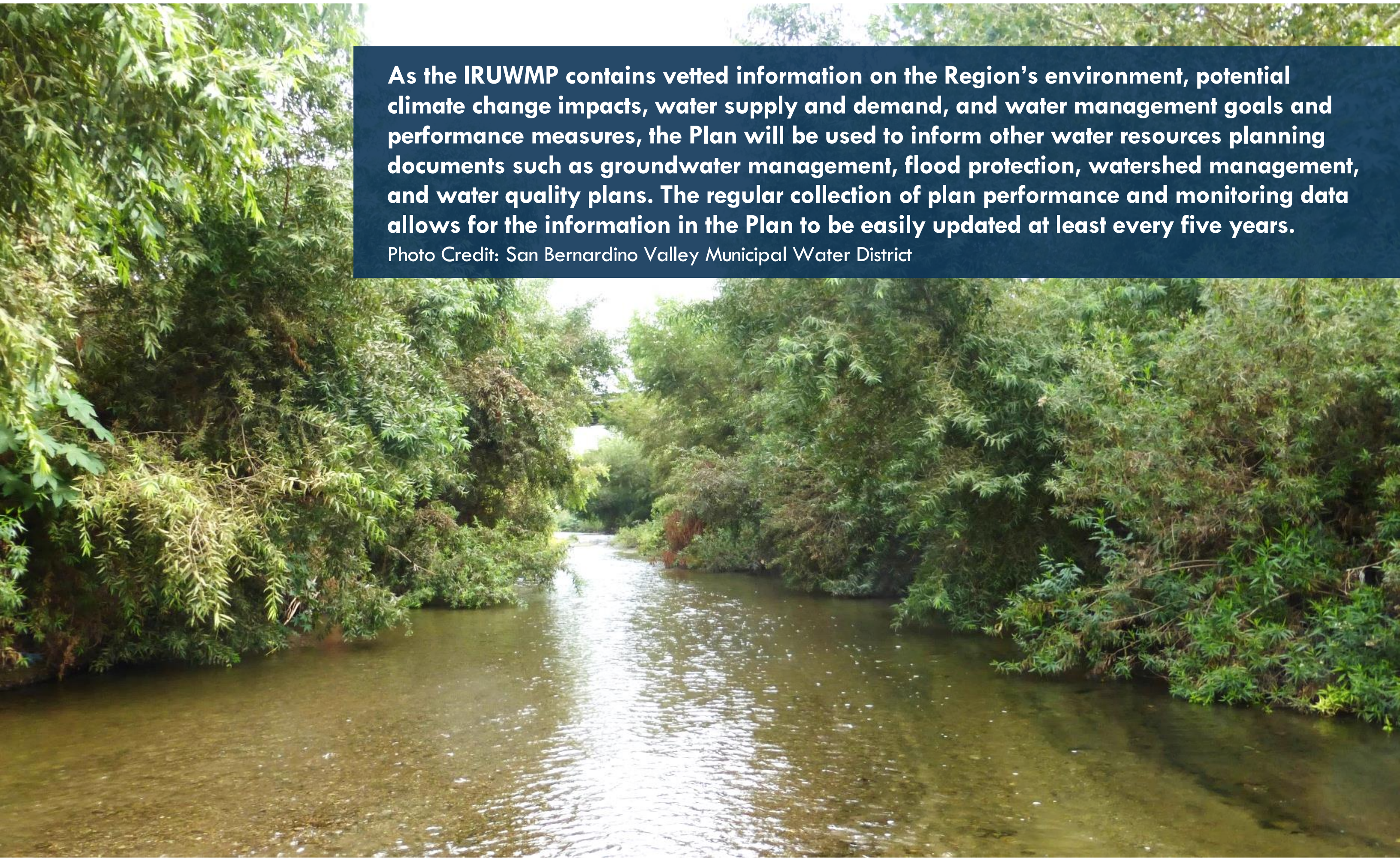
Figure 8-1. Implementation Components



8.1 Continued Governance, Outreach and Coordination

The responsibility for implementation of the Plan will continue to be guided by the BTAC agencies, all of whom participated in the planning process and prepared this update of the Plan. The implementation responsibility will continue to be shared among the BTAC agencies based upon the jurisdiction of each responsible entity. The Region will continue its current governance structure, which has proven itself to be effective since the implementation of the 2007 IRWM Plan, as well as with other regional water resources planning efforts such as management of the SBB and the Santa Ana River watershed.

