

**SAN GORGONIO PASS WATER AGENCY**  
**1210 Beaumont Avenue, Beaumont, CA**  
**Board of Directors Engineering Workshop**  
**Agenda**  
**April 9, 2018 at 1:30 p.m.**

1. **Call to Order, Flag Salute and Roll Call**
2. **Public Comment:**  
Members of the public may address the Board at this time concerning items relating to any matter within the Agency's jurisdiction. To comment on specific agenda items, please complete a speaker's request form and hand it to the board secretary.
3. **Review of San Gorgonio Pass Integrated Regional Water Management Plan\* (p. 2)**
4. **Review of DWR 2017 Delivery Capability Report\* (p. 124)**
5. **Review of Surplus Water Sale Agreement with San Bernardino Valley MWD\* (p. 172)**
6. **Review of Water Supply Agreement with AVEK Dated July 17, 2017\* (p. 178)**
7. **Announcements**
  - A. Regular Board Meeting, April 16, 2018 at 1:30 p.m.
  - B. Finance and Budget Workshop, April 23, 2018 at 1:30 p.m.
  - C. San Gorgonio Pass Regional Water Alliance, April 25, 2018 at 5:00 p.m. – Banning City Hall
8. **Closed Session (1 Item)**
  - A. CONFERENCE WITH REAL PROPERTY NEGOTIATORS  
Pursuant to Government Code Section 54956.8  
Property: Potential transfer of State Water Project rights/supplies among State Water Project Contractors  
Agency negotiator: Jeff Davis, General Manager  
Negotiating parties: Kern County Water Agency, Curtis Creel, General Manager  
Under negotiation: price and terms of payment
9. **Adjournment**

**\*Information included in Agenda Packet**

(1) Materials related to an item on this Agenda submitted to the Board of Directors after distribution of the agenda packet are available for Public inspection in the Agency's office at 1210 Beaumont Avenue, Beaumont during normal business hours. (2) Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection at the Agency's office, located at 1210 Beaumont Avenue, Beaumont, California 92223, during regular business hours. When practical, these public records will also be made available on the Agency's Internet Web site, accessible at <http://www.sgpwa.com>. (3) Any person with a disability who requires accommodation in order to participate in this meeting should telephone the Agency (951 845-2577) at least 48 hours prior to the meeting in order to make a request for a disability-related modification or accommodation.



# S A N G O R G O N I O

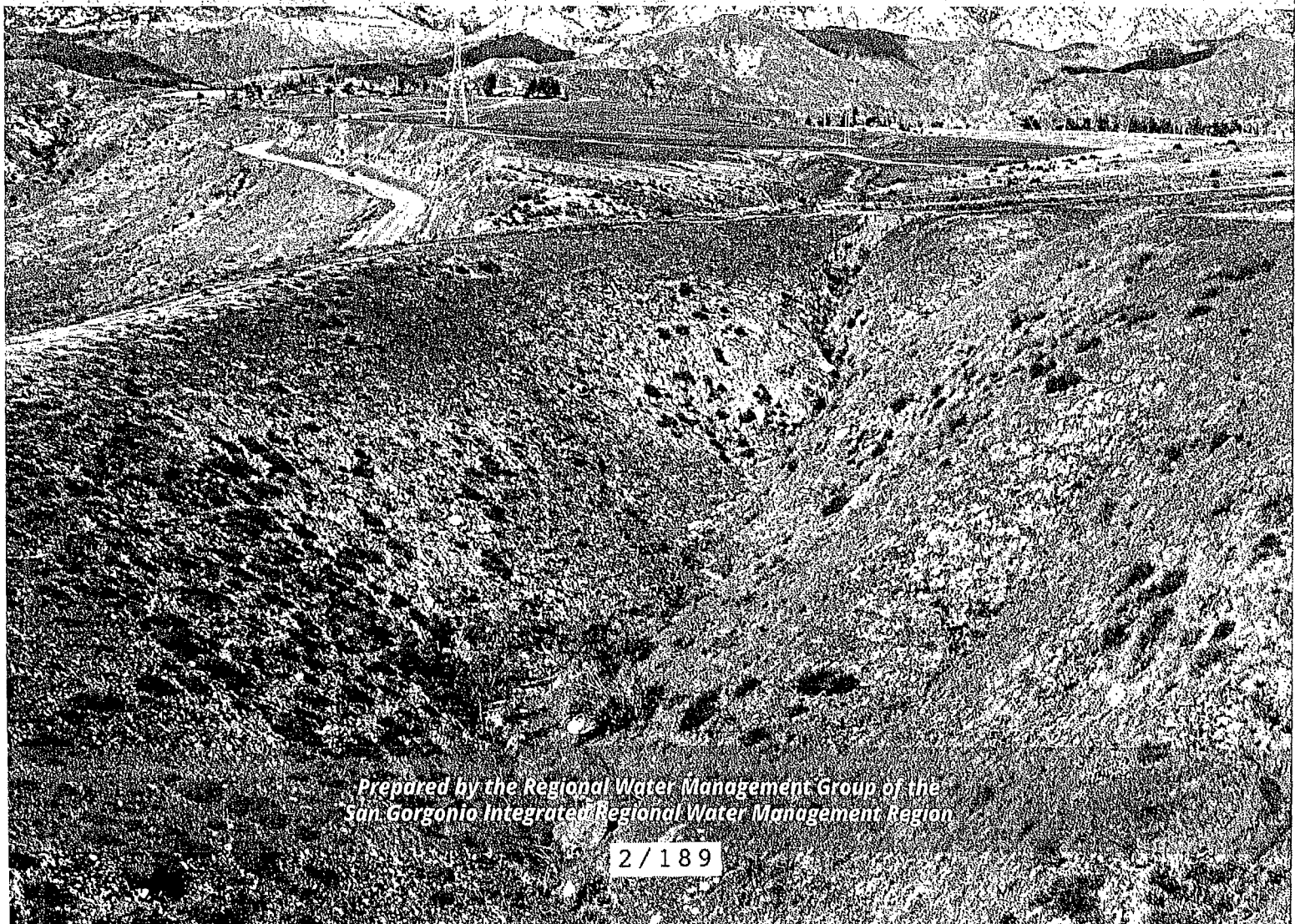
---

## INTEGRATED REGIONAL WATER MANAGEMENT PLAN

---

DRAFT

March 2018



*Prepared by the Regional Water Management Group of the  
San Geronio Integrated Regional Water Management Region*

This page intentionally left blank.

# San Gorgonio Integrated Regional Water Management Plan

*Draft - March 2018*



Prepared by the Regional Water Management Group of the  
San Gorgonio Integrated Regional Water Management Region

With assistance from Woodard & Curran



This page intentionally left blank.

# Table of Contents

Table of Contents .....	i
List of Appendices.....	iii
List of Figures.....	iii
List of Tables .....	iv
List of Acronyms and Abbreviations .....	vi
Preface.....	ix
<b>1. Regional Planning, Governance, Outreach and Coordination .....</b>	<b>1-1</b>
1.1 IRWM Regional Planning.....	1-1
1.1.1 San Geronio Pass Water Alliance .....	1-1
1.1.2 California's Integrated Regional Water Management Program .....	1-1
1.1.3 San Geronio Regional Acceptance Process .....	1-1
1.1.4 IRWM Plan Preparation.....	1-2
1.1.5 Plan Outcomes.....	1-2
1.2 Technical Studies .....	1-5
1.3 Technical Analysis .....	1-6
1.4 Regional Governance.....	1-8
1.4.1 Process for Developing the Governance Structure .....	1-8
1.4.2 Governance Structure .....	1-9
1.4.3 Regional Water Management Group.....	1-9
1.4.4 Stakeholder Advisory Committee .....	1-10
1.5 Outreach and Participation .....	1-11
1.5.1 Stakeholder Identification .....	1-11
1.5.2 DAC Outreach.....	1-13
1.5.3 Tribal Outreach.....	1-13
1.5.4 Public Outreach.....	1-14
1.6 Regional Coordination .....	1-14
1.6.1 Coordination with Other Regions.....	1-14
1.7 Coordination with Local and Regional Water and Land Use Planning Efforts .....	1-14
1.7.1 IRWM Plan Updates.....	1-16
<b>2. Region Description.....</b>	<b>2-1</b>
2.1 Regional Boundaries .....	2-1
2.2 Physical Setting .....	2-1
2.2.1 Climate .....	2-3
2.2.2 Watershed and Surface Water Features .....	2-4
2.2.3 Geology and Geohydrology.....	2-5
2.2.4 Habitat and Environment.....	2-7
2.3 Land Use .....	2-11
2.3.1 Land Use Agencies and Planning .....	2-11
2.3.2 Land Use Types .....	2-12
2.4 Socio-Economic Setting.....	2-14
2.4.1 Population and Demographics .....	2-16
2.4.2 Disadvantaged Communities .....	2-16
2.4.3 Economic Factors.....	2-18

2.4.4 Social and Cultural Values .....2-18

2.5 Water Supply and Demand.....2-18

2.5.1 Water Demand .....2-21

2.5.2 Imported Water Supply.....2-22

2.5.3 Local Surface Water Supply.....2-24

2.5.4 Groundwater Supply.....2-27

2.5.5 Recycled Water .....2-30

2.5.6 Regional Water Supply Projections .....2-31

2.6 Water Quality .....2-32

2.6.1 Beneficial Use .....2-32

2.6.2 Drinking Water Quality .....2-33

2.6.3 Environmental Water Quality.....2-35

2.7 Flood Management.....2-35

**3. Goals and Objectives ..... 3-1**

3.1 Development of Goals and Objectives.....3-1

3.2 Challenges, Needs, and Vulnerabilities .....3-1

3.2.1 Water Supply.....3-3

3.2.2 Water Quality.....3-3

3.2.3 Flood Management .....3-4

3.2.4 Habitat and Open Space .....3-4

3.2.5 Disadvantaged Communities .....3-5

3.2.6 Climate Change.....3-5

3.3 Goals and Objectives.....3-8

3.3.1 Goal #1: Increase Regional Supply Availability and Reliability .....3-8

3.3.2 Goal #2: Improve resilience of regional water distribution systems.....3-9

3.3.3 Goal #3: Develop useable tools to understand hydrologic processes and regional management ..3-10

3.3.4 Goal #4: Decrease impacts to groundwater quality .....3-10

3.3.5 Goal #5: Increase resilience to changing water quality requirements .....3-11

3.3.6 Goal #6: Enhance regional flood control infrastructure .....3-11

3.3.7 Goal #7: Protect aquatic and riparian habitat .....3-12

3.3.8 Goal #8: Support DACs and maintain the affordability of water .....3-12

3.3.9 Goal #9: Support the economic vitality of DACs.....3-13

3.3.10 Goal #10: Adaptation and Mitigation to Climate Change.....3-13

3.4 Objective Prioritization .....3-14

3.5 Conformance of Plan Objectives with Statewide Priorities .....3-14

**4. Resource Management Strategies ..... 4-1**

4.1 Consideration of Strategies .....4-1

4.2 Regional Watershed Management Strategies .....4-1

4.2.1 Reduce Water Demand.....4-2

4.2.2 Improve Operational Efficiency and Transfers .....4-3

4.2.3 Improve Flood Management .....4-4

4.2.4 Increased Water Supply .....4-4

4.2.5 Improve Water Quality.....4-6

4.2.6 Practice Resource Stewardship .....4-7

4.2.7 People and Water.....4-9

4.2.8 Strategies Not Applicable to the Region .....4-10

4.2.9 Additional Climate Change Mitigation Strategies .....4-10

**5. Projects .....5-1**

---

5.1	Project Identification .....	5-1
5.1.1	Initial Call for Projects.....	5-1
5.1.2	Project Identification in Technical Studies.....	5-1
5.2	Project Submittal, Review and Prioritization Process .....	5-2
5.2.1	Project Categories.....	5-2
5.2.2	Notification and Project Submittal.....	5-2
5.2.3	Review Process.....	5-5
5.2.4	Prioritizing the Projects.....	5-5
5.3	Implementation Grant Project Process .....	5-6
6.	Implementation.....	6-1
6.1	Impacts and Benefits of Plan Implementation.....	6-1
6.2	Performance and Monitoring .....	6-4
6.2.1	Plan Performance.....	6-4
6.2.2	Project Performance.....	6-4
6.3	Outreach and Governance .....	6-5
6.4	Data Management .....	6-5
6.4.1	Data Collection .....	6-5
6.4.2	Data Dissemination .....	6-6
6.4.3	Compatibility with Statewide Databases.....	6-6
6.4.4	Data Needs .....	6-7
6.5	Funding and Financing .....	6-8
6.5.1	Funding and Financing Options .....	6-8
6.5.2	Financing Plan.....	6-10
7.	References .....	7-1

## List of Appendices

- Appendix A – Water Supply Reliability Study
- Appendix B – San Gorgonio Region Recycled Water Study
- Appendix C – San Gorgonio Integrated Watershed and Groundwater Model Technical Memorandum
- Appendix D – Memorandum of Understanding
- Appendix E – Projection Nomination Form
- Appendix F – Plan Project List

## List of Figures

Figure 1-1: San Gorgonio IRWM Region .....	1-4
Figure 1-2: San Gorgonio IRWM Governance Structure.....	1-9
Figure 2-1: Proximate IRWM Regions .....	2-2
Figure 2-2: Watersheds and Surface Water Features.....	2-6
Figure 2-3: Regional Groundwater Basins .....	2-8
Figure 2-4: Habitat Areas Coverage Map.....	2-9
Figure 2-5: Land Management Authority.....	2-13
Figure 2-6: Land Use .....	2-15
Figure 2-7: Disadvantaged Communities.....	2-17
Figure 2-8: Regional Water Purveyors .....	2-20



Figure 2-9: Regional Water Supply Infrastructure ..... 2-26  
Figure 2-10: San Gorgonio Groundwater Basin Storage Units ..... 2-29  
Figure 2-11: 100-Year FEMA Flood Zones ..... 2-37  
Figure 5-1: Overview of Project Submittal, Review and Prioritization Process ..... 5-3  
Figure 6-1: IRWM Components that Require Funding and Financing..... 6-8

## List of Tables

Table 1-1: Incorporating Technical Studies into IRWM Plan ..... 1-5  
Table 1-2: Technical Data and Studies Used in the San Gorgonio IRWM Plan..... 1-6  
Table 1-3: San Gorgonio IRWM RWMG and SAC Members ..... 1-11  
Table 1-4: Stakeholder Outreach Distribution List..... 1-12  
Table 1-5: Coordination with Local and Regional Planning Documents..... 1-15  
Table 2-1: Average Monthly Climate ..... 2-4  
Table 2-2: Land Management Agencies ..... 2-12  
Table 2-3: San Gorgonio IRWM Region Population..... 2-16  
Table 2-4: Water Demand..... 2-22  
Table 2-5: Estimated Deliveries of SWP Table A Water (2015)..... 2-23  
Table 2-6: Imported Water Recharged to Beaumont Basin by the city of Banning ..... 2-24  
Table 2-7: Current and Projected Water Supplies (AFY) ..... 2-32  
Table 2-8: Beneficial Uses of Surface Water<sup>1</sup> ..... 2-32  
Table 2-9: Beneficial Uses of Groundwater<sup>2</sup> ..... 2-33  
Table 3-1: Organization of Goals and Objectives..... 3-2  
Table 3-2: Projected Regional Climate Change Impacts ..... 3-5  
Table 3-3: Climate Change Vulnerability Issues for San Gorgonio Region..... 3-6  
Table 3-4: Objectives and Performance Measures for Goal #1 ..... 3-9  
Table 3-5: Objectives and Performance Measures for Goal #2 ..... 3-9  
Table 3-6: Objectives and Performance Measures for Goal #3 ..... 3-10  
Table 3-7: Objectives and Performance Measures for Goal #4 ..... 3-11  
Table 3-8: Objectives and Performance Measures for Goal #5 ..... 3-11  
Table 3-9: Objectives and Performance Measures for Goal #6 ..... 3-12  
Table 3-10: Objectives and Performance Measures for Goal #7 ..... 3-12  
Table 3-11: Objectives and Performance Measures for Goal #8 ..... 3-13  
Table 3-12: Objectives and Performance Measures for Goal #9 ..... 3-13  
Table 3-13: Objectives and Performance Measures for Goal #10 ..... 3-14  
Table 3-14: IRWM Plan Objectives and Statewide Priorities ..... 3-14  
Table 4-1: Resource Management Strategies that Reduce Water Demand ..... 4-2  
Table 4-2: Resource Management Strategies that Improve Operation Efficiency and Transfers ..... 4-3  
Table 4-3: Resource Management Strategies that Improve Flood Management..... 4-4  
Table 4-4: Resource Management Strategies that Increase Water Supply ..... 4-5  
Table 4-5: Resource Management Strategies that Improve Water Quality ..... 4-6  
Table 4-6: Resource Management Strategies that Practice Resource Stewardship..... 4-8  
Table 4-7: Resource Management Strategies that Connect People and Water..... 4-9  
Table 4-8: Resource Management Strategies Not Included in the IRWM Plan..... 4-10  
Table 4-9: Additional Climate Change Mitigation Strategies ..... 4-11  
Table 4-10: Resource Management Strategies That Meet San Gorgonio IRWM Goals ..... 4-12  
Table 5-1: Project Prioritization Criteria and Scoring ..... 5-6  
Table 6-1: Potential Benefits and Impacts of Plan Implementation..... 6-2  
Table 6-2: State Databases ..... 6-7

Table 6-3: State and Federal Grants..... 6-9  
Table 6-4: Financing Plan ..... 6-10

## List of Acronyms and Abbreviations

AF	Acre-feet
AFY	Acre-feet per year
Alliance	San Geronio Pass Regional Water Alliance
ASBS	Areas of special biological significance
Banning	City of Banning
BCVWD	Beaumont-Cherry Valley Water District
BDCP	Bay-Delta Conservation Plan
BHMWC	Banning Heights Mutual Water Company
BIA	Building Industry Association
BMP	Best management practices
BMZ	Basin Management Zone
CALFED	California and Federal Bay-Delta Program
CARB	California Air Resources Control Board
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
Chromium-6	Hexavalent Chromium
CRA	Colorado River Aqueduct
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
CVP	Central Valley Project
CWD	Cabazon Water District
CWP	California Water Plan
DAC	Disadvantaged communities
Delta	Sacramento-San Joaquin Delta
DWR	California Department of Water Resources
EDA	Economic Development Administration
ETo	Evapotranspiration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Maps
GHG	Greenhouse gas
GIS	Geographic information systems
GPCD	Gallons per capita per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWR	Groundwater recharge

HVWD	High Valleys Water District
IEEP	Inland Empire Economic Partnership
IRWM	Integrated regional water management
MAF	Million acre-feet
MBMI	Morongo Band of Mission Indians
MCL	Maximum contaminant level
MDP	Master Drainage Plan
mg/L	Milligrams per liter
mgd	Million gallons per day
MHI	Median household income
MOU	Memorandum of Understanding
MS4	Municipal separate storm sewer system
MSHCP	Multiple Species Habitat Conservation Plan
MSWD	Mission Springs Water District
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Services
NO <sub>3</sub>	Nitrate
NPDES	National Pollutant Discharge Elimination System
ppb	Parts per billion
PEIR	Public Interest Energy Research
PRS	Project Review Subcommittee
O&M	Operations and management
RAP	Region Acceptance Process
RCFCWCD	Riverside County Flood Control and Water Conservation District
RCHCA	Riverside County Habitat Conservation Agency
RCIP	Riverside County Integrated Project
Region	San Gorgonio IRWM Region
RMS	Resource Management Strategies
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
SAC	Stakeholder Advisory Committee
SAWPA	Santa Ana Watershed Project Authority
SBVMWD	San Bernardino Valley Municipal Water District
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SFHA	Special Flood Hazard Areas
SG IRWM	San Gorgonio Integrated Regional Water Management
SGIWGM	San Gorgonio Integrated Watershed and Groundwater Model
SGMA	Sustainable Groundwater Management Act

SGPWA	San Geronio Pass Water Agency
SLR	Sea Level Rise
SRF	State Revolving Fund
SU	Subunit
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
Title 22	California Code of Regulations, Title 22, Division 4.5 – Wastewater Standards
TMDL	Total Maximum Daily Load
USFS	United States Forest Service
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
WUE	Water Use Efficiency
WWTP	Waste Water Treatment Plant

## Preface

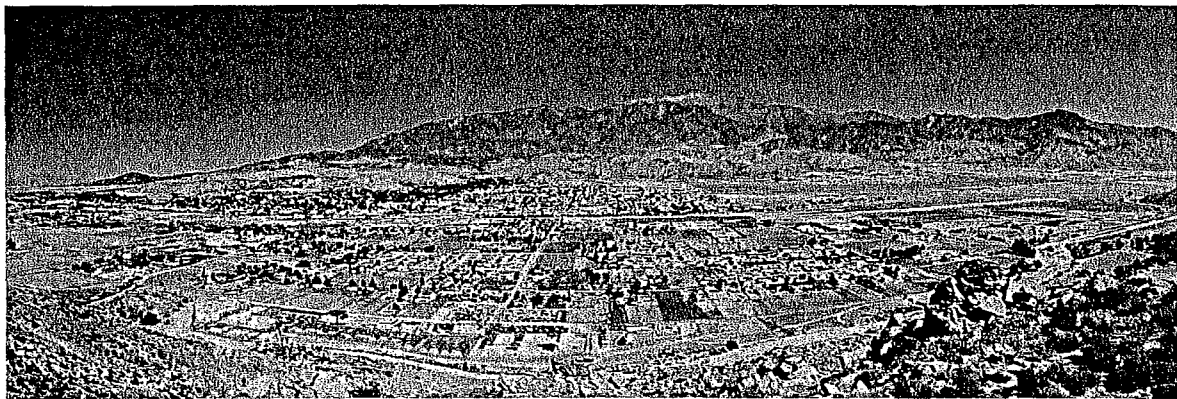
The 2018 San Geronio Integrated Regional Water Management (IRWM) Plan provides a pathway for agencies and stakeholders to collaboratively identify and implement water management solutions that provide multiple integrated benefits to the stakeholders and communities within the San Geronio IRWM Region.

Newly formed in 2016, the San Geronio IRWM Region embarked on the development of this 2018 Plan to not only meet the requirements for participation in the statewide IRWM Program, but to also articulate the needs, goals, objectives, strategies and projects that are unique to this Region.

The San Geronio Region is relatively rural, with immense areas of open space that allow for continued growth and urbanization. Residents, local agencies, and tribal communities understand the importance and value of the Region's natural resources and beauty and know they must balance these needs with that of a growing community. This IRWM Plan provides opportunities for water resource planners, managers, and leaders to invest and utilize sustainable water management strategies as the Region prepares for a growing urban and rural populations.

This Plan provides the framework and procedures used to govern, collaborate, and plan activities, as well as to pursue statewide funding opportunities within the statewide IRWM Program. It is a "living document" that is intended to evolve with the changing needs and conditions of the Region, and it should provide a collaborative platform for discussion, data sharing, and planning.

The success of this Plan relies on the continued participation of stakeholders and community members. Agencies, stakeholders, and citizens are encouraged to read this Plan and continue to participate in the IRWM process. Information on how to participate and the schedule of stakeholder meetings can be found on the program's website at [www.sgirwm.org](http://www.sgirwm.org). Specific questions about the San Geronio IRWM Region, Plan and Program can be emailed to the program administrator at [SGIRWM@ci.banning.ca.us](mailto:SGIRWM@ci.banning.ca.us).



*Part of the San Geronio IRWM Region, overlooking the City of Banning and the Sand to Snow National Monument from State Highway 243*

This page intentionally left blank.

# 1. Regional Planning, Governance, Outreach and Coordination

The San Gorgonio Integrated Regional Water Management (IRWM) Region was established in 2016. This chapter describes the process used to form the Region and prepare the first San Gorgonio IRWM Plan in 2018. In addition, it will provide information on the Region's governance framework, decision-making process, participating stakeholders, and public involvement and coordination with water and land use planning agencies.

## 1.1 IRWM Regional Planning

### 1.1.1 San Gorgonio Pass Water Alliance

Water management within the San Gorgonio Pass area had historically been conducted by individual water resource management agencies acting to meet localized needs. In the interest of improving coordination, collaboration and communication among governments and water suppliers, the San Gorgonio Pass Regional Water Alliance (Alliance) was created in 2014 by thirteen agencies whose service areas span across the San Gorgonio Pass area and two watersheds including the Santa Ana on the west, and the Whitewater on the east. The Alliance's role is to foster communication, coordination, and cooperation among the various agencies, thus providing and improving opportunities to manage water resources.

### 1.1.2 California's Integrated Regional Water Management Program

The State of California's IRWM Program began in 2002 with the passing of the Regional Water Management Act (Senate Bill 1672). The IRWM Program is managed by the California Department of Water Resources (DWR) to "identify and implement water management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives."

Since 2002, California voters have approved Propositions 50, 84 and 1 that have provided \$1.5 billion to fund the IRWM program. Funds are allocated to participating IRWM Regions through competitive grants for both planning and project implementation.

To participate in the IRWM Program, entities within a water management "region" can apply to be accepted as an official IRWM Region through DWR's Region Acceptance Process (RAP). It is through the RAP that regional boundaries are proposed by applicants and confirmed by DWR.

### 1.1.3 San Gorgonio Regional Acceptance Process

Since 2007, when DWR began the RAP, the eastern San Gorgonio Pass area has not been a part of a recognized IRWM Region and therefore not included in the IRWM Program. The Alliance recognized the need for integrated and regional water planning and projects in the area as well as additional sources of funding to support these efforts. Members of the Alliance began working with other stakeholders in the San Gorgonio Pass area to develop a new IRWM Region and formed the San Gorgonio Regional Water Management Group (RWMG) to lead the RAP.



The RWMG submitted a RAP application to DWR in 2016. DWR conditionally accepted the San Gorgonio IRWM Region in January 2017 pending additional inter-regional coordination.

The RWMG worked with DWR and the surrounding regions to confirm that the newly proposed San Gorgonio Region was in the best interest of stakeholders in and around the San Gorgonio Pass area. The San Gorgonio IRWM Region was accepted in 2017 by DWR and is shown in **Figure 1-1**.

### 1.1.4 IRWM Plan Preparation

In 2016, the San Gorgonio IRWM Region (Region) received a Proposition 1 Planning Grant to develop its first IRWM Plan in accordance with 2016 IRWM Grant Program Guidelines issued by DWR. The resulting San Gorgonio IRWM Plan was completed in 2018. This initial IRWM Plan process set regional goals and created an integrated planning process to develop strategies and projects that will address the water resource management needs of the Region's stakeholders and meet IRWM Plan Standards.

The San Gorgonio IRWM Plan benefitted from significant input from regional stakeholders and the public during six Stakeholder Advisory Committee (SAC) meetings held between May 2017 and March 2018. The first five SAC meetings focused on key topics that directly informed development of specific IRWM Plan content. Plan chapters were drafted by the project team (Woodard & Curran, consultant to the RWMG) and reviewed by the RWMG. Once all IRWM Plan sections had been completed, a public draft was released for a 30-day review on March 5, 2018. Announcement of the public review period was made via the San Gorgonio IRWM Program website ([sgirwm.org](http://sgirwm.org)) and directly via emails to the Program's interested party distribution list. At the direction of the RWMG, public comments were incorporated in the Final IRWM Plan that was submitted to DWR on *{to be filled in once Final is completed}*.

Public hearings were held by each of the agencies comprising the RWMG to adopt the IRWM Plan in 2018. SAC members were also invited to adopt the IRWM Plan following adoption by the RWMG.

It is anticipated that updates to this initial 2018 IRWM Plan will take place in the future, so that the IRWM planning process will adapt to the changes within the Region and continue to reflect future needs, goals, strategies and projects.

### 1.1.5 Plan Outcomes

The 2018 San Gorgonio IRWM Plan provides the framework and procedures used to govern, collaborate, and plan regional IRWM activities, and foster project implementation. The Region's water-related agencies, districts, counties, cities, tribes, and other stakeholders worked across jurisdictional boundaries to conduct integrated and regional water resource management planning. This planning fosters the ability to implement projects that align with the needs and goals of the San Gorgonio IRWM Region.

By having created and successfully adopted an IRWM Plan, the Region is also eligible to receive much-needed funding to implement key projects for the Region's water resources, communities and environment.

Future updates to the IRWM Plan will build on the existing IRWM Program governance, outreach, and coordination described in this chapter, in order to meet future DWR requirements, as well as the needs of the Region.



## 1.2 Technical Studies

As part of the San Gorgonio IRWM Region’s Proposition 1 Planning Grant, funding was allocated to complete three separate, yet integrated, water resources technical planning efforts. These technical efforts (listed below) were used to inform the IRWM Plan development by increasing the understanding of regional needs as well as identifying key strategies and potential projects to benefit the Region.

1. The *Water Supply Reliability Study (Appendix A)* estimates existing regional water supply reliability under current and projected conditions through 2040 and includes scenarios that identified water supply goals, strategies, and projects for inclusion in the IRWM Plan.
2. The *San Gorgonio Region Recycled Water Study (Appendix B)* identifies technical, institutional, and political opportunities to advance the use of recycled water on a regional scale and addresses related constraints for implementation. This Study also informs the IRWM Plan’s regional goals and objectives, strategies, and potential projects.
3. The *San Gorgonio Integrated Watershed and Groundwater Model Technical Memorandum (SGIWGM) (Appendix C)* describes the process used to develop a new model for use in the Region. The completed model focused on combining existing watershed and groundwater models into an integrated surface and groundwater model that could be used to better understand the relationship between surface and groundwater systems and to assess the impacts and benefits of potential regional projects.

Table 1-1 describes the ways in which these additional technical efforts have been incorporated into the IRWM Plan.

**Table 1-1: Incorporating Technical Studies into IRWM Plan**

IRWM Plan Chapter	Water Supply Reliability Study	Recycled Water Study	SGIWGM
<b>Region Description</b>	Characterize existing and projected water supplies and demands	Describe current wastewater processes and recycled water as well as regulatory setting	Characterize current groundwater knowledge and setting
<b>Goals and Objectives</b>	Define regional needs, goals and objectives relative to water supply, quality and reliability as well as perform the climate change vulnerability analysis and set goals	Define regional goals and objectives for recycled water use as it relates to water supply, water quality and other topics	Support regional goal focused on improving understanding and management of groundwater basin
<b>Regional Water Management Strategies</b>	Identification and vetting of potential strategies to meet the Region's goals and objectives	Consider potential regional recycled water strategies that could be implemented to meet IRWM Plan goals and objectives	Provide tool to estimate benefits associated with potential recharge and groundwater management strategies within the IRWM Plan

IRWM Plan Chapter	Water Supply Reliability Study	Recycled Water Study	SGIWGM
<b>Projects</b>	Identify potential project concepts and the benefits and costs that could be included in the IRWM Plan for implementation	Identify potential project concepts and the benefits and costs that could be included in the IRWM Plan for implementation	Provide a tool to model conceptual groundwater project viability and impacts

### 1.3 Technical Analysis

In addition to direct input from stakeholders and the public and the technical studies, other technical data, plans, and studies were used to develop the San Gorgonio IRWM Plan. **Table 1-2** describes the primary sources of information used to prepare Plan sections and describes how data were analyzed, the relevant results from the analysis, and how the data were used in the IRWM Plan. Technical information was provided by statewide, local, and regional plans and studies related to water supply reliability. Facilities planning, water quality, flood control, and habitat protection were developed with public review and stakeholder participation. Much of the water supply and demand information used in the creation of the Plan was found in Urban Water Management Plans (UWMP) for the City of Banning and the San Gorgonio Pass Water Agency. The UWMP development process for water suppliers is updated frequently and undergoes extensive public review. However, there are smaller water purveyors (fewer than 3,000 connections), private water rights holders, and sovereign tribes that are not required to complete UWMPs; so additional sources of information were used.

**Table 1-2: Technical Data and Studies Used in the San Gorgonio IRWM Plan**

Data or Study	Analysis Method	Results/Derived Information	Use in IRWM Plan
<b>2010 &amp; 2015 Urban Water Management Plans for City of Banning and SGPWA</b>	Analysis of water supply reliability, water quality, water demands, and infrastructure	Current and projected supplies and demands, quality concerns, and facility descriptions	Used to describe current and projected supplies and demands in the Region, and discuss drinking water quality concerns, and facilities. Also, used to establish water supply issues and needs.
<b>2010-2014 American Community Survey (US Census Bureau)</b>	Growth analysis, review of census block groups and designated places	Population, housing, and income data for the 5-year period from 2010 to 2014	Used to estimate median household income and Disadvantaged Communities (DACs)
<b>SCAG Regional Growth Forecast (Southern California Association of Governments, 2016)</b>	Growth analysis, review of Transportation Analysis Zone (TAZ) data	Population, employment, for the period from 2010 to 2040	Used to estimate population, describe demographics and economic setting as well as to calculate demand

<b>Data or Study</b>	<b>Analysis Method</b>	<b>Results/Derived Information</b>	<b>Use in IRWM Plan</b>
<b>2010/2015 Census (US Census Bureau)</b>	Review of census block groups and designated places	Populations and housing data for the years 2010 and 2015	Used to estimate current population for the Region, and calculate demand
<b>Maximum Perennial Yield Estimates for the Banning and Cabazon Storage Units, and Available Water Supply from the Beaumont Basin (City of Banning, 2011)</b>	Water supply analysis, regional groundwater resources	Safe yields for storage units in the San Gorgonio Pass subbasin	Used to describe the Region's groundwater resources
<b>2013 Reevaluation of the Beaumont Basin Safe Yield (Beaumont Basin Watermaster, 2015)</b>	Water supply analysis, regional groundwater resources	Current and projected groundwater supplies under Beaumont Basin Adjudication	Used to describe the Region's groundwater resources
<b>San Gorgonio Pass Water Agency Report on Water Conditions (SGPWA, 2014)</b>	Water supply reliability analysis	Current regional water supply sources and groundwater pumping estimates	Use to describe water supply and demand in the Region
<b>Water Supply Assessment for Butterfield Specific Plan (City of Banning, 2011)</b>	Water supply feasibility analysis	Description of projects with multiple benefits to stormwater and water supply	Used to describe planned projects with multiple benefits
<b>City of Banning Recycled Water Master Plan (City of Banning, 2006)</b>	Water supply feasibility analysis	Projected recycled water demands and facilities	Used to describe existing plans for use of recycled water as a new source of supply
<b>City of Banning Chromium-6 Treatment and Compliance Study Memorandum (2016)</b>	Water quality analysis	Description of compliance options for regulatory changes to allowable Chromium 6 levels	Used to describe resilience to change water quality requirements
<b>1986-1989 Riverside County Master Drainage Plans (County of Riverside)</b>	Flood analysis, review of drainage planning	Current drainage facilities and needs, as well as flood planning in Riverside County	Used to describe the Region's flood control facilities and needs.
<b>State Water Project Delivery Capability Report (DWR, 2015)</b>	Water supply reliability analysis, review of SWP supplies to SGPWA	Forecasted SWP Table A deliveries under historical hydrology and climate change scenarios	Used to describe the reliability of imported water supplies to the region, including impacts of climate change

Data or Study	Analysis Method	Results/Derived Information	Use in IRWM Plan
<b>Water Quality Control Plan for the Colorado River Basin (Colorado River Regional Water Quality Control Board [RWQCB])</b>	Water quality analysis	Beneficial use designations and water quality objectives	Used to describe current water quality impairments, beneficial uses for surface waters, and quality objectives for surface and ground waters
<b>Western Riverside County Multiple Species Habitat Conservation Plan (County of Riverside)</b>	Review location of sensitive habitats	Locations of habitat areas, and conservation needs	Used to describe the species habitat areas in the Region, conservation areas, and to establish habitat issues and needs
<b>Coachella Valley Multiple Species Habitat Conservation Plan (County of Riverside)</b>	Review location of sensitive habitats	Locations of habitat areas, and conservation needs	Used to describe the species habitat areas in the Region, conservation areas, and to establish habitat issues and needs
<b>Rancho San Gorgonio Specific Plan</b>	Water supply planning and analysis	Future water supply demands and locations of those demands	Used to describe and help calculate the future demands for water and wastewater needs and uses for the Region in the future

## 1.4 Regional Governance

The current San Gorgonio IRWM Region governance framework was developed to meet the requirements of DWR’s 2016 Proposition 1 Program Guidelines while also reflecting the Region’s unique setting and resources. The membership of the RWMG, collectively with the SAC, represents all entities significant to water management planning in the planning area. These entities have the institutional and fiscal capacity and systems to carry out IRWM planning and implementation efforts. The governance structure of the San Gorgonio IRWM Region is designed to be flexible and to meet the needs of the Region’s stakeholders, while maintaining a clear structure and decision-making process.

### 1.4.1 Process for Developing the Governance Structure

In 2016, the San Gorgonio IRWM RWMG was formed for the purpose of creating a new IRWM Region in the San Gorgonio Pass. Initial members of the RWMG initiated a recruitment program to identify and involve water management-related entities, organizations, and agencies for both the RWMG and the companion SAC.

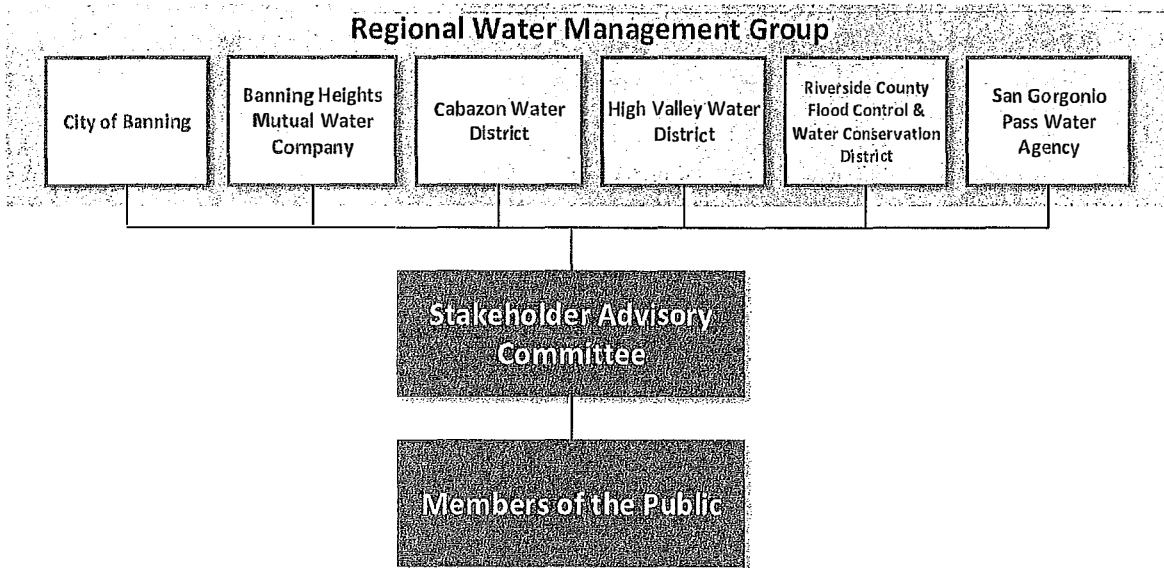
That same year, the City of Banning (Banning), Banning Heights Mutual Water Company (BHMWC), Cabazon Water District (CWD), High Valleys Water District (HVWD), Riverside County Flood Control and Water Conservation District (RCFCWCD), and the San Gorgonio Pass Water Agency (SGPWA) signed the Memorandum of Understanding (MOU) to conduct IRWM Planning for the San Gorgonio Region. This MOU (**Appendix D**) forms the basis of the San

Gorgonio IRWM RWMG. By adopting the MOU, the RWMG members committed resources and funding to work collaboratively together with the SAC and public to develop, adopt, and support implementation of an IRWM Plan. New entities can join the RWMG with a majority concurrence of the existing members and through the execution of the MOU by their governing boards. The term of the MOU is 10 years.

### 1.4.2 Governance Structure

The Region’s governance structure features an inclusive process that encourages stakeholder involvement in the IRWM planning process. As shown in **Figure 1-2**, the simple structure is comprised of three key groups that work together to provide the Region with focused direction, while allowing for effective and comprehensive inter- and intra-regional collaboration.

**Figure 1-2: San Gorgonio IRWM Governance Structure**



### 1.4.3 Regional Water Management Group

The RWMG is a decision-making body that seeks to gain consensus from all members on key decision points so that items requiring decisions are discussed and agreed upon. The RWMG determines how to solicit and use input received from the SAC and the public within the IRWM program

The RWMG consists of local agencies having statutory authority over water supply, water quality, water management, and/or flood protection. Furthermore, the RWMG members have diversity in water management responsibilities, including responsibilities associated with water supply, drinking and environmental water quality, wastewater, flood control, and water conservation. Together, the RWMG members represent nearly all major water resource managers in the Region and have a variety of stakeholders and customers that are represented in the IRWM process.

The MOU identifies Banning as the lead in contracting for planning, preparing applications for funding, and implementing funded efforts on behalf of all potential project proponents and stakeholders within the Region. The MOU also authorizes Banning to submit applications to DWR

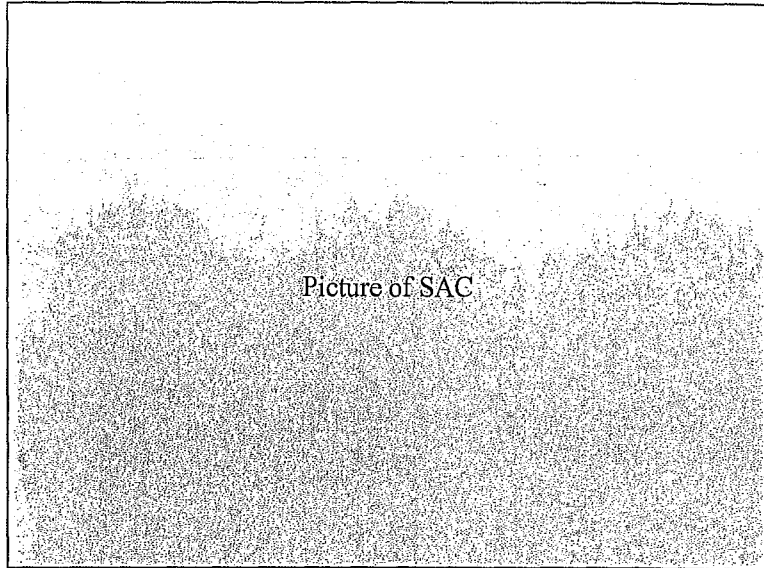


for IRWM Planning and Implementation Grants, enter into contracts with DWR, and disburse funds to grantees. As such, the RWMG elected the Banning’s representative to serve as Chair of the SG IRWM RWMG.

Currently the RWMG meets monthly to discuss San Gorgonio IRWM Program needs, which includes Plan development. However, the RWMG may opt to meet less frequently once the Region and its IRWM Plan are fully established.

### 1.4.4 Stakeholder Advisory Committee

The SAC was created to provide a dedicated group of key stakeholders to participate in the SG IRWM Program. Current members of the SAC include all the RWMG members as well as representatives from Native American Tribes, local businesses, and environmental groups throughout the Region. SAC members were selected by consensus of, and serve on behalf of, the RWMG to inform and advise the RWMG agencies on regional needs, goals, priorities, strategies, and projects. Together, SAC members represent local and countywide agencies, tribal nations, and commercial, community, and industry groups involved in water resource management, as identified in **Table 1-3**.



*SAC meeting and members, taken at the DATE meeting*

The existence of the SAC encourages other stakeholders and members of the public to participate in the planning process and submit goals, priorities, and projects. Membership in the SAC requires RWMG approval, but the Region actively encourages additional stakeholders that attend the SAC meetings as members of the public to officially join the SAC. Persons interested in participating in the SAC and meetings should contact the Program Manager at [SGIRWM@ci.banning.ca.us](mailto:SGIRWM@ci.banning.ca.us) or review the “Get Involved” section of the San Gorgonio IRWM website at [www.sgirwm.org](http://www.sgirwm.org).

Initially, the SAC met through a series of six workshops dedicated to the development of the San Gorgonio IRWM Plan. For ongoing collaboration and grant program participation, the SAC will meet on a quarterly or as-needed basis.

**Table 1-3: San Gorgonio IRWM RWMG and SAC Members**

RWMG	SAC
<ul style="list-style-type: none"> <li>• City of Banning</li> <li>• Riverside County FC&amp;WCD</li> <li>• Cabazon Water District</li> <li>• High Valleys Water District</li> <li>• Banning Heights MWC</li> <li>• San Gorgonio Pass Water Agency</li> </ul>	<ul style="list-style-type: none"> <li>• City of Banning</li> <li>• Riverside County FC&amp;WCD</li> <li>• Cabazon Water District</li> <li>• High Valleys Water District</li> <li>• Banning Heights MWC</li> <li>• San Gorgonio Pass Water Agency</li> <li>• Morongo Band of Mission Indians</li> <li>• United States Forest Service (USFS)</li> <li>• Banning Bench Community of Interest Association</li> <li>• BIA Building Industry Association</li> <li>• Diversified Pacific</li> <li>• Pardee Development</li> </ul>

## 1.5 Outreach and Participation

The San Gorgonio IRWM Program is supported by a diverse group of stakeholders with differing expertise, perspectives, and authority over various aspects of water management. The 2018 IRWM Plan development was informed by participation from a group of stakeholders that included the Region’s water management agencies, tribes, and non-governmental organizations, engaged to represent a balance in viewpoints. The main opportunity for participation is through SAC meetings and workshops, at which there are no limitations preventing other stakeholders and the public from participating on an equal footing with members of the SAC. Stakeholders do not need to be SAC members to participate in the IRWM planning process and efforts. The Region does, however, require that if a stakeholder wishes to submit a project as part of an IRWM related grant application, that stakeholder would need to become an official member of the SAC.

### 1.5.1 Stakeholder Identification

During the 2016 RAP application process, the RWMG developed a preliminary list of potential stakeholders with water resources interests in the San Gorgonio Region, including cities and counties, special districts, tribes, state and federal agencies, environmental stewardship organizations, community organizations, disadvantaged community representatives, industrial and private interests, and neighboring IRWM Regions. A representative for each of the stakeholders in **Table 1-4** below was sent a letter soliciting interest in participating in the IRWM planning

process as a stakeholder. During the 2018 IRWM planning process, the RWMG further expanded this list of potential stakeholder groups. Organizations representing these communities were personally contacted by phone and email to participate in the IRWM planning process.

**Table 1-4: Stakeholder Outreach Distribution List**

Entity Type	Agencies and Entities
<b>Cities/Counties</b>	<ul style="list-style-type: none"> <li>• City of Banning</li> <li>• City of Beaumont</li> <li>• Southern California Association of Governments</li> <li>• County of Riverside</li> <li>• Western Riverside Council of Governments</li> </ul>
<b>Community Organizations</b>	<ul style="list-style-type: none"> <li>• Banning Bench Community of Interest Association</li> <li>• Banning Bench Emergency Preparedness Committee</li> <li>• Cabazon Association</li> <li>• Cherry Valley Acres and Neighbors</li> <li>• Habitat for Humanity</li> <li>• Housing and Community Development Departments</li> <li>• Inland Empire Economic Partnership (IEEP)</li> </ul>
<b>Environmental Stewardship Organizations</b>	<ul style="list-style-type: none"> <li>• Endangered Habitats League</li> <li>• Riverside Land Conservancy</li> <li>• Wild California</li> <li>• Western Riverside County Regional Conservation Authority</li> </ul>
<b>Industrial and Private Interests</b>	<ul style="list-style-type: none"> <li>• Building Industry Association (BIA)</li> <li>• Diversified Pacific</li> <li>• Highland Springs Ranch &amp; Inn</li> <li>• Krieger &amp; Stewart</li> <li>• Pardee Development</li> <li>• Twin Pines Boys Ranch</li> <li>• Silent Valley Campground</li> <li>• Southern California Edison</li> </ul>
<b>Flood Control and Stormwater Management</b>	<ul style="list-style-type: none"> <li>• Riverside County Flood Control and Water Conservation District</li> <li>• San Bernardino County Flood Control District</li> </ul>
<b>Special Districts and Agency Alliances</b>	<ul style="list-style-type: none"> <li>• Banning School District</li> <li>• San Gorgonio Pass Water Agency</li> <li>• Banning Heights Mutual Water Company</li> <li>• Cabazon Water District</li> <li>• High Valleys Water District</li> <li>• Beaumont Cherry Valley Water District</li> <li>• San Gorgonio Pass Regional Water Alliance</li> </ul>

Entity Type	Agencies and Entities
State & Federal	<ul style="list-style-type: none"> <li>• California State Lands Commission</li> <li>• California Department of Fish and Wildlife</li> <li>• California Department of Water Resources</li> <li>• California Energy Commission</li> <li>• California Regional Water Quality Control Board – Colorado Region</li> <li>• California Wildlife Conservation Board</li> <li>• Natural Resources Conservation Service</li> <li>• San Bernardino National Forest</li> <li>• US Army Corps of Engineers</li> <li>• US Bureau of Land Management</li> <li>• US Environmental Protection Agency</li> <li>• US Federal Emergency Management Agency</li> <li>• US Fish and Wildlife Service</li> <li>• US Geological Survey</li> </ul>
Tribes	<ul style="list-style-type: none"> <li>• Morongo Band of Mission Indians</li> </ul>
Neighboring IRWM Regions	<ul style="list-style-type: none"> <li>• Coachella Valley IRWM Region</li> <li>• Santa Ana Watershed Project Authority (SAWPA) IRWM region</li> </ul>

Those entities that were contacted but did not join the SAC were added to an interested party distribution list and are included on as-needed email updates regarding the San Gorgonio IRWM Program. This list is updated regularly to include any newly identified interested parties.

### 1.5.2 DAC Outreach

Of the estimated population of 30,255 within the San Gorgonio IRWM Region, 27,272 people, or 90%, qualify as living in a Disadvantaged Community (DAC) in accordance with State Guidelines (defined as communities with an annual median household income [MHI] less than 80% of the statewide annual median income). Many of the DACs in the San Gorgonio IRWM Region rely on significant infrastructure to serve relatively small and sparse populations. This can be challenging for the small, local water resource management agencies to adequately finance new projects and operate/maintain existing systems. These areas are further described in the *Region Description*.

Given that the RWMG, together with the SAC, provides water service to the entire Region, these entities also represent constituents within DACs. In addition, nearly all of the stakeholders that are included in the SAC, or are on the distribution list, in some way represent DAC interests within the Region. To further engage participation from representatives in these areas, the RWMG members personally contacted potential DAC representatives to solicit participation.

### 1.5.3 Tribal Outreach

The Morongo Band of Mission Indians (MBMI) is the only Federally Recognized Native American Tribe within the Region. The MBMI collaborated directly with RWMG members in the formation of the San Gorgonio IRWM Region and is an active member of the SAC. Tribal representatives are included on the IRWM distribution list and receive all SAC communications.

## 1.5.4 Public Outreach

Any member of the public can be included in the IRWM distribution list to receive notifications and agendas for upcoming SAC meetings, requests for information or input on IRWM planning activities, notifications for funding opportunities, and other IRWM-related announcements. While distribution of information is primarily conducted via email and through the program's website, interested members of the public can request that materials be distributed in other formats to accommodate their needs by contacting the Region's Program Manager.

The public is always invited and encouraged to attend SAC meetings to participate and provide input into the IRWM Program. IRWM SAC meetings include IRWM Program announcements, status reports on IRWM projects, status of IRWM grant funding awarded and opportunities, and other current activities. These other activities may include IRWM Plan update activities such as updating goals and objectives, identifying needs and strategies, determining climate change vulnerabilities, developing and reviewing projects, and updating the region description.

## 1.6 Regional Coordination

The Region regularly coordinates with relevant local, regional, and statewide planning entities as well as other IRWM Regions.

### 1.6.1 Coordination with Other Regions

Some members of San Gorgonio IRWM RWMG and SAC also participate in other IRWM Regions, which enhances the Region's ability to coordinate with proximate IRWM Regions. Given their proximity, there is a long history of working together with members from the SAWPA and Coachella Valley IRWM Regions (refer to **Figure 2-1**) to resolve water resources management-related issues and conflicts. As part of the 2016 RAP and Planning Grant applications, the San Gorgonio RWMG met with the Coachella Valley RWMG to discuss the formation of the San Gorgonio IRWM Region. As a result of these initial meetings, the two Regions agreed to the benefits and geographic coverage of the new San Gorgonio Region and acknowledged a desire to continue to collaborate on inter-regional issues within the Colorado Funding Area, including participation in DWR's DAC involvement initiative.

In addition to IRWM activities, members of the RWMG participate in the San Gorgonio Pass Water Alliance, which provides a regular mechanism to conduct inter-regional coordination with the neighboring SAWPA and Coachella Valley IRWM Regions.

## 1.7 Coordination with Local and Regional Water and Land Use Planning Efforts

The San Gorgonio IRWM stakeholder outreach and involvement process allows for interactive feedback to occur between local planning efforts (both water and land use) and IRWM planning. Within the San Gorgonio IRWM Region, local planning is conducted by counties, cities, local agencies and special districts. The County of Riverside (through the RCFCWCD), cities, and water agencies within the Region selected representatives to regularly attend and participate in IRWM meetings and workshops, providing valuable input. Additionally, State and Federal agencies provided input and participation with IRWM efforts to assist in communication, cooperation, or implementation of Plan components.

---

In addition, existing local, regional, and statewide plans were reviewed for relevant information to include as a part of the IRWM Plan process. The relevant plans, listed in **Table 1-5**, were used to further refine the Region's description, needs, goals, objectives, and strategies, and were used to help develop the Region's short- and long-term priorities for water management. Although local plans relevant to the Region do not currently include climate change adaptation and mitigation, other planning documents, such as the Santa Ana Watershed Project Authority IRWM Plan, were evaluated for those strategies to help guide and provide consistency across the greater region. **Table 1-5** lists each plan, describes its planning jurisdiction, explains how it applies to the Region, and provides an updated schedule.

The Region recognizes the importance of collaboration between land use planning and water resources management. The processes in place for articulating the Region's description, objectives, strategies, and projects incorporate input from land use planners that are a part of the SAC or provide comments on IRWM documents. It will be necessary to continue coordination with these land use planners to ensure that the IRWM Plan is appropriately implemented and to insure future Regional and local planning efforts evolve together and complement one another.

**Table 1-5: Coordination with Local and Regional Planning Documents**

Planning Document	Jurisdiction	Planning Content	Updates
California Water Plan (DWR, 2013)	Water Resource Planning	Population, housing, and income data for the 5-year period from 2006 to 2010	Every five years
City of Banning General Plan (Banning, 2006)	Land Use	Includes land use and zoning information, growth projections for the City of Banning	As needed
City of Banning 2015 Urban Water Management Plan (Banning, 2016)	Water supply / Wastewater	Provides current and projected water supply and demand, drinking water supply/quality issues, population, facilities, and water infrastructure and source information.	Every five years
San Gorgonio Pass Water Agency 2015 Urban Water Management Plan (SGPWA, 2016)	Water supply	Provides current and projected water supply and demand, drinking water supply/quality issues, population, facilities, and water infrastructure and source information.	Every five years
Riverside County General Plan, including subsections: Pass Area Plan and Riverside Extended Mountain Area Plan (County of Riverside, 2008)	Land Use	Includes area description, land use, and zoning information for Riverside County.	As needed

Planning Document	Jurisdiction	Planning Content	Updates
Western Riverside County Multiple Species Habitat Conservation Plan (County of Riverside, 2003)	Land Use	Includes a description of species habitat conservation areas, planning for future areas, and ecosystem descriptions.	As needed
Coachella Valley County Multiple Species Habitat Conservation Plan (County of Riverside, 2003)	Land Use	Includes a description of species habitat conservation areas, planning for future areas, and ecosystem descriptions.	As needed
Riverside County Flood Control and Water Conservation District Master Drainage Plan (RCFC&WCD, 1988)	Flood management	Includes flood risk and management information for Riverside County.	As needed
Regional Water Quality Control Board Plan for the San Diego Basin (RWQCB, 2012)	Water Quality	Includes 303(d) listings, beneficial uses, TMDLs, and plans for control of pollutants to surface waters.	As needed
2013 Re-evaluation of the Beaumont Basin Safe Yield	Water supply	Includes the background information and setting of the Beaumont hydrogeologic setting as well as the determined safe yield.	Every ten years
Santa Ana Watershed Project Authority (SAWPA) IRWM Plan	Water Resource Planning	Provides planning efforts, goals, climate change adaptations and mitigation strategies for local inter-Regional areas.	Every five years
First Update to the Climate Change Scoping Plan	California Air Resources Control Board (CARB)	Provides strategies to reduce or mitigate GHGs and climate change activities in California	As needed

### 1.7.1 IRWM Plan Updates

Formal IRWM Plan updates are required no less than every five years. The San Geronio IRWM Plan is intended to be a “living document” that is updated on a regular basis. Amendments and changes to the Plan may or may not trigger formal IRWM Plan updates. Amendments and changes significant enough to initiate a formal IRWM Plan update will be determined by the RWMG. All other changes will be approved by the RWMG and posted to the program website.

---

## 2. Region Description

The purpose of this chapter is to define the San Gorgonio IRWM Region through descriptions of its boundaries, water demands, supply sources, water quality, ecological and environmental processes, land uses, social characteristics, and economic trends and conditions. Understanding the unique nature of the Region is key to developing meaningful IRWM planning needs, goals, and objectives, resource strategies, and projects as described in subsequent chapters of this IRWM Plan.

### 2.1 Regional Boundaries

The San Gorgonio IRWM Region represents the eastern San Gorgonio Pass, a distinctive geographical area in Southern California located between the San Bernardino Mountains to the north, the San Jacinto Mountains to the south, the desert areas of the Coachella Valley to the east, and the San Bernardino and Morena Valleys to the west. The San Gorgonio IRWM Region is predominately located within Riverside County; however, northern portions extend into San Bernardino County. The Region includes unique geographic, watershed, groundwater, and jurisdictional boundaries compared with those areas surrounding the Region.

The Region covers an area of 228 square miles (142,720 acres) within the Colorado River Basin Funding area of the IRWM Program. The San Gorgonio IRWM boundary, drawn by regional stakeholders, reflects how water resources within the San Gorgonio Pass function as well as what and whom they benefit.

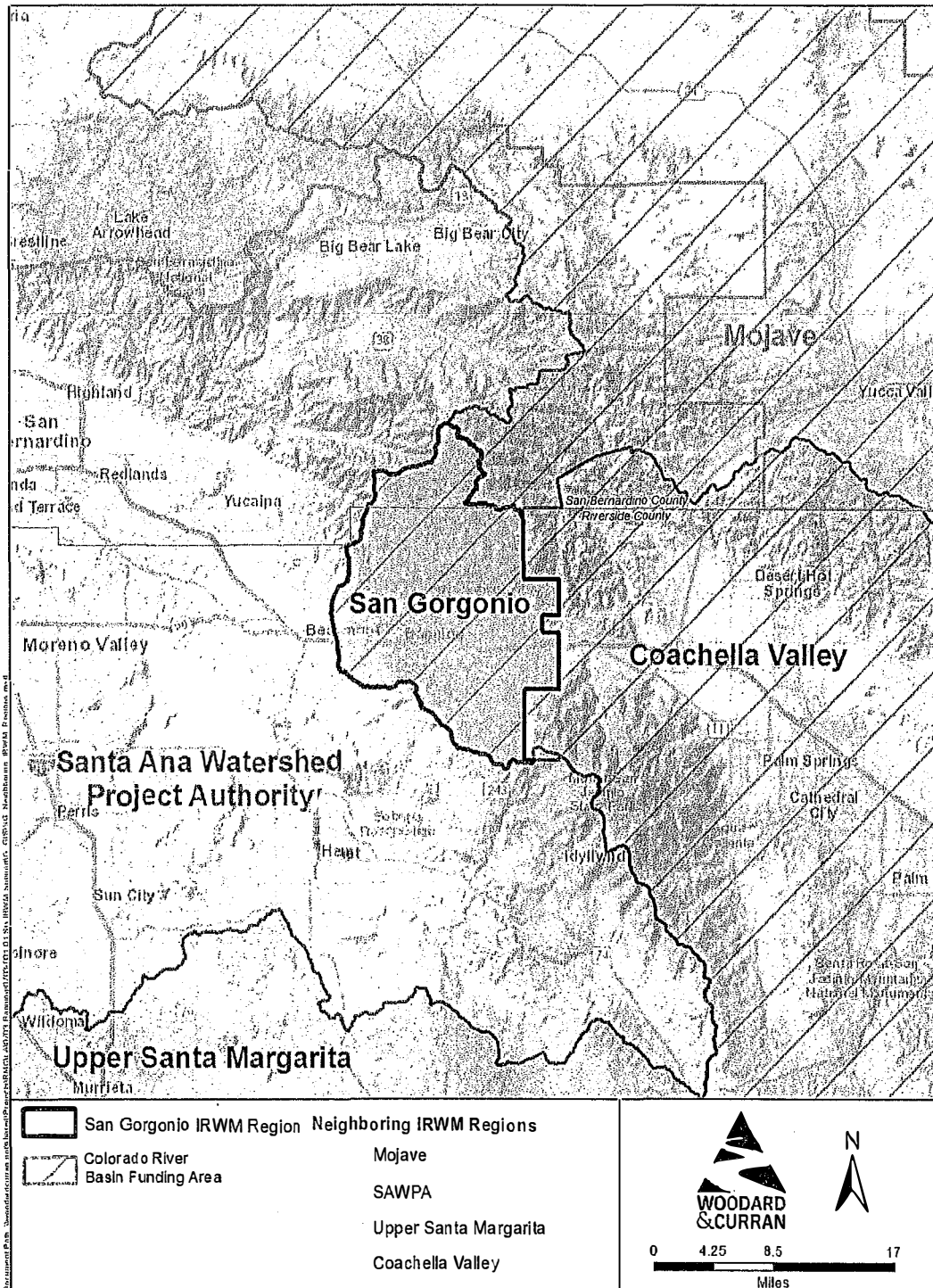
It was agreed during boundary determination that existing and adjacent IRWM regional boundaries needed to be mirrored. The Region's eastern and southeastern boundary runs adjacent to the Coachella Valley IRWM Region's northwest boundary which follows the service area boundary of the Desert Water Agency. The western and southwestern portions of the San Gorgonio IRWM boundary are defined by the boundary of the SAWPA IRWM Region which is contiguous with the Santa Ana River Watershed in this area. The San Gorgonio IRWM Region's northern boundary is defined by the Garnet Hill and Mission Creek subwatersheds of the Whitewater River Watershed, which is actively managed by Banning and BHMWC. The San Gorgonio IRWM Region boundaries are shown in Figure 2-1.

### 2.2 Physical Setting

The physical setting of the Region is consistent with what is commonly referred to as the San Gorgonio Pass. As such, the Region is characterized as having a higher elevation than the nearby desert and coastal areas. This topography provides the region with a unique climate pattern in a relatively rural setting with immense areas of open space, multiple seismic fault lines, ephemeral rivers, and specialized habitats.



Figure 2-1: Proximate IRWM Regions



## 2.2.1 Climate

The Region's unique climate is the primary factor that distinguishes water resources and management from other surrounding areas. Climate plays a large role in the ability to predict and manage the timing and volume of regional water resources. Demand and supply projections used by the Region's water resources managers are based on both seasonal and longer-term patterns of precipitation and temperature, allowing for variations between wet, dry, and average years as well as summer and winter seasons. Local surface water and groundwater supply infrastructure has been developed based upon the somewhat consistent patterns of precipitation that supply these resources. An understanding of local precipitation patterns is also critical to provide adequate flood protection and environmental flows for the Region. The following discussion provides information on the existing climate within the Region and goes on to explore some of the anticipated effects of longer-term climate change on the Region's water resources.

### Existing Climate

The Region's area has a transitional climate characterized by the marine coastal influences from the west and arid Mojave Desert influences from the east, with cool winters and hot, dry summers. Precipitation in the Region generally occurs as rainfall, although snowfall can occur. As shown in **Table 2-1**, mean annual rainfall for the Region is on average 16.5 inches per year, with most rainfall occurring during just a few major storms from November through April. During wetter years, the Region can receive as much as 40 inches per year.

The mean annual minimum temperature is approximately 47°F and the mean annual maximum temperature is 77°F. The highest average maximum temperature of 96°F occurs in July and the lowest average minimum temperature of 39°F occurs during January.



*San Geronio River's dry riverbed and arid desert climate*

Evapotranspiration rate (ET<sub>o</sub>) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). ET<sub>o</sub> serves as an indicator of how much water plants need for healthy growth and productivity. The standard annual average ET<sub>o</sub> for the Region is approximately 5 feet per year with the highest rates of 8 inches occurring in July, and the lowest rate of 2 inches occurring during December.

Table 2-1: Average Monthly Climate

Month	Average Monthly ETo (inches) <sup>1</sup>	Average Rainfall (inches) <sup>2</sup>	Average Max Temperature (°F) <sup>2</sup>	Average Min Temperature (°F) <sup>2</sup>
January	1.5	3.0	60.4	38.8
February	3.1	3.2	63.0	39.0
March	4.9	2.9	65.9	40.3
April	6.0	1.4	71.8	43.0
May	6.2	0.5	78.5	47.8
June	8.3	0.1	87.6	52.6
July	8.4	0.2	95.5	58.7
August	8.2	0.2	95.2	59.2
September	6.1	0.5	90.0	55.9
October	4.3	0.6	79.9	49.4
November	3.2	1.5	69.1	43.4
December	2.1	2.2	61.5	39.5
Annual	62.3	16.3	76.5	47.3

<sup>1</sup> CIMIS, 2017

<sup>2</sup> Western Regional Climate Center, 2017

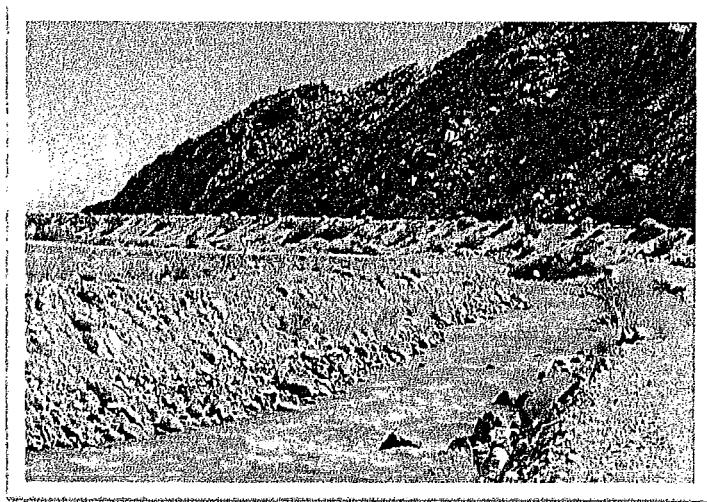
### Potential Impacts and Effects of Climate Change

Estimating the impacts and effects of climate change at a regional level is challenging due to the coarse spatial scale of models that project climate change impacts of temperature and rainfall, and due to the long timescale evaluated in many models. Recently, state entities have been working to scale down climate models to allow for climate change planning at a level that can be useful for planning efforts. Understanding projected climate change impacts and effects on the Region will help to identify the ways in which water resources in the Region will be most vulnerable to climate change. The SAC conducted a climate change workshop as part of the IRWM Plan development, and climate change vulnerabilities were prioritized to identify strategies and projects that would most effectively adapt to and mitigate against climate change. **Chapter 3** provides further discussion on the potentially significant vulnerabilities to climate change within the Region. **Chapter 4** includes strategies identified by the Region to help meet climate change related objectives and address regional vulnerabilities identified by the SAC and RWMG.

## 2.2.2 Watershed and Surface Water Features

The San Gorgonio IRWM Region contains nearly all of the Banning and Cabazon subwatersheds of the larger San Gorgonio River Watershed. The Region also includes a part of the Garnet Hill subwatershed which serves as the larger Whitewater River watershed's headwaters; specifically, the South and East fork sub-watersheds at and upstream of their confluence. These physical watershed boundaries are presented in **Figure 2-2**.

The San Gorgonio River is also a tributary of the Whitewater River, which is a part of the Colorado River Basin. The river and its tributaries drain 2,209 square miles, beginning in the San Bernardino Mountains and flows approximately 80 miles east through the San Gorgonio Pass. The San Gorgonio River continues east beyond the San Gorgonio IRWM Region to its confluence with the Whitewater River in the Coachella Valley IRWM region, ultimately draining into the Salton Sea.



*Photo of the Whitewater River just before its confluence with the San Gorgonio River*

The Cabazon subwatershed of the San Gorgonio River includes Hathaway Creek and Potrero Creek to the north, originating in the San Bernardino Mountains, and Brown Creek, Twin Pines Creek, and Azalea Creek to the south, originating in the San Jacinto Mountains. The Banning subwatershed of the San Gorgonio River originates at the summit of the San Gorgonio Pass and includes Montgomery Creek and Smith Creek (**Figure 2-2**).

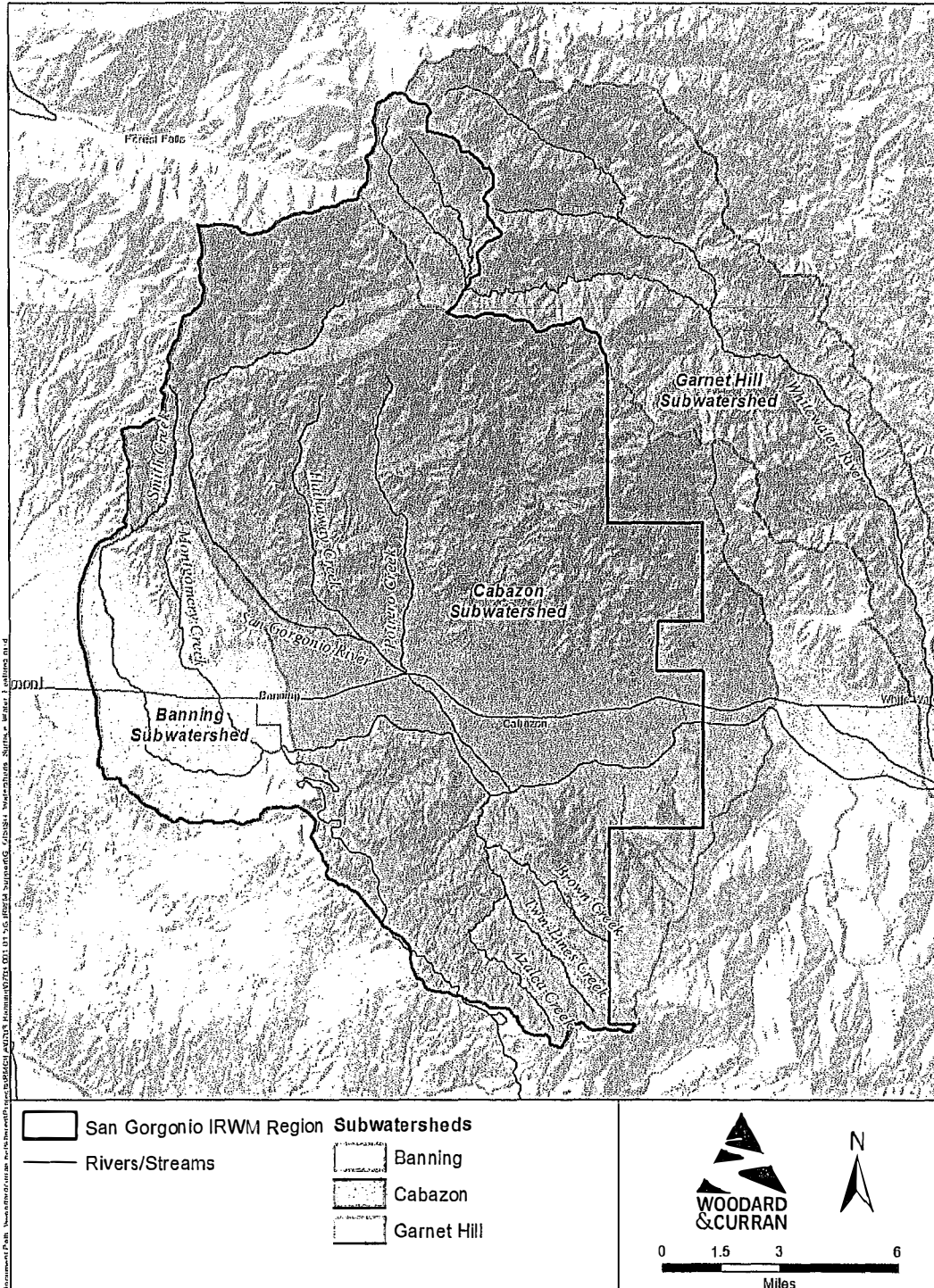
In addition to the San Gorgonio River system, the Region also includes the South and East forks of the Whitewater River that lie within the Garnet Hill subwatershed. The South and East forks have diversion structures that bring surface supplies to the San Gorgonio IRWM Region through the San Gorgonio Flume and is thus hydraulically linked to the San Gorgonio Region.

### 2.2.3 Geology and Geohydrology

The Region's high desert mountain pass topography is covered by multiple alluvial fan deposits that were derived from the San Bernardino and San Jacinto Mountains (USGS, *San Gorgonio Pass: Geologic Setting*, 2017). This alluvial fan geology provides wide areas that can rapidly and consistently recharge surface flows into the underlying San Gorgonio Pass Groundwater Basin. The San Gorgonio Pass watersheds recharge approximately 72% of total watershed flows into groundwater basins on an annual average. As result, the Region's watersheds have only ephemeral streams, with only a few perennial surface water sources occurring at higher elevations (USGS, *Estimating Natural Recharge in San Gorgonio Pass Watershed*, 2012).

The Region is a densely-faulted area, defined by the San Andreas Fault system, which includes a family of geologic structures covering a large area. Within the San Gorgonio Pass, the normally confined San Andreas fault line disaggregates into a family of irregular and discontinuous separate fault lines (Yule, 2009). This fractured fault system complicates how groundwater flows and moves throughout the area. Due to the numerous faults, bedrock and sediment layers have shifted resulting in significant differences in groundwater levels and flows that are difficult to understand and map. As such, recharge and pumping of supplies within the Region must be managed within many specific storage unit areas.

Figure 2-2: Watersheds and Surface Water Features



Together, these features create the greater San Gorgonio Pass Groundwater Basin. A map of this basin and the surrounding basins, as developed by DWR under Bulletin 118, is shown in **Figure 2-3**. The Region's subbasins and storage units are described in greater detail as part of this chapter's Water Supply section.

## 2.2.4 Habitat and Environment

Conservation and enhancement of habitat, biodiversity, and protection and restoration of the natural function of water systems are integral to maintaining the environmental processes that support healthy ecosystems and enable beneficial human uses of the watershed. Maintaining the quantity and quality of water resources within the San Gorgonio Region is critical to maintaining its unique habitat.

The Region falls within two Multiple Species Habitat Conservation Plans (MSHCP) that were developed to articulate the characteristics and needs of habitats within Riverside County as shown in **Figure 2-4**. The *Western Riverside County MSHCP* covers the western portion of Riverside County and includes approximately 62,824 acres of the Region's western half. The *Coachella Valley MSHCP* covers portions of Riverside County within the Coachella Valley and the eastern portion of the Region. The MSHCPs do not address Tribal Lands, including the Morongo Band of Mission Indians' Reservation.