Continued outreach and coordination with regional stakeholders and other planning efforts will be key to implementing this Plan. In keeping with the Region's efforts to involve stakeholders in its regional planning efforts, the Region will continue to provide the IRUWMP, an up-to-date project list, and information on BTAC meetings such as meeting announcements, agendas, and materials available on Valley District's website. Additional information may be posted as appropriate, such as Plan performance data and information on how to become involved with the BTAC. Valley District will be responsible for creating and maintaining the website, though the BTAC will contribute to provide information.



As the IRUWMP contains vetted information on the Region's environment, potential climate change impacts, water supply and demand, and water management goals and performance measures, the Plan will be used to inform other water resources planning documents such as groundwater management, flood protection, watershed management, and water quality plans. The regular collection of plan performance and monitoring data allows for the information in the Plan to be easily updated at least every five years.

Photo Credit: San Bernardino Valley Municipal Water District

The BTAC will continue to look for opportunities to coordinate with land use planning efforts and incorporate land use planning issues and strategies into water management decisions. Though agencies in the BTAC already take part in the San Bernardino Countywide Vision Project water element, there may be additional opportunities for involvement of land use planners with water resources planning, such as those opportunities shown in **Figure 8-2.** To further assess these opportunities, the Region will identify land use authorities and meet with them to discuss coordination opportunities. Once opportunities have been identified, the BTAC will work with the land use authorities to determine how to incorporate issues and strategies from land use planning into water management plans. Further coordination efforts may also include conducting regular meetings between water managers and land use planners, inviting land use planners to BTAC meetings, or even including land use planners in the BTAC.

Figure 8-2: Opportunities for Coordination Between Land Use Planning and Water Management

Opportunities for Land Use Planners to Provide Input to Water Managers

- Floodplain management
- Flood control planning
- Groundwater recharge and conjunctive water use
- Treatment and conveyance facilities
- Water conservation
- Watershed management and restoration
- Groundwater sustainabilty planning

Opportunities for Water Managers to Provide Input to Land Use Planners

- Municipal landscaping programs
- Public access and recreational area management
- Changes in land use
- General Plan updates
- Planning and development review
- Water supply for public safety and emergency planning purposes
- Habitat management

8.2 Project Implementation

Project implementation is the responsibility of each project sponsor. For projects funded through IRWM-related grant programs, the BTAC will work with regional agencies to coordinate, apply, receive, and distribute the grant funding for project implementation. Projects formulated for the IRWM Plan must periodically be updated and reprioritized, as new projects may be introduced for screening and prioritization. Activities necessary to update and prioritize projects will continue to be the responsibility of the BTAC Project Review Subcommittee. Project implementation responsibilities include coordination with the appropriate local, state, and federal agencies to prepare and complete necessary environmental documents and to pursue opportunities to fund the projects that are under their jurisdiction, consistent with the IRUWMP.

8.2.1 Funding and Financing

The Region plans for and secures funding and financing to implement the Plan, including ongoing integrated, regional program management activities and project development and implementation. These components have specific activities, which are shown in Figure 8-3

.

Figure 8-3: IRWM Funding and Financing Activities

8.2.2 Funding and Financing Options

While regular BTAC meetings and other integrated, regional program operations generally rely on in-kind staff time and occasional assessments, project implementation may require a wider variety of funding options. Depending on the characteristics and scope of a particular project, some activities and projects currently identified in the IRUWMP and future activities will likely be contingent on securing funding from federal, state, and/or local sources. Therefore, it is important for the BTAC, in coordination with project sponsors, to develop a financing plan that identifies funding sources and further refines priorities for project implementation. In addition, the agencies should actively engage in obtaining grant funding to assist in project implementation.

Potential funding sources include water rates; assessments, fees, and taxes; loans and grants; and bonds. Methods for collecting this funding include in-kind time provided by BTAC agencies and project sponsors, as-needed assessments, and applying for loans and grants. The following summarizes project funding approaches to date, as well as anticipated funding strategies.

Federal Funding

The federal grant funding sources are currently limited. The U.S. Bureau of Reclamation's (Reclamation) WaterSMART (Sustain and Manage America's Resources for Tomorrow) provides funding for water management programs and projects in the western United States. This grant program might help fund the implementation of actions to increase water supply through investments to modernize existing infrastructure. Reclamation also provides funding for water recycling programs in Southern California. The U.S. Environmental Protection Agency (EPA) provides funding for environmental improvement projects. In addition, funding can be directed for implementation of projects under the Plan, through the Federal Energy and Water Development Appropriations legislation.

State Grant Funding

State funding may be a significant source of funding for implementation of the Plan.

Current key State funding sources include the following:

- DWR's Proposition 1 IRWM Program, which provides funding for implementing multi-benefit projects that are included in IRWM Plans of DWR-accepted IRWM Regions (including the SAWPA Region, which the USARW Region is a part of)
- DWR's Sustainable Groundwater Management (SGM) Implementation Program, which provides funding for sustainable groundwater planning and implementation projects
- DWR's Desalination Grant Program, which provides funding to conduct research, feasibility studies, pilot projects or construction of desalination projects (both ocean and groundwater)
- SWRCB Water Recycling Funding Program, which provides funding for the planning, design, and construction of water recycling projects

Local Agency Funding

For years, local entities have been implementing cost-effective projects and programs at the local level. In the past, local funding has been used in part or in total to fund local water projects. Today, however, a major constraint in implementing many of the projects in this Plan is the lack of financial capacity and funding availability at the local level. Some of the communities in the Region are economically disadvantaged and they may not be able to finance costly projects. Bond laws generally require local agencies to share the cost of implementing their project unless the project benefits a DAC, in which case, the community could be qualified for exemption from local cost-sharing requirements.

Financing Plan

As mentioned previously, the agencies in the Region have successfully collaborated in management of their water resources for a number of years, allowing them to come together in 2005 to form the USARW IRWM Region and develop the first IRWM Plan. These efforts have been supported primarily through in-kind time from BTAC agencies and without being dependent upon outside funding to support the IRWM program. The Region intends to continue operating its IRWM program through local support from in-kind staff time. **Table 8-1** shows the Region's funding and financing plan to achieve the IRWM Program management, project review and prioritization, project grants, project implementation, and planning needs.

Table 8-1: Financing Plan

ACTIVITY	APPROXIMATE COST OR TIME COMMITMENT	FUNDING SOURCE AND PERCENT OF COST	FUNDING SOURCE CERTAINTY/LONGEVITY
IRWM PROGRAM MANAGEMENT			
Regional Program Management • BTAC Meetings • Plan Performance • Intra-regional collaboration • Data Management • Plan Updates • BTAC Water Conservation Subcommittee • Engineering Subcommittee	700 hrs/yr[1]	**In-Kind:** 100% BTAC Agencies **Funds:** BTAC Agencies	• On-going agency staff allocations • BTAC agency operating budget
PROJECT DEVELOPMENT AND IMPLEMENTATION			
Project Review and Prioritization • Subcommittee Meetings	Approximately annually	**In-Kind:** 100% Subcommittee Agencies	• On-going agency staff allocations
Project Grants • Grant Application • Grant Management	Dependent upon specific grant program	**In-Kind:** 100% Project Sponsors **Funds:** Project sponsors	• Contingent on funding available and # of projects • Contingent on grant program success
Project Implementation	Dependent upon type and size of project	**In-Kind:** Project sponsor **Funds:** Project sponsor agencies, grants, and loans	• On-going for the life of the project • Agency funding and staff allocations • Contingent on funding available • Contingent on grant program success
Project Monitoring	Dependent upon type and size of project	**In-Kind:** Project sponsor	• On-going for the life of the project • Agency funding and staff allocations