The northernmost portion of the Region (within San Bernardino County) lies within the Sand to Snow National Monument and is not encompassed by the Riverside County MSHCPs. However, because of its proximity to existing identified significant conservation areas within Riverside County through the Western Riverside and Coachella Valley MSHCP's, the habitat and environmental processes discussed below are assumed to be somewhat relevant to this area as well.

### Essential Ecological Processes

The San Gorgonio River and various tributaries function as a fluvial sand transport system for the adjacent Snow Creek/Windy Point and the Whitewater Floodplain conservation areas. The Region's San Bernardino Mountains and the San Jacinto Mountains are sand sources for this fluvial sand transport system. Fluvial sand transport along the San Gorgonio River west of the Cabazon Conservation Area, and functionality of the San Gorgonio River as a Biological Corridor, are maintained as a result of public ownership along the river and flood control regulations.

### Biological Corridors and Linkages

The San Gorgonio River and associated tributaries provide value as a Biological Corridor between the San Bernardino Mountains and the San Jacinto Mountains. The area on either side of the Fornat Wash culvert under the Interstate Highway 10 (I-10) is included in the Conservation Area to serve as a Biological Corridor. The corridor on both the north and south sides of I-10 are bordered within one mile of the Morongo Indian Reservation, thus less is known about these areas.

Figure 2-3: Regional Groundwater Basins

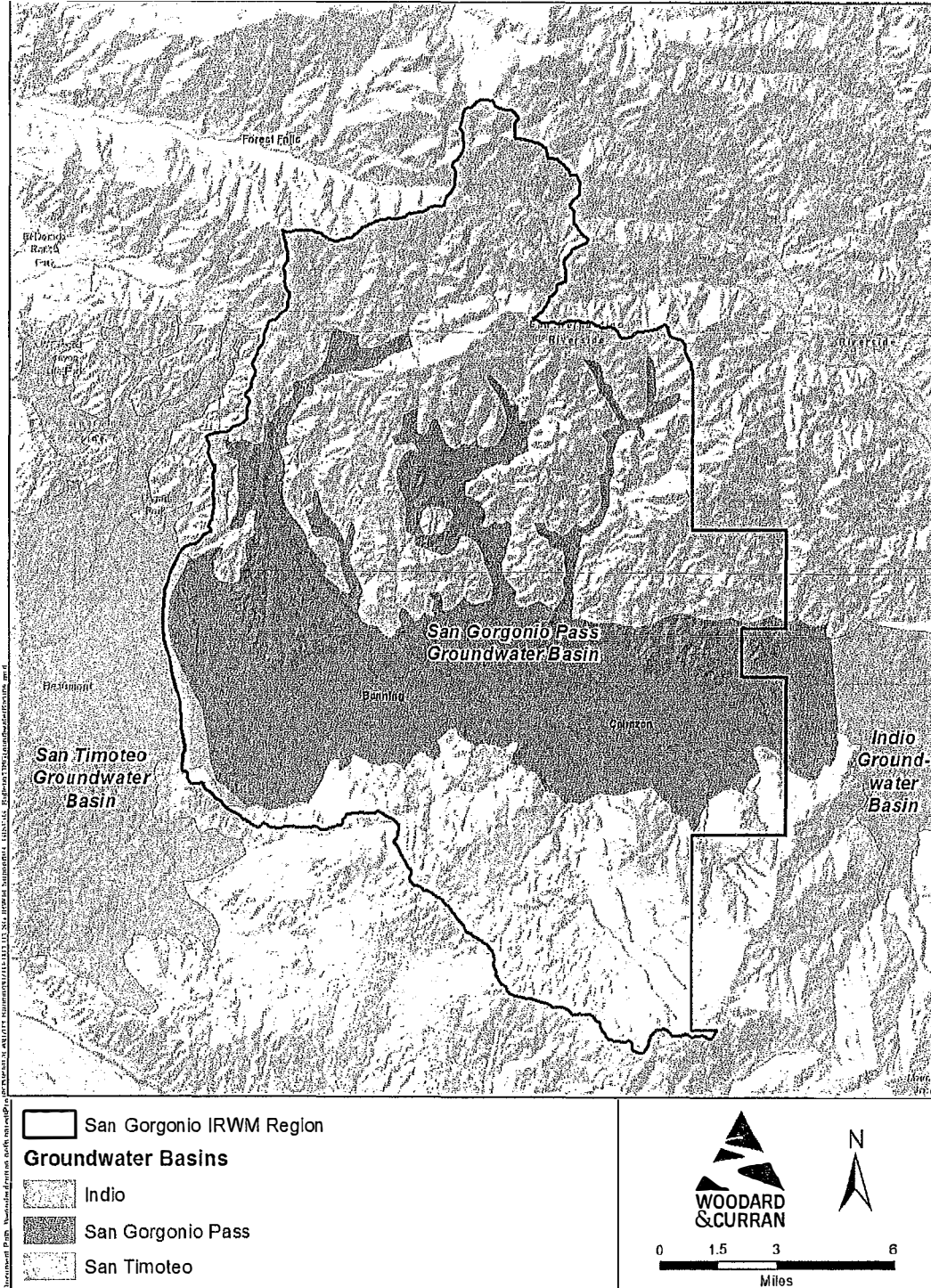
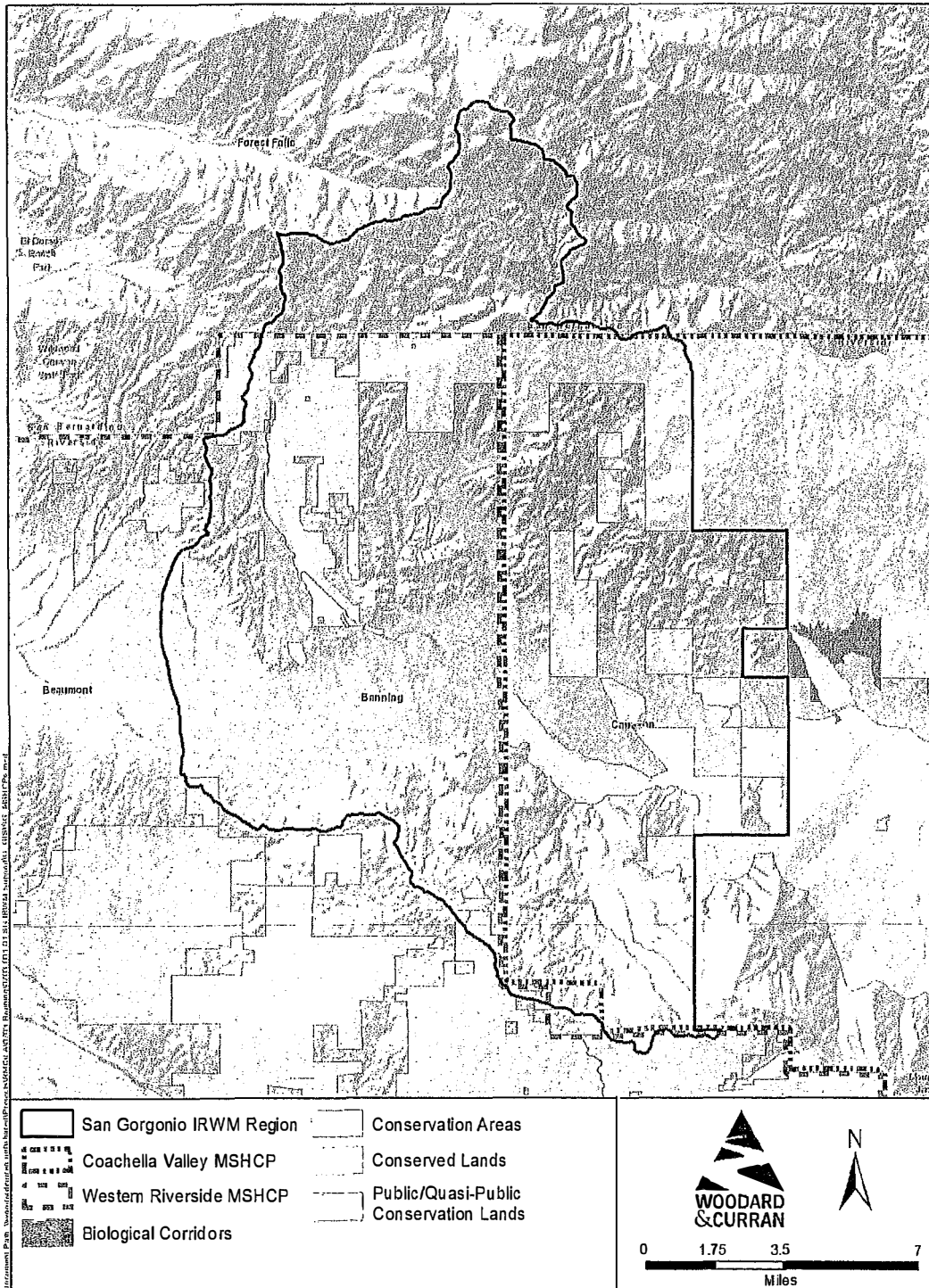
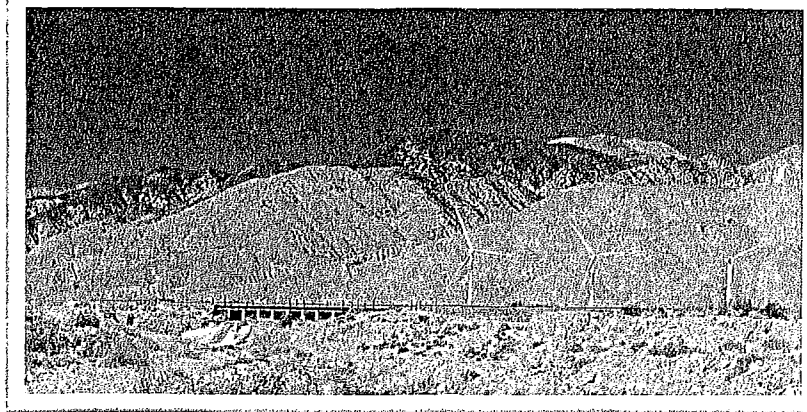


Figure 2-4: Habitat Areas Coverage Map





The Sand to Snow National Monument is a diverse area with a wide range of ecosystems, including lowland Mojave and Colorado deserts, riparian forests, creosote bush scrub and woodlands, fresh water marshes, Mediterranean chaparral, and alpine conifer forests. The San Gorgonio Wilderness, which is the area of the Monument within the Region, contains large un-fragmented habitat areas with no roads, and serves as an important habitat linkage between the San Bernardino and San Jacinto Mountain ranges. The area has been important for biological and ecological research, climate and land use change studies, and the impact of fire and invasive species management. The area has a remarkable species richness that makes it one of the most biologically diverse areas in southern California.



*Sand to Snow National Monument taken just east from Cabazon*

### Sensitive Habitat and Species

Core Areas (Cores) are defined as blocks of habitat of appropriate size, configuration, and vegetation characteristics that generally support the life history requirements of one or more of the species identified for conservation in the MSHCPs. Linkages between Cores are also critical for conservation of sensitive species. Many of these Cores are large undisturbed tracts of land that are not currently connected to other Cores through linkages. The San Gorgonio IRWM Region intersects two designated and one proposed Core.

Core areas within the San Gorgonio Region provide potential nest sites, foraging habitat and connection to the portion of the San Bernardino Mountains in San Bernardino County that harbors key populations of certain species. Identified “planning species” that have suitable habitats within the Core area include the mountain lion, San Bernardino mountain kingsnake, and the California spotted owl. Maintenance of habitat quality and large intact interconnected habitat blocks are important for these species. Areas of the Region also contain MSHCP designated “Essential Habitat” for Peninsular bighorn sheep.

Additionally, the Cabazon Conservation Area contains “Other Conserved Habitat” for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, desert tortoise, burrowing owl, gray vireo, least Bell's vireo, Le Conte's thrasher, southwestern willow flycatcher, summer tanager, yellow-breasted chat, yellow warbler, Coachella Valley round-tailed ground squirrel, Peninsular bighorn sheep, and Palm Springs pocket mouse. Most of the Habitat for the Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse is in the floodplain area of the San Gorgonio River.

MSHCP conservation objectives for this area do not include protecting the habitat for these species except incidental to conserving the Biological Corridor in the Fornat Wash area. The Plan aims to conserve the riparian species habitat.

## Bioregions

The diversity of topography, climate, soils, and other physical elements of the Region have resulted in rich biological resources that are largely undisturbed but are experiencing rapidly increasing development pressure in many areas.

- **The San Bernardino Mountains Bioregion** includes the northern portion of the San Gorgonio IRWM Region at elevations above 3,000 feet. This Bioregion supports coniferous forests, montane chaparral, and broad-leaved forest. This Bioregion has not been heavily disturbed or urbanized.
- **The Riverside Lowland Bioregion** includes the lower areas of the San Gorgonio Pass area including the City of Banning, as well as the unincorporated developed areas east of Banning such as Cabazon. It also includes the lower elevation portions of the Morongo Reservation. The Riverside Lowlands Bioregion generally occurs at elevations below 2,000 feet and is characterized by Riversidean sage scrub and annual grasslands. The relatively arid climate is in part the result of the rain shadow cast by the Santa Ana Mountains. A high level of disturbance and urbanization are noted within this Bioregion.
- **The San Jacinto Mountains Bioregion** is the southernmost portion of the San Gorgonio IRWM Region that occurs at elevations above 3,000 feet. This Bioregion supports coniferous forests, montane chaparral, and broad-leaved forest. This Bioregion has not been heavily disturbed or urbanized.

## Aquatic Resources

The San Gorgonio IRWM Region has two perennial river systems; the San Gorgonio River and the headwaters of the Whitewater River. The upper reaches of the Whitewater river are largely undisturbed, allowing the Whitewater River to be considered an area of high ecological significance as it is one of the most pristine and remote watersheds in southern California. It serves as a critical biological link between the San Bernardino Mountains and the Coachella Valley and San Jacinto Mountains and provides an important habitat for diverse species such as the California spotted owl, Nelson's bighorn sheep, and arroyo toad. The full course of the Whitewater River, extending outside of the region, hosts rich riparian vegetation that provides seasonal homes to endangered neo-tropical songbirds including least Bell's vireo and the southwest willow flycatcher (CalWild, 2017).

## Fire Hazard

Due to the vast amounts of undeveloped, sloping terrain and the presence of certain types of vegetation such as the oak woodlands and chaparral habitat, much of the Region is subject to a high risk of fire hazards. The highest danger of wildfires can be found in the San Bernardino National Forest, in nearby rural areas, and along the urban edges.

## 2.3 Land Use

### 2.3.1 Land Use Agencies and Planning

Multiple local, state, tribal and Federal agencies have jurisdiction over land management in the Region. Table 2-2 lists the cities, unincorporated areas, ecological reserves, tribal reservations, and

state and federal lands in the Region. **Figure 2-5** illustrates the jurisdiction of cities and unincorporated areas.

**Table 2-2: Land Management Agencies**

Cities and Unincorporated Areas
<ul style="list-style-type: none"> <li>• City of Banning</li> <li>• Riverside County</li> <li>• San Bernardino County</li> </ul>
Tribal Reservations
<ul style="list-style-type: none"> <li>• Morongo Band of Mission Indians</li> </ul>
Federal Lands
<ul style="list-style-type: none"> <li>• United States Forest Service</li> </ul>

The *County of Riverside General Plan* contains land use policies and recommendations for the San Gorgonio Region within portions of four Specific Plans: the *Pass Area Plan*, the *Riverside Extended Mountain Area Plan (REM Area Plan)*, the *Butterfield Ranch Specific Plan*, and the *Rancho San Gorgonio Specific Plan*. The Region is primarily located in the *Pass Area Plan*, which includes the incorporated cities of Banning, Beaumont, and Calimesa as well as the unincorporated communities of Cherry Valley, Cabazon, and Banning Bench. The *REM Area Plan* applies to a small area in the south of the Region in the San Jacinto Mountains. The *Butterfield Ranch Specific Plan* includes a portion of the western-most part of the Region along the border of the City of Banning north of I-10. The *Rancho San Gorgonio Specific Plan* includes areas in the southern portion of Banning south of I-10 between Sunset Avenue and South San Gorgonio Avenue. These Plans were used to define the land uses within the San Gorgonio IRWM Region in this section.

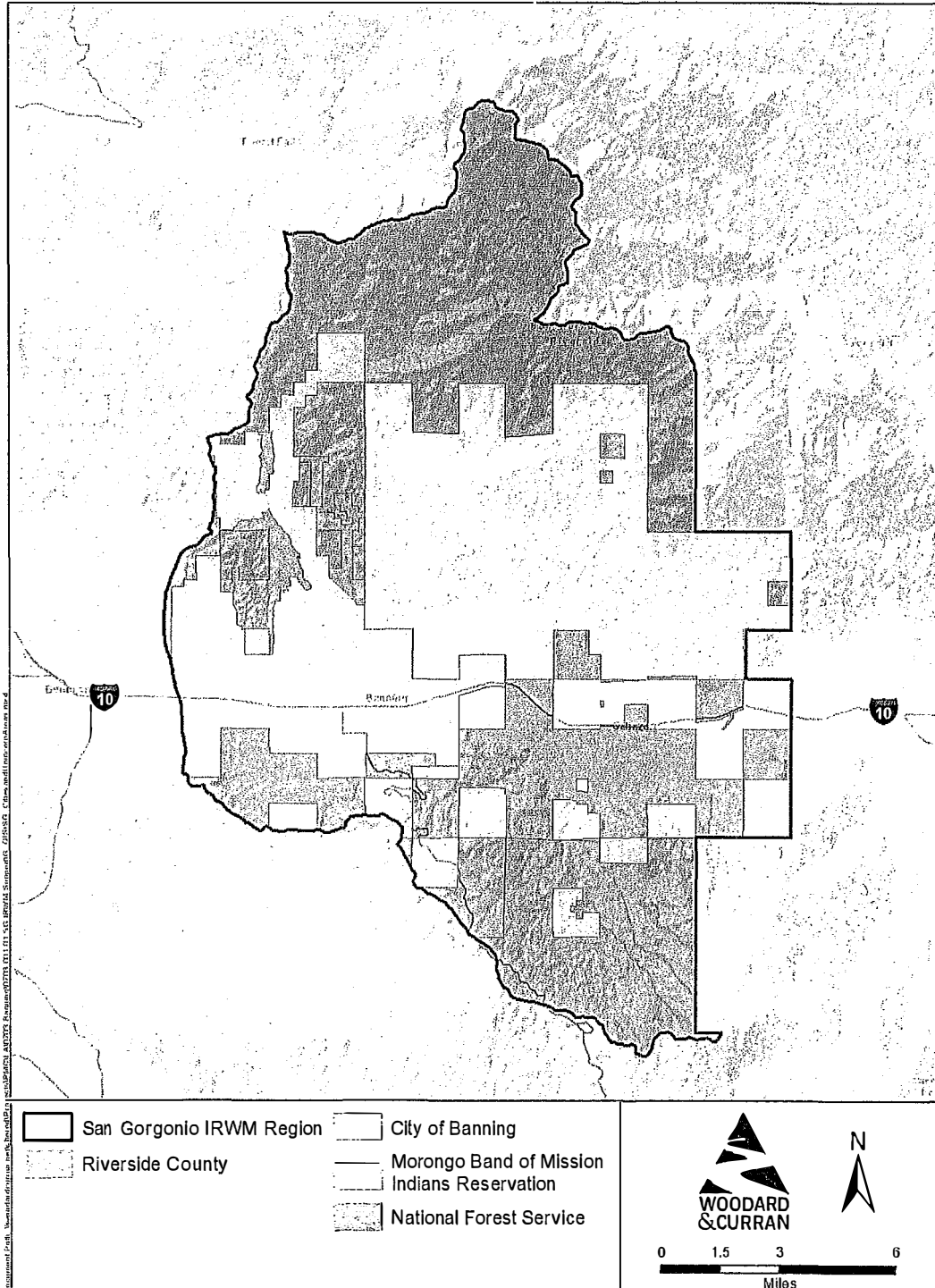
### 2.3.2 Land Use Types

The San Gorgonio IRWM Region is characterized as a predominately rural area with a slightly urbanized core that extends from west to east along the I-10. Most of the proposed development within the Region is expected to remain focused in areas that could potentially be annexed to the City of Banning. The land uses within this area are shown in **Figure 2-6** and are described below.

#### Tribal Lands

The Morongo Band of Mission Indians Tribe is a designated Federally Recognized Tribe by the US Department of the Interior, Bureau of Indian Affairs. As such, tribal lands in **Figure 2-6** are depicted as “Other” by most land use databases, and thus the Morongo Band of Mission Indians Tribal Land has been overlaid with orange and classified as tribal lands. Information as to how land is used and managed is relatively limited, but it is generally consistent with the rural nature of the areas without a separate urban core. The Morongo Band of Mission Indians also operates a casino and hotel within the Region.

Figure 2-5: Land Management Authority



---

### Other Urban Residential and Commercial

The City of Banning is the Region's only incorporated city. Banning's residential land uses are predominately classified as single family with larger more rural lots south of the I-10 Freeway. A commercial core follows the I-10 through the center of Banning.

### Industrial and Agricultural

The San Gorgonio IRWM Region does not include major agricultural activity. Recently, high value and more climatically appropriate crops have been cultivated within the Region, but this practice is relatively new and additional information is limited.

One of the largest industrial employers within the Region is the Arrowhead Water Bottling Facility, operated by Nestle Waters North America, Inc., which lies just within the boundaries of the Morongo Band of Mission Indians Reservation.

### Open Space

The San Gorgonio IRWM Region contains vast open spaces of mountain forests and valleys that provide key habitats as well as recreational opportunities for communities across Southern California. The Region is home to portions of the San Bernardino National Forest, one of the major outdoor recreation areas of Southern California, including a stretch of the Pacific Crest Trail and the Santa Rosa National Monument.

The San Gorgonio Wilderness, which lies within the Region's portion of the San Bernardino National Forest, is a recreational hub for the approximately 24 million Californians that live within a two-hour drive and is the number one visited wilderness in Southern California, attracting over 50,000 annual visits to this wild area. The Sand to Snow National Monument is a 154,000-acre area that encompasses lands in the Sonoran Desert floor up to 10,000 feet in the San Gorgonio Wilderness in the San Bernardino National Forest.

The San Gorgonio IRWM Region also contains portions of the San Jacinto Wilderness, which is managed by the USFS. The rugged terrain, open space, and scenic qualities of the San Bernardino and San Jacinto Mountains are expected to continue to be preserved through the Rural Mountainous and Open Space Conservation land use designations. It is co-managed by the USFS and the Bureau of Land Management, with 101,000 acres designated as wilderness.

## 2.4 Socio-Economic Setting

The San Gorgonio IRWM Region is characterized as a rural area with vast open spaces. Although it is relatively far from urbanized Los Angeles to the west, it is influenced by its proximity to the I-10 which connects the cities of Los Angeles to the west and Palm Springs to the east. The Region's socio-economic setting is reflective of historical, current, and emerging changes to its physical condition as well as from the way in which both land and water are managed within the Region. This section describes the Region's population, demographics, socio-economics, and cultural values.



## 2.4.1 Population and Demographics

The existing and projected populations for the San Gorgonio Region are shown in Table 2-3. The majority of the Region's residents live in the City of Banning. The remaining population is primarily concentrated within the unincorporated areas of Cabazon and Banning Bench and the Morongo Band of Mission Indians Reservation.

**Table 2-3: San Gorgonio IRWM Region Population**

	2015 <sup>1</sup>	2020 <sup>2</sup>	2025 <sup>2</sup>	2030 <sup>2</sup>	2035 <sup>2</sup>	2040 <sup>2</sup>
City of Banning	30,491	35,730	40,969	46,207	51,446	56,685
Unincorporated Riverside County (Including the Morongo Band of Mission Indians Reservation)	3,609	3,776	4,055	4,355	4,614	4,888
Unincorporated San Bernardino County	393	400	416	432	437	442
<b>Total</b>	<b>34,493</b>	<b>39,906</b>	<b>45,440</b>	<b>50,994</b>	<b>56,497</b>	<b>62,015</b>

<sup>1</sup> USCB, 2013

<sup>2</sup> SCAG, 2012

The Region has a diverse population comparable to the County of Riverside. According to Riverside County subdivision data from the 2010 Census<sup>1</sup>, Hispanics and Latinos represent 37% of the San Gorgonio Pass area's population, which is lower than the countywide average of 45%. The Region also has a similar population of Asian Americans at 5%, African Americans at 6%, and Native Americans at 2%. The Region has historically been an area for affordable retirement. The Region has a larger percentage of population over 64 years old at 19%, compared with a countywide average of 12%. Similarly, 34% of the Region is under 25 years old, which is less than the countywide average of 39%.

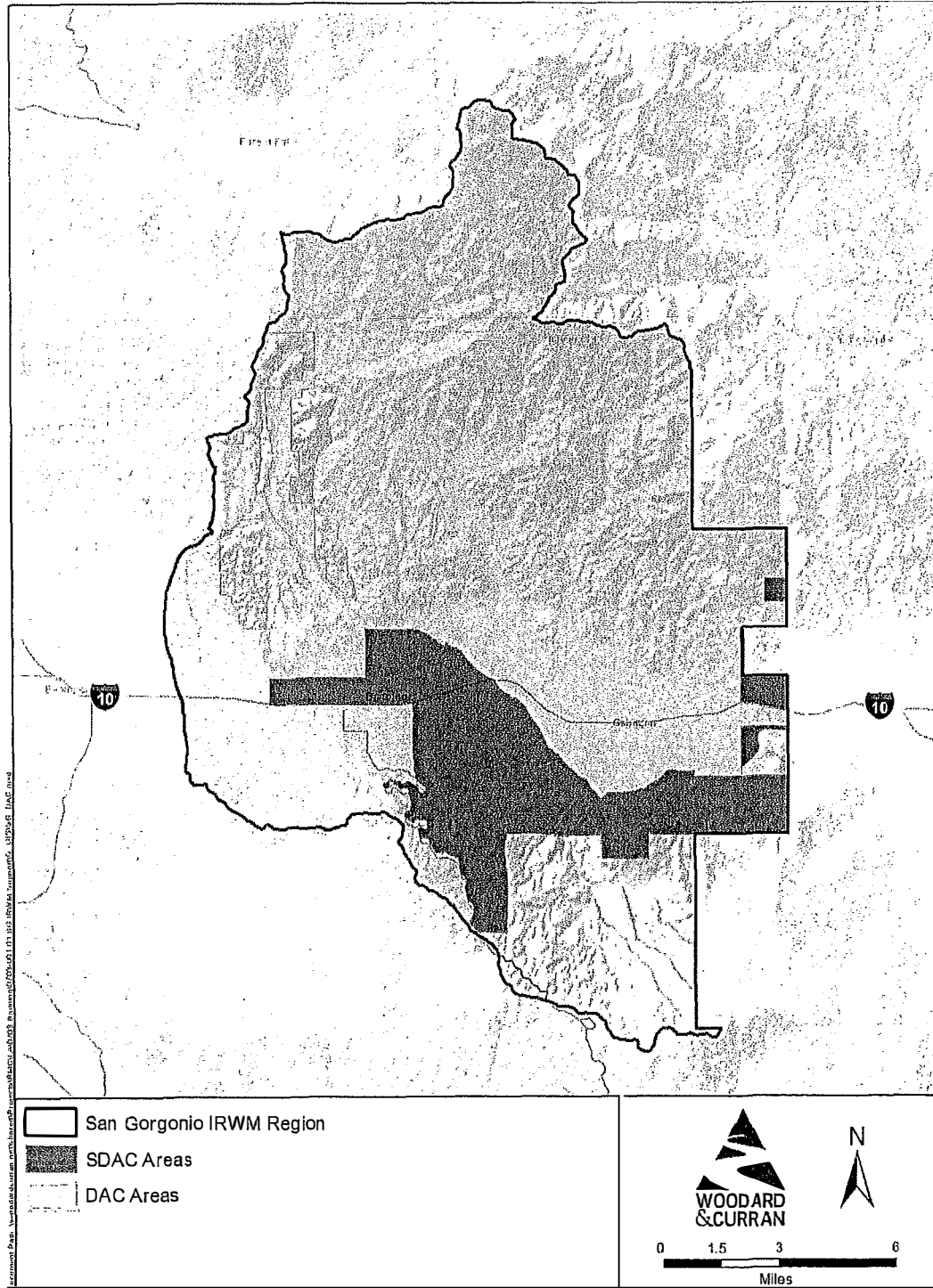
## 2.4.2 Disadvantaged Communities

The Region's residential areas meet the State of California's definition of DACs. DACs are defined as those communities with an annual MHI less than 80% of the statewide annual MHI (California Water Code, (CWC § 79505.5(a)). At the time this plan was prepared (2017), DACs were considered areas with a MHI less than \$49,191 (USCB, 2015). Approximately 17% of the Region's DAC areas qualify as a Severely Disadvantaged Community (SDAC), or those communities that have annual MHI of 60% (\$36,893) or less than the statewide annual average. The Region's SDACs are centered around the City of Banning and the southernmost portion, as shown in **Figure 2-7**.

---

<sup>1</sup> The San Gorgonio Pass Subdivision of Riverside County is a statistical division recognized by the Census Bureau covering the greater San Gorgonio Pass area. It includes the populated area within the Region, extends west, and includes the city of Beaumont and the community of Cherry Valley

Figure 2-7: Disadvantaged Communities





### 2.4.3 Economic Factors

For the forecast period 2010 to 2035, Riverside County is expected to have an annual average employment growth rate of approximately 3%. Employment levels are expected to reach approximately 1,243,000 in 2035 per Southern California Association of Governments (SCAG) projections. The five largest employment sectors in 2035 are expected to be retail, construction, health care, social services, and government. Leisure and hospitalities are expected to experience strong growth as it is anticipated that casino businesses will continue to expand on Tribal Lands. Riverside County will continue its trend of increasingly shifting from a logistics and manufacturing based economy to an information/professional services-based economy.

Driven by increases in projected employment levels and population, additional housing is required for economic expansion. Two-thirds of the new units are expected to be constructed in western Riverside County, which includes the SG IRWM Region. Another economic indicator of housing is the ability of the population to afford housing. Affordability measures in 2013 indicated that 56% of the population could afford the median priced home of \$298,000, making western Riverside County and southwestern San Bernardino County the most affordable region in southern California. The Region's unemployment rate is 10.2%.<sup>1</sup>

### 2.4.4 Social and Cultural Values

As part of the *Riverside County Integrated Project (RCIP)*, a county-wide public opinion survey has identified the following ideas on social and cultural goals for the future of the County:

- Continued planned growth in response to population growth
- Road corridors that connect communities, within and to Riverside County
- Open space corridors that connect habitats
- No leapfrog development
- Less sameness, greater densities for “smart” developments
- Regional north/south and east/west solutions to congestion
- Better air quality through less traffic congestion and more local jobs
- A planning pact with cities to help achieve the plan

## 2.5 Water Supply and Demand

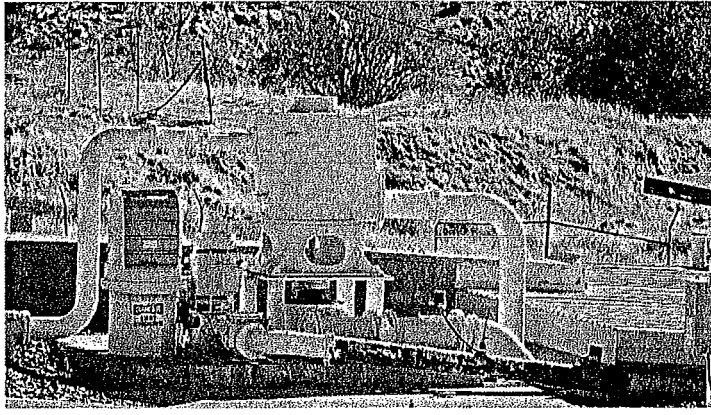
The SG IRWM Region's water framework governs how the San Gorgonio Groundwater Basin's network of subbasins are managed. Local surface water and imported water supplies are used to recharge these basins that provide vital supply storage given significant seasonal and annual surface supply variability. This section describes the water demands within the Region as well as how supplies are accessed and distributed to meet those needs.

---

<sup>1</sup> Calculated using 2006-2010 American Community Survey Employment Data by Block Group.

**San Gorgonio Pass Water Agency:** Water imported through the SWP is supplied to the Region by SGPWA. SGPWA is a wholesale water agency (and SWP contractor) whose service area includes eight retail purveyors in the Beaumont Plains and the San Gorgonio Pass.

**City of Banning:** Banning's Public Works Department and Water Division provides retail municipal water to its service area (of 16,908 acres) that encompasses Banning's incorporated area and some unincorporated areas of Riverside County as shown in **Figure 2-8**. Banning currently provides water service to a population of approximately 30,500 residents through 10,648 service connections.



*City of Banning production well located in the San Gorgonio River Valley*

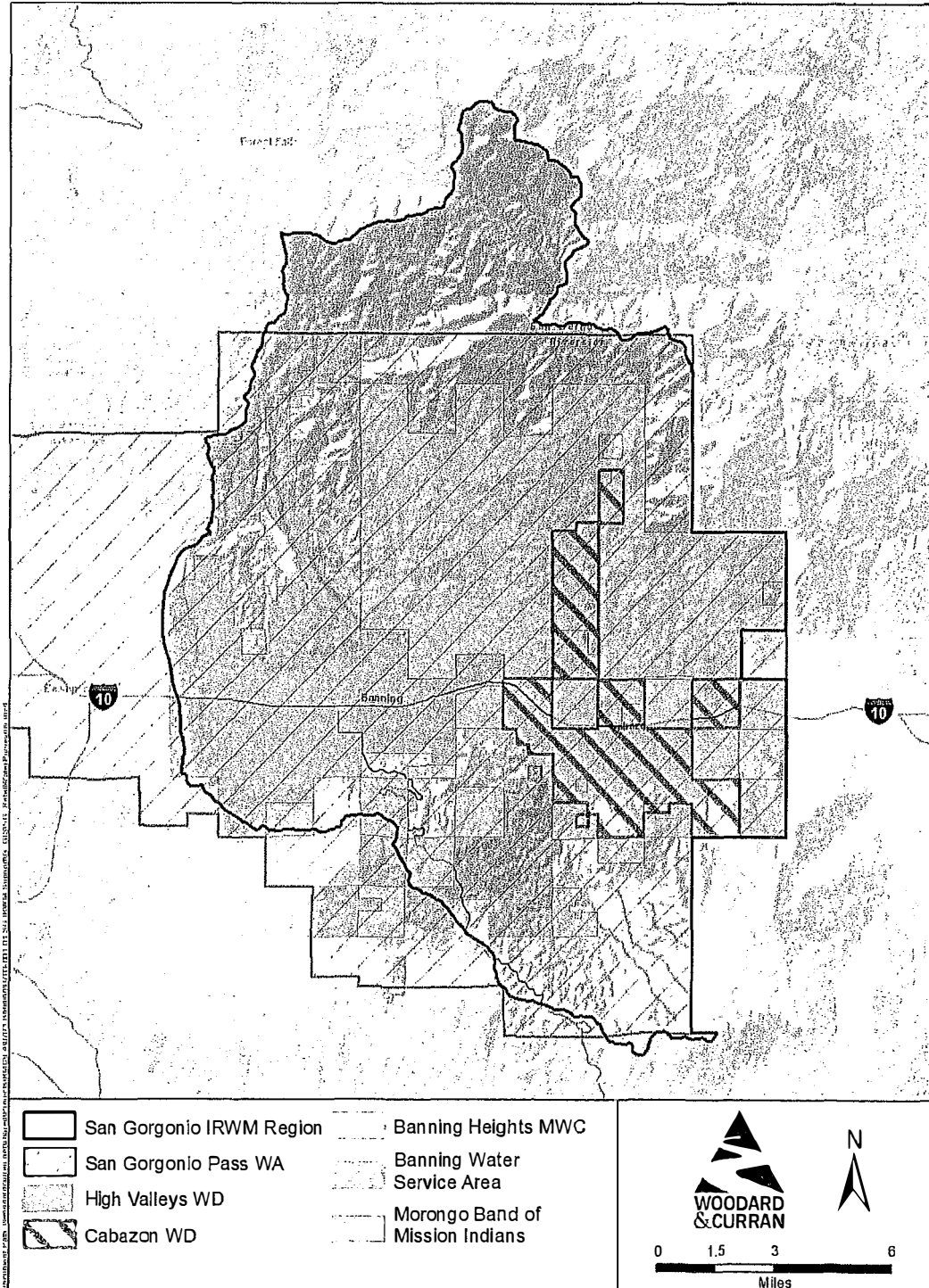
Banning produces groundwater from 21 potable wells plus three wells co-owned with the Beaumont Cherry Valley Water District (BCVWD). Banning also purchases imported water from the SGPWA, which is discharged to the BCVWD recharge facility outside of the San Gorgonio IRWM Region and stored in the Beaumont Basin. Additionally, Banning recharges the Banning Canyon Storage Unit with water delivered from the Whitewater River via a flume system.

Banning also owns and operates a wastewater treatment plant and wastewater collection system which receives and treats on average 2.0 million gallons a day (mgd). The effluent from these plants is discharged to above ground ponds that recharge the Banning Storage Unit. There are plans to upgrade the WWTP to produce recycled water supplies and provide groundwater recharge in the future.

**Banning Heights Mutual Water Company:** BHMWC is in the Banning Bench unincorporated community on a natural mesa to the north of Banning. BHMWC's service area covers approximately one square mile and serves approximately 200 domestic water meter connections and approximately 500 residents. BHMWC is a non-profit mutual water company that is owned by the property owners who are also the only shareholders. BHMWC diverts surface water from the Whitewater River by way of the Whitewater Flume and purchases water directly from Banning. BHMWC has two additional groundwater production wells in the Banning Bench Basin Storage Unit that are used only in the event of an emergency (BHMWC, 2016).