2. These hours are approximated using the following assumptions: monthly meetings of the BTAC's 14 agencies (3 hours per meeting), development of annual plan performance reports (12 hours per year), annual project review and prioritization by the Subcommittee (12 hours per year), monthly intra-regional collaboration (2 hours per month for one representative to attend SAWPA meetings), monthly data management for Valley District (2 hours per month), Plan Updates every 5 years (800 hours, annualized to 160 hours per year)

8.3 Obstacles to Implementation

The most significant obstacle to implementation of the IRUWMP is funding of capital improvement projects. Steps that can be taken to remedy funding obstacles include obtaining grant funding and forging partnerships to fund major projects. No other insurmountable obstacles to implementation of the Plan have been identified. As described earlier, the agencies within the Region have successfully worked together in the past on the development and implementation of projects and programs to improve the water resources management within the Region. Working together, these agencies have developed successful relationships, enabling them to accomplish tasks that satisfy the varied interests within the Region. Developing these initial relationships, trust, and accountability among the participating groups is one of the biggest challenges to any regional cooperation. The stakeholders and interested parties within the Region can continue to successfully work together to implement future projects to improve the water resources management for the citizens of the Region.

8.4 Impacts and Benefits of the Plan

The Region has evaluated the impacts and benefits of implementation of the Plan, and considered all objectives, strategies and projects included as a part of the Plan. Given the integrated nature of the Plan, it is difficult to determine any specific benefits or disproportionate impacts to DACs or create environmental justice concerns. It is assumed that all projects will complete the State and/or federal environmental documentation necessary to fully analyze any project-specific impacts that may occur, including those to DACs or any environmental justice concerns.

8.4.1 IRUWMP Benefits

One of the most significant benefits of the Plan is the planning process itself. The process creates a cooperative environment among all agencies in the Region, which meet on a regular basis to discuss the water management issues and plan for meeting future water needs of the Region. The agencies worked together to develop solution-oriented programs, they forged agreements, and they work together to provide the most basic and essential service to the communities—serving water. The planning process provides a framework for evaluation and update, as needed, of regional and integrated solutions.

Full implementation of the Plan will result in multiple benefits associated with meeting the objectives identified.

Key public and overall benefits from implementation of the plan elements include the following:

- Continued commitment to a diverse water supply portfolio that includes investment in both local water supplies and imported water supplies.

- Continued commitment to coordinated management of the Region's surface water and groundwater resources, including conjunctive management of groundwater and surface water resources and recharge of groundwater basins.
- Continued commitment to water quality through effective management of groundwater resources, expediting the cleanup of contaminant plumes in the Region, and improving stormwater management.
- Continued commitment to flood protection.
- Plan to address climate change vulnerabilities including reduced GHG emissions and energy usage.
- Continued commitment to distribute and serve high quality water to disadvantaged communities.
- Continued commitment to environmental stewardship.
- Enhancement of water-dependent environmental assets.
- Continued commitment to water-related education, recreation, and public access opportunities in the Region.
- Continued commitment to understanding of the Region's water resources, including focused regional monitoring to ensure groundwater is used in a sustainable manner.
- Continued commitment to coordination of water management activities of the Region through sharing of ideas and mutually beneficial management of project opportunities.
- Continued commitment to coordinated development of water management strategies and associated projects.
- Continued commitment to preparation for a disaster.

The aforementioned benefits will be realized both within and outside of the Region as neighboring areas can benefit through inter-regional collaboration with SAWPA, as well as collaboration with agencies that overlap larger area, such as Western.

8.4.2 IRUWMP Impacts

The potential negative impacts from implementing most of the projects in the Region's Plan are anticipated to be primarily short-term facility construction impacts. It is proposed that conjunctive water management projects include a monitoring and assessment element to evaluate the impacts of project implementation. Monitoring and assessment elements will provide tools to evaluate and modify project operation to mitigate potential impacts.

8.4.3 Environmental Documentation and County Ordinance Compliance

Permitting and environmental documentation will be required for new project facilities in accordance with federal, state, and local laws and ordinances. The project-specific environmental compliance will be performed by project sponsors on a case-by-case basis prior to project construction. Impacts and benefits of the proposed actions will be further assessed. All actions and investigations will be coordinated with local, state, and federal agencies to share information and ensure compliance with applicable laws and ordinances.

8.5 Adaptive Management

The IRUWMP represents the current state of water resources planning in the Region, based upon available information, and recognizes that water management strategies will continue to evolve in response to changing conditions over the next five years before the plan is again updated. The IRUWMP incorporates an adaptive approach that allows the Plan to stay current in light of changing conditions, such as local and regional water needs and changing regulatory requirements.

Given changing conditions, the planning process is continually evolving and developing additional data that improve the Region's understanding, which may redefine objectives and priorities to respond to these changing conditions.

The adaptive management framework is based on an iterative process of:

- Collecting information and data regarding the conditions within the Region
- Evaluating the new data to determine plan/project performance
- Formulating a plan in response to these changing conditions

Using data collected and monitored as part of IRUWMP performance tracking discussed in Section 8.5.2 the BTAC will review issues and needs and re-evaluate its objectives and strategies upon changing conditions. This process will allow the Region to proactively manage its available resources, including making investments in the planning and implementation of new projects and programs. This includes preparation of periodic updates of the IRUWMP to respond to changing conditions (including climate change and the re-evaluation of any impacts and benefits) through a continued working relationship with the BTAC, and to inform project participants and stakeholders about changes to the IRUWMP.

8.5.1 Plan Performance

To monitor that the Region is making progress towards implementing its Plan, it reviews and tracks Plan performance in two areas:

Plan Objectives

The Region tracks progress in meeting the Plan's objectives by tracking its various performance measures over time

Project Monitoring

The Region uses each project's monitoring plan to track performance of implemented projects

8.5.1.1 Plan Objectives Monitoring

The BTAC is responsible for monitoring progress in meeting IRUWMP objectives on a periodic basis and including the data as a part of the data management system described in the **Section 8.5.2.2**.

The results of monitoring are presented at BTAC meetings and are incorporated into regular IRUWMP updates to help the Region re-evaluate needs, objectives, and strategies. In addition, progress in meeting IRUWMP goals will be reported annually to the San Bernardino Valley Municipal Water District Advisory Commission on Water Policy and every year to the BTAC in a Report Card format.

The Region developed a number of performance measures that can be used to measure progress in meeting the objectives, and are shown in Table 8-2.