**Cabazon Water District:** CWD covers an area of approximately 7.5 square miles in the eastern part of the San Gorgonio Region adjacent to Banning's service area. CWD provides potable water service to 910 domestic water meter connections within the Cabazon unincorporated area of Riverside County. All water served by CWD is pumped from four groundwater wells in the Cabazon Storage Unit.

Figure 2-8: Regional Water Purveyors



**High Valleys Water District:** HVWD is located in the San Jacinto Mountains and covers approximately 8 square miles, serving approximately 220 customers. HVWD does not have a natural water source and purchases water directly from Banning. Water is pumped eight miles up the mountain through three booster stations into three storage tanks and 40 miles of pipe to deliver water to residents. Since HVWD gets 100% of its supply from Banning, its supply and demand projections are incorporated into Banning's projections.

**Morongo Band of Mission Indians:** Under the direction of the Tribal Council and Reservation Services Administrator's office, the MBMI Water Department has the responsibility to provide a safe, reliable, and potable water supply to the residents and commercial enterprises within the reservation. The daily transient population on the reservation averages between 8,500 and 12,000 and the approximate residential population is 1,500. Morongo Band of Mission Indians owns and operates a wastewater treatment facility which provides centralized wastewater service to tribal and non-tribal commercial facilities, while all residential homes are currently on septic systems.

It should be noted that part of the western boundary includes small portions of Cherry Valley (0.17 square miles) and the City of Beaumont (0.28 square miles) due to the natural watershed boundary.

## 2.5.1 Water Demand

Current and projected water demands and supplies for the Region were calculated as part of the *Water Supply Reliability Study (Appendix A)*. Demand projections were estimated using the following two methods, based on planning data available for the purveyors:

- 1) **Banning 2015 UWMP:** Used for Banning demand projections
- 2) **SGPWA 2015 Report on Water Conditions:** Used to estimate 2015 demand for private pumpers
- 3) **SCAG population projections:** Used to generate rates of population growth for estimation of demand projections for non-Banning purveyors

As part of its 2015 UWMP, Banning projected its demands based on SCAG population projections and a demand factor of 220 gallons per capita per day (GPCD), as well as on planned developments. Given that the remaining water purveyors in the Region didn't have demand projections readily available, it was assumed that increases in demand for those service areas would correlate to the SCAG population growth rate.

For the areas within the Region but outside of Banning's service area, the population growth rate was calculated using SCAG population projections for unincorporated Riverside County. The assumed growth rate from 2015 to 2020 is 0.93% per year, from 2020 to 2035 is 1.48% per year, and from 2035 to 2040 is 1.19% per year.

Demand projections were then estimated using existing regional planning documents, the results of which can be seen in **Table 2-4**.

Table 2-4: Water Demand

Water Provider	Annual Demand (AFY)					
	2015 <sup>1</sup>	2020 <sup>2</sup>	2025 <sup>2</sup>	2030 <sup>2</sup>	2035 <sup>2</sup>	2040 <sup>2</sup>
City of Banning	6,709	10,515	11,320	12,047	12,837	13,629
High Valleys Water District	65	68	73	78	83	88
Cabazon Water District	497	520	558	597	635	673
Banning Heights Mutual Water Company	105	110	118	126	134	142
Morongo Band of Mission Indians	1,750	1,831	1,967	2,102	2,238	2,370
Other Small Users	689	721	774	828	881	933
<b>Region Total</b>	<b>9,815</b>	<b>13,765</b>	<b>14,787</b>	<b>15,778</b>	<b>16,781</b>	<b>17,836</b>

<sup>1</sup> Volumes shown are actual deliveries. 2015 data is from the City of Banning's 2015 UWMP and unverified groundwater production data from the SGPWA 2015 Report on Water Conditions.

<sup>2</sup> 2020-2040 data is based on the City of Banning's 2015 UWMP and regional growth projections

## 2.5.2 Imported Water Supply

The Region receives imported water from the SWP via the East Branch Extension, a 33-mile long pipeline conveyance system that includes reservoirs and pump stations. Delivery of SWP supplies began with the completion of Phase 1 of the East Branch Extension in 2003. Phase 2 of the East Branch Extension increases the conveyance capacity to allow for a full allocation of SWP to SGPWA. SWP deliveries are recharged at the Noble Creek Recharge Facility, which is owned and operated by the BCVWD. The Noble Creek Recharge Facility consists of recharge basins overlying the Beaumont Basin, with a capacity of approximately 20,000 AFY.

The SWP is the nation's largest state-built water conveyance system, which includes reservoirs, lakes, and storage tanks; canals, tunnels and pipelines; and pumping and power plants. The source of SWP water is precipitation (melted snow and rainfall runoff) from the Sierra Nevada Mountains of Northern California. Water captured in the Oroville Reservoir travels to the Sacramento-San Joaquin Delta (Delta), which is a network of natural and artificial channels and reclaimed islands at the confluence of the Sacramento and San Joaquin rivers. The Delta forms the eastern portion of the San Francisco Bay estuary, receiving runoff from more than 40% of the state's land area. It is a low-lying region interlaced with hundreds of miles of waterways. From the Delta, the water is pumped into a series of canals and stored in reservoirs, which provides water to urban and agricultural users throughout the San Francisco Bay Area and Central and Southern California. SGPWA, as a SWP contractor, is allocated a "Table A" amount, which specifies the maximum annual amount of water an SWP contractor may request. The SGPWA SWP Table A amount is currently 17,300 AFY. The SWP contracts that were initiated and signed in the 1960's had initial 75-year terms, ending in 2035. Efforts are currently underway to extend the SWP contracts, and it is anticipated that the term of the SWP contracts will be extended to December 31, 2085.

The annual allocation of SWP water to SWP contractors is dependent on several factors and is subject to extreme variability from year to year. The primary factors affecting this supply are the amounts of water in SWP storage at the beginning of the year, hydrology, regulatory and operational constraints, and the total amount of water requested by the contractors.

DWR issues SWP reliability reports every two years to assist SWP contractors with water supply planning. Most recently, DWR released the *State Water Project Final Delivery Capability Report 2015*, which estimated the current and future reliability of SWP delivery capability considering regulatory requirements and the potential impacts of climate change and sea level rise. Table 2-5 shows the estimates for deliveries of SWP Table A water during average years and a variety of dry year future conditions. Droughts were analyzed by DWR using the historical drought-period precipitation and runoff patterns from 1922 through 2003 as a reference.

DWR has also studied the potential effects of climate change in its analysis of SWP delivery reliability under future conditions. For that report, DWR identified that climate change poses the threat of increased variability in floods and droughts, and that sea level rise complicates efforts to manage salinity levels and preserve water quality in the Delta for urban and agricultural uses.

**Table 2-5: Estimated Deliveries of SWP Table A Water (2015)**

Hydrological Scenarios	Future Conditions
Long Term Average (1921-2003)	60%
Single Dry Year (1977)	11%
2-Year Drought (1976-1977)	28%
4-Year Drought (1931-1934)	33%
6-Year Drought (1987-1992)	29%
6-Year Drought (1929-1934)	33%

(DWR, 2015)

Article 21 of the SWP contract allows contractors (including SGPWA) to receive additional SWP deliveries during years when excess water is available and delivery of the water does not otherwise interfere with SWP operations. The SGPWA is entitled to purchase additional SWP supplies, pursuant to Article 21, when these conditions are satisfied. Article 21 water is typically only available during the wet months of the year.

SGPWA entered into the Yuba Accord Agreement which allows for the purchase of water from the Yuba County Water Agency through DWR to SWP contractors (including SGPWA) and the San Luis and Delta-Mendota Water Authority. Yuba Accord water comes from north of the Delta, and the water purchased under this agreement is subject to losses associated with transporting it through the Delta. While the amount of this water varies each year depending on hydrologic conditions, the average amount received by SGPWA has been approximately 300 AFY.

SGPWA is also in final negotiations with the San Bernardino Valley Municipal Water District (SBVMWD) to purchase up to 5,000 AFY of Table A water in years SBVMWD declares a surplus. Surplus years are expected every two out of every five years, thus being 2,000 AFY on average.

SGPWA recently approved an agreement with the Antelope Valley-East Kern Water Agency to lease 1,700 AFY for a 20-year period, starting in 2017. This will augment supplemental water supplies significantly, especially during dry years.

SWP supplies intended for use by the San Gorgonio Region are purchased by the City of Banning from SGPWA. SGPWA recharges the purchased untreated imported water into the Beaumont Groundwater Basin on behalf of Banning. Banning accesses this supply through five wells, and three additional wells co-owned with BCVWD. The supply produced from these wells is conveyed into Banning's water supply system through pipelines also owned and operated by Banning. The Region does not directly purchase any treated imported water supply and instead treats imported water in combination with groundwater and local surface supplies. The Beaumont Basin provides local storage for all imported water supplies to those entities with approved storage accounts, including any additional Article 21 water.

**Table 2-6: Imported Water Recharged to Beaumont Basin by the city of Banning**

Year	Imported Water Recharged (AFY)
2010	1,338
2011	800
2012	1,200
2013	1,200
2014	608
2015	694

(City of Banning, 2015)

### 2.5.3 Local Surface Water Supply

Surface water flows from the Region's steep mountain areas are intermittent, with runoff only occurring after precipitation in the winter and spring months and during infrequent thundershowers. Streamflow from the San Bernardino Mountains to the north and the San Jacinto Mountains to the south percolates quickly in the sand and gravel of the canyon bottoms and in the San Gorgonio Pass, becoming part of the Region's groundwater supply. A portion of the surface water in the Region is, however, used directly by way of the Whitewater River Flume, while additional infrastructure captures surface water for groundwater recharge.

#### Whitewater River Flume

The Whitewater River is one of the few perennial surface water sources within the Region. A portion of the natural runoff from the South and East Forks of the Whitewater River is diverted and conveyed approximately 14 miles across the steep mountain slopes in the San Bernardino National Forest. This occurs in a concrete lined flume and steel penstocks through two hydroelectric power plants, historically operated by Southern California Edison (SCE). A map of the Whitewater River Flume is provided in **Figure 2-9**.

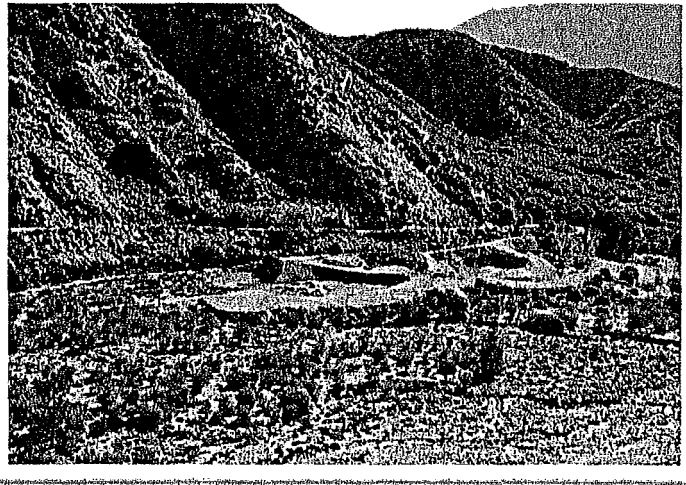
Under a 1928 Division of Water Rights determination, SCE, Banning, and BHMWC have rights to divert 13.26 cfs of natural flows from the Whitewater River. Since 1961, the three parties have collectively diverted an average of 1,500 AFY. BHMWC diverts approximately 1,000 AFY of the Whitewater River diversions from the Flume through a pipeline and a storage tank, which is treated at a filtration plant operated by BHMWC. The remainder of the diverted water flows into the San Gorgonio River, where a portion of the natural runoff and the Whitewater River diversions are

diverted into spreading ponds for groundwater recharge in the Banning Bench Storage Unit. It is uncertain exactly how much of the diverted water is currently recharged into the aquifer of the Canyon subunit as the flows are not metered.

Water rights to surface runoff out of the canyons in the San Bernardino Mountains to the Whitewater River watershed have been of concern in the past. BHMWC and Banning jointly have pre-1914 appropriative diversion rights to local surface runoff from the Whitewater Flume, which in the past was operated by SCE as part of a hydroelectric project. SCE ceased to operate the diversion for power generation in 1998 but has continued to allow its use for surface runoff diversion for irrigation and domestic beneficial use by BHMWC and Banning. The Whitewater Flume was damaged in January 2002 from erosion and maintenance challenges, limiting the ability to divert surface flow through a portion of the existing flume. To solve this issue, a temporary diversion and pipeline were created using existing natural channels to convey water to the lower flume. In addition, as part of the long-term ownership and maintenance of the existing flume in conjunction with SCE's surrender of its FERC Power license, SCE, SGPWA, BHMWC, and Banning entered into a four-party agreement to transfer ownership of the Whitewater Flume from SCE to the other three parties. The commitment to repair the diversions and existing conveyance system to maximize use of the existing rights was a component of the transfer agreement.

### Stormwater Capture

The City of Banning diverts surface water from the San Gorgonio River into percolation ponds located in Banning Canyon to recharge the Banning Bench Storage Unit. As previously described, the flows within the San Gorgonio River at this point include all supplies diverted by Banning from the Whitewater River. The contribution of the percolation ponds to subsurface groundwater flows into the Banning Bench Storage unit is unknown since no meter is currently present at the recharge basins.

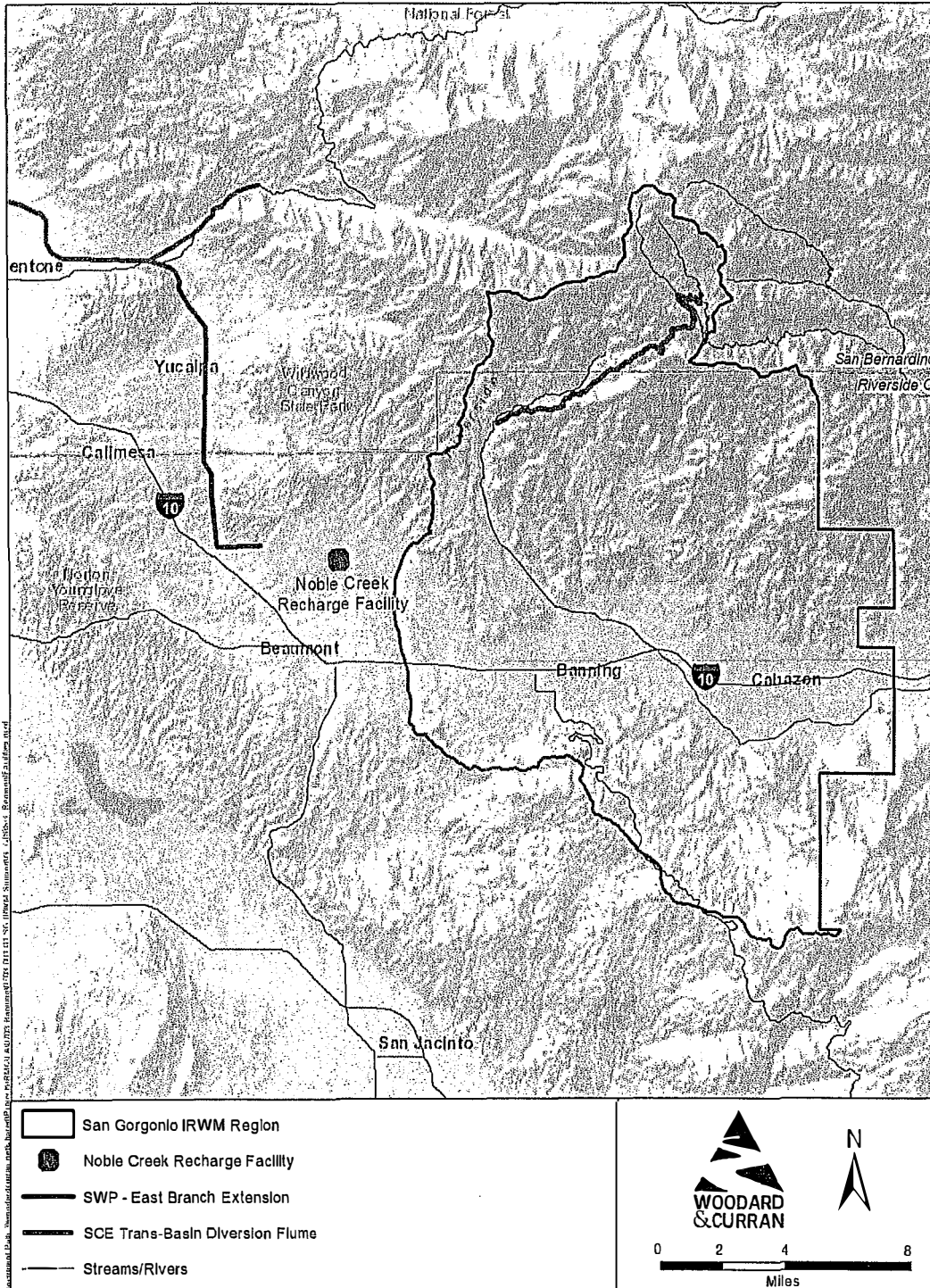


*Surface water diversion spreading basins along the San Gorgonio River located within Banning Canyon*

Additional storm water capture within the Region represents a potential new local water supply. Banning is currently planning to conserve stormwater flows from tributary creeks within its service area to create new supplies of water to meet future needs. Additional stormwater flows can be captured and directed to basins or ponds for recharge of local groundwater basins. Butterfield Ranch and Rancho San Gorgonio are planned developments within the Region, and both developments' Specific Plans incorporate stormwater capture. The *Butterfield Ranch Specific Plan* includes design features that are estimated to capture and recharge approximately 1,370 AFY of stormwater flows from Smith Creek by 2020, and the *Rancho San Gorgonio Specific Plan* includes design features that are estimated to capture and recharge approximately 199 AFY of stormwater at full buildout.



Figure 2-9. Regional Water Supply Infrastructure



## 2.5.4 Groundwater Supply

The Region overlies the San Gorgonio Pass Groundwater Basin, (also known as the San Gorgonio Pass Subbasin of the larger Coachella Valley Hydrologic Unit, as defined in DWR Bulletin 118). Approximately 15 miles long, the San Gorgonio Groundwater Basin includes five hydraulically-connected ground water storage units: the Banning Storage Unit, the Banning Bench Storage Unit, the Banning Canyon Storage Unit, the Cabazon Storage Unit, and the Beaumont Storage Unit. These storage units are created by geologic faults that form barriers to the lateral movement of groundwater and cause water levels to vary significantly across adjacent Storage Units. Storage unit boundaries have most recently been defined in a 2006 United States Geological Survey report (USGS, 2006). The annual safe yield of storage units within the San Gorgonio Pass Subbasin has been estimated in an additional report published by the City of Banning in 2011 (Banning, 2011). Storage Units within the San Gorgonio Pass Subbasin are shown in **Figure 2-10**.

The Sustainable Groundwater Management Act (SGMA), passed in 2014, requires all groundwater basins in California to be managed sustainably by 2022. The legislation requires that a Groundwater Sustainability Plan (GSP) be prepared by 2022 in those basins the DWR has identified as medium to high priority. Since the San Gorgonio Pass Basin is listed as a medium priority basin, Regional agencies have formed a Groundwater Sustainability Agency (GSA) to manage the Basin under SGMA. The SGIWGM and the associated *SGIWGM Technical Memorandum* completed as part of the IRWM Plan development (**Appendix C**) provides an important step in furthering the GSP development process.

### Beaumont Storage Unit

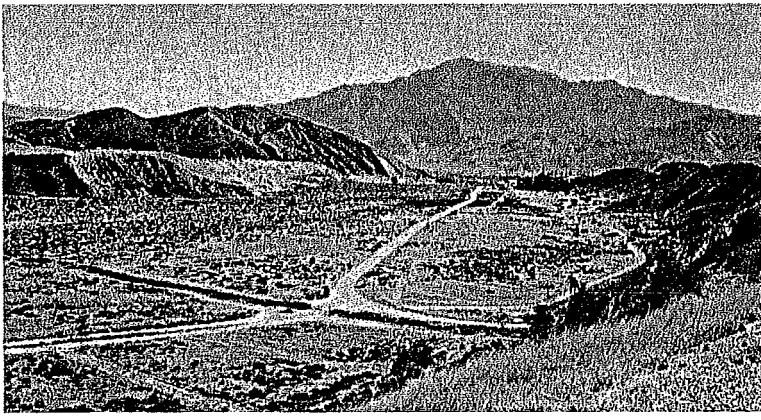
The Beaumont Storage Unit, also referred to as the Beaumont Basin, is located at the western end of the San Gorgonio Pass. A portion of the Beaumont Basin is within the Region, as can be seen in **Figure 2-10**. However, the primary functional storage capacity of the Beaumont Storage Unit underlies the City of Beaumont just outside of the Region. The Beaumont Storage Unit extends across the surface drainage divide between the San Gorgonio River and the Upper Santa Ana River watersheds. Surface runoff from Smith Creek and other areas in the eastern portion of the Beaumont Storage Unit flow east into the San Gorgonio River. The major inflows into the Storage Unit are Edgar, Little San Gorgonio, and Noble Creeks in the San Bernardino Mountains, which flow west into San Timoteo Creek and to the Pacific Ocean by way of the Santa Ana River.

The Beaumont Storage Unit is adjudicated pursuant to the *Stipulation for Entry of Judgement Adjudicating Groundwater Rights in the Beaumont Basin*. The court gave the responsibility of managing the storage unit to a Watermaster Committee, consisting of representatives from each of the five appropriators who serve water demands within the basin. The Watermaster makes an annual determination of the groundwater that each producer is entitled to pump from the Basin without incurring a replenishment obligation. The court initially established a long-term safe yield for the Basin of 8,650 AFY to be distributed among the appropriators. The safe yield was reevaluated by the Beaumont Basin Watermaster in the *2013 Reevaluation of the Beaumont Basin Safe Yield* and revised to 6,700 AFY in 2015. The Watermaster has also approved applications for use of the Basin for storage purposes. Banning is permitted to store up to 80,000 AF of surplus appropriated water within the Beaumont Storage Unit. An application was also approved in 2013 to allow the Morongo Band of Mission Indians to store up to 20,000 AF of imported water in the Beaumont Storage Unit.

Banning pumps water from the Beaumont Storage Unit that was recharged, with imported water purchased from SGPWA, via the BCVWD's Noble Creek spreading facility. This supply is pumped as needed and distributed to customers or sold to other water suppliers within the Region.

### Banning Canyon Storage Unit

The Banning Canyon Storage Unit underlies BHMWC and the northernmost portion of Banning. The northern portion of the Banning Canyon Storage Unit is located in the County of San Bernardino. Surface water from the San Gorgonio River percolates rapidly in the alluvial sediments of the Banning Canyon and groundwater levels typically respond rapidly to precipitation events because of the high permeability and limited groundwater storage in this basin. Bedrock in the middle portion of the canyon is located approximately 200 feet below the ground surface.



*Banning Canyon and the location of the Banning Canyon Storage Units southern portion*

Groundwater from the Banning Canyon Storage Unit flows south across the Banning Fault and into Banning Bench Storage Unit.

When surface flow is present in Banning Canyon, flows are diverted by Banning into off-stream recharge basins to facilitate ground water recharge. The contribution of the infiltration basins to subsurface flow into the

Banning Bench SU is unknown since no meter is currently present at the percolation basins. The safe yield of the Banning Canyon SU is estimated to be 4,070 AFY.

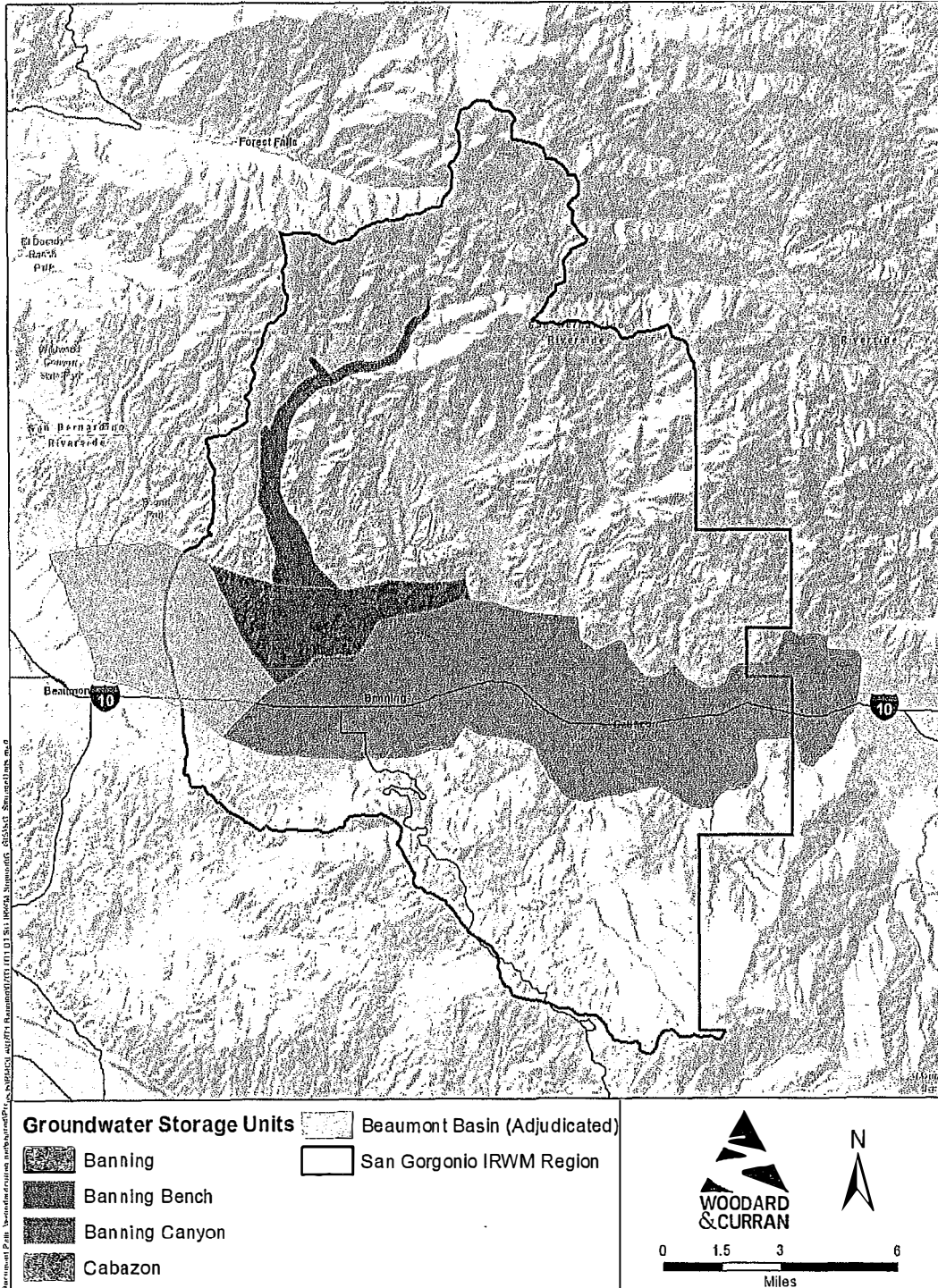
### Banning Bench Storage Unit

The Banning Bench Storage Unit is the southernmost storage unit in the Banning Canyon. This storage unit is located north of Banning in an area of alluvial fill distinctly higher than that of the San Gorgonio Pass. The Banning Bench SU is 160 feet high and approximately 1.5 miles wide above the stream channel at the mouth of the San Gorgonio River Canyon. Groundwater in the Banning and Banning Bench Storage Units generally flow southeast into the Cabazon Storage Unit. The Safe Yield of the Banning Bench Storage Unit is estimated to be 1,960 AFY.

### Banning Storage Unit

The Banning Storage Unit is located south of the Banning Bench Storage Unit, immediately north and south of I-10 in Banning. This storage unit encompasses approximately 7.6 square miles and serves the area at the base of the Banning Bench and the southern portion of Banning. The estimated safe yield of the Banning Storage Unit is 1,130 AFY. Groundwater from this storage unit tends to flow south into the Beaumont Storage Unit.

Figure 2-10: San Gorgonio Groundwater Basin Storage Units



### Cabazon Storage Unit

The Cabazon Storage Unit is bounded on the north by the San Bernardino Mountains and by semi-permeable rocks, and on the south by the San Jacinto Mountains. The eastern boundary is formed by a bedrock ridge that creates a constriction defining the end of the San Gorgonio Pass and the start of the Indio Subbasin. Within the Region, groundwater producers in the Cabazon Storage Unit include Banning, CWD, and MBMI. Other groundwater pumpers outside the Region include the Mission Springs Water District (MSWD) which is essentially within the Coachella Valley IRWM Region.

Total storage capacity of the Cabazon Storage Unit was estimated at 2.2 million acre-feet (MAF) by DWR in 1987. The hydrologic Budget for the Cabazon Storage Unit indicates additional groundwater production can be developed due to a positive change in storage resulting from inflow and outflow factors, including wastewater percolation into the SU. Planned recycled water use for irrigation purposes in the Region would result in a reduction in direct percolation for the Cabazon Storage Unit.

The MWD CRA cuts southwest across the Region, just to the east of Cabazon where it goes from the valley floor into and through Mount San Jacinto and out of the Region. The San Jacinto tunnel, which was constructed in bedrock and is concrete lined, intercepts groundwater draining from the overlying mountain, about 1,500 AFY, and the CRA conveys it out of the area for use by others.

### **2.5.5 Recycled Water**

The California Department of Public Health (CDPH) and the Colorado River RWQCB regulate the use and quality of recycled water in the Region. Title 22, Chapter 4, of the California Code of Regulations establishes recycled water quality standards and treatment reliability criteria dependent upon the end use of recycled water and the need to protect public health. Both secondary and tertiary treated wastewater can meet Title 22 standards dependent upon the end use of the water.

Utilization of recycled water for groundwater recharge is reviewed by CDPH on a case-by-case basis. CDPH requires blending of recycled water with non-recycled water, minimum travel times, and monitoring based on a thorough review of engineering reports. Initial blend requirements typically start at 20% recycled water and 80% non-recycled water for spreading projects. Water recharged in this manner must be retained for a minimum of two months in the ground prior to extraction for drinking water, though this could be longer based on CDPH review.

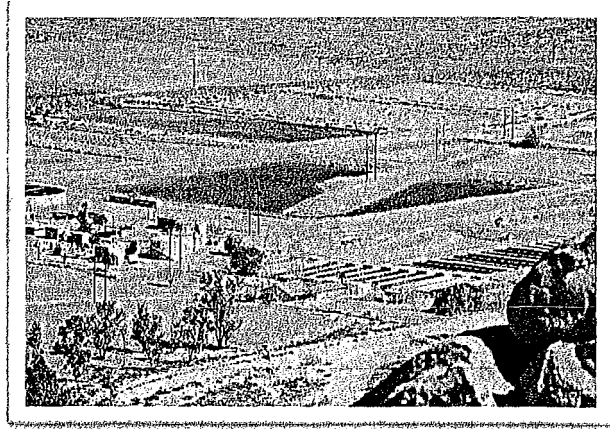
Recycled water is currently not produced or used within the Region. However, previous technical studies have explored the feasibility of using recycled water for irrigation and municipal uses within the region, and the *San Gorgonio Region Recycled Water Study (Appendix B)* was conducted to support goals and strategies identified in this plan through identification of recycled water project options within the Region.

The *San Gorgonio Region Recycled Water Study* evaluated existing data and water plan documents, and then identified potential sources of recycled water that would be available to the region over the planning horizon. Analysis was first conducted to identify potential sources of recycled water and the quantity those sources could provide. Consideration was then given to the potential uses of recycled water within the Region, both non-potable and groundwater recharge.

From these findings, a series of potential projects were identified. The Study roughly estimated project costs and identified next steps for the Region for its planning efforts.

### Existing Wastewater Treatment

The City of Banning provides sewer service to the area within the City of Banning and to unincorporated areas of Riverside County that surround the southeast portion of the City. Collected wastewater is conveyed through sewer main lines, which are connected to the larger trunk lines. The trunk lines transport wastewater to Banning's 3.6 mgd WWTP. The effluent is treated to secondary standards and is then discharged to percolation ponds to recharge the Cabazon Storage Unit.



*City of Banning WWTP and spreading basins*

The Morongo Band of Mission Indians also owns and operates a WWTP designed to treat up to 0.75 mgd per day. The effluent is treated to secondary standards and is then discharged to percolation ponds to recharge the Cabazon Storage Unit.

### Planned Recycled Water Facilities

Banning is proposing to expand its WWTP and construct facilities to support planned recycled water use in accordance with Banning's 2006 *Recycled Water Master Plan*. Phase I of the WWTP expansion consists of increasing the treatment capacity from 3.6 mgd to 5.1 mgd and adding tertiary treatment facilities for production of recycled water. Upon completion of Phase I, approximately 1,680 AFY of recycled water will be available to Banning for irrigation use. Banning has a projected recycled water demand of approximately 2,700 AFY for non-potable irrigation.

## 2.5.6 Regional Water Supply Projections

Table 2-7 summarizes the current and projected supply and demand within the Region under existing conditions and current projections, as identified in the *Water Supply Reliability Study* (Appendix A) completed as part of the overall IRWM Plan preparation process. As shown in the table, it is expected that in 2045, average annual demand may start exceeding average annual supply. Total supply includes imported, groundwater, local surface water, and recycled water.

Table 2-7: Current and Projected Water Supplies (AFY)

	Annual Average AFY					
	2020	2025	2030	2035	2040	2045
<b>Total Demand</b>	13,765	14,787	15,778	16,781	17,836	<b>18,898</b>
<b>Total Supply</b>	21,493	19,882	18,888	18,593	18,298	<b>18,163</b>
<b>Difference</b> (supply minus demand)	<b>7,727</b>	<b>5,095</b>	<b>3,110</b>	<b>1,812</b>	<b>462</b>	<b>-735</b>

## 2.6 Water Quality

The San Gorgonio Region is noted for its high level of both environmental and drinking water quality. The Region benefits from low levels of urbanization, agriculture, and industrial processing. In addition, the permeability of the overlying soils ensures that pure surface flows running off of open space lands go directly into local groundwater basins, helping to dilute any contaminants that enter the system.

Pollutant loading can come from two types of sources: point sources which are discrete discharges of water and wastes, and non-point sources which are discharges often resulting from anthropogenic land uses such as agricultural applications, atmospheric deposition, or wildlife. In some cases, a non-point source, such as urban runoff, can become a point source when it is collected by a storm drain or other collection system and discharged.

Water quality within the San Gorgonio Region is addressed through several plans, regulations, and guidelines including the 2006 *Water Quality Control Plan: Colorado River Basin- Region 7* (Basin Plan), which includes beneficial use designations and water quality objective standards for prevention of further degradation of impaired waters listed under 303(d) of the Clean Water Act, and Total Maximum Daily Load (TMDL) process.

### 2.6.1 Beneficial Use

Table 2-8 and Table 2-9 provide the beneficial uses for individual reaches and groundwater basins as described in Section 2 of the 2006 Basin Plan.

Table 2-8: Beneficial Uses of Surface Water<sup>1</sup>

Stream/River	MUN	AGR	AQUA	FRSH	IND	GWR	RECI	RECI	WARM	COLD	WILD	POW	RARE
Azalea Creek	P	X				X	X	X	X	X		X	
Brown Creek	P	I				I	I	I	I		I		
Hathaway Creek	P	X				I	I	I	I		I		
Potrero Creek	P	X				X	X	X	X		X		
San Gorgonio River	P	X				X	X	X		X	X		

Stream/River	MUN	AGR	AQUA	FRSH	IND	GWR	RECI	RECI	WARM	COLD	WILD	POW	RARE
Twin Pines Creek	X	X				X	X	X	X		X		
Whitewater River	X	X				X	X	X	I	X	X	X	

Listing of the beneficial uses is indicated by X for existing uses, P for potential uses, and I for intermittent uses.

MUN = Municipal and Domestic Supply; AGR = Agricultural Supply; AQUA= Aquaculture; FRSH = Freshwater Replenishment; IND = Industrial Service Supply; GWR = Groundwater Recharge; RECI = Water Contact Recreation; RECI = Non-contact Water Recreation; WARM = Warm Freshwater Habitat; COLD = Cold Freshwater Habitat; WILD = Wildlife Habitat; POW = Hydropower Generation; RARE = Preservation of Rare, Threatened, or Endangered Species

<sup>1</sup> Colorado River Basin Regional Water Quality Control Board, 2006

**Table 2-9: Beneficial Uses of Groundwater <sup>2</sup>**

Hydrologic Unit	MUN	IND	AGR
San Gorgonio hydrologic subunit	X	X	X

<sup>2</sup> Colorado River Basin Regional Water Quality Control Board, 2006

## 2.6.2 Drinking Water Quality

### Water Quality Management

Drinking water resources in the Region are governed by multiple legal, institutional, and regulatory issues and standards. California Title 22 Drinking Water Standards (Title 22) incorporates the federal requirements of the Safe Drinking Water Act, and compliance with Title 22 is required by all water service providers. Therefore, Title 22 monitoring of all regulated chemicals, as well as a number of unregulated chemicals, is conducted by water agencies in the Region. In order to be in compliance with Title 22, each agency must ensure that the regulated chemicals meet established primary drinking water standards to ensure the safety of the water supply. In addition to the primary drinking water standards, secondary drinking water standards have been set for some minerals based on non-health related aesthetics, such as taste and odor. Both primary and secondary standards are expressed as the maximum contaminant levels (MCLs) that are allowable for a given constituent. The *Water Quality Control Plan for the Colorado River Basin- Region 7*, published by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) outlines several water quality objectives for surface water sources within the region.

### Groundwater Quality

Groundwater quality is dependent upon a number of factors, including the water source, type of water-bearing materials in which the water occurs, water depth, proximity to faults, presence of surface contaminants, and quality of well maintenance. Water quality in the Region has historically been high. There is no known historical industrial or mining activity in the region that has generated harmful plumes of pollutants.