Table 8-2: Objectives and Performance Measures

OBJECTIVE	PERFORMANCE MEASURE
1a: Comply with conservation legislation requirements (AB1668 and SB606)	• Volume of water used per person or acre (to be defined by water use objectives to be set by the State)
1b: Increase stormwater capture and recycled water use by 20,000 AFY	• Volume of stormwater to be captured by new or expanded recharge basins • Volume of recycled water used through new non-potable uses or for new recharge projects
1c: Implement the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) to increase storage in the SBB by 64,000 AF	• Volume of water recharged to groundwater basins in wet years as reported in Groundwater Storage Reporting
1d: Improve system resiliency and the ability to respond to emergency supply interruptions	• Number of new interties constructed • Number of back-up facilities constructed • Number of emergency power sources installed • Number of redundant treatment systems implemented • Volume of new emergency storage constructed • Number of mutual aid agreements in place • Number of emergency preparedness exercises participated in by agencies
1e: Continue to ensure equitable access to clean drinking water for all communities	• Number of households participating in low-income support programs provided by retailers
1f: Complete groundwater management plans for the San Bernardino, Rialto-Colton, and Yucaipa Basins	• Groundwater management plans completed
2a: Complete necessary agreements to use flood control retention/detention basins for recharge in the San Bernardino, Rialto-Colton and Yucaipa Basins when not needed for flood control	• Number of MOUs implemented to use flood control retention/detention basins for recharge
2b: Implement 20 acres of integrated flood projects that also provide multiple benefits, where possible	• Acres of new integrated flood projects constructed
2c: Continue to ensure equivalent implementation of flood projects in DAC areas by implementing at least one flood control project in a DAC area.	• Development of a map of areas experiencing flooding issues • Number of flood control projects implemented in DAC areas
2d: Identify 4 urban stormwater capture projects to increase recharge and improve surface water quality	• Number of urban stormwater capture projects implemented
3a: Ensure no violations of drinking water quality standards	• Number of drinking water quality standard violations reported in Consumer Confidence Reports and/or to the SWRCB • Number of boil water or "do not drink" orders
3b: Proactively address new constituents of concern as MCLs are developed	• Volume of groundwater treated to address contaminant plumes • Pounds of contaminants removed from groundwater through treatment
3c: Complete a Salt and Nutrient Management Plan for the region	• Progress made in developing a Salt and Nutrient Management Plan
4a: Preserve or improve habitat by conserving or restoring 150 acres of riparian, wetland, and permanent water areas	• Acres of riparian, wetland and permanent water areas preserved or improved
4b: Identify "multi-use" opportunities to increase recreation and public access and identify 4 multi-use projects	• Acres of multi-use projects implemented
5a: Implement local supply and flood control projects to help offset the impacts of climate change	• Projects implemented that address or manage climate change impacts
5b: Implement 4 projects to reduce or offset energy consumption or reduce GHG emissions associated with water and wastewater systems	• Number of projects implemented that reduce or offset non-renewable energy use or GHG emissions associated with water or wastewater systems • Decrease in the energy intensity of water supplies in kWh/AF
5c: Complete the SBVMWD Climate Adaptation and Resilience Plan (CARP)	• Completion of the CARP

8.5.1.2 Project Monitoring

Implementation of the projects selected for inclusion in the IRUWMP will help the Region to meet its objectives. To track this information, project sponsors will be responsible for preparing a monitoring plan for their project. Information similar to that which is included in a Project Assessment and Evaluation Plan (PAEP) would be developed for projects prior to implementing the project.

The goals of a PAEP are as follows:

- To provide a framework for assessment and evaluation of project performance,
- To maximize the value of public expenditures to achieve results,
- To identify measures that can be used to monitor progress towards achieving project goals, and
- To provide information to help improve current and future projects.

The monitoring plan will be based on project-specific information, and will:

- Describe project characteristics and the project sponsor
- Demonstrate consistency with local planning documents such as the Plan
- Identify project goals and link goals with desired outcome
- Select performance indicators
- Identify expected benefits and impacts
- Determine outcome indicators (site-specific, regional, and system-wide)
- Identify/implement monitoring needed to evaluate a project's performance, including frequency, locations, and protocols/methodology
- Identify procedures to keep track of what is monitored and ensure the monitoring schedule is maintained and adequate resources (including funding) are available
- Analyze and assess data
- Evaluate overall success of the project
- Communicate the results to the BTAC

Project proponents will be responsible for providing data collected through project monitoring to the BTAC for use in tracking progress in meeting objectives.

8.5.2 Data Collection and Monitoring

The Region has a long history of collecting and monitoring data to allow effective management of its water resources. These efforts have been incorporated into the IRUWMP to support regional data collection, integrate with other regional and statewide programs, and identify data gaps.

8.5.2.1 Data Collection and Monitoring Efforts

An extensive network of data collection and monitoring is already in place in the Region.

Currently, the following data are being collected in the Region:

Groundwater data

Groundwater monitoring is in place for measuring groundwater production, water quality, and water levels representative of the various subbasins.

Stream gage data

Stream gages in the Region are operated by either the USGS or the SBCFCD and allow for stream flow data to be collected throughout the watershed.

Drinking water quality data

Water quality data collected by water purveyors for all sources of water. These data are periodically monitored according to Title 22 and are required by the SWRCB Division of Drinking Water (DDW).

Water supply and demand data

Water supply and demand data are reported by water purveyors and will be provided in this Plan every five years as required by DWR.