Banning is working with other pumpers in the Beaumont Basin to manage basin supply and quality in the Beaumont Basin Management Zone (BMZ) through the BMZ Maximum Benefits Program. The Maximum Benefits Program is intended to ensure the long-term sustainability of water quality in the BMZ through regional cooperation among Banning, Yucaipa Valley Water District, Beaumont-Cherry Valley Water District, the San Geronio Pass Water Agency, and the City of Beaumont. This program's requirements include conditions for operation of Banning's wastewater treatment plant, including water quality standards for recycled water and for water quality monitoring and reporting, focusing on total dissolved solids.

According to the *City of Banning General Plan*, wells within the Banning Canyon contain a total dissolved solids (TDS) concentration ranging from 185 to 360 milligrams per liter (mg/L). Studies of these wells indicated that water quality is within State limits for all chemical constituents, with the exceptions of calcium and bicarbonate. High bicarbonate levels are typical of runoff from the San Bernardino Mountains. In general, the TDS concentrations are lowest at the head of Banning Canyon at 185 to 200 mg/L. At the Canyon's base and at the valley floor, the TDS concentration range increases slightly to 185 to 360 mg/L.

**Nitrates.** Another impact on area groundwater is contamination associated with nitrates reaching groundwater basins resulting from long-term discharge at on-lot septic systems. The greatest impacts to groundwater quality are expected to occur where septic systems serve large populations in high densities. Well maintained community sewer systems provide excellent protection of groundwater resources, as they provide for the prompt removal of sewage materials. Scattered residential sites in the Region continue to rely on private septic systems for the disposal of wastewater. Many of these systems will be abandoned over time, as future development occurs and infrastructure is expanded.

**Chromium-6.** The State of California released a new MCL for hexavalent chromium (also known as "Chromium-6") in drinking water, effective July 1, 2014. Nine of Banning's groundwater wells are impacted by naturally occurring Chromium-6, as well as two wells co-owned with BCVWD. The City has received a variance from the Chromium-6 MCL until year 2020 in order take actions necessary to address the high Chromium-6 concentrations. Banning's *Chromium-6 Compliance Plan*, dated December 2015, involves analysis to determine treatment options and the design and construction of treatment facilities. The SWRCB voted in August 2017 to withdraw the new MCL but anticipates making a recommendation for a new MCL. In the interim, Compliance Plans will no longer be enforced by the Division of Drinking Water. See the SWRCB website on Chromium-6 for additional details

### Imported Water Quality

SWP supplies delivered to the SGPWA service area are treated at the Yucaipa Valley Regional Water Filtration Facility. SGPWA samples water quality of SWP supplies at the Devil Canyon sampling station in San Bernardino. According to SGPWA's *2015 Urban Water Management Plan*, SWP water is generally low in dissolved minerals, such as calcium, magnesium, sodium, potassium, iron, manganese, nitrate, and sulfate. The chloride content of SWP water varies from well over 100 (mg/L) to below 40 mg/L, depending on Delta conditions. Salinity of SWP water is dependent on hydrologic conditions, and during wet years, TDS concentrations are relatively low. This is significant because the ambient salinity concentration of the Beaumont Basin benefits from the recharge of SWP water.

### Surface Water Quality

Surface water from the South and East Forks of the Whitewater River is diverted by the Whitewater River Flume at an elevation of about 7,200 feet in a rugged mountainous terrain within the San Bernardino National Forest. The surface water supply is tested for constituents as required by state and federal regulations and is treated by BHMWC for use within its service area. This source of supply is currently of excellent quality, and it is at low risk for contamination due to the location of the diversion and conveyance system.

### 2.6.3 Environmental Water Quality

The San Gorgonio Region is located within the northwesterly boundary of the Colorado River Hydrologic Region and falls under the jurisdiction of the Colorado River RWQCB Region 7. The RWQCB is charged by the California Water Code with protecting water quality within the Region. The *Colorado River Water Quality Control Plan* (Colorado River Basin Plan) establishes water quality objectives for inland surface waters and groundwater based on their beneficial uses (See **Table 2-8** through **Table 2-9**). The Coachella Valley Planning Area of the Colorado River Hydrologic Region includes the San Gorgonio Hydrologic Subunit of the Whitewater Hydrologic Unit.

Within the Whitewater Hydrologic Subunit, it is necessary for agencies to coordinate their urban runoff management activities to achieve appropriate protection of receiving water quality. The USEPA publishes a list of impaired and threatened waters such as lakes, streams, and rivers. For each water body on the list, the state identifies the pollutant causing the impairment and assigns a TMDL for that pollutant based on the severity of the pollution and sensitivity of the water and water uses. This list of impaired waters is referred to as the 303(d) list.

The Region does not have any 303(d) listed waters; however, surface and groundwater quality are still a concern to the Region's stakeholders. In 2013, the Regional Board issued a Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit to the County of Riverside, RCFCWCD, the Coachella Valley Water District, and ten incorporated cities: Banning, Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage. Banning does not share an interconnected MS4 with the remainder of the permittees and discharges directly into the San Gorgonio River, where most MS4 discharges infiltrate. Rarely and only during significant runoff events, storm drainage may flow as far as the infiltration basins in the upper Coachella Valley upstream of Palm Springs.

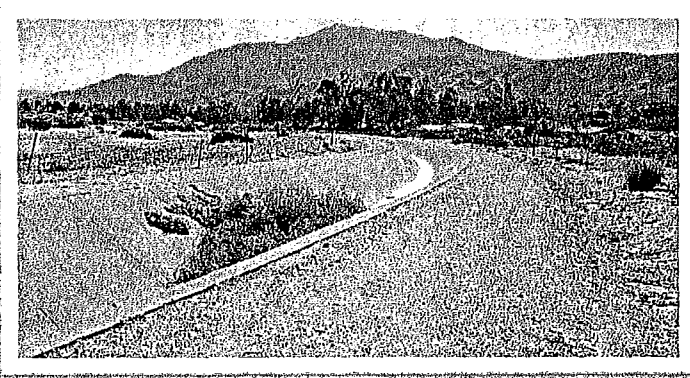
## 2.7 Flood Management

The San Gorgonio Region is characterized by low-lying desert areas and higher elevation mountains. Although there is below average annual precipitation (compared to California as a whole), the annual precipitation is contained within infrequent larger events, resulting in large volume run-off events that flow through the Region. Due to the local geology, soil percolation rates are low in some areas, causing surface flows to build with the potential to create flash flooding. As a result, there are several "washes" within the region that can convey normal precipitation and flow events and also have the potential to overflow and flood the valley floors.

The *Banning Master Drainage Plan* (MDP) was originally adopted by the RCFCWCD in 1975 and was revised in September 1994. The Banning MDP covers approximately 19 square miles

within the City of Banning and surrounding unincorporated County. It is roughly bounded by the San Gorgonio River on the north, Smith Creek on the south, Hathaway Street on the east, and Highland Springs Road on the west.

The Banning area has experienced serious flooding problems in the past. As the area continues to urbanize, potential damages are expected to increase. Thus, the MDP encourages a more orderly growth pattern that can safely incorporate stormwater infrastructure.



*A flood control channel in the City of Banning*

The MDP has not been fully implemented at this time. Proposed stormwater infrastructure within Banning includes surface drainage structures such as open channels as well as underground storm drains that will convey stormwater to Smith Creek. Stormwater from a 10-year frequency event is planned to be conveyed in roadways where flows will reach the top of curbs and then by underground storm drains. Open channels are sized for a 100-year

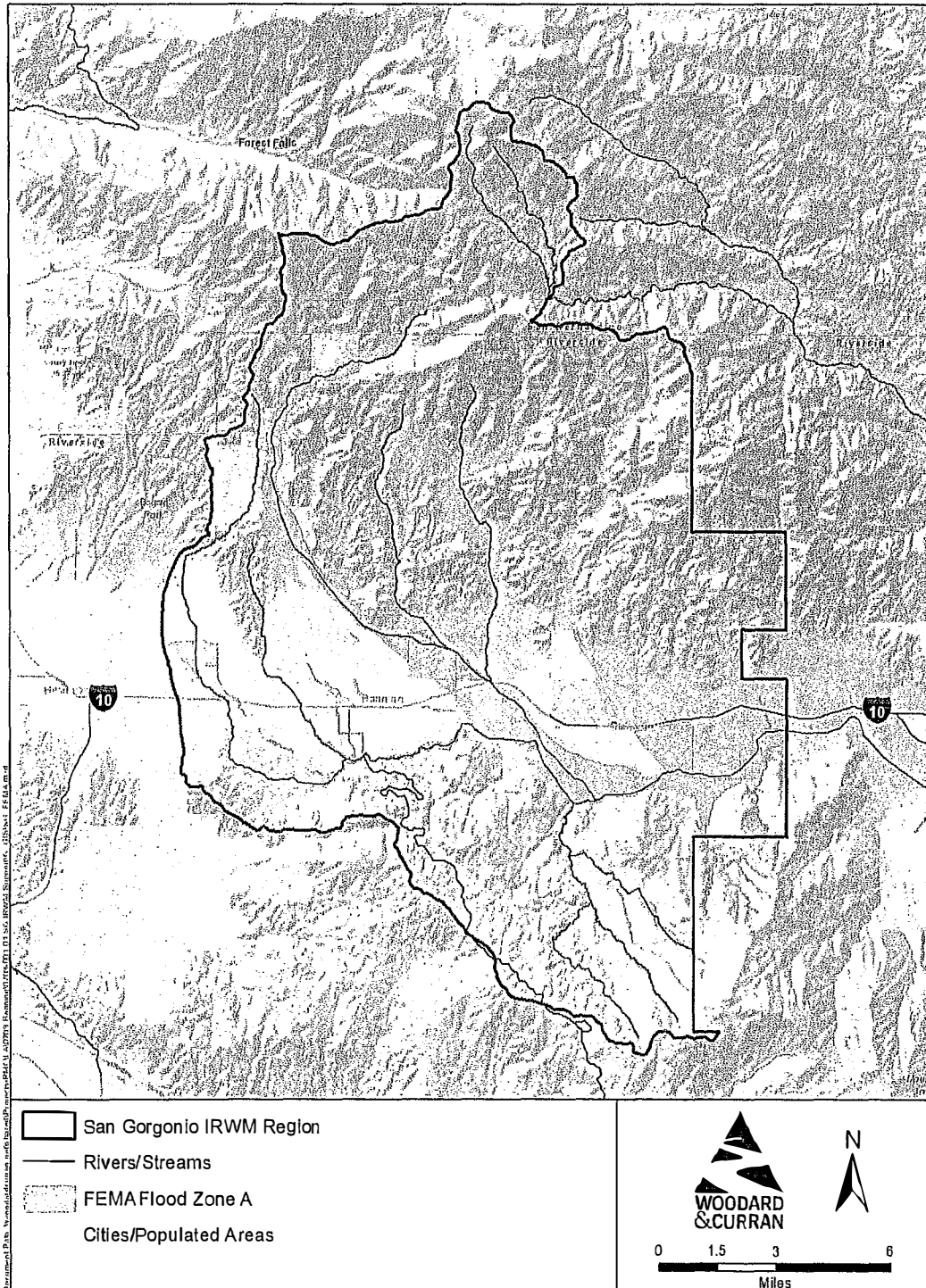
storm. Responsibility for flood protection infrastructure has fallen to individual communities and the county. As much of the Region is undeveloped, there is little infrastructure outside of the San Gorgonio Pass area.

Infrastructure to address a 10-year event, the Banning MDP Line D-2 and D-2a, is currently being constructed within the IRWM boundary. The Notice to Proceed was issued to the contractor on May 15, 2017, and it is anticipated to be completed in early 2018. Line D-2 is over a mile of storm drain in Hargrave Street and Line D-2a is approximately 600 feet in Theodore Street (see Figure 2-12 of the *Banning Master Drainage Plan*, green line). This project will address flooding concerns in the area.

The Federal Emergency Management Agency (FEMA) designates areas of high risk of flooding as Special Flood Hazard Areas (SFHA). These areas are subject to flooding during a 100-year storm event and are mapped in FEMA Flood Insurance Rate Maps (FIRM) as Zone A. These flood zones have been mapped for the Region and are shown in **Figure 2-11**.

In 2015, the RCFCWCD reconstructed portions of the existing Gilman Home Channel in the City of Banning. The new facility consists of an underground storm drain sized to convey 100-year storm flows from George Street to the existing facility at Williams Street. As part of this project, RCFCWCD has been processing a Letter of Map Revision from FEMA to revise the 100-year floodplain in that area. Once the mapping revision goes into effect, it will remove approximately 200 parcels from the FEMA Zone A floodplain.

Figure 2-11: 100-Year FEMA Flood Zones





---

## 3. Goals and Objectives

This chapter outlines several water resources related goals for the San Gorgonio IRWM Region. The goals were developed to address regional needs and challenges identified by the RWMG and SAC. The Region also established measurable objectives to provide a pathway toward meeting the established regional goals as well as performance measures that can be used to gauge the Region's success in meeting its objectives.

### 3.1 Development of Goals and Objectives

The goals and objectives for the San Gorgonio IRWM Plan were developed by the RWMG with input and participation from the Region's stakeholders over the course of several SAC workshops during the development of this IRWM Plan. An initial workshop was focused on defining water management needs, issues, and challenges for the Region. The needs were informed by the technical data, plans, and studies used to develop the San Gorgonio IRWM Plan discussed in **Section 1.2**, as well as by the three stand-alone water resources planning efforts approved as part of the San Gorgonio Region's Proposition 1 Planning Grant, as discussed in **Chapter 1**.

Based on the identified needs, issues, and challenges, the RWMG drafted regional goals and objectives which were discussed and refined by the SAC. An additional climate change objective was later recommended by the SAC and included by the RWMG to address the regional climate change vulnerabilities that were later identified. Each of these workshops was open to the public and those in attendance benefited from the knowledge, values, and experience of the Region's stakeholders.

The goals and objectives described for the San Gorgonio Region are shown in **Table 3-1**. The goals have been defined by the RWMG as general statements of purpose, and the objectives are defined as measurable actions that can be taken to meet the associated goal. A total of 10 goals and 17 objectives were established for the IRWM Plan. This broad set of goals and objectives addresses the challenges, needs, and vulnerabilities for the San Gorgonio Region in the areas of water supply, water quality, flood management, habitat and open space, DACs, and climate change.

### 3.2 Challenges, Needs, and Vulnerabilities

Below is a discussion of the challenges, needs, and vulnerabilities that form the foundation for the San Gorgonio Region's goals and objectives within the areas of water supply, water quality, flood management, habitat and open space, DACs, and climate change. As additional data is collected through regional planning efforts described later in Section 6.4, these challenges, needs, and vulnerabilities may be updated.

Table 3-1: Organization of Goals and Objectives

Goals	Measurable Objectives
<b>Water Supply</b>	
<b>Goal 1:</b> Increase regional supply availability and reliability	<p><b>Objective 1A:</b> Implement regional recycled water projects within the Region and support local recycled water projects.</p> <p><b>Objective 1B:</b> Support affordable investments and agreements between local and external agencies to enhance the reliability of imported water throughout the Region.</p> <p><b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</p> <p><b>Objective 1D:</b> Implement appropriate regional demand management, water loss reduction and other conservation programs.</p>
<b>Goal 2:</b> Improve resilience of regional water distribution systems	<p><b>Objective 2A:</b> Implement regional infrastructure projects to increase distribution capacity, flexibility and redundancy.</p> <p><b>Objective 2B:</b> Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</p> <p><b>Objective 2C:</b> Support projects to increase resilience and redundancy of local production and distribution facilities.</p>
<b>Goal 3:</b> Develop useable tools to understand hydrologic processes and regional management	<b>Objective 3:</b> Build an integrated ground and surface water model for all subbasins within the San Gorgonio Groundwater Basin for use in determining available surface water supplies, groundwater basin functionality, storage potential and recharge project feasibility.
<b>Water Quality</b>	
<b>Goal 4:</b> Decrease impacts to groundwater quality	<p><b>Objective 4A:</b> Reduce use of septic systems by expanding centralized collection and treatment systems.</p> <p><b>Objective 4B:</b> Increase monitoring of existing septic areas and enforcement of monitoring protocols.</p>
<b>Goal 5:</b> Increase resilience to changing water quality requirements	<b>Objective 5:</b> Remain engaged across the changing legal, institutional, and regulatory framework affecting drinking water standards.
<b>Flood Management</b>	
<b>Goal 6:</b> Enhance regional flood control infrastructure	<p><b>Objective 6A:</b> Reduce properties subject to flood hazard insurance.</p> <p><b>Objective 6B:</b> Enhance regional multipurpose, multiple benefit stormwater management infrastructure.</p>
<b>Habitat and Open Space</b>	
<b>Goal 7:</b> Protect aquatic and riparian habitat	<b>Objective 7:</b> Provide continued protection consistent with the Western Riverside and Coachella Valley MSHCPs.
<b>Disadvantaged Communities</b>	
<b>Goal 8:</b> Support DACs and maintain the affordability of water	<b>Objective 8:</b> Seek funding opportunities to ensure all communities have access to a reliable water supply and adequate wastewater treatment.
<b>Goal 9:</b> Support the economic vitality of DACs	<b>Objective 9:</b> Support projects to provide safe, sustainable and livable communities and to promote future economic development of local DACs.
<b>Climate Change</b>	
<b>Goal 10:</b> Adaptation to Climate Change	<b>Objective 10:</b> Implement multi-benefit strategies that reduce GHG emissions and adapt to climate change in the areas of flood management, water supply, water quality, water-dependent habitat, and fire risk.

### 3.2.1 Water Supply

The San Gorgonio IRWM Region receives imported water from the Delta through the SWP. The availability of this supply is highly variable and there are current challenges to the system's overall sustainability given Bay Delta environmental protections. Climate change also poses long-term threats to the SWP supply as a result of reduced Sierra Nevada snowpack, loss of natural water storage, and sea level rise that increases the potential for levee failures and water quality impairments.

Although the Region benefits from the SWP supply, a connection to or discharge point from the SWP does not exist within the boundaries of the Region. The East Branch Extension of the California Aqueduct, a 33-mile long pipeline conveyance system, brings SWP supply as far east as the Beaumont Basin but does not physically deliver water into the San Gorgonio Region. SGPWA supplies imported water to the Region by recharging the Beaumont Basin. Those supplies are pumped by the City of Banning to serve customers within the Region. This lack of a direct connection to the Region limits the ability of imported water to be a resource for meeting future regional demands for areas such as Cabazon, High Valleys, and the Morongo Band of Mission Indians Reservation. Being at the end of the SWP system also creates emergency reliability concerns. The East Branch Extension is located in a densely-faulted area with high seismic activity from the San Andreas Fault System and therefore has the highest potential for a seismic event that could interrupt SWP service.

Locally, there is limited understanding as to the extent of the reliability of local surface and groundwater supplies in the region. During extended dry periods, regional demands can greatly exceed the availability of surface water intended for diversion or recharge and storage. This results in declining groundwater levels until wet years replenish the basins. Although there have been no major shortages of supplies within the Region historically, there is concern that changes in local flows, increased demands, and imported water availability would impact the water supply.

In addition, differences in groundwater levels and flows are difficult to understand and map given the fractured fault system within the San Gorgonio Pass. Effective water resources planning and management in accordance with SGMA will require a more comprehensive understanding of groundwater basin function.

### 3.2.2 Water Quality

The vast majority of drinking water in the San Gorgonio Region is from local groundwater. Water quality challenges for the Region are primarily focused on protecting the high quality of existing groundwater resources from emerging sources of contamination, as well as some localized groundwater quality issues. The greatest impacts to groundwater quality within the Region are expected to be from nitrates reaching groundwater basins as a result of long-term discharges from septic systems. If properly designed, constructed and maintained, septic systems can provide long-term, effective treatment of household wastewater in low density rural areas without alternative centralized wastewater treatments systems. The primary potential impacts to the Region are from areas where septic systems serve large and densely populated areas.

Additional water quality concerns in the Region include low levels of Chromium-6, a heavy metal that occurs naturally within the Region from the erosion and oxidation of ultra-mafic igneous rocks. In 2014, the California State Water Resources Control Board set a new MCL for Chromium-

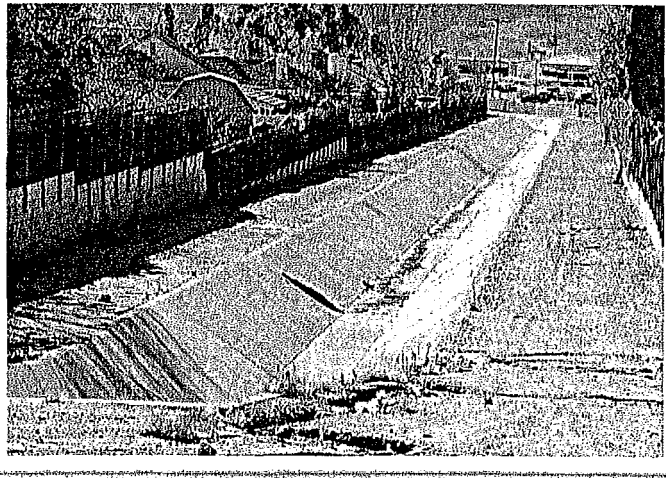


6 at 10 parts per billion (ppb), resulting in exceedances in City of Banning wells and wells co-owned by Banning and the BCWD, all of which were within the range of 10 ppb and 25 ppb. The new MCL limit was contested, and in 2017 the SWRCB voted to remove the proposed standard and revert to the previous standard. It is possible that these limits will be revisited by the SWRCB in the future, and the compliance scenarios developed by Banning may be required.

### 3.2.3 Flood Management

Storm runoff from the San Bernardino Mountains and surrounding foothills can cause infrequent yet high volume flows along the San Gorgonio River system. The natural drainage system is designed to accommodate and adjust to these processes. There are several “washes” within the Region that can convey normal precipitation and flow events but also have the potential to overflow and flood the valley floors. Urbanization has modified watershed characteristics, including original runoff and sediment transport patterns, through the construction of impervious areas and artificial drainage structures.

Existing communities within the Region are subject to unconfined flooding and debris flows from the local mountain watersheds. The San Gorgonio River Watershed is part of a narrow, steep mountain pass, and fires along the mountainous slopes can create significant debris hazards for downstream communities. Generally, most of the flood control infrastructure in the Region provides protection from 100-year floods; so residential, commercial, and industrial areas could be subject to flooding in larger storms. Some residents in the Region whose properties are subject to flooding are required to have flood insurance.



*Local flood control channel*

### 3.2.4 Habitat and Open Space

Water within the Region has many beneficial uses including the contribution and support of wildlife habitat, rare species, and wetland ecosystems within the San Bernardino National Forest, and in areas along the San Gorgonio River. Habitat planning work through the Western Riverside County and Coachella Valley MSHCPs indicates that there are ample areas within the Region for native habitat. Development that occurs without consideration of habitat can cause habitat degradation and lead to the establishment of invasive species which adversely impact the hydrology, diversity, and ecological function of the riparian habitats. As the Region continues to develop, it will be important to protect and preserve existing habitat areas and the water that they depend upon.

### 3.2.5 Disadvantaged Communities

As described in **Chapter 2**, the Region’s residential areas are all categorized by the State of California as DACs, including tribal DACs. As a result, water supplies within the Regional DACs must be affordable, accessible, and in compliance with state and federal requirements to meet the needs of DACs. Many DACs within the Region are in rural and remote areas, creating challenges in finding affordable ways to maintain and/or improve reliable water supplies.

### 3.2.6 Climate Change

Climate change refers to decades long changes in the Earth’s climate as a result of elevated levels of greenhouse gases (GHG). A climate change vulnerability assessment for the San Gorgonio IRWM Region was conducted as part of the IRWM Plan development. The potential impacts are described on a regional and statewide level.

#### Projected Regional Climate Change Impacts

The San Gorgonio Region is small, and few climate impact studies apply specifically to the Region and its boundary. When possible, information specific to the Region was used, such as outputs for the San Gorgonio River Watershed from the Cal-Adapt website (<http://cal-adapt.org/>), developed by the California Energy Commission Public Interest Energy Research Program (PIER). Additional resources include climate change impact studies of nearby watersheds, such as the *2013 Santa Ana Watershed Basin Study* completed by USBR in collaboration with SAWPA. Where information on regional impacts was not available, state wide or larger regional data were used, such as those used in the State of California’s *Third Climate Change Assessment* or DWR’s *State Water Project Final Delivery Capability Report 2015*. The projected climate change impacts for the San Gorgonio Region are provided in **Table 3-2**.

**Table 3-2: Projected Regional Climate Change Impacts**

Climate Variable	Change
Temperature <sup>1</sup>	<ul style="list-style-type: none"> <li>• Increase in average temperature of 2°F- 4°F by 2050 and 5°F-10°F by 2100</li> <li>• Extreme heat days (≥ 96.7°F) increase by more than 30 days/year by 2100</li> </ul>
Precipitation <sup>1</sup>	<ul style="list-style-type: none"> <li>• On average, projections show little change in total annual precipitation</li> <li>• Significant reduction in mountain snowpack, with precipitation falling as rain</li> </ul>
Wildfire Risk <sup>1</sup>	<ul style="list-style-type: none"> <li>• Slight increase in wildfire risk</li> </ul>
Surface Water <sup>2</sup>	<ul style="list-style-type: none"> <li>• Projected changes in precipitation patterns and increases in temperature will decrease natural recharge throughout the basin</li> </ul>
Groundwater	<ul style="list-style-type: none"> <li>• Decrease in natural groundwater recharge<sup>2</sup></li> <li>• Decreased SWP imports will decrease regional groundwater recharge<sup>3</sup></li> </ul>
Flooding <sup>2</sup>	<ul style="list-style-type: none"> <li>• 200-year flood event likely to replace 100-year flood event as a standard of measure</li> </ul>

<sup>1</sup> Cal-Adapt, 2017

<sup>2</sup> USBR, 2013

<sup>3</sup> DWR, 2015

**Projected Statewide Climate Change Impacts**

Since the Region receives imported SWP supplies, potential climate change impacts to the SWP system threaten the availability of imported water for the Region. In the Sierra Nevada Mountains (the source of SWP supplies), snowpack quantity is projected to decrease as there is a shift towards increased winter precipitation in the form of rain rather than snow. The timing of snowmelt runoff is also expected to shift as flows increase in the winter and decrease in the late spring and early summer. This change in timing is expected to impact flood control dam functionality and could decrease overall reservoir storage throughout the year and reduce the reliability of SWP water supply. Sea level rise also complicates efforts to manage salinity levels and preserve water quality in the Delta for urban and agricultural uses. DWR’s *State Water Project Final Delivery Capability Report 2015* estimates that climate change could result in a 25% decrease in SWP supply by 2040. This decrease in supply will directly affect the amount of SWP water that can be delivered to the Beaumont Basin, which is a critical water source for the Region.

**Vulnerability Sector Assessment and Prioritization**

In order to identify the potential vulnerabilities to the Region’s water resources as a result of the anticipated climate change impacts, the SAC conducted a climate change workshop as part of the IRWM Plan development. The vulnerabilities were then prioritized to identify strategies and projects that would most effectively adapt to and mitigate against climate change. “Adaptation” refers to adjustment to the effects of the changing climate by addressing areas of vulnerability, while “mitigation” refers to the reduction of emissions that contribute to climate change.

The State of California’s *2011 Climate Change Handbook for Regional Water Planning* was used as guide to facilitate the SAC workshop assessment. The handbook provides quantitative tools for assessing the vulnerability of a watershed or region to climate change and techniques for addressing climate change adaptation and mitigation in a regional and watershed planning process.

The vulnerability issues prioritized by the SAC are described in **Table 3-3**. Based on the feedback from the stakeholders in the Region, all vulnerabilities are considered a priority but some were assigned as a higher priority level.

**Table 3-3: Climate Change Vulnerability Issues for San Gorgonio Region**

Vulnerability Issue	Description	Priority Level
<b>Water Demand</b>		
Increase in crop demand	There is a projected increase in regional water demands from new climate sensitive crops.	Priority
Decreased ability to use groundwater storage to buffer drought	The groundwater table has historically decreased during dry and normal year periods and has been replenished in wet years. More frequent and severe droughts from climate change could reduce opportunities to recharge the Region's groundwater basins.	Priority

Vulnerability Issue	Description	Priority Level
Limited ability to conserve further	The Region responded well to conservation mandates during the last drought. Hardening of demand could make the Region vulnerable to future droughts.	Priority
Limited ability to meet future demand	The area is characterized by high summer and low winter use. Higher temperatures create potential for increasing future peak summer and annual demands.	Highest Priority
<b>Water Supply</b>		
Decrease in local surface supply	A recent analysis of climate change and water supply in the Santa Ana River Watershed recently concluded that surface water supplies are likely to decrease.	Highest Priority
Decrease in groundwater supply	Changes in runoff patterns will impact the Region's ability to access and store water in local groundwater basins.	Highest Priority
Decrease in imported supply	Imported water reliability from the SWP could be reduced by 25% due to sea level rise as a result of climate change.	Highest Priority
<b>Water Quality</b>		
Increase in treatment needs and costs	Increased wildfires and erosion could impact water quality in surface water facilities such as the Whitewater Flume.	Priority
<b>Flooding</b>		
Increase in inland flooding	It is projected that floods will be more severe in the future. There are some places in the Region where the flood control infrastructure has been insufficient in extreme flood events, and most flood control infrastructure provides protection from 100-year events.	Priority
Increase in flood hazards	The San Gorgonio Watershed is part of a narrow, steep mountain pass. Potential increases from fires along the mountainous slopes can create significant debris hazards for downstream communities.	Priority
<b>Ecosystem and Habitat</b>		
Increased impacts to water dependent species	Water dependent species are expected to be affected by erosion and shifts in sedimentation. Seasonal high and low flows are also likely to shift, impacting species reliant on seasonal freshwater flow.	Priority
Decrease in available necessary habitat	Threatened species identified in the Coachella Valley and Western Riverside County MSHCPs have a lowered capacity to adapt to climate change.	Priority

Vulnerability Issue	Description	Priority Level
<b>Hydropower</b>		
Decrease in hydropower potential	There is potential for future use of hydropower generation from the Whitewater Flume, which could be affected by changing runoff patterns.	Priority

### 3.3 Goals and Objectives

Below is a summary of the goals and objectives for the San Gorgonio Region. The goals were defined as general statements of purpose, and the objectives were defined as measurable actions taken to achieve the associated goal. There are a total of 10 goals and 17 objectives within the IRWM Plan. This broad set of goals and objectives addresses the issues, needs, and challenges for the San Gorgonio Region in the areas of water supply, water quality, flood management, habitat and open space, DACs, and climate change.

The objectives standard in the 2016 IRWM Guidelines requires that objectives be measurable. A measurable objective means there is a metric the RWMG can use to determine if the objective is being met as the IRWM Plan is implemented. Many of the metrics directly apply to the results of projects that are implemented to support IRWM Plan objectives.

The goals and objectives include a list of qualitative performance measures identified for the San Gorgonio IRWM Plan. Performance measures for each of the 17 objectives help the Region measure progress in meeting its objectives, and ultimately in achieving its goals. Note that the measurement standards provided in **Table 3-4** through **Table 3-13** are intended to be examples and are not inclusive of all measures that could potentially be used.

#### 3.3.1 Goal #1: Increase Regional Supply Availability and Reliability

A reliable water supply is necessary to protect the economic vitality of the Region and meet anticipated needs of the Region’s population. As water demand grows in the Region, water supplies to the Region (specifically imported water supplies) are becoming less reliable. The first goal focuses on the need to maintain and improve regional water supply reliability, reduce dependency on imported water from the Delta, protect communities from extended droughts, and address the needs for adaptation to the potential water supply impacts of climate change.

The stakeholders in the San Gorgonio Region have identified a number of objectives to increase water supply availability and reliability. These include implementing recycled water projects that provide regional water supply benefits, further diversifying the Region’s water portfolio, expanding infrastructure to maximize groundwater storage through recharge of imported water and the capture and storage of stormwater, and reducing the Region’s potable water consumption through water use efficiency. Measurable objectives established for this goal are provided in **Table 3-4**.

**Table 3-4: Objectives and Performance Measures for Goal #1**

<b>IRWM Plan Objectives</b>	<b>Performance Measure</b>
<b>Objective 1A:</b> <i>Implement regional recycled water projects within the Region and support local recycled water projects.</i>	Number of recycled water projects implemented and/or AFY of recycled water recharged or delivered within the Region as reported in UWMPs or other project documentation.
<b>Objective 1B:</b> <i>Support affordable investments and agreements between local and external agencies to enhance the reliability of imported water throughout the Region.</i>	Number of implemented transfers and agreements planned and/or AFY water delivered to water providers within the Region as reported in UWMPs.
<b>Objective 1C:</b> <i>Maximize the use of groundwater supplies, including local storage of imported water.</i>	Number of implemented projects, the AFY of additional groundwater recharge, and/or AFY of groundwater production as reported in UWMPs or Annual Watermaster Reports.
<b>Objective 1D:</b> <i>Implement appropriate regional demand management, water loss reduction and other conservation programs.</i>	Number of water conservation programs implemented or GPCD savings as reported in the UWMPs.

### 3.3.2 Goal #2: Improve resilience of regional water distribution systems

With the expansion of the Region's water supply portfolio, it will be necessary to match the supply and treatment level of water resources to their uses and water quality demands. The second goal focuses on agreements and infrastructure investments to provide flexibility in the regional distribution system operations in response to seismic disturbances and other emergency interruptions. It also addresses geographic differences in water supply reliability, including access to reliable sources of imported water. Measurable objectives established for this goal are provided in **Table 3-5**.

**Table 3-5: Objectives and Performance Measures for Goal #2**

<b>IRWM Plan Objectives</b>	<b>Performance Measure</b>
<b>Objective 2A:</b> <i>Implement regional infrastructure projects to increase distribution capacity, flexibility and redundancy.</i>	Number of implemented projects that increase capacity of regional infrastructure and/or cfs of increased capacity as reported in UWMPs or other project documentation.
<b>Objective 2B:</b> <i>Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</i>	Number of implemented regional supply, conservation and emergency response agreements and/or

IRWM Plan Objectives	Performance Measure
	referenced AFY provided as reported in the UWMPs or other project documentation.
<i>Objective 2C: Support projects to increase resilience and redundancy of local production and distribution facilities</i>	Number of implemented projects that increase reliability of local production facilities and/or AFY served with improved reliability as reported in UWMPs or other project documentation.

### 3.3.3 Goal #3: Develop useable tools to understand hydrologic processes and regional management

The third goal focuses on developing tools that increase scientific knowledge and understanding of water management issues and effects of water management actions in the San Gorgonio Pass Groundwater Basin. An integrated groundwater model for the Region would combine and expand existing surface and groundwater models into a single numerical model of the areas of the San Gorgonio Pass Groundwater Basin. Such tools would be important in determining availability of surface water supplies under historical conditions as well as climate change conditions, understanding groundwater basin functionality and groundwater storage potential, and planning the location and feasibility of recharge projects for surface, imported, and recycled water within the region. Measurable objectives established for this goal are provided in Table 3-6.

**Table 3-6: Objectives and Performance Measures for Goal #3**

IRWM Plan Objectives	Performance Measure
<i>Objective 3: Build an integrated ground and surface water model for all subbasins within the San Gorgonio Groundwater Basin for use in determining available surface water supplies, groundwater basin functionality, storage potential and recharge project feasibility.</i>	Delivery of the expansion of existing models to include the entire San Gorgonio Groundwater Basin and the use of integrated models in planning documents that manage groundwater resources such as GSPs

### 3.3.4 Goal #4: Decrease impacts to groundwater quality

The fourth goal focuses on protecting local groundwater quality in order to ensure water supply reliability and availability and to protect human health. Flows from septic systems have the potential to add nitrates or other contaminants to the local groundwater basin. Reducing use of septic systems by expanding centralized collection and converting to sewer systems can reduce pollutant concentrations of organics but not minerals in groundwater. Continued and increased monitoring of existing septic areas and enforcement of monitoring protocols can also provide water quality and reliability benefits, particularly in rural areas and DACs where sewer collection

systems are not currently feasible. Measurable objectives established for this goal are provided in **Table 3-7**.

**Table 3-7: Objectives and Performance Measures for Goal #4**

IRWM Plan Objectives	Performance Measure
<i>Objective 4A: Reduce use of septic systems by expanding centralized collection and treatment systems.</i>	Number of septic systems upgraded and/or the AFY of wastewater diverted from a septic to a centralized system as documented in UWMPs or other project documentation.
<i>Objective 4B: Increase monitoring of existing septic areas and enforcement of monitoring protocols.</i>	Number of implemented monitoring programs and/or the number of septic systems improved through those programs.

**3.3.5 Goal #5: Increase resilience to changing water quality requirements**

The fifth goal focuses on ensuring compliance with MCLs protecting local groundwater in the State of California. The detection of Chromium 6 in groundwater supplies has raised concerns over the reliability of those supplies and has pointed to the need to monitor for, and potentially mitigate, changes in statewide drinking water standards. In the event new standards are adopted, the Region fully intends to take steps to provide water with levels at or below the MCL. Measurable objectives established for this goal are provided in **Table 3-8**.

**Table 3-8: Objectives and Performance Measures for Goal #5**

IRWM Plan Objectives	Performance Measure
<i>Objective 5: Remain engaged across the changing legal, institutional, and regulatory framework affecting drinking water standards.</i>	Continued compliance with State and Federal drinking water regulations and standards.

**3.3.6 Goal #6: Enhance regional flood control infrastructure**

The sixth goal focuses on enhancing regional flood control infrastructure through a watershed-wide approach in order to reduce flood risk and ensure community health and safety, while also increasing the potential for other benefits such as water quality, water supply, and habitat enhancement. Flood control infrastructure, including multi-purpose, multi-benefit, stormwater management projects are necessary to provide safe, sustainable and livable communities. Projects focused on reducing the risk of flooding within the Region can be focused on areas designated as



high risk under FEMA's Flood Insurance Rate Maps. Measurable objectives established for this goal are provided in **Table 3-9**.

**Table 3-9: Objectives and Performance Measures for Goal #6**

IRWM Plan Objective	Performance Measure
<i>Objective 6A: Reduce properties subject to flood hazard insurance.</i>	Number of implemented flood projects or practices, and/or the number of structures or total area removed from flood hazards areas as documented in reduction analysis results.
<i>Objective 6B: Enhance regional multipurpose, multiple benefit stormwater management infrastructure.</i>	Number of flood management projects implemented in Region with multiple benefits.

### 3.3.7 Goal #7: Protect aquatic and riparian habitat

The seventh goal focuses on preserving the environmental health of the Region's watersheds, ecosystems, and natural resources. The Region's water resources planning must include considerations for the habitat that is also dependent upon how supply is managed. Objectives to both protect and enhance existing habitat areas as well as to create new areas have been developed as part of the Western Riverside County and Coachella Valley MSHCPs. Measurable objectives established for this goal are provided in **Table 3-10**.

**Table 3-10: Objectives and Performance Measures for Goal #7**

IRWM Plan Objective	Performance Measure
<i>Objective 7: Provide continued protection consistent with the Western Riverside and Coachella Valley MSHCPs.</i>	Number of projects implemented to protect, improve, enhance, and/or restore the Region's ecological resources.

### 3.3.8 Goal #8: Support DACs and maintain the affordability of water

The eighth goal focuses on supporting access to affordable water and wastewater resources projects for the many DACs within the region, particularly those areas that may face future water quality challenges or water reliability challenges due to insufficient infrastructure. The Region can help DACs by providing technical guidance, financial or staff resources to develop water resources related projects, or help to develop partnerships and funding for projects. Measurable objectives established for this goal are provided in **Table 3-11**.

**Table 3-11: Objectives and Performance Measures for Goal #8**

IRWM Plan Objective	Performance Measure
<i>Objective 8: Seek funding opportunities to ensure all communities have access to a reliable water supply and adequate wastewater treatment.</i>	Number of grant proposals submitted by and on behalf of DACs, and/or amount of funds received that directly benefit DACs within the Region.

**3.3.9 Goal #9: Support the economic vitality of DACs**

Effective water resources management is critical to the economic, social, and environmental stability of the DACs within the Region. Measurable objectives established for this goal are provided in **Table 3-12**.

**Table 3-12: Objectives and Performance Measures for Goal #9**

IRWM Plan Objective	Performance Measure
<i>Objective 9: Support projects to provide safe, sustainable and livable communities and to promote future economic development of local DACs.</i>	Number of implemented projects with DAC benefits within the Region.

**3.3.10 Goal #10: Adaptation and Mitigation to Climate Change**

Given climate change vulnerabilities to the Region’s water resources, stakeholders have identified the need to take actions within the watershed to adapt to climate change impacts such as changes in the amount, intensity, timing, and quality and variability of runoff and recharge within the Region. The Region also acknowledges the need for the use of renewable energy and opportunities to reduce carbon emissions or sequester carbon and encourages projects and future Region activities to use renewable energy sources and low energy options when feasible. Additionally, reductions in potable water consumption decrease the dependency on imported supplies which will reduce the energy required to transport and pump water through the SWP leading to GHG emission reductions. Water efficiency improvements and reductions in energy consumption and GHG emissions incorporate strategies adopted by the California Air Resources Board AB 32 Scoping Plan. Considering the potential impacts in the Region’s water resource management decisions now will allow the Region to better respond to future impacts to its water resources. Measurable objectives established for this goal are provided in **Table 3-13**.

**Table 3-13: Objectives and Performance Measures for Goal #10**

IRWM Plan Objective	Performance Measure
<i>Objective 10: Implement multi-benefit strategies that reduce GHG emissions and adapt to climate change in the areas of flood management, water supply, water quality, water-dependent habitat, and fire risk.</i>	Number of implemented projects that promote mitigation and/or adaptation strategies with multiple benefits.

### 3.4 Objective Prioritization

The SAC was asked to provide a recommendation to the RWMG for prioritizing the objectives in accordance with DWR Plan guidance. Based on the feedback from SAC members, the RWMG decided that all objectives are at the same priority level for the Region. Although the RWMG prioritized all objectives, those that relate to water supply are of immediate (2018) interest for the Region due to several factors such as anticipated population growth and climate change concerns.

### 3.5 Conformance of Plan Objectives with Statewide Priorities

The 2016 DWR IRWM Guidelines require that the IRWM Plan consider overarching goals of the Colorado River Basin Plan, the recommendations from CWP Update 2015, statewide water efficiency goals, the requirement of the IRWM Planning Act, and SGMA. **Table 3-14** provides the resulting correlation between the San Gorgonio IRWM Plan objectives and statewide priorities from the California Water Plan Update 2015.

**Table 3-14: IRWM Plan Objectives and Statewide Priorities**

Statewide Priorities	IRWM Plan Objectives
Make Conservation a California Way of Life	<ul style="list-style-type: none"> <li>• <b>Objective 7:</b> Provide continued protection consistent with the Western Riverside and Coachella Valley MSHCPs.</li> </ul>
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government	<ul style="list-style-type: none"> <li>• <b>Objective 1A:</b> Implement regional recycled water projects within the Region and support local recycled water projects.</li> <li>• <b>Objective 1B:</b> Support affordable investments and agreements between local and external agencies to enhance the reliability of imported water throughout the Region.</li> <li>• <b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</li> <li>• <b>Objective 1D:</b> Implement appropriate regional demand management, water loss reduction and other conservation programs.</li> </ul>

Statewide Priorities	IRWM Plan Objectives
	<ul style="list-style-type: none"> <li>• <b>Objective 2A:</b> Implement regional infrastructure projects to increase distribution capacity, flexibility and redundancy.</li> <li>• <b>Objective 2B:</b> Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</li> <li>• <b>Objective 2C:</b> Support projects to increase resilience and redundancy of local production and distribution facilities</li> <li>• <b>Objective 3:</b> Build an integrated ground and surface water model for all subbasins within the San Gorgonio Groundwater Basin for use in determining available surface water supplies, groundwater basin functionality, storage potential and recharge project feasibility.</li> </ul>
<p>Achieve the Co-Equal Goals for the Delta</p>	<ul style="list-style-type: none"> <li>• <b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</li> <li>• <b>Objective 1D:</b> Implement appropriate regional demand management, water loss reduction and other conservation programs.</li> <li>• <b>Objective 2B:</b> Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</li> </ul>
<p>Protect and Restore Important Ecosystems</p>	<ul style="list-style-type: none"> <li>• <b>Objective 7:</b> Provide continued protection consistent with the Western Riverside and Coachella Valley MSHCPs.</li> </ul>
<p>Manage and Prepare for Dry Periods</p>	<ul style="list-style-type: none"> <li>• <b>Objective 1A:</b> Implement regional recycled water projects within the Region and support local recycled water projects.</li> <li>• <b>Objective 1B:</b> Support affordable investments and agreements between local and external agencies to enhance the reliability of imported water throughout the Region.</li> <li>• <b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</li> <li>• <b>Objective 1D:</b> Implement appropriate regional demand management, water loss reduction and other conservation programs.</li> <li>• <b>Objective 2B:</b> Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</li> <li>• <b>Objective 3:</b> Build an integrated ground and surface water model for all subbasins within the San Gorgonio Groundwater Basin for use in determining available surface water supplies, groundwater basin functionality, storage potential and recharge project feasibility.</li> </ul>

Statewide Priorities	IRWM Plan Objectives
	<ul style="list-style-type: none"> <li>• <b>Objective 6B:</b> Enhance regional multipurpose, multiple benefit stormwater management infrastructure.</li> </ul>
<p>Expand Water Storage Capacity and Improve Groundwater Management</p>	<ul style="list-style-type: none"> <li>• <b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</li> <li>• <b>Objective 3:</b> Build an integrated ground and surface water model for all subbasins within the San Geronio Groundwater Basin for use in determining available surface water supplies, groundwater basin functionality, storage potential, and recharge project feasibility.</li> <li>• <b>Objective 4A:</b> Reduce use of septic systems by expanding centralized collection and treatment systems.</li> <li>• <b>Objective 4B:</b> Increase monitoring of existing septic areas and enforcement of monitoring protocols.</li> </ul>
<p>Provide Safe Water for All Communities</p>	<ul style="list-style-type: none"> <li>• <b>Objective 8:</b> Seek funding opportunities to ensure all communities have access to a reliable water supply and adequate wastewater treatment.</li> <li>• <b>Objective 9:</b> Support projects to provide safe, sustainable and livable communities and to promote future economic development of local DACs.</li> </ul>
<p>Increase Flood Protection</p>	<ul style="list-style-type: none"> <li>• <b>Objective 6A:</b> Reduce properties subject to flood hazard insurance.</li> <li>• <b>Objective 6B:</b> Enhance regional multipurpose, multiple benefit stormwater management infrastructure.</li> <li>• <b>Objective 10:</b> Implement multi-benefit strategies, that adapt to climate change impacts for flood management, water supply, water quality, water-dependent habitat, and fire risk.</li> </ul>
<p>Increase Operational and Regulatory Efficiency</p>	<ul style="list-style-type: none"> <li>• <b>Objective 1A:</b> Implement regional recycled water projects within the Region and support local recycled water projects.</li> <li>• <b>Objective 1B:</b> Support affordable investments and agreements between local and external agencies to enhance the reliability of imported water throughout the Region.</li> <li>• <b>Objective 1C:</b> Maximize the use of groundwater supplies, including local storage of imported water.</li> <li>• <b>Objective 1D:</b> Implement appropriate regional demand management, water loss reduction and other conservation programs.</li> <li>• <b>Objective 2A:</b> Implement regional infrastructure projects to increase distribution capacity, flexibility and redundancy.</li> <li>• <b>Objective 2B:</b> Form agreements between local and external agencies to support regional supply systems, conservation programs and emergency response.</li> </ul>

Statewide Priorities	IRWM Plan Objectives
	<ul style="list-style-type: none"><li>• <b>Objective 2C:</b> Support projects to increase resilience and redundancy of local production and distribution facilities</li><li>• <b>Objective 5:</b> Remain engaged across the changing legal, institutional, and regulatory framework affecting drinking water standards</li></ul>
Identify Sustainable and Integrated Financing Opportunities	<ul style="list-style-type: none"><li>• <b>Objective 8:</b> Seek funding opportunities to ensure all communities have access to a reliable water supply and adequate wastewater treatment.</li></ul>



## 4. Resource Management Strategies

This chapter considers the impacts and benefits of broad-ranging regional water management strategies that will help the San Geronio IRWM Region to meet the goals and objectives, while adapting to climate change vulnerabilities.

### 4.1 Consideration of Strategies

The Region considered the Resource Management Strategies (RMS) outlined in the *California Water Plan Update 2013* as required in DWR’s 2016 IRWM Guidelines, as well as additional climate change strategies. The SAC reviewed and discussed the RMS and provided recommendations to the RWMG as to which were appropriate for the San Geronio IRWM Region and its stakeholders. This process also included the identification of additional strategies selected to mitigate against climate change through a reduction in energy consumption and emission of GHGs.

The RMS in this IRWM Plan are those that are considered by stakeholders as useful for meeting the Region’s goals and objectives. **Table 4-10** shows the relationship between the RMS and the Region’s goals from **Chapter 3**. In many instances, RMS can address multiple goals.

### 4.2 Regional Watershed Management Strategies

The RMS selected for inclusion in the IRWM Plan are described in this section according to *California Water Plan* grouping. The Region’s stakeholders went through an exercise of classifying the selected RMS as either a strategy that should be supported or a strategy that should be implemented. Supported strategies are those that can be indirectly beneficial to meeting the Region’s goals and objectives but cannot be implemented within the Region. Implemented strategies are those that will directly meet the Region’s goals and objectives. In this section, the following icons are used to identify whether RMS from the CWP are categorized as *support* or *implement*.



The SAC also identified strategies that address the Region’s ability to adapt to climate change and/or mitigate GHG emissions. If a strategy improved the resilience of water resources in the face of climate change, the strategy was identified as helping the Region adapt to climate change. If a strategy is viewed as helping reduce the amount of energy consumed and/or GHGs produced, it is identified as mitigating GHGs. These chosen adaptation and mitigation strategies are identified with the following icons:









The following is a discussion of the RMS considered by stakeholders as useful for meeting the Region’s goals and objectives.

### 4.2.1 Reduce Water Demand

Table 4-1 includes RMS selected to meet the Region’s water supply goals and objectives by reducing water demand in the Region. Enhancing the water supply reliability through reductions in water demand will help the Region adapt to reductions in local and statewide water supply availability resulting from climate change, while addressing potential increases in irrigation demand from increased temperatures. Furthermore, each of these strategies has the potential to mitigate the effects of climate change by reducing the electrical energy required to treat or deliver water to customers.

**Table 4-1: Resource Management Strategies that Reduce Water Demand**




Description	Meets IRWM Objectives
<b>Agricultural Water User Efficiency</b>	
<p>Agricultural water use efficiency involves improvements in technologies and management of agricultural water to reduce water used for agricultural irrigation. It included incentives, public education, and other programs. The San Geronio Region is not currently considered to be an agricultural region, but agriculture of high value crops is increasing within the Region.</p>	
<b>Urban Water Use Efficiency</b>	
<p>Urban water use efficiency involves technological, policy, or behavioral improvements that reduce indoor and outdoor residential, commercial, industrial, and institutional water use. Examples of methods that the Region can use include incentivizing low flow devices and drought-friendly outdoor landscaping incentives, conservation pricing, and public education. Urban water use efficiency also contributes to environmental water quality in the Region by decreasing the over-irrigation of outdoor landscapes that contribute pollutants to urban runoff and dry weather flows.</p>	
<b>Crop Idling for Water Transfers</b>	
<p>Crop idling for water transfers is the practice of not planting crops in order to transfer water that would have otherwise been used to irrigate the crop to meet other demands. Although the Region does not have any large-scale agriculture, crop idling outside of the Region can increase imported water supplies for potential use within the Region. The potential for mitigation benefits from reduced energy consumption would depend on the resulting energy intensity of the resulting water transfer.</p>	


Description	Meets IRWM Objectives
<p><b>Water Meter Installation</b></p> <p>Water meter installation involves both the installation or upgrade to modern water meters to allow for more accurate data on water use and efficiency of distribution systems. Improved knowledge of water use and leaking can reduce overall demand.</p>	

### 4.2.2 Improve Operational Efficiency and Transfers

Table 4-2 includes RMS selected to implement water transfers and improve operational efficiencies in the Region. Each of these strategies will help the Region adapt to the water supply impacts of climate change, including changes in runoff patterns, decreases in surface supplies, and decreases in imported supplies.

**Table 4-2: Resource Management Strategies that Improve Operation Efficiency and Transfers**


Description	Meets IRWM Objectives
<p><b>Conveyance – Regional/Local</b></p> <p>Conveyance Strategies for Regional/Local Infrastructure seek to improve the existing system flexibility and reliability through maintenance and new projects. Local and regional water supply conveyance systems that could benefit from this strategy within the San Gorgonio Region include both natural watercourses and man-made facilities such as pipelines and flood control channels.</p>	
<p><b>Conveyance – Delta</b></p> <p>Conveyance of water from the Bay Delta to SWP is an important source of water for the Region. Although the Region can't directly implement strategies to improve Delta conveyance, it supports external efforts to improve SWP supply reliability.</p>	
<p><b>System Reoperation</b></p> <p>System Reoperation allows for improved management and movement of existing water supplies including managing surface storage facilities to optimize the availability and quality of stored water supplies. System reoperation in the Region could involve balancing delivery forecasts and optimizing depth and timing of withdrawals.</p>	

Description	Meets IRWM Objectives
<b>Water Transfers</b>	
<p>A water transfer is a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer, sale, lease, or exchange of water or water rights. A water transfer can be a temporary or permanent sale of water or water right by the water right holder, a lease of the right to use water from the water right holder or a sale or lease of a contractual right to water supply. Water transfers can be used by the Region to improve intra-regional flexibility as well as to secure additional imported sources from outside of the Region.</p>	

### 4.2.3 Improve Flood Management

Table 4-3 includes the RMS selected to meet the Region’s flood management goals and objectives. This objective also addressed the need for the Region to adapt to increasing inland flooding and flood hazards resulting from climate change. Through added water supply benefits, this objective also provides mitigation benefits by decreasing the need for more energy intensive sources of supply.






**Table 4-3: Resource Management Strategies that Improve Flood Management**

Description	Meets IRWM Objectives
<b>Flood Risk Management</b>	
<p>Flood Management focuses on protecting people, property, and infrastructure from floods. Flood management in the Region can include both structural and non-structural measures, preserve existing natural floodplains, remove existing structures from areas subject to flooding, and/or implement flood control measures. Flood control measures include channelization, detention and debris control, preparation for, response to, and recovery from a flood, minimization of loss of life, and damage to property from flooding. This is done while recognizing the benefits to ecosystems from periodic flooding.</p>	

### 4.2.4 Increased Water Supply

Table 4-4 includes RMS that meet the Region’s water supply goals and objectives related to water supply. Each of these strategies addresses the water supply impacts of climate change, and some have the potential to mitigate climate change impacts where new supplies are less energy intensive and would reduce GHG emissions.




**Table 4-4: Resource Management Strategies that Increase Water Supply**




Description	Meets IRWM Objectives
<b>Conjunctive Management and Groundwater Storage</b>	
<p>Conjunctive Management is the act of storing surface water in a groundwater basin when available and withdrawing that water in drier years. Conjunctive Management and Groundwater Storage projects and programs can capitalize on available storage and increase groundwater supplies for the Region. In dry years when natural recharge is low and groundwater pumping is high, groundwater levels can decline, which increases overdraft potential, degradation of water quality, and may result in subsidence.</p>	
<b>Municipal Recycled Water</b>	
<p>Municipal recycled water is municipal treated wastewater that is further treated through a rigorous and high level of treatment for reuse. Recycled water is a significant resource in the Region that can be used to offset the need for potable water demands and improve groundwater quality.</p>	
<b>Surface Storage – Regional Local</b>	
<p>Regional and Local Surface Storage strategies increase local supply through the construction or modification of surface reservoir and stormwater catchment infrastructure. While no surface reservoirs are planned within the Region, there is a need to address changes in runoff patterns resulting from climate change and to further utilize potential strategies to capture stormwater in local groundwater basins.</p>	
<b>Surface Storage – CALFED/(SWP)</b>	
<p>This strategy encompasses the storage of water and cooperation with other agencies to store and enhance natural waterways and water quality. Such storage and water conservation and management agencies/organizations include California and Federal Bay-Delta Program (CALFED) and SWP. The Region receives SWP water, and increased reliability of the SWP is of high importance to the Region.</p>	
<b>Irrigated Land Retirement</b>	
<p>This is the process of retiring or discontinuing the irrigation of land so that water intended for irrigation can be transferred or used somewhere else permanently.</p>	

### 4.2.5 Improve Water Quality

Table 4-5 includes RMS that meet the Region’s water quality goals and objectives. Through the improvements in water quality, water supply can be increased thus being more resilient against climate change impacts. Additionally, increasing water quality may also help promote climate change mitigation by reducing overall energy requirements and reducing GHG emissions.

**Table 4-5: Resource Management Strategies that Improve Water Quality**






Description	Meets IRWM Objectives
<b>Drinking Water Treatment and Distribution</b>	
<p>Drinking water treatment and distribution encompasses the improvement of quality of supplies delivered from treatment facilities. This ensures the Region delivers high quality and resilient supplies to customers. Implementing this strategy will support the Region's objectives of meeting water quality standards and increasing groundwater supply which may not have been previously available due to quality concerns.</p>	
<b>Groundwater Remediation/Aquifer Remediation</b>	
<p>The practice of removing constituents and contaminants which impact the beneficial use of water. Remediation can take place in situ or ex situ depending on treatment strategies and contaminants and their levels. The Region does not currently have a need for groundwater remediation but would support efforts where necessary.</p>	
<b>Matching Water Quality to Use</b>	
<p>This strategy recognizes not all water uses require the same level of treatment and quality. This encompasses the identification of and execution of the steps required to efficiently and effectively supply appropriately treated water to customers with different water quality needs. Matching water quality to water use by recognizing the different needs, natural background conditions, hydrologic limitations, and economics ensures that limited public resources can be focused on the most significant problems. Benefits of this strategy to the Region can include providing reduced treated water costs if users can be supplied with raw water or recycled water, while reserving high quality water for drinking and industrial purposes.</p>	


Description	Meets IRWM Objectives
<p><b>Pollution Prevention</b></p> <p>This strategy is the control or reduction of pollutants from point and nonpoint sources that can affect multiple environmental resources including water supply, water quality, and riparian and aquatic habitat. Methods to accomplish this may include public education, efforts to identify and control pollutant contributing activities, regulation of pollution-causing activities, and the implementation of structural and nonstructural water quality best management practices that reduce containment concentrations. Pollution prevention strategies would benefit the Region's by preventing the contamination of local environmental flows and water supplies.</p>	
<p><b>Salt and Salinity Management</b></p> <p>The management of water resources to reduce salt loads that impact a region to secure, maintain, and recover usable water supplies. Salinity impacts are often slow to emerge but can result in loss of habitat, and a reduction in community growth potential. Implementation of this strategy would help the Region achieve objectives related to habitat, groundwater quality, and water supply reliability and resiliency.</p>	
<p><b>Urban Runoff Management</b></p> <p>Encompasses the control of urban runoff through interception, diversion, control or capture of storm or dry weather runoff. While there are not currently significant volumes of urban runoff within the Region, this strategy can help recharge groundwater systems while protecting natural habitat from contamination.</p>	

### 4.2.6 Practice Resource Stewardship

Table 4-6 contains RMS that aim to protect aquatic and riparian habitat and the Region's overall ecosystem health. Each of these strategies address the need to adapt to climate change impacts, including impacts to water dependent species and decreases in available habitat, as well as resiliency to water quality impacts from wildfires and erosions and water supply impacts. These strategies can also reduce GHG's through reduced need for water treatment and the development of new higher energy consuming supplies.

**Table 4-6: Resource Management Strategies that Practice Resource Stewardship**



Description	Meets IRWM Objectives
<b>Ecosystem Restoration</b>	
<p>The process of returning selected ecosystems to a state similar to its state before any disturbances. Disturbance may be the result of fires, floods, invasive species, or most commonly, human urbanization. This strategy aligns with several of Region's objectives, including increased habitat, as well as other benefits to water supply, including groundwater recharge and water quality.</p>	
<b>Forest Management</b>	
<p>The implementation of projects and programs to support water resources in relation to forestlands. Projects and programs may include long-term monitoring, multi-party coordination, communication between downstream and upstream communities and water users, and revisions to water quality plans. These projects and programs can help protect the Region's riparian and aquatic habitat through the revision and improvement of its management practices.</p>	
<b>Land Use Planning and Management</b>	
<p>The use of land controls to manage, minimize, or control activities that may negatively affect the quality of ground and surface waters, natural resources, or endangered or threatened species. The most effective and efficient practices would integrate the Region's water and land use planning with considerations of future economic development, land and property development, growth projections, and economic developments with their needs for water, energy, and other resources. Proper land use planning and management intersect and share benefits with many resource management strategies that can help the Region work towards all of its objectives.</p>	
<b>Recharge Areas Protection</b>	
<p>This encompasses the protection of lands that are conducive and contribute to groundwater recharge, including river and streambeds, open spaces that allow water to permeate into the ground, artificial recharge areas, ponds, and basins. Protection techniques the Region may use include land use planning, land conservation, and habitat protection programs.</p>	
<b>Sediment Management</b>	
<p>Encompasses the proper management of sediment levels and types of sediments in waterways. Sediment is beneficial in some areas, and detrimental in others, and can be variable in types, sizes, and compositions. Proper management within the Region is important not only to protect riparian and aquatic habitat, but for flood management and water infiltration as well.</p>	

Description	Meets IRWM Objectives
<b>Watershed Management</b>	
<p>Aims to restore and enhance watershed function through planning, programs, and projects encompassing a broader perspective on resource management which includes improving and protecting water quality, ecosystems, and open space. Using the watershed as a basic management unit promotes multi-benefit, integrated projects, and regional collaboration. Projects that use watershed management can help the Region to meet all of its objectives.</p>	


### 4.2.7 People and Water

Table 4-7 includes RMS that focus on the education of the Region’s population about water resources and recognizing the importance of how water influences their local culture. Through this, pollution and contamination from anthropogenic sources may decrease, while water use efficiency and conservation may increase. The strategies can address climate change adaptation and mitigation by reducing overall water demand.

**Table 4-7: Resource Management Strategies that Connect People and Water**

Description	Meets IRWM Objectives
<b>Economic Incentives Policy (Loans, Grants, and Water Pricing)</b>	
<p>Economic incentives through loans, grants, or water pricing support are important for successful implementation of a project. Lack of adequate funding can often prevent projects from moving forward, while incentives can result in lower operational costs or lower local costs for implementing a project.</p>	
<b>Outreach, Engagement, and Education</b>	
<p>Education and outreach are important for all water resource management programs and projects including those focused on watershed and water resources. Outreach to stakeholders and educating the public about critical water issues facing the Region are important steps towards successful program and project implementation to improve the Region's water supply, quality, and habitat. Additionally, performing engagement and outreach to other agencies and organizations allows for partnerships to be formed in order to enhance and advance programs and projects.</p>	



Description	Meets IRWM Objectives
<b>Water and Culture</b>	
Water and Culture acknowledges the cultural connection tribes have with their water resources. This strategy ensures that water resources on Native American lands within the Region are managed sustainably to ensure water quality and supplies are sufficient to maintain those cultural connections.	

### 4.2.8 Strategies Not Applicable to the Region

Some of the *California Water Plan 2015* RMSs are not applicable to the San Gorgonio IRWM Region due to geographic or resource limitations or being deemed inappropriate and/or ineffective. These strategies were discussed by the SAC and RWMG, but they are not incorporated into the San Gorgonio IRWM Plan. These strategies are described in **Table 4-8**.

**Table 4-8: Resource Management Strategies Not Included in the IRWM Plan**

Strategy	Reason for not including
Desalination (Brackish and Sea Water)	Desalination is the removal of salts from saline waters, including sea water for coastal communities and brackish groundwater for inland water users. The Region is in an inland watershed and there is no known saline groundwater body.
Precipitation Enhancement	Precipitation enhancement, commonly called "cloud seeding," artificially stimulates clouds to produce more rainfall or snowfall than they would produce naturally. This is considered an ineffective strategy by the stakeholders in the Region.
Agricultural Land Stewardship	Agricultural land stewardship involves balancing water supply and environmental management in conjunction with the historical food production of a Region. The San Gorgonio Region does not have significant agricultural areas that produce food.
Water-Dependent Recreation	Water-dependent recreation protects and enhances water bodies such as lakes, reservoirs, beaches, and perennial streams and rivers, for recreation use. However, there are no water bodies in the Region that support water-dependent recreation.

### 4.2.9 Additional Climate Change Mitigation Strategies

In addition to the RMS from the *California Water Plan*, the Region identified additional climate change mitigation strategies from the State of California’s 2011 *Climate Change Handbook for Regional Water Planning* at a climate change workshop conducted by the SAC. While the majority of the RMS already listed in this chapter will help mitigate climate change, the Region identified

the following additional strategies that would specifically mitigate against climate change through a reduction in energy consumption and GHGs. These strategies are described in **Table 4-9**.

**Table 4-9: Additional Climate Change Mitigation Strategies**





Description	Meets IRWM Objectives
<p><b>Optimize Sewer System</b></p> <p>This strategy includes the construction, repair, or modernization of the Region's sewer system to increase reliability and functionality. It may incorporate recharge or recycled water infrastructure or planning.</p>	
<p><b>Conduct Emissions Inventory and Target</b></p>	
<p>This strategy utilizes the study, data collection, and modeling of local emissions to calculate reduction goals.</p>	
<p><b>Treatment and Distribution Efficiency (Urban and Agricultural)</b></p>	
<p>This strategy encompasses the efficient treatment and distribution of water supplies by ensuring waste, leakage, and energy inefficient processes are limited.</p>	
<p><b>Increase Use of Renewable Energy Sources</b></p>	
<p>The implementation or continued expansion of renewable energies within the Region, such as solar and wind.</p>	

Table 4-10: Resource Management Strategies That Meet San Geronio IRWM Goals

Resource Management Strategies	San Geronio IRWM Goals									
	1) Increase regional supply availability and reliability	2) Improve resilience of regional water distribution systems	3) Develop useable tools to understand hydrologic processes	4) Decrease impacts to groundwater quality	5) Increase resilience to changing water quality requirements	6) Enhance regional flood control infrastructure	7) Protect aquatic and riparian habitat	8) Support DACs and maintain the affordability of water	9) Support the economic vitality of DACs	10) Adaptation to Climate Change
<b>Reduce Water Demand</b>										
Agricultural Water Use Efficiency <sup>1</sup>	✓	✓		✓			✓	✓	✓	✓
Urban Water Use Efficiency	✓	✓		✓			✓	✓	✓	✓
Crop Idling for Water Transfers <sup>1</sup>	✓	✓		✓		✓	✓	✓	✓	✓
Water Meter Installation	✓	✓						✓	✓	✓
Graywater Use	✓	✓					✓	✓	✓	✓
<b>Improve Flood Management</b>										
Flood Risk Management	✓	✓		✓	✓	✓	✓	✓	✓	✓
<b>Improve Operational Efficiency and Transfers</b>										
Conveyance – Delta <sup>1</sup>	✓							✓	✓	
Conveyance – Regional/Local	✓	✓						✓	✓	✓
System Reoperation		✓			✓	✓	✓	✓	✓	✓
Water Transfers	✓			✓			✓	✓	✓	
<b>Increase Water Supply</b>										
Conjunctive Management and Groundwater Storage	✓	✓	✓			✓		✓	✓	✓
Desalination	✓	✓		✓						
Municipal Recycled Water	✓	✓		✓		✓		✓	✓	✓
Surface Storage – Regional/Local	✓	✓				✓		✓	✓	✓
Surface Storage – CALFED (/SWP) <sup>1</sup>	✓	✓						✓	✓	✓

681/66

1001/189

Resource Management Strategies	San Gorgonio IRWM Goals									
	1) Increase regional supply availability and reliability	2) Improve resilience of regional water distribution systems	3) Develop useable tools to understand hydrologic processes	4) Decrease impacts to groundwater quality	5) Increase resilience to changing water quality requirements	6) Enhance regional flood control infrastructure	7) Protect aquatic and riparian habitat	8) Support DACs and maintain the affordability of water	9) Support the economic vitality of DACs	10) Adaptation to Climate Change
Irrigated Land Retirement <sup>1</sup>	✓			✓						
<b>Improve Water Quality</b>										
Drinking Water Treatment and Distribution	✓	✓		✓	✓			✓	✓	✓
Groundwater Remediation/Aquifer Remediation <sup>1</sup>			✓	✓		✓	✓			
Matching Water Quality to Use		✓		✓	✓			✓	✓	✓
Pollution Prevention	✓	✓		✓	✓			✓	✓	✓
Salt and Salinity Management	✓		✓	✓			✓			
Urban Runoff Management	✓	✓		✓	✓	✓	✓	✓	✓	✓
<b>Practice Resources Stewardship</b>										
Agricultural Lands Stewardship			✓	✓		✓				✓
Ecosystem Restoration	✓			✓		✓	✓	✓	✓	✓
Forest Management							✓	✓	✓	✓
Land Use Planning and Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recharge Areas Protection	✓	✓		✓	✓	✓	✓	✓	✓	✓
Sediment Management				✓	✓	✓		✓	✓	✓
Watershed Management	✓		✓	✓	✓	✓	✓	✓	✓	✓
<b>People and Water</b>										
Economic Incentives Policy	✓		✓	✓	✓	✓	✓	✓	✓	✓
Outreach and Education	✓		✓	✓	✓	✓	✓	✓	✓	✓
Water and Culture	✓		✓	✓	✓	✓	✓	✓	✓	✓

<sup>1</sup> Supported RMS that can be indirectly beneficial to the meeting Region's goals and objectives but cannot be implemented within the Region.



## 5. Projects

Implementing projects is an integral part of the IRWM Plan, providing the primary means for meeting the IRWM Plan's goals and objectives. This chapter describes how the SG IRWM Region will work to facilitate the development of project concepts and the process by which the Region will submit, review, and prioritize projects in the IRWM Plan.

### 5.1 Project Identification

One of an IRWM Program's primary functions is to support the development of projects that promote integration and collaboration from a regional perspective while addressing the needs of the Region's stakeholders and IRWM requirements. The projects included as part of the SG IRWM Plan were developed by stakeholders within the Region through multiple processes as described here.

#### 5.1.1 Initial Call for Projects

An initial call for San Geronio IRWM Plan projects was introduced at an SAC Workshop in November 2017. SAC Meeting attendees were given an overview of the project development and submittal process, including the Project Nomination Form (**Appendix F**). Potential project sponsors were given an opportunity to discuss their projects and/or project ideas with other stakeholders from the Region.

In addition to the SAC meeting, the announcement of the call for projects was sent to the Region's email distribution list and posted on the SGIRWM website, along with an information sheet describing deadlines, required information, and the submittal process. The potential project sponsors were given several weeks to prepare and submit the Project Nomination Form.

Since this process was newly developed and being implemented for the first time in the Region, the RWMG opted to allow for an initial project review step. If sponsors wanted to submit projects earlier, they would be reviewed for any potential issues and provided with relevant feedback. Any identified issues were reviewed with sponsors, allowing them to update the Project Nomination Form prior to the official close of the initial project call.

#### 5.1.2 Project Identification in Technical Studies

As part of SG IRWM's Proposition 1 Planning Grant, funding was allocated to conduct an assessment of regional water supply reliability and recycled water potential use. These planning efforts were used to inform the project process by identifying potential water supply and recycled water projects and conducting planning level feasibility analyses of the benefits, costs and implementation considerations. Some of the projects within these studies were submitted to the IRWM Plan by regional stakeholders.

##### Water Supply Reliability Plan

The *Water Supply Reliability Study* (**Appendix A**) was developed with the participation of an ad-hoc water supply committee made up of members of the RWMG. The Study identifies the water supply reliability related needs of the Region through a baseline assessment of the Region's current and projected water supplies and a gap analysis to evaluate the ability of the Region's water

purveyors to meet future demands under various hydrologic scenarios. A variety of water supply reliability project concepts are identified to address the water supply needs of the Region, and they are further developed for inclusion in the IRWM Plan. This Study also presents planning-level costs and associated unit costs for each of the options.

### San Gorgonio Region Recycled Water Study

Water recycling in the SG IRWM Region can create a local, drought-resistant source of water and reduce the nitrate levels in the groundwater. The San Gorgonio Region does not currently produce recycled water and the *San Gorgonio Region Recycled Water Study* (**Appendix B**) addresses the opportunities to do so through identifying regional recycled water project options and assessing the benefits and costs of these options. While individual agency recycled water planning efforts have been conducted within the Region, this Study is primarily focused on using a regional perspective and developing project concepts that can achieve multiple benefits for multiple entities. The Study is intended to support goals and strategies identified in the IRWM Plan by identifying recycled water project options in the San Gorgonio Region and evaluating the benefits of these project options. This Study also presents planning-level costs and associated unit costs for each of the project options.

## 5.2 Project Submittal, Review and Prioritization Process

Beyond the initial call for projects, project submittal and review is intended to be an on-going and dynamic process to encourage new and beneficial projects to be incorporated into the IRWM Plan as they are developed. The submittal review and prioritization process used by the San Gorgonio Region seeks to minimize barriers for inclusion and promotes participation for all stakeholders within the Region.

### 5.2.1 Project Categories

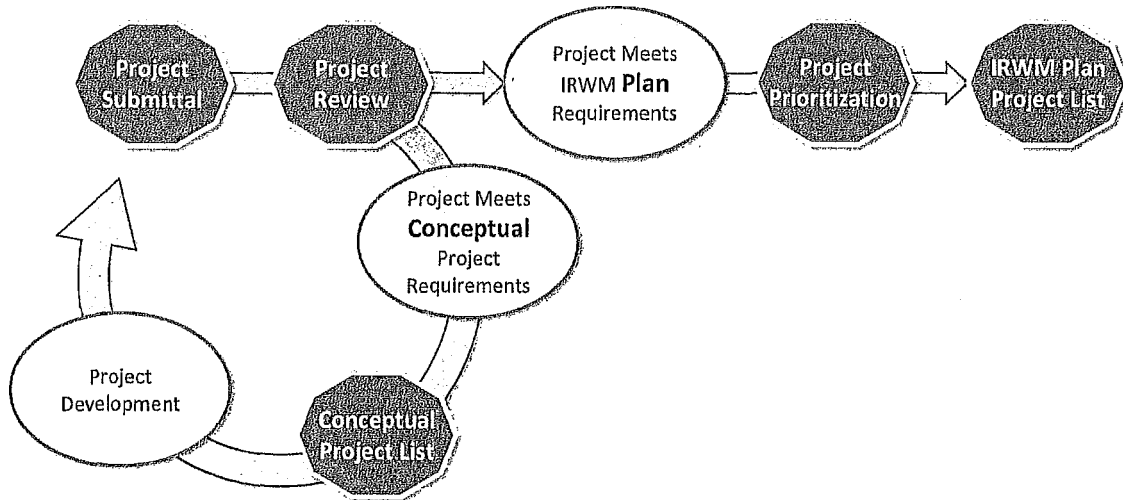
To facilitate the further development of project ideas that may not yet meet IRWM Plan project requirements, the RWMG allows for two categories of projects within the IRWM Plan:

- *Conceptual Projects*: Projects that do not yet meet the minimum DWR criteria for acceptance as an IRWM Plan Project but do support the goals and objectives of the IRWM Region. These projects are included in the IRWM Plan as a separate Conceptual Projects List and are tracked as part of the IRWM planning process for further collaboration and development into Plan Projects.
- *Plan Projects*: Projects that satisfy IRWM Plan requirements and benefit the Region. These plans, once approved, are prioritized and included in the IRWM Plan.