Energy Use

Energy use for water supply conveyance and treatment is estimated by water purveyors in this Plan every five years as required by DWR.

General Plan land use

Information on land use is available through city and county general plans and are updated, as necessary.

Santa Ana River flow data

Santa Ana River Watermaster Reports contain information on flows and status in meeting flow requirements.

Project monitoring reports

As discussed previously, project sponsors are asked to collect monitoring data on their implemented projects and communicate the results to the BTAC.

Surface and ground water quality data

SWRCB regularly updates its Integrated Reports and 303(d) lists of quality impaired waters.

To track all of the performance measures listed in **Table 8-2**, it may be necessary to collect and monitor additional data not currently collected on a regular basis.

These data needs include:

- GHG emissions from treatment and conveyance of water resources
- information regarding changes in flood plain area
- additional stream gages to improve flows in key areas to improve stormwater capture (such as above Seven Oaks Dam)
- ongoing groundwater quality mapping to track changes in quality as treatment projects are put into place.

A monitoring plan has been developed for the Region as a component of the IRUWMP to formalize and standardize data collection procedures that focus on groundwater and surface water.

The objectives of the monitoring plan are to:

- Provide a standard methodology for the collection, storage, and reporting of hydrologic data.
- Document the collection of data needed for management of the groundwater basin to meet the requirements of various judgments. In the SBB and other adjudicated basins, the Watermaster is responsible for collection, review, and compilation of the data needed for management of the basin and for providing a level of coordination among many water users. Similarly, the Yucaipa Sustainable Groundwater Management Agency is responsible for collecting, analyzing, and reporting the data needed to sustainably manage the Yucaipa Subbasin.
- Provide the data needed for developing the “Annual Operation Plan” for management of the SBB.
- Provide standardized procedures to collect source water data that agencies use to meet requirements of the SWRCB DDW drinking water standards.

Remaining data not collected as a part of this monitoring plan is expected to come from existing databases and monitoring efforts with established procedures. The Region assumes that the agencies performing these data collection and monitoring efforts have procedures in place to ensure accuracy of the data and that appropriate quality control has been completed prior to upload to data to storage in electronic databases and spreadsheets.

Collection of project-specific monitoring will be the responsibility of the agencies implementing the project.

8.5.2.2 Data Management

Data that is collected is stored, organized, and secured in electronic databases and spreadsheets by the agency responsible for the data.

Data collected in the Region will be available to the stakeholders, DWR, and other local and state agencies. Data collected in support of state-funded water quality-related projects will be made available to the SWRCB's Surface Water Ambient Monitoring Program and Groundwater Ambient Monitoring and Assessment Program. Valley District collects and reports water level data to the California Statewide Groundwater Elevation Monitoring (CASGEM) program for the Bunker Hill, Rialto-Colton, and Yucaipa Subbasins. Groundwater data for basins affected by SGMA is also available via DWR's SGMA Portal.

Data collected each year is used in a variety of different reports, including the BTAC management plan which is completed on an annual basis. Overall progress in meeting each IRUWMP objective will be reported annually in the Report Cards and every five years as a part of regular IRUWMP updates.

8.5.3 Periodic Review and Update Process

To keep the IRUWMP current, it should be refined as necessary, but no less than every five years. These refinements will be the result of knowledge gained through implementation of the IRUWMP. The BTAC will assume responsibility for making updates to the IRUWMP. Reviews and updates will focus on analyzing new information developed since the adoption of the previous IRUWMP and the need for specific water management actions. The reviews would identify areas where the IRUWMP has been successfully implemented, as well as areas where deficiencies are apparent. Potential additional planning needs identified through the IRUWMP preparation process that may be considered as part of future updates include: a more detailed understanding of DACs, SDACs and under-represented communities within the Region; development of a climate change adaptation and resilience plan; development of an online system for the collection of project benefits data; and development of a region-specific website that exists outside of an agency's website. The BTAC will continue to coordinate the regional planning activities of the IRUWMP as needed, and coordinate with other IRWM planning efforts surrounding the Region, and with State and federal agencies.

9

PART 1: REGIONAL CONTEXT

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