### 5.2.2 Notification and Project Submittal

The Region encourages projects to be submitted or updated by stakeholders on an ongoing basis. However, the Region may also conduct a targeted call for projects as necessary to support any IRWM Plan updates and grant funding opportunities.

Figure 5-1: Overview of Project Submittal, Review and Prioritization Process



### Submittal Process

Stakeholders can submit projects at any time. To submit a project, stakeholders must first complete a Project Nomination Form (**Appendix F**). The form and instructions can be found on the program website at [www.sgirwm.org](http://www.sgirwm.org). Once completed, the project sponsor emails the form directly to the SG IRWM Program Manager at [SGIRWM@ci.banning.ca.us](mailto:SGIRWM@ci.banning.ca.us). For stakeholders without internet access, a hard copy form may be obtained by contacting the IRWM Program Manager at the City of Banning.

If the Region issues a specific call for projects, there will be specific project submittal dates and requirements posted on the program website. This information will also be distributed to the stakeholder email list and announced at SAC meetings.

As project information changes or is further developed on an already submitted project, project sponsors can submit an updated Project Nomination Form for the same project.

### Required Project Information

Projects submitted to the IRWM Plan may be in different stages of development. For a project to be added to the IRWM Plan, sufficient technical development and vetting of the project needs to be completed by the project sponsor to indicate basic feasibility and value of the project.



**Information Required for Conceptual and Plan Projects**

- *Project type:* Indicate whether the project is a Conceptual Project or IRWM Plan Project.
- *General Project Information:* Basic information about the project, including name of the project sponsor, project title, project type (planning or implementation), project location, and list of potential partners if applicable.
- *Project Benefits:* Indicate which IRWM Plan Objectives would be supported by the project. All projects must support at least one IRWM Plan Objective.
- *Project Strategies:* Indicate which IRWM Plan strategies would be implemented as a result of the project. All projects must align with one or more Resource Management Strategies selected for use in the IRWM Plan.
- *Additional Project Benefits:* Indicate whether the project supports other specific IRWM tenets. Projects are not required to support any of the tenets to be included, but they are used for project prioritization. These include:
  - *Partnerships* – Establish partnerships through sharing data, funds, resources and infrastructure.
  - *Regionality* – Implements watershed-wide or regional-scale projects.
  - *Integration* – Meets objectives within multiple regional goals.
  - *Targeted Benefits* - Benefits DAC, Native American Tribal Communities and Environmental Justice Concerns.
  - *Sustainability* – Reductions to GHG emission compared to alternatives, adapts to climate change, or reduce Regional reliance on Sacramento/San Joaquin Delta.

**Additional Information Required for IRWM Plan Projects**

- *Project Cost and Funding:* Provide estimated project cost, a list of potential sources of funding for the project, and describe the basis for the project cost.
- *Project Feasibility:* Provide the status of the project, including the names of supporting documents, quantification of project benefits, and describe whether an economic feasibility analysis has been conducted.

### 5.2.3 Review Process

Project review is performed by the Project Review Subcommittee of the SAC to provide recommendations to the RWMG on which projects should be included in the IRWM Plan and their prioritization. The PRS is composed of volunteers from the SAC and approved by the RWMG. PRS responsibilities include reviewing projects to determine if the information submitted is sufficient to include the project into the next IRWM Plan update or if it qualifies as a conceptual project. The PRS reviews all Project Nomination Forms to determine if the information provided is complete and reasonable but does not verify or fact check the responses provided by project sponsors. Once the PRS has concluded their review, it will provide recommendations to the RWMG which is responsible for voting on the final project determination. Members of the PRS can conduct the review process independently but must meet to obtain consensus on project recommendations to the RWMG.

The frequency at which the PRS reviews and provides recommendations on projects will be flexible relative to the number of project nomination forms submitted and any time sensitivities expressed by project sponsors. The RWMG determines the necessity and schedule for PRS reviews and meetings.

**Appendix F** has the IRWM Plan Project list as of February 2018. The most recent version of the list can be found on the San Geronio IRWM Program website at [www.sgirwm.com](http://www.sgirwm.com).

### 5.2.4 Prioritizing the Projects

DWR specifies that IRWM Regions should develop a process to prioritize submitted projects relative to the Region's stated objectives. The RWMG developed a project review structure based on a simple and straight-forward point system that is to be implemented by the PRS.

Based upon the review of the Project Nomination Forms, the PRS scores projects based upon the objective scoring criteria and weightings presented in **Table 5-1**. Scores are grouped into three categories: Group A (5-6 points), Group B (3-4 points), and Group C (1-2 points). Projects in Group A are considered to have a higher priority within the IRWM Plan. Plan prioritization is based heavily upon the potential for individual projects to best reflect the ideals of integration and regionalism promoted through the IRWM Program; however, it is not necessarily reflective of which projects should be prioritized for actual funding programs or implementation.

The PRS provides the RWMG with a recommended listing of new projects for inclusion in the IRWM Plan as well as a modified complete list of projects that includes the new recommended projects prioritized relative to all existing projects. The RWMG makes the final determination for the project prioritization and inclusion in the IRWM Plan. Once the projects have been approved for inclusion in the IRWM Plan, the Program Manager will make the list of projects available on the program website.

Table 5-1: Project Prioritization Criteria and Scoring

<b>Project Prioritization Criteria and Scoring (one point each)</b>	
<b>Criterion 1:</b> Meets objectives in at least two regional goals <u>and/or</u> implements at least two RMS	<i>The RWMG would like to see projects that align with and meet as many goals and RMS as possible to maximize potential benefit for the Region.</i>
<b>Criterion 2:</b> Forms partnership between multiple agencies <u>and/or</u> organizations	<i>Projects are encouraged to work and collaborate with other entities within the Region, as well as potential partners outside of the Region to fully utilize resources, data, knowledge, and experience.</i>
<b>Criterion 3:</b> Benefits DAC or Tribe	<i>Projects that benefit DACs or Native American Tribes are extremely important for Regional economic growth and stability.</i>
<b>Criterion 4:</b> Has at least one quantified benefit	<i>Projects should have documentation supporting the quantification of at least one benefit, but more are preferable to maximize and diversify the benefits gained by each project.</i>
<b>Criterion 5:</b> Has a completed cost/benefit analysis	<i>The RWMG must ensure projects will not only provide a net benefit, but also that funding and financing of the project have been evaluated by the project sponsor.</i>
<b>Criterion 6:</b> Adapts to climate change and/or reduces GHG emissions	<i>Based on IRWM Guidelines, reductions in GHGs and other climate change drivers are of high importance. Not only do these measures benefit the Region locally, they have a broader global impact.</i>

### 5.3 Implementation Grant Project Process

It is important to emphasize that the requirements for projects to be included as part of the IRWM Plan should be assumed to be different than the requirements or standards for inclusion in an IRWM implementation grant application. Inclusion in an approved IRWM Plan is, however, a requirement to be eligible to receive implementation funding from the IRWM Program.

If the San Geronio Region chooses to pursue a IRWM implementation grant, the RWMG will develop a specific process for submittal, review and selection of implementation grant projects relative to the unique requirements and scoring criteria of that funding opportunity. Any projects that are submitted through this specialized grant-related call for projects will also need to meet the basic IRWM plan requirements and be accepted by the RWMG into the existing IRWM Plan prior to inclusion in a San Geronio Region IRWM grant application.

## 6. Implementation

This chapter provides a roadmap for implementation of the IRWM Plan. The success of the IRWM Plan will depend on the Region's ability to anticipate challenges, monitor performance, and effectively respond to changing conditions through effective governance, outreach, and adaptive management. The SG IRWM Plan has developed an implementation framework that includes the following five components:

1. *Impacts and Benefits of Plan Implementation:* The Region identifies and communicates the potential impacts and benefits of IRWM Plan implementation, both within the IRWM Region and outside of the Region.
2. *Performance and Monitoring:* The Region monitors progress toward meeting planning goals and objectives and individual project performance.
3. *Outreach and Governance:* The Region maintains consistent governance and continued outreach to encourage further integrated and regional collaboration.
4. *Data Management:* The Region uses standardized processes of data collection, storage, and dissemination to promote information sharing and dissemination among project sponsors, stakeholders, the public, and the State of California.
5. *Funding and Financing:* The Region has identified potential sources of funding to support the continued implementation of the IRWM Plan.

### 6.1 Impacts and Benefits of Plan Implementation

The San Geronio IRWM Region has identified potential impacts and benefits from implementing the IRWM Plan. These include impacts and benefits within and outside the Region. It is also recognized that there will also be additional project-specific impacts associated with project implementation.

#### Planning Level Impacts and Benefits

The primary benefit from the preparation of the IRWM Plan has been the creation of a framework and implementation pathway for collaborative regional planning. This includes increased understanding of regional needs and opportunities, information sharing among stakeholders, opportunities for collaboration on project concepts, solving of regional conflicts, and accessing funding sources. There have been no substantive impacts identified as a result of completing this IRWM Plan, except the increased responsibility from the RWMG for funding, implementing, and managing the IRWM Plan.

**Table 6-1** below lists potential regional and inter-regional impacts and benefits associated with implementation projects in the IRWM Plan. The table is organized by categories of goals and objectives, as identified in **Table 3-1** from **Chapter 3**.

Table 6-1: Potential Benefits and Impacts of Plan Implementation

San Geronio Region			Inter-Regional	
IRWM Goals	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
<p><b>Water Supply</b></p> <p><b>Goal #1:</b> Increase regional supply availability and reliability</p> <p><b>Goal #2:</b> Improve resilience of regional water distribution systems</p> <p><b>Goal #3:</b> Develop useable tools to understand hydrologic processes and regional management</p>	<ul style="list-style-type: none"> <li>• Short term construction and site-specific impacts such as ground, biological, and soil disturbances, as well as temporary aesthetic, air quality, noise, and transportation</li> <li>• Reduced effluent discharge available for instream flows</li> <li>• Increased water supply costs</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased potable demand</li> <li>• Increased water supply and enhanced supply reliability</li> <li>• Reduced dependence on imported water</li> <li>• Potential to better understand and manage groundwater resources and prevent over-draft</li> <li>• Reduced vulnerability from climate-change related reductions in overall water supply</li> <li>• Benefits extend to broad Region, including any disadvantaged communities and Native American Tribes</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased instream flow to downstream users</li> </ul>	<ul style="list-style-type: none"> <li>• Increased available water supplies through decreased consumption within the Region</li> <li>• Increased availability of Bay-Delta water supplies</li> <li>• Improved management of shared groundwater resources</li> </ul>
<p><b>Water Quality</b></p> <p><b>Goal #4:</b> Decrease impacts to groundwater quality</p> <p><b>Goal #5:</b> Increase resilience to changing water quality requirements</p>	<ul style="list-style-type: none"> <li>• Increased short-term construction and site-specific impacts</li> <li>• Increased water treatment and supply costs</li> </ul>	<ul style="list-style-type: none"> <li>• Higher quality water for customers throughout the Region</li> <li>• Improved health and safety for residents, including a high percentage of DACs</li> <li>• Improved water quality that is more resilient to changes in quality standards</li> <li>• Improved habitat quality for water dependent species</li> <li>• Protection against accidental contamination</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>

109/189

		San Geronimo Region		Inter-Regional	
IRWM Goals	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits	
<p><b>Flood Management</b></p> <p><b>Goal #6:</b> Enhance regional flood control infrastructure</p>	<ul style="list-style-type: none"> <li>Increased short-term construction and site-specific impacts</li> <li>Changes in sediment loads and distribution</li> </ul>	<ul style="list-style-type: none"> <li>Reduced risk to property and life</li> <li>Reduced flood insurance costs</li> <li>Increased water supply, water quality, and habitat</li> <li>Advancement of integrated flood management engineering and application for use by other entities</li> </ul>	<ul style="list-style-type: none"> <li>Altered sediment loads to downstream regions</li> </ul>	<ul style="list-style-type: none"> <li>Advancement of integrated flood management engineering and application for use by other entities</li> </ul>	
<p><b>Habitat and Open Space</b></p> <p><b>Goal #7:</b> Protect aquatic and riparian habitat</p>	<ul style="list-style-type: none"> <li>Increased short-term construction and site-specific impacts</li> <li>Limiting urban land use for development</li> </ul>	<ul style="list-style-type: none"> <li>Reduced invasive species, and increased native and endangered species</li> <li>Improved passive recreation, education, water quality, water supply and flood control</li> <li>Improved ability to increase or maintain habitat corridors</li> </ul>	<ul style="list-style-type: none"> <li>None Identified</li> </ul>	<ul style="list-style-type: none"> <li>Improved ability to increase or maintain habitat corridors</li> </ul>	
<p><b>Disadvantaged Communities</b></p> <p><b>Goal #8:</b> Support DACs and maintain the affordability of water</p> <p><b>Goal #9:</b> Support the economic vitality of DACs</p>	<ul style="list-style-type: none"> <li>Short-term increases to water costs</li> <li>Potential local construction disturbances</li> </ul>	<ul style="list-style-type: none"> <li>Decreased water cost over time</li> <li>Higher quality water supply</li> <li>More resilient water supply</li> <li>Increased health benefits from new infrastructure and higher quality supply</li> </ul>	<ul style="list-style-type: none"> <li>None Identified</li> </ul>	<ul style="list-style-type: none"> <li>Increased regional economic growth will attract more intra-regional travel and tourism to the Region and its neighbors</li> </ul>	
<p><b>Climate Change</b></p> <p><b>Goal #10:</b> Adaptation to Climate Change</p>	<ul style="list-style-type: none"> <li>Increased short-term costs for implementing programs</li> </ul>	<ul style="list-style-type: none"> <li>Improved air quality through decreased GHG and other emissions</li> <li>Decreased energy consumption</li> </ul>	<ul style="list-style-type: none"> <li>None Identified</li> </ul>	<ul style="list-style-type: none"> <li>Improved air quality through decreased GHG and other emissions</li> </ul>	

### Project Level Impacts and Benefits

IRWM project impacts and benefits have been identified as part of the process for inclusion in the Plan. Since the IRWM project list is dynamic, the collective impacts and benefits are expected to change over time and so are not articulated within this chapter. An assessment of impacts and benefits for current IRWM projects can be found on the San Geronio IRWM website. The articulation of project-specific impacts and benefits will increase as projects are closer to implementation.

## 6.2 Performance and Monitoring

Performance monitoring is necessary for documenting the success of the IRWM Plan implementation. The Region assesses Plan performance in two areas:

1. *Plan Performance:* The RWMG tracks the Region's overall progress toward meeting the IRWM Plan's stated goals and objectives.
2. *Project Specific Performance:* The Region reviews the project monitoring plans for each project that is implemented through the IRWM Program to assess how projects are performing relative to expected goals, benefits and impacts.

### 6.2.1 Plan Performance

The RWMG is responsible for evaluating IRWM Plan Performance. The RWMG provides annual Plan performance updates that include a discussion on the funding and/or implementation of projects as well as the status of meeting IRWM Plan objectives and other planning requirements as identified in the IRWM Plan. An evaluation of new climate change information and tools that may help the Region with future planning efforts is included as well for discussion and consideration. Findings are presented to the SAC, and all information is provided on the program website at [www.sgirwm.org](http://www.sgirwm.org).

The Region's progress in meeting the goals and objectives of the IRWM Plan are measured using the performance measures described in **Chapter 3**. Each performance measure listed includes the potential source of the data or information necessary to determine how projects are advancing in terms of meeting IRWM objectives.

Focusing on IRWM Plan performance not only ensures that the Region is working toward achieving its goals, but it helps identify any gaps that stakeholders feel need to be addressed. The SAC participates in annual discussions to identify any parts of the IRWM Plan that should be updated to reflect regional conditions and needs and to incorporate new information. These lessons learned are incorporated in future updates of the IRWM Plan.

### 6.2.2 Project Performance

Pursuant to DWR guidelines, projects funded through IRWM-related grants are required to include a project specific monitoring plan so performance can be readily assessed. The project sponsors have the responsibility for development of projects' specific monitoring plans and are responsible for monitoring activities to determine if the project achieves its intended benefits. Required contents of monitoring plans include:

- Description of what is being monitored for each project (in a table format)
- Measures to remedy or react to problems encountered during monitoring
- Location of monitoring
- Monitoring frequency
- Monitoring protocols/methodologies, including who is responsible for monitoring
- Procedures to keep track of what is monitored
- Procedures to ensure monitoring schedule is maintained and adequate resources (including funding) are available

Project specific monitoring plans are prepared prior to the start of project construction or implementation, and the RWMG uses these monitoring plans to evaluate performance as projects are implemented. The RWMG is also responsible for ensuring implementation project data are available to the RWMG, stakeholders, and other interested parties.

## 6.3 Outreach and Governance

The governance and outreach process to be used for Plan implementation is described in *Chapter I: Regional Planning, Governance, Outreach and Coordination*. The RWMG reviews these procedures annually relative to any input received from the SAC or public and makes updates as needed.

## 6.4 Data Management

The IRWM Plan has been prepared through a collaborative process that has generated and will continue to generate data and information to support its implementation. The Region provides stakeholders and members of the public access to the Plan and information developed through IRWM planning and project implementation. These data can be a valuable resource to stakeholders, regional entities, and the State. The Region's stakeholders can utilize data developed through the IRWM Plan process to better manage water supply reliability, water quality monitoring, invasive species removal, aquatic/riparian habitat management, species of concern, recreation and open space, land use development, climate change impacts, and project progress.

The San Geronio IRWM Program website serves as the Region's primary data management system. The data management system will be provided at [www.sgirwm.org](http://www.sgirwm.org) in addition to the public meeting dates, agendas, and meeting summaries. This section provides an overview of data collection techniques, data dissemination, coordination with state databases, and data needs. The SG IRWM Program Manager is responsible for maintaining the operation efficiency and organization of the DMS, and project sponsors are responsible for submitting project specific information.

### 6.4.1 Data Collection

The data and information used to evaluate IRWM Plan performance is collected from existing databases and monitoring efforts with established procedures, including:

- Urban Water Management Plans



- Annual Watermaster Reports
- Groundwater Management Plans
- Basin Studies
- General Plan land use
- MSHCP implementation data

Project specific data is provided by the project sponsor through project specific monitoring plans. The Region assumes that the agencies and organizations performing these monitoring efforts have validation procedures in place to ensure accuracy of the data.

### 6.4.2 Data Dissemination

Data dissemination occurs through several mechanisms including SAC meetings, website postings, email notices, and agency contacts. The CEQA and NEPA processes for implementation projects also provide opportunities for public input, review, and data dissemination.

Stakeholder workshops and SAC meetings are a primary means for data dissemination where partner agencies and organizations provide handouts, deliver presentations, and hold question and answer periods regarding implemented projects and programs. This not only ensures that data are made readily and easily available but also helps other project sponsors potentially use or align their own data collection practices for more efficient collaboration. The IRWM Plan and project performance reports are posted on the program website for the public to access. The performance reports include a description of recent activities on the IRWM Plan, project status updates, and performance statistics on meeting objectives.

### 6.4.3 Compatibility with Statewide Databases

The Region's agencies coordinate with the state to maximize opportunities to share data and meet statewide data needs. To the extent possible, data collected under the IRWM Plan are in a format compatible with statewide data programs, including the programs described in **Table 6-2**. To accomplish this, project sponsors work with the coordinating state agency to obtain the appropriate data formats for submission to these programs. In addition, the RWMG standardizes data gathered through IRWM planning efforts to integrate with applicable state data programs.

Additional data beyond that resulting from IRWM-funded project monitoring programs can also be added to the Region's data management system; however, the format and content of those data may or may not meet state standards since it was not necessarily funded through a state program. The Region has indicated that if stakeholders wish to share data within the Region, the IRWM Program data management system can be used for that purpose.

Table 6-2: State Databases

Program	Coordinating Agency	Description
California Environmental Data Exchange Network	SWRCB	Database to find and share information such as water quality, aquatic habitat, and wildlife health for California's water bodies, including streams, lakes, rivers, and the coastal ocean.
Water Data Library	DWR	Records data from various monitoring stations and types such as groundwater levels, water quality stations, surface water stage and flow sites, precipitation, climate observations, well logs, and other information.
California Statewide Groundwater Elevation Monitoring Program	DWR	Groundwater monitoring program to monitor and report groundwater elevations in all or part of a groundwater basin, as required by enacted legislation.
Surface Water Ambient Monitoring Program	SWRCB	Statewide monitoring effort designed to assess the conditions of surface waters using state, regional, and local agencies as well as the public and other NGOs.
Groundwater Ambient Monitoring and Assessment Program	SWRCB	Statewide basin assessment program designed to monitor groundwater for chemicals at low detection limits to improve statewide ambient groundwater quality monitoring and the availability of groundwater information and data.
California Environmental Information Clearinghouse	California Natural Resources Agency	Formerly known as the CA Spatial Information Library, this online directory facilitates the coordinated and sustainable development, maintenance, licensing and sharing of geospatial data and web map services by California government agencies, partners and stakeholders.

#### 6.4.4 Data Needs

One of the functions of IRWM Plan Projects is to collect valuable and regionally relevant data for use between local agencies and stakeholders. The Region identified data needs early on in the IRWM Plan and Region formation process which guided the technical studies included in the Appendixes of this document. Other needs identified by the RWMG include water supply and water quality data to produce more robust and scientifically supported water management decisions. The Region would also benefit from an expansion of the groundwater model to include more of the Region's groundwater storage units and basins. Lastly, additional data on existing and needed infrastructure within the Region would help streamline and identify efficient expansion and repairs of the system.

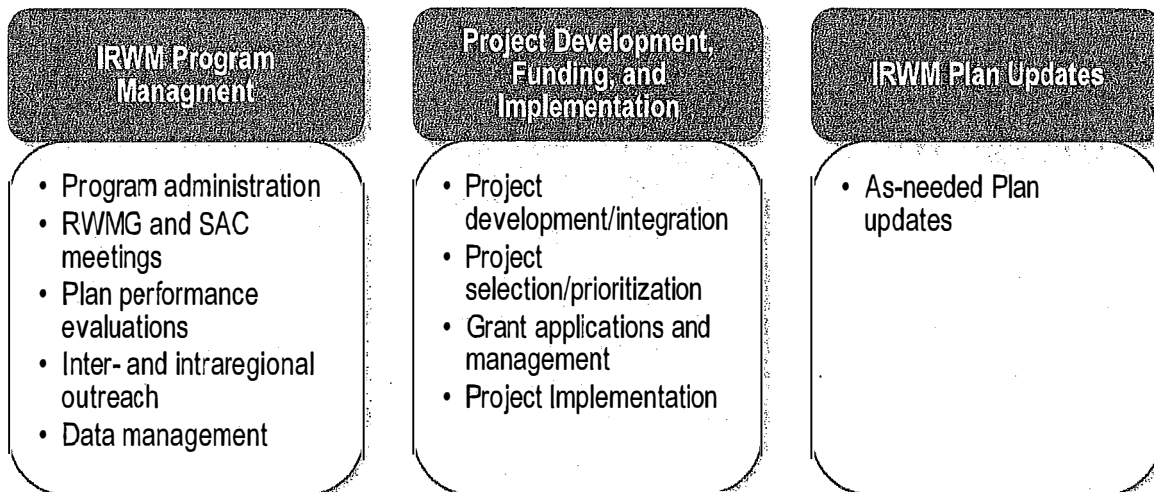
## 6.5 Funding and Financing

The purpose of this section is to provide adequate information on the potential costs and sources of funding to support the ongoing implementation of the IRWM Plan over time.

The first IRWM planning effort for the San Geronio IRWM Region was funded by a Proposition 1 Planning Grant issued by DWR. Of the estimated population of 30,255 within the San Geronio IRWM Region, 90% qualify as a DAC in accordance with State Guidelines. As a result, no other sources of local funding were required outside of in-kind contributions from the RWMG and the volunteers who participate in the SAC.

Following completion and adoption of the IRWM Plan, RWMG will need to secure ongoing revenues to support the cost of implementation. Projected costs of IRWM Plan implementation are primarily associated with three categories, listed in **Figure 6-1**.

**Figure 6-1: IRWM Components that Require Funding and Financing**



### 6.5.1 Funding and Financing Options

The Region plans to continue to secure funding and financing to implement the IRWM Plan and ongoing program management activities. Local funding may be limited because the majority of the Region is classified as a DAC.

#### Local Financing

Local financing and in-kind services are the foundation of a successful IRWM Program. The Region’s program management activities such as administration, meetings, performance monitoring, outreach, and some data management are in-kind services performed by members of the RWMG. Project development and integration can also be contributed as in-kind services

RWMG agencies and local project sponsors are also expected to provide funding for project implementation and O&M costs. Potential funding sources and methods include local funding such as rates, operating funds, water enterprise funds, taxes, assessments, and fees. It is also expected or required in some instances for sponsors who receive grant funds to provide local cost share.

Given that local revenue sources are not expected to be sufficient to fully fund all aspects of the IRWM Program’s financing needs, the Region plans to fund its IRWM Program activities using a combination of local, state and federal funds.

Additional Financing Opportunities

The Region will continue to evaluate and apply for state funding opportunities, including future water related propositions and funding opportunities for IRWM project implementation. Other state and federal funding opportunities will also be evaluated. **Table 6-3** includes a list of potential state and federal grants that could supply additional funding for Plan project planning and implementation. This list is not exhaustive but represents a sample of the type of opportunities that the Region could pursue at this time.

**Table 6-3: State and Federal Grants**

Sources	Description
<b>Grants Currently Awarded to the Region</b>	
IRWM Grant Program – Planning Grants – State Program	Intended for IRWM Planning activities. The IRWM Region's IRWM Plan must comply with current Guidelines and Plan Standards.
<b>Future IRWM Grants the Region Could Pursue</b>	
IRWM Grant Program – Implementation Grants – State Program	Intended for water resources projects. The projects must be included in a compliant IRWM Plan to be eligible.
IRWM Grant Program – DAC Involvement – State Program	These applications are submitted by Funding Area (not IRWM Region) and require IRWM Regions to collaborate and disperse funds among the Regions to support DAC planning and project activities.
<b>Other Funding Sources the Region Could Pursue</b>	
SWRCB Groundwater Sustainability – State Program	A grant program for projects that prevent or clean up contamination of groundwater that serves or has served as a source of drinking water.
DWR CalConserve Water Use Efficiency Revolving Fund – State Program	Meant for local agencies, two types of urban water use efficiency projects and programs are eligible; 1) Pilot projects for local agencies to provide water efficiency upgrades to customers at no upfront costs, and 2) Local agencies to provide low-interest loans to customers to finance the installation of onsite improvements to repair or replace water pipes to conserve water. All applications are on a rolling basis, first-come, first-serve.
SWRCB Site Cleanup Subaccount Projects – State Program	Intended for projects that remediate the harm or threat of harm to human health, safety, or the environment caused by surface or groundwater contamination. This is for human-made contamination only and will not fund projects related to naturally occurring contamination.
Water Recycling Funding Program – State Program	A grant designated for planning and construction of water recycling projects by public agencies.

Sources	Description
Clean Water State Revolving Fund Loan Program – State Program	Offers low interest loans for construction of publicly-owned facilities including wastewater treatment, local sewers, sewer interceptors, water reclamation facilities, and stormwater treatment.
Drinking Water State Revolving Fund– State Program	Offers low-interest loans for planning/design and construction of drinking water infrastructure projects including: treatment systems, distribution systems, interconnections, consolidations, pipeline extensions, water sources, water meters, and water storage.
Water Infrastructure Finance and Innovation Act– Federal Program	Similar to State Revolving Fund Programs, however there are project cost requirements and the interest rate is higher.
Title XVI Water Recycling and Reclamation Program and WIIN Subset of Title XVI – Federal Program	Administered by the U.S. Bureau of Reclamation and provides grants for construction of water recycling treatment conveyance facilities, including planning, design, and construction costs.
USDA Rural Development Water and Environmental Program– Federal Program	Offers rural communities (populations ≤ 10,000) to develop, construct, or improve water and wastewater infrastructure.
HUD Community Development Block Grants– Federal Program	Funds local community development activities that expand economic opportunities, principally for low and moderate-income areas. The program can fund drinking water and wastewater projects.
Department of Commerce Economic Development Administration (EDA) – Federal Program	Supports development in economically distressed areas of the U.S. through strategic investments that foster job creation and attract private investment. EDA's Public Works Program helps communities in economic decline upgrade their physical infrastructure, including drinking water and wastewater facilities.

### 6.5.2 Financing Plan

Table 6-4 shows the Region’s funding and financing plan to complete the IRWM Program management, project development and implementation, and IRWM Plan update activities. Cost sharing and financing plans have largely been outlined in the MOU, signed in September of 2016 (Appendix D). Responsibilities for ongoing program management and Plan updates will be shared among the RWMG. The RWMG will determine the cost-sharing arrangement to complete grant applications on a case-by-case basis and will consider the potential recipients of the funds.

**Table 6-4: Financing Plan**

Activity	Approximate Cost or Time Commitment	Funding Source	Certainty/Longevity of Funding
<b>IRWM Program Management</b>			
RWMG Meetings, SAC Meetings, Plan Performance, Outreach, Data Management, Program Administration	\$50,000 – 100,000 /yr	<u>In-Kind:</u> Program Manager/ RWMG Agencies/ SAC  <u>Funds:</u> RWMG Agencies	On-going agency staff allocations and RWMG members' operating budgets

Activity	Approximate Cost or Time Commitment	Funding Source	Certainty/Longevity of Funding
<b>Project Funding and Implementation</b>			
Grant Applications, Grant Management	Cost varies by type of grant application	<u>In-Kind:</u> Program Manager/ Project Sponsors  <u>Funds:</u> RWMG Agencies	Contingent on funding available and the number of projects, as well as grant program success
Project Implementation	Cost varies by type and size of project	<u>In-Kind:</u> Program Manager/Project Sponsors  <u>Funds:</u> Project Sponsor, State Grants, Federal Grants	Agency and staff allocations. Contingent on available funding and grant program success
<b>Plan Updates</b>			
As Needed Plan Updates	Cost is expected to depend on the scale of the plan update	<u>In-Kind:</u> Project Manager/RWMG Agencies  <u>Funds:</u> RWMG Agencies, State Grants	Agency and staff allocations. Contingent on available funding and grant program success



## 7. References

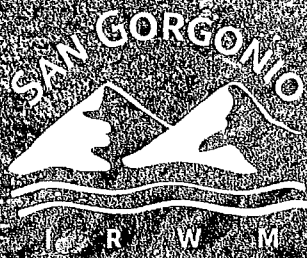
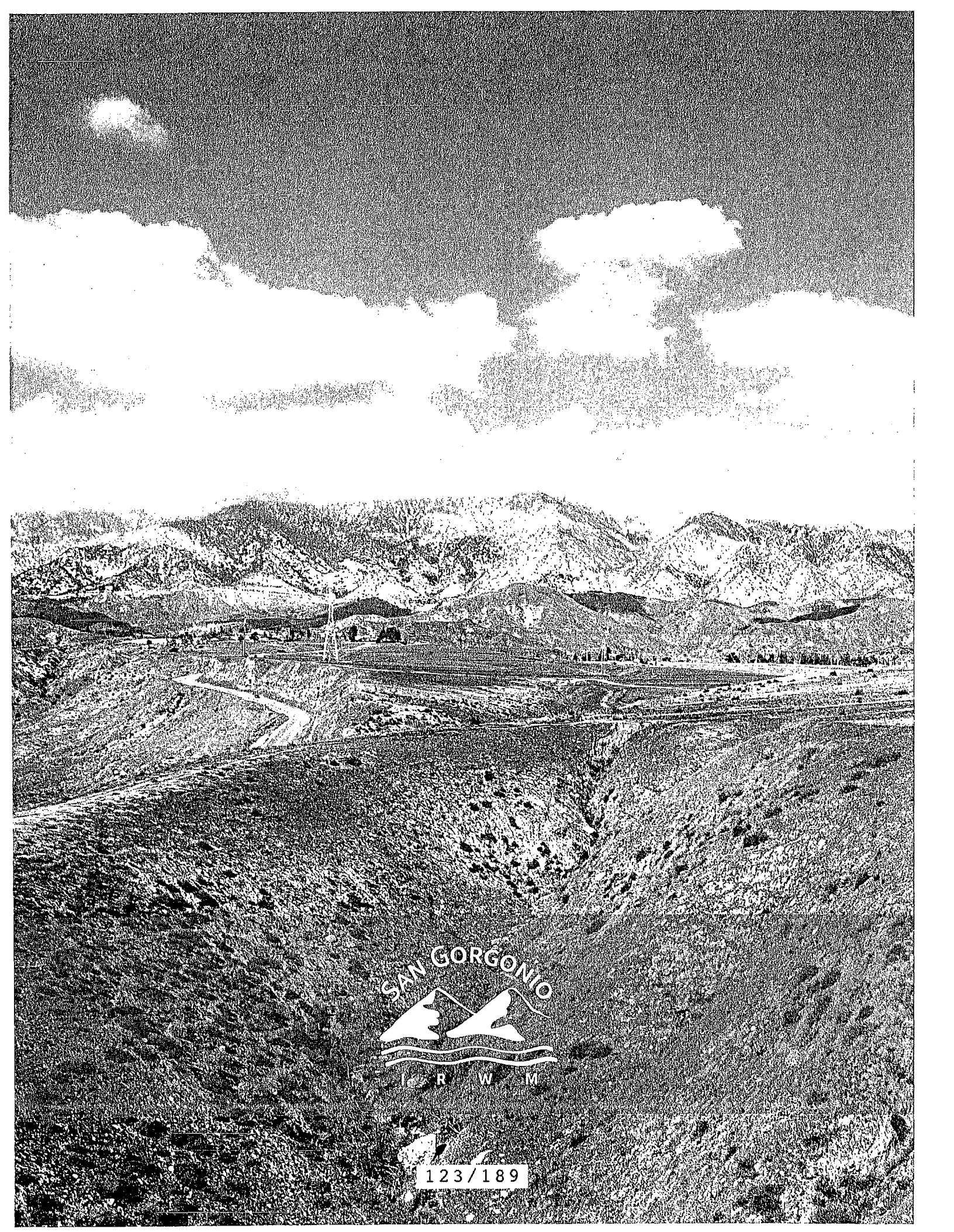
- Banning Heights Mutual Water Co. *2016 Consumer Confidence Report*. March 28, 2017. <http://www.bhmwco.com/wp-content/uploads/2013/01/Annual-Water-Quality-Report-2016.pdf>
- Cal-Adapt, Accessed October 2017. <http://cal-adapt.org/>
- California Department of Water Resources, Bay-Delta. *State Water Project Final Delivery Capability Report 2015*. <http://baydeltaoffice.water.ca.gov/swpreliability/>
- California Irrigation Management Information System (CIMIS). <http://www.cimis.water.ca.gov/>
- Hemet Station (Station 239). Period of Data 01/2015 08/2017.
- CalWild. *Whitewater River*. Accessed 6/14/2017. <https://www.calwild.org/whitewater/>
- Colorado River Basin Regional Water Quality Control Board (CRBRWQCB), *Water Quality Control Plan, Colorado River Basin- Region 7*. June 2006. [http://www.waterboards.ca.gov/coloradoriver/publications\\_forms/publications/docs/basin\\_plan\\_2006.pdf](http://www.waterboards.ca.gov/coloradoriver/publications_forms/publications/docs/basin_plan_2006.pdf)
- Maximum Perennial Yield Estimates for the Banning and Cabazon Storage Units, and Available Water Supply from the Beaumont Basin*. Prepared for Banning, 2011.
- San Gorgonio Pass Water Agency 2015 Urban Water Management Plan
- SCAG – GIS and Data Services. 2012AdoptedGrowthForecast.xls. Accessed 7/11/2017. <http://gisdata.scag.ca.gov/Pages/SocioEconomicLibrary.aspx?keyword=Forecasting>
- State of California Natural Resources Agency, Department of Water Resources. *The State Water Project Final Delivery Capability Report 2015*. Published July 2015.
- United States Bureau of Reclamation and Santa Ana Watershed Project Authority, *Santa Ana Watershed Basin Study 2013*. <https://www.usbr.gov/lc/socal/basinstudies/OWOW.html>
- United States Census Bureau / American FactFinder. 2010 Census. U.S. Census Bureau, 2010. Web. 1 January, 2013. <http://factfinder2.census.gov>
- United States Census Bureau / American FactFinder. *2010-2014 Census*. U.S. Census Bureau, 2015. <http://factfinder2.census.gov>
- United States Geological Survey. *Geology, Ground-Water Hydrology, Geochemistry, and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside County, California, Scientific Investigations Report 2006-5026*. [https://pubs.usgs.gov/sir/2006/5026/pdf/sir\\_2006-5026.pdf](https://pubs.usgs.gov/sir/2006/5026/pdf/sir_2006-5026.pdf)
- United States Geological Survey. *San Gorgonio Pass: Geologic Setting of the Transverse Ranges Province – San Bernardino Mountains*. Accessed 7/31/2017. [https://geomaps.wr.usgs.gov/archive/socal/geology/transverse\\_ranges/san\\_gorgonio\\_pass.html](https://geomaps.wr.usgs.gov/archive/socal/geology/transverse_ranges/san_gorgonio_pass.html) Excludes losses to evapotranspiration.
- United States Geological Survey. *Estimating Natural Recharge in San Gorgonio Pass Watershed, California, 1913-2012*.



Western Regional Climate Center. Beaumont #2 Station (040609). Period of Data 08/01/1939 to 06/10/2016. <http://www.wrcc.dri.edu/>

Yule, Doug. *The enigmatic San Gorgonio Pass*. Geoscience World. Published February 6, 2009. Accessed 7/31/2017. <http://geology.geoscienceworld.org/content/37/2/191>.

This page intentionally left blank.



# The State Water Project Final Delivery Capability Report 2017

March 2018



State of California  
Natural Resources Agency  
Department of Water Resources

State of California  
**Edmund G. Brown Jr., Governor**  
Natural Resources Agency  
**John Laird, Secretary for Resources**  
Department of Water Resources  
**Karla Nemeth, Director**

Cindy Messer  
**Chief Deputy Director**

**Kasey Schimke**  
Asst. Director  
Legislative Affairs Office

**Erin Mellon**  
Asst. Director  
Public Affairs Office

**Spencer Kenner**  
Office of the Chief Counsel

**Eric Koch**  
Deputy Director  
Integrated Water  
Management

**Christy Jones**  
Deputy Director Security and  
Emergency  
Management Program

**Kathie Kishaba**  
Deputy Director  
Business Operations

**Jim Spence**  
Acting Deputy Director  
California Energy Resources  
Scheduling

**Joel Ledesma**  
Deputy Director  
State Water Project

**Taryn Ravazzini**  
Deputy Director  
Special Initiatives

Bay-Delta Office  
**Tara Smith, Acting Chief**  
Modeling Support Branch  
**Tara Smith, Chief**

**This report was prepared under the supervision of  
Erik Reyes, Chief, Central Valley Modeling Section**

**This report was prepared by  
Sina Darabzand, Senior Engineer, WR, Central Valley Modeling Section  
Nazrul Islam, Senior Engineer, WR, Central Valley Modeling Section**

**Individuals contributing to the development of the report**  
**Ali Abrishamchi, Engineer, WR, Central Valley Modeling Section**  
**Raymond Hoang, Engineer, WR, Central Valley Modeling**  
**Christopher Quan, Engineer, WR, Central Valley Modeling**  
**Gardner Jones, Program Manager II, Executive Program Office**  
**Timothy Smith, Program Manager II, Executive Program Office**  
**Kristina Reese, Senior Environmental Scientist (Supervisory), Division of  
Environmental Services**  
**Emmanuel Asinas, Research Program Manager III, Division of Statewide Integrated  
Water Management**  
**Salma Kibrya, Research Program Specialist II, Division of Statewide Integrated Water  
Management**  
**Gholam Shakoori, Senior Environmental Scientist (SPEC), Division of Statewide  
Integrated Water Management**  
**Sean Bagheban Rezvan, Supervising Engineer, WR, Division of Flood Management**  
**Michelle Morrow, Assistant Chief Council, Office of the Chief Counsel**  
**Linda Ackley, Attorney IV, Office of the Chief Counsel**  
**Robin McGinnis, Attorney, Office of the Chief Counsel**

## List of Acronyms

ANN (Artificial Neural Network)  
BDCP (Bay Delta Conservation Plan)  
BiOps (Biological Opinions)  
CEQA (California Environmental Quality Act)  
CESA (California Endangered Species Act)  
CDFW (California Department of Fish and Wildlife)  
CVP (Central Valley Project)  
CY (Calendar Year)  
D-1641 (State Water Board's Water Right Decision 1641 (D-1641), issued in December 1999 and updated in March 2000)  
DKIP (Delta Knowledge Improvement Program)  
DLIS (Delta Levees Investment Strategy)  
DO (Dissolved oxygen)  
DRMS (Delta Risk Management Strategy)  
DSM2 (Delta Simulation Model 2)  
E/I (Delta Exports to Inflow ratio)  
EcoRestore (Governor Brown's Delta habitat restoration plan)  
EIR (Environmental Impact Report)  
EIS (Environmental Impact Statement)  
ESA (Endangered Species Act)  
FCWCD (Flood Control and Water Conservation District)  
HCP (Habitat Conservation Plan)  
ID (Irrigation District)  
KCWA (Kern County Water Agency)  
M&I (Municipal and Industrial)  
MWDSC (Metropolitan Water District of Southern California)  
NCCP (Natural Community Conservation Plan)  
NEPA (National Environmental Policy Act)  
NMFS (National Marine Fisheries Service)  
NOD (Notice of Determination)  
OAL (The State Office of Administrative Law)  
ROD (Record of Decision)  
RPA (Reasonable and Prudent Alternative)  
SED (Substitute Environmental Document)  
SWC (State Water Contractors)  
SWP (State Water Project)  
SWPAO (State Water Project Analysis Office)  
SWRCB (State Water Resources Control Board)  
USBR (United States Bureau of Reclamation)  
USFWS (United States Fish and Wildlife Service)  
UWMP (Urban Water Management Plan)  
WaterFix (The water transfer component of the Bay Delta Conservation Plan)  
WD (Water District)  
WSD (Water Storage District)  
WSI-DI (Water Supply Index vs. Demand Index Relationship)  
WQCP (Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta)  
WY (Water Year)  
X2 (The distance in kilometers from Golden Gate, where salinity concentration in the Delta is 2 parts per thousand)

This page intentionally left blank.

# Table of Contents

List of Tables .....	vi
List of Figures.....	vii
Summary .....	1
Section 1: Reasons to Assess SWP Water Delivery Capability .....	3
Population Growth, Land Use, and Water Supply .....	3
Legislation on Ensuring a Reliable Water Supply.....	3
Urban Water Management Planning Act.....	3
Water Conservation Act .....	4
Section 2: Regulatory Restrictions on SWP Delta Exports.....	5
Biological Opinions on Effects of Coordinated SWP and CVP Operations.....	5
Delta Inflows.....	7
Water Quality Objectives.....	8
Section 3: Ongoing Environmental and Policy Planning Efforts.....	10
Delta Plan.....	10
Bay Delta Conservation Plan (BDCP)/California WaterFix.....	11
Biological Opinions for CA WaterFix.....	12
EcoRestore.....	12
Section 4: State Water Project Historical Delivery Capability (2007-2016) .....	14
Section 5: Existing SWP Water Delivery Capability (2017).....	18
Hydrologic Sequence.....	18
Water Year Type Definition.....	18
Existing Demand for Delta Water .....	19
SWP Table A Water Demands.....	19



SWP Article 21 Water Demands ..... 20

Estimates of SWP Table A Water Deliveries ..... 21

    Wet-Year Deliveries of SWP Table A Water ..... 23

    Dry-Year Deliveries of SWP Table A Water ..... 24

Estimates of SWP Article 21 Water Deliveries ..... 26

    Wet-Year Deliveries of SWP Article 21 Water ..... 27

    Dry-Year Deliveries of SWP Article 21 Water ..... 28

Section 6: Historical SWP Delivery Tables for 2007-2016 ..... 29

# List of Tables

Table 4-1. Maximum Annual SWP Table A Water Delivery Amounts for SWP Contractors .....15

Table 5-1. Water year types used in the Sacramento River Index ..... 19

Table 5-2. Comparison of Estimated Average, Maximum, and Minimum Demands for SWP  
Table A Water, Excluding Butte County and Yuba City (Existing Conditions, in taf/year)  
.....20

Table 5-3. Comparison of Estimated Average, Maximum, and Minimum Deliveries of SWP  
Table A Water, Excluding Butte County and Yuba City (Existing Conditions, in taf/year)  
..... 21

Table 5-4. Estimated Average and Wet-Period Deliveries of SWP Table A Water, Excluding  
Butte County and Yuba City (Existing Conditions, in taf/year), and Percent of Maximum SWP  
Table A Amount, 4,133 taf/year..... 24

Table 5-5. Estimated Average and Dry-Period Deliveries of SWP Table A Water, Excluding  
Butte County and Yuba City (Existing Conditions, in taf/year), and Percent of Maximum SWP  
Table A Amount, 4,133 taf/year..... 25

Table 5-6. Estimated Average and Wet-Period Deliveries of SWP Article 21 Water (Existing  
Conditions, in taf/year) ..... 27

Table 5-7. Estimated Average and Dry-Period Deliveries of SWP Article 21 Water (Existing  
Conditions, in taf/year) ..... 28

Table 6–1. Historical State Water Project Deliveries, Calendar Year 2007..... 30

Table 6–2. Historical State Water Project Deliveries, Calendar Year 2008..... 31

Table 6–3. Historical State Water Project Deliveries, Calendar Year 2009..... 32

Table 6–4. Historical State Water Project Deliveries, Calendar Year 2010 ..... 33

Table 6–5. Historical State Water Project Deliveries, Calendar Year 2011 ..... 34

Table 6–6. Historical State Water Project Deliveries, Calendar Year 2012..... 35

Table 6–7. Historical State Water Project Deliveries, Calendar Year 2013..... 36

Table 6–8. Historical State Water Project Deliveries, Calendar Year 2014..... 37

Table 6–9. Historical State Water Project Deliveries, Calendar Year 2015..... 38

Table 6–10. Historical State Water Project Deliveries, Calendar Year 2016..... 39

## List of Figures

Figure 4-1. Historical Deliveries of SWP Table A Water, 2007–2016 .....	16
Figure 4-2. Total Historical SWP Deliveries, 2007–2016 (by Delivery Type) .....	17
Figure 5-1. SWP Article 21 Demands during Non–Kern Wet Years and Kern Wet Years (Existing Conditions) .....	22
Figure 5-2. Estimated Likelihood of SWP Table A Water Deliveries, by Increments of 500 taf (Excluding Butte County and Yuba City) .....	23
Figure 5-3. Estimated Wet-Period SWP Table A Water Deliveries (Excluding Butte County and Yuba City) .....	24
Figure 5-4. Estimated Dry-Period SWP Table A Water Deliveries (Excluding Butte County and Yuba City) .....	25
Figure 5-5. Estimated Range of Monthly Deliveries of SWP Article 21 Water (Existing Conditions) .....	26
Figure 5-6. Estimated Likelihood of Annual Deliveries of SWP Article 21 Water (Existing Conditions) .....	27

This page intentionally left blank.

# Summary

This report is intended for public information about the key factors affecting the operation of the State Water Project (SWP) system in California, its long-term reliability as a source of water for beneficial use, and an estimate of its current delivery capability.

Water provided by the SWP is a major component of the water supplies available to many SWP Contractors. State Water Contractors (SWC) consists of 29 legal entities that include cities, counties, urban water agencies, and agricultural irrigation districts. SWC's local/regional water users have long term contracts with the California Department of Water Resources (DWR) for all, or a portion of their water supply needs. Thus, the reliability of water from the SWP system is an important component in the water supply planning of its recipients, and ultimately affects the amount of water available for beneficial use in California.

The availability of these water supplies may be highly variable. A sequence of relatively wet water years<sup>1</sup> may be followed by a varying sequence of dry or critically dry years. Having good and reliable estimates on how much water each water user under contract with DWR will receive in a given year—whether it be a wet water year, a critical year, or somewhere in between—gives Contractors a better sense of the degree to which they may need to implement increased conservation measures, or plan for new additional, or back up sources of water to meet their needs.

The geography of California, and infrastructure of water transfer from the source areas, located in the Sierra Mountain Range, to areas of demand for water makes the Sacramento-San Joaquin Delta, a key feature of the SWP's ability to deliver water to its agricultural and urban Contractors in the North Bay, the South Bay, California Central Valley, and Southern California. All but five of the 29 SWP Contractors receive water deliveries by diversions from the Delta. These water diversions are pumped by either the Harvey O. Banks or Barker Slough pumping plants.

DWR, and the United States Bureau of Reclamation (USBR), the managing entities of the two statewide systems of water transfer in California, face numerous challenges in the operation of their diversion facilities in the Delta, and are regulated by several state and federal agencies to maintain, and enhance the Delta's long-term sustainability.

Maintaining suitable quality of water flowing in the channels of the Delta for the numerous in-basin beneficial uses, and the protection of endangered and threatened fish species, are important factors of concern for the operators of the Delta export diversion facilities. Ongoing regulatory restrictions, such as those aimed at protecting the estuary's resident and migratory fish species are major challenges to a reliable, and at the same time, sustainable water delivery capability of both, SWP and the CVP systems.

Complications induced by climate change also pose the threat of increased variability in floods and droughts, and the projected sea level rise, caused by the increase in

---

<sup>1</sup> Water years start on October 1 and end on September 30 of the next year. It is the time period where precipitation totals are measured

average temperature, complicate efforts to manage salinity levels in the channels below tide level. This could result in more frequent water quality degradation in the Delta channels.

Among the other challenges are continued subsidence of Delta islands, many of which are already below sea level, maintained by relatively unstable levee system, and the related threat of a catastrophic levee failure as water pressure increases on fragile levees.

The analyses in this report, factor in all of the current regulations governing SWP and CVP operations in the Delta and upstream, and assumptions about water uses upstream in the Sacramento River and San Joaquin River watersheds.

Analyses were conducted that considered the amounts of water that SWP Contractors use, and the amounts of water they choose to hold for use in a subsequent year.

Many of the same specific assumptions on SWP operations described in the *State Water Project Delivery Capability Report 2015* remain the same in this update for 2017. Most notably, the effects on the timing and the amount of SWP and CVP Delta diversions, by operating the system to meet the constraints spelled out in the 2008 and 2009 federal biological opinions (BiOps). Hence, the differences between the 2015 and 2017 reports can be attributed primarily to inputs on operating assumptions that result in a realistic simulation study, with the least amount of foresight on the historical hydrology (October 1921-September 2003) used in the simulation.

SWP Delta exports have decreased since 2005, although the bulk of the change occurred by 2009 as the federal BiOps went into effect, restricting operations of the CVP and SWP diversion pumps. The most salient findings in this report are as follows:

- Under existing conditions, the average annual delivery of Table A water estimated for this 2017 Report is 2,571 taf/year, 21 taf more than the 2,550 taf/year estimated for the 2015 Report.
- The likelihood of existing-condition SWP Article 21 deliveries (supplemental deliveries to Table A water) being greater than 20 taf/year has decreased by 2% relative to the likelihood presented in the 2015 Report.

# Section 1

## Reasons to Assess SWP Water Delivery Capability

Two major factors underscore the importance of assessing the SWP's water delivery capability: the effects of population growth on California's balance of water supply and demand, and State legislations intended to help maintain a reliable water supply.

### Population Growth, Land Use, and Water Supply

California's population has grown rapidly in recent years, with resulting changes in land use. This growth is expected to continue. From 1990 to 2005, California's population increased from about 29.8 million to about 36 million. Based on this trend, California's population has been projected to be more than 40.8 million by 2020. The "current trends" scenario depicted in the *California Water Plan 2013* for year-2050 conditions, based on the California Department of Finance's projections of 2010 U.S. Census data, assumes a population of nearly 51 million—a 75% increase in the 1990 population.

The amount of water available in California can vary greatly from year to year. Some areas may receive 2 inches of rain a year, while others are deluged with 100 inches or more. As land uses have changed, population centers have emerged in many locations without sufficient local water supplies. Thus, Californians have always been faced with the problem of how best to conserve, control, and move water from areas of abundant water to areas of water need and use.

### Legislation on Ensuring a Reliable Water Supply

The laws described below impose specific requirements on both urban and agricultural water suppliers. These laws increase the importance of SWP water delivery capability estimates to local and regional water purveyors.

#### Urban Water Management Planning Act

The Urban Water Management Planning Act was enacted in 1983 (California Water Code, Sections 10610–10656). As amended, this law requires all public urban water purveyors to adopt urban water management plans (UWMPs) every 5 years and submit those plans to DWR. DWR reviews submitted plans to report to the legislature on the status of submitted plans and for the purposes of grant eligibility requirements.

UWMPs must include an estimate of water supply and demand for a 20-year planning horizon and three water-year types, normal, single dry year and multi dry years. SWP Contractors use SWP delivery capability to estimate their long-term water supply needs from other sources available to them.

DWR publishes a guidebook to assist water suppliers prepare their urban water management plans. Guidance documents are available at <http://www.water.ca.gov/urbanwatermanagement>.

The municipalities and water districts that have adopted 2010 UWMPs and submitted them to DWR are listed at [https://wuedata.water.ca.gov/uwmp\\_plans.asp](https://wuedata.water.ca.gov/uwmp_plans.asp).

## Water Conservation Act

The Water Conservation Act of 2009 (Senate Bill X7.7, Steinberg), enacted in November 2009, includes requirements for urban and agricultural suppliers. Water suppliers report on compliance with these requirements in either the urban or agricultural water management plans. DWR reviews plans for consistency with Water Conservation Act requirements.

This law sets goals for the State of California to reduce average statewide per capita urban water use by 10% by the end of 2015, and 20% by the end of 2020. Urban (M&I) water suppliers in their 2010 UWMPs, calculated baseline water-use and set targets for 2015 and 2020. Data submitted by participating local/regional suppliers on water use reduction target compliance, show a cumulative reduction in statewide M&I water production of more than 22% during the 22-month period of June 2015 through March 2017. DWR is required to report to the Legislature on progress toward meeting the State's goal of 20% reduction by 2020.

In addition, as part of the Water Conservation Act, agricultural water suppliers with 25,000 acres or more of irrigated land were required to prepare and adopt agricultural water management plans and submit the plans to DWR by the end of 2012 and then once every five years beginning in 2015. The Act also required suppliers to measure volumetrically water deliveries to farms and base the price of water sales at least in part on the volume of water delivered. Water suppliers were required to report on water measurement and water pricing in the water management plans.

In June 2015, DWR released a guidebook for developing agricultural water management plans:

<http://www.water.ca.gov/wateruseefficiency/sb7/docs/2015/Approved%20Final%202015%20AWMP%20Guidebook%20June%202015.pdf>

Water agencies filing agricultural water management plans are listed on a Web page maintained by DWR's Water Use and Efficiency Branch:

[http://www.water.ca.gov/wateruseefficiency/sb7/docs/2014/032315\\_2012\\_AWMPs\\_Received\\_12March2015.pdf](http://www.water.ca.gov/wateruseefficiency/sb7/docs/2014/032315_2012_AWMPs_Received_12March2015.pdf)



## Section 2

### Regulatory Restrictions on SWP Delta Exports

Multiple needs converge in the Delta: the need to protect a fragile ecosystem, to support Delta recreation and farming, and to provide water for agricultural and urban needs throughout much of California. Various regulatory requirements are placed on the SWP's Delta operations to protect special-status species such as delta smelt and spring- and winter-run Chinook salmon. As a result, as described below, restrictions on SWP operations imposed by State and federal fish and wildlife agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year.

#### **Biological Opinions on Effects of Coordinated SWP and CVP Operations**

Several fish species listed under the federal Endangered Species Act (ESA) as threatened or endangered are found in the Delta. These protected species' health and the viability of their populations are impacted by various factors, including SWP and CVP operations, nonnative species, predation, Delta salinity, water quality and contaminants, sediment supply, physical alterations to the Delta, land subsidence, pelagic organism decline, methylmercury and selenium, invasive aquatic vegetation, low dissolved oxygen (DO) levels and illegal harvest.

Because of the decline of these species, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have issued several Biological Opinions (BiOps) since the 1990s on the effects of coordinated SWP/CVP operations on several listed species. (USFWS Biological Opinion for Delta smelt protection and NMFS Biological Opinion for salmonids, green sturgeon, and Southern Resident killer whales.)

These BiOps affect the SWP's water delivery reliability for two reasons. Most notably, they include terms that restrict SWP exports in the Delta to specific amounts at certain times under certain conditions. In addition, the BiOps' requirements are predicated on physical and biological conditions that occur daily while DWR's water supply models are based on monthly data.

The first BiOp on the effects of SWP (and CVP) operations were issued in February 1993 (NMFS BiOp on effects of project operations on winter-run Chinook salmon) and March 1995 (USFWS BiOp on project effects on delta smelt and splittail). Among other things, the BiOps contained requirements for Delta inflow, Delta outflow, and export pumping restrictions in order to protect listed species. These requirements imposed substantial constraints on Delta water supply operations. Many were incorporated into the 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta*<sup>2</sup> (1995 WQCP), as described in the "Water Quality Objectives" section, below.

---

<sup>2</sup> The SWRCB is currently updating the WQCP

The terms of the USFWS and NMFS BiOps have become increasingly restrictive over the years. In 2004 the USBR sought a new BiOp from USFWS regarding the operation of the Central Valley Project (CVP) and the State Water Project (SWP) (collectively, Projects). USFWS issued the opinion in 2005, finding that the proposed coordinated operations of the Projects were not likely to jeopardize the continued existence of the delta smelt or result in the destruction or adverse modification of its critical habitat. After judicial review, the 2005 BiOp was vacated and USFWS was ordered to prepare a new one. USFWS found that the proposed operations of the Project would result in jeopardy to the delta smelt and in December 2008 issued a Jeopardy BiOp which included a Reasonable and Prudent Alternative (RPA) with more protective export restrictions and other actions intended to protect the delta smelt.

Similarly, in 2004 NMFS issued a BiOp on the effects of the coordinated operation of the Projects on salmonids, green sturgeon, and Southern Resident killer whales and found that the proposed operations of the Projects were not likely to jeopardize the continued existence of the listed species or result in the destruction or adverse modification of their critical habitat. After judicial review, the 2004 BiOp was also vacated and NMFS was ordered to prepare a new one. In June 2009, NMFS issued a Jeopardy BiOp covering effects on winter-run and spring-run Chinook salmon, steelhead, green sturgeon, and killer whales. Like the 2008 smelt BiOp, the salmon BiOp included an RPA with more protective export restrictions and other actions intended to protect listed species.

The USFWS BiOp includes requirements on operations in all but 2 months of the year. The BiOp calls for "adaptively managed" (adjusted as necessary based on the results of monitoring) flow restrictions in the Delta intended to protect delta smelt at various life stages. USFWS determines the required target flow with the reductions accomplished primarily by reducing SWP and CVP exports. Because this flow restriction is determined based on fish location and decisions by USFWS staff, predicting the flow restriction and corresponding effects on export pumping with any great certainty poses a challenge. The USFWS BiOp also includes an additional salinity requirement in the Delta for September and October in wet and above-normal water years, calling for increased releases from SWP and CVP reservoirs to reduce salinity. Among other provisions included in the NMFS BiOp, limits on total Delta exports have been established for the months of April and May. These limits are mandated for all but extremely wet years.

The 2008 and 2009 BiOps were issued shortly before and shortly after the Governor proclaimed a statewide water shortage state of emergency in February 2009, amid the threat of a third consecutive dry year. NMFS calculated that implementing its BiOp would reduce SWP and CVP Delta exports by a combined 5% to 7%, but DWR's initial estimates showed an impact on exports closer to 10% in average years, combined with the effects of pumping restrictions imposed by the BiOps to protect delta smelt and other species. The operational rules specified in the 2008 and 2009 BiOps continue to be legally required and are the rules used in the analyses presented in this report. It should be noted that in late 2016 USBR and DWR requested reinitiating consultation with NMFS and USFWS on the Coordinated Long-term Operations of the CVP and SWP due to new information and science on declining listed fish species populations. During this reinitiated consultation, the CVP and SWP will continue to operate pursuant to the existing USFWS (2008) and NMFS (2009) Biological Opinion requirements. The

consultation process formally began in 2017 with a kick-off meeting and regular meetings with DWR, regulatory agencies, and stakeholders. A project management plan was developed and scoping notices are anticipated in 2018.

In 2008-2009 and periodically through the drought and for changed circumstances in 2017, CDFW issued consistency determinations under Section 2080.1 of the California Fish and Game Code. The consistency determinations stated that the USFWS and the NMFS BiOps would be consistent with the California Endangered Species Act (CESA). Thus, CDFW allowed incidental take of species listed under both the federal ESA and CESA to occur during SWP and CVP operations without requiring DWR or the USBR to obtain a separate State-issued permit.<sup>3</sup>

These BiOps affect the SWP's water delivery capability by requiring constraints on the total SWP and CVP exports from the Delta. These constraints include terms that restrict total Delta exports to specific amounts at certain times under certain conditions. A complicating factor in the methodology used in this report, however, is that the BiOps' requirements are predicated on physical and biological conditions that occur daily in the Delta, while DWR's water supply models are based on monthly average data. This requires the application of the artificial neural network (ANN) methodology to long-term planning studies. The DWR ANN constructs a response function for the monthly average water supply regime that is most likely to minimize instances of violation of the conditions of the BiOps and other regulatory constraints for exports from the Delta. The DWR ANN is trained on the average daily results of several 16-year simulations by DWR's Delta Simulation Model 2 (DSM2) that simulates the hydrodynamic conditions in the Delta channels at a 15-minute time resolution.

## Delta Inflows

Delta inflows vary considerably from season to season, and from year to year. For example, in an above-normal year, nearly 85% of the total Delta inflow comes from the Sacramento River, more than 10% comes from the San Joaquin River, and the rest comes from the three eastside streams (the Mokelumne, Cosumnes, and Calaveras Rivers).

The type of water year is also an important factor affecting the volume of Delta inflows. When hydrology is analyzed, water years are designated by DWR as "wet" (W), "above normal" (AN), "below normal" (BN), "dry" (D), or "critical" (C). All other factors (such as upstream level of development) being equal, much less water will flow into the Delta during a dry or critical water year (that is, during a drought) than during a wet or above-normal water year. Fluctuations in inflows are a substantial overall concern for the Delta, and a specific concern for the SWP; such fluctuations affect Delta water quality and fish habitat, which in turn trigger regulatory requirements that constrain SWP Delta pumping.

---

<sup>3</sup> However, CDFW stated in an October 2017 response letter to DWR that according to the evidence, the USFWS memorandum (2017 Memorandum), authorizing a change to the required location of X2 in September and October of Wet Years, would not be consistent with the California Endangered Species Act (CESA) requirements

Delta inflows will also vary by time of year as the amount of precipitation varies by season. About 80% of annual precipitation occurs between November and March, and very little rain typically falls from June through September. Upstream reservoirs regulate this variability by reducing flood flows during the rainy season, and storing water to be released later in the year to meet regulatory requirements and water demands.

### Water Quality Objectives

Because the Delta is an estuary, salinity is a particular concern. In the 1995 WQCP, the State Water Board set water quality objectives to protect beneficial uses of water in the Delta and Suisun Bay. The objectives must be met by the SWP and federal CVP as specified in the water right permits issued to DWR and the USBR. Those objectives—minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels—are enforced through the provisions of the State Water Board's Water Right Decision 1641 (D-1641), issued in December 1999 and updated in March 2000, which implemented the 1995 WQCP.

DWR and the USBR must monitor the effects of diversions and SWP and CVP operations to ensure compliance with existing water quality standards.

Among the objectives established in the 1995 WQCP and D-1641 are the "X2" objectives. X2 is defined as the distance in kilometers from Golden Gate, where salinity concentration in the Delta is 2 parts per thousand. The location of X2 is used as a surrogate measure of Delta ecosystem health.

For the X2 objective to be achieved, the X2 position must remain downstream of Collinsville in the Delta for the entire 5-month period, and downstream of other specific locations in the Delta on a certain number of days each month from February through June. This means that Delta outflow, which among other factors controls the location of X2 must be at certain specified levels at certain times. This can limit the amount of water the SWP may pump at those times at its Harvey O. Banks Pumping Plant in the Delta.

Because of the relationship between seawater intrusion and interior Delta water quality, meeting the X2 objective can also improve water quality at Delta drinking water intakes; however, meeting the X2 objectives can require a relatively large volume of water for outflow during dry months that follow months with large storms.

The 1995 WQCP and D-1641 also established an export/inflow (E/I) ratio. The E/I ratio is designed to provide protection for the fish and wildlife beneficial uses in the Bay Delta estuary. The E/I ratio limits the fraction of Delta inflows that are exported. When other restrictions are not controlling, Delta exports are limited to 35% of total Delta inflow from February through June and 65% of inflow from July through January.

The State Water Board is updating the WQCP. Phase 1 of the WQCP update focuses on flows on the San Joaquin River and salinity objectives in the South Delta. Phase 2 focuses on new inflow requirements for the Sacramento River, its tributaries, and eastside tributaries to the Delta (the Mokelumne, Calaveras and Cosumnes rivers); new and modified Delta outflow requirements; new requirements for cold water habitat; new and modified interior Delta flow requirements; recommendations for

complementary ecosystem protection actions that others should take; and adaptive management, monitoring, evaluation, special study, and reporting provisions. A primary focus of the WQCP update is on additional flows for the beneficial use of fish and wildlife. Based on the environmental documentation that has been produced up to this date by the State Water Board, it is likely that the implementation of these flow requirements will affect SWP contractor deliveries. The State Water Board issued its Substitute Environmental Document (SED), which is the equivalent of CEQA analysis, on Phase 1 in 2016 and expects to issue its SED on Phase 2 in 2018. After these documents are finalized, the proposed changes will have to be adopted through an order of the State Water Board.

## Section 3

### Ongoing Environmental and Policy Planning Efforts

It is hard to overstate the Delta's importance to California's economy and natural heritage. The Delta supplies a large share of the water used in the state. California would not be the same without that water — hundreds of billions of dollars of economic activity depend upon it. Southern California, with half of the state's population, gets almost a quarter of its average water supply from the Delta; Kern County, which produces nearly \$3 billion annually in grapes, almonds, pistachios, milk, citrus, and carrots, depends on the Delta for about a fifth of its irrigation supply; the west side of the San Joaquin Valley also produces billions of dollars' worth of food and depends on the Delta for about three-quarters of its irrigation supply; and the San Francisco Bay Area, including the innovation hub of Silicon Valley, takes about half of its water supply from the Delta and its tributaries.

At the same time, the hundreds of miles of river channels that crisscross the Delta's farmed islands provide a migratory pathway for Chinook salmon, which support an important West Coast fishing industry. Other native fish species depend upon the complex mix of fresh and salt water in the Delta estuary. Multiple stressors have impaired the ecological functions of the Delta, and concerns have been growing over the ability to balance the many needs of both people and the ecosystem.

In order to respond to these concerns, considerable effort by government agencies and California water community as a whole has been spent during the past several decades to study ways that the problems in the Delta can be addressed, and the more recent attention to the effects of climate change has helped the water community to realize the urgency of addressing these problems. The essential part of all these efforts has been to find a comprehensive solution that brings various, sometimes competing, interests together in a coordinated and concerted set of actions. The Delta Plan and the Bay Delta Conservation Plan (BDCP)/California WaterFix are two large-scale planning efforts that are in development. Once implemented, both efforts, could affect SWP water delivery capability in different ways, and at different scales.

#### Delta Plan

After years of concern about the Delta amid rising water demand and habitat degradation, the Delta Stewardship Council was created in legislation to achieve State-mandated coequal goals for the Delta. As specified in Section 85054 of the California Water Code:

"Coequal goals" means the two goals of providing more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

The final Delta Plan was adopted by the Council on May 16, 2013. The Delta Plan contains a set of 14 regulatory policies as well as 73 recommendations, which are non-regulatory but identify actions essential to achieving the coequal goals. The State

Office of Administrative Law (OAL) approved the 14 regulations to implement the Delta Plan, which became effective with legally-enforceable regulations on September 1, 2013.

The Council is required to review the Delta Plan at least every five years. To be responsive to changing circumstances and in accordance with commitments made in the 2013 Plan, the Council amended the Delta Plan twice in 2016, and work on several other amendments are underway.

The Delta Plan as adopted in 2013 called for completion of the Bay Delta Conservation Plan (BDCP). Pursuant to the Delta Reform Act of 2009, the BDCP, if it met all other requirements of law, was to be automatically incorporated into the Delta Plan. The Delta Plan also provided that if the BDCP were not approved by Jan. 1, 2016, the Council would consider amending the Delta Plan to promote options for new conveyance and storage projects and how they could be operated.

To fulfill the Delta Plan's directives, the Council this year directed staff to develop a proposed amendment to the Delta Plan regarding Delta conveyance, water storage, and the operation of both.

### **Bay Delta Conservation Plan (BDCP)/California WaterFix**

In 2006, state and federal agencies started pursuing an ambitious and comprehensive conservation plan under Section 10 of the Endangered Species Act (ESA) and California's Natural Community Conservation Planning Act. The approach included new water conveyance facilities and sought to improve reliability of water delivery and contribute to the recovery of listed species under a single regulatory package. A draft Bay Delta Conservation Plan (BDCP) and draft EIR/EIS were released for a public comment period that began in December 2013 and closed in July 2014. While the draft EIR/EIS was out for public review several significant changes were announced by the Brown Administration and its federal partners.

Based on these project changes and in consideration of comments received on the draft EIR/EIS, state and federal agencies announced in April 2015 a change in their approach to seeking a permit for a project to improve, protect, and maintain ecosystem health, water quality, and water supplies so that the SWP and CVP are capable of reliably delivering water within a stable regulatory framework. Rather than pursue the project as a Habitat Conservation Plan (HCP), under Section 10 of the ESA, and a Natural Community Conservation Plan (NCCP), under the state's Natural Community Conservation Planning Act, the state and federal agencies chose to study additional alternatives to achieve the dual goals through implementation of new water conveyance facilities that would be built in compliance with Section 7 of the ESA and Section 2081(b) of the California ESA.

Based on this change in the permitting approach and other design modifications, DWR and the USBR released a joint Partially Recirculated Draft EIR/Supplemental Draft EIS on the Bay Delta Conservation Plan/California WaterFix for public review and comment from July 2015 through October 2015. The draft document included analysis of three new sub-alternatives as well as additional analysis and refinement of portions of the previous draft environmental document. The additional sub-alternatives do not include an HCP/NCCP, as was proposed as part of the alternatives analyzed in the

previously circulated documents. Instead, the alternative implementation strategy allows for other state and federal programs to address the long-term conservation efforts for species recovery in programs separate from the project.

The new sub-alternatives, including the new preferred alternative known as California WaterFix (sub-alternative 4A), focus on the conveyance facility improvements necessary for the SWP and CVP to address more immediate water supply reliability needs in conjunction with ecosystem improvements to significantly reduce reverse flows and fish species impacts associated with the existing south Delta intakes.

In December of 2016, DWR and the USBR publicly released a Final EIR/EIS. The Final EIR/EIS describes the alternatives, discusses potential environmental impacts, and identifies mitigation measures that would help avoid or minimize impacts. It also provides responses to all substantive comments received on the 2013 Draft Environmental Impact Report/Environmental Impact Statement and 2015 Partially Recirculated Draft Environmental Impact Report /Supplemental Draft Environmental Impact Statement. In July 2017, DWR released a Notice of Determination and certified the Final EIR under the California Environmental Quality Act. The USBR has not issued a ROD under the National Environmental Protection Act (NEPA) as of the date of this report.

### Biological Opinions for CA WaterFix

Moving forward with the alternative implementation strategy (described above), in January 2016, DWR and the USBR released a draft Biological Assessment, which included a species-by-species analysis and proposed mitigation to offset and avoid potential project impacts. In August 2016, DWR and the USBR submitted a revised Biological Assessment to USFWS and NMFS to initiate formal consultation and under Section 7 of the ESA and begin the process of obtaining incidental take authorization for federally-listed species. Remaining consistent with the change in approach, in October 2016, DWR submitted a 2081 (b) application to CDFW to address incidental take of state-listed species for California ESA compliance. The incidental take analysis included in the 2081(b) application analyzes potential project impacts and provides mitigation necessary to ensure project impacts are fully mitigated. In January 2017, NMFS, USFWS, and CDFW submitted draft CA WaterFix Biological Opinion and 2081(b) mitigation analyses to the Delta Science Program's Aquatic Science Peer Review Panel. During this time, DWR and USBR assisted and coordinated with NMFS, USFW, CDFW working towards the completion of the CA WaterFix Biological Opinions and 2081(b) document. In June 2017, NMFS and USFWS Service released their final Biological Opinions. In July 2017, CDFW issued the incidental take permit (20181(b) document).

### EcoRestore

In addition to the new Section 7 permitting approach, and preferred alternative California WaterFix, Governor Brown announced the creation of the California EcoRestore program in April 2015, committing to restore more than 30,000 acres of Delta habitat, which will be implemented on an accelerated timeline independent of the proposed water conveyance facilities. This comprehensive suite of habitat restoration actions under the California EcoRestore program includes specific targets for



floodplain, tidal and sub-tidal, managed wetlands, and fish passage improvements to benefit native fish species and a commitment to adaptive management. A subset of the program's targets includes breaking ground on efforts complying with the restoration required by the 2008 and 2009 Biological Opinions for Long Term Operations of the SWP and CVP.

## Section 4

### State Water Project Historical Deliveries (2007-2016)

Section 4 and Section 6 present the State Water Project Historical Deliveries from 2007-2016 (Calendar year). Section 4, this section, focuses on the annual minimum, maximum, and average total contractor combined deliveries during this 10 year (2007-2016) period. Section 6 of this report includes tables listing annual historical deliveries by various water classifications for each SWP Contractor for 2007–2016.

Contractor deliveries are presented as four different delivery types - Table A delivery, an Article 21 delivery, a carryover delivery, or a turnback delivery. These delivery types are briefly described below.

**“Table A” Water** is an exhibit to the SWP’s water supply contracts. The maximum Table A amount is the basis for apportioning water supply and costs to the SWP contractors. Once the total amount of water to be delivered is determined for the year, all available water is allocated in proportion to each contractor’s annual maximum SWP Table A amount.

**Article 21 Water** (it is described in Article 21 of the water contracts) is water that SWP contractors may receive on a short-term basis in addition to their Table A water, if they request it. Article 21 water is used by many SWP contractors to help meet demands when allocations are less than 100%. The availability and delivery of Article 21 water cannot interfere with normal SWP operations.

**Carryover Water** is SWP water that is allocated to an SWP contractor and approved for delivery to that contractor in a given year, but not used by the end of the year. This water is exported from the Delta by the Banks Pumping Plant, but instead of being delivered to the contractor, it is stored in the SWP’s share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

**Turnback Pool Water** SWP contractors may offer a portion of their Table A water that has been allocated in the current year and exceeds their needs to a “turnback pool,” where another contractor may purchase it. Contractors that sell their extra Table A water in a turnback pool receive payments from contractors that buy this water.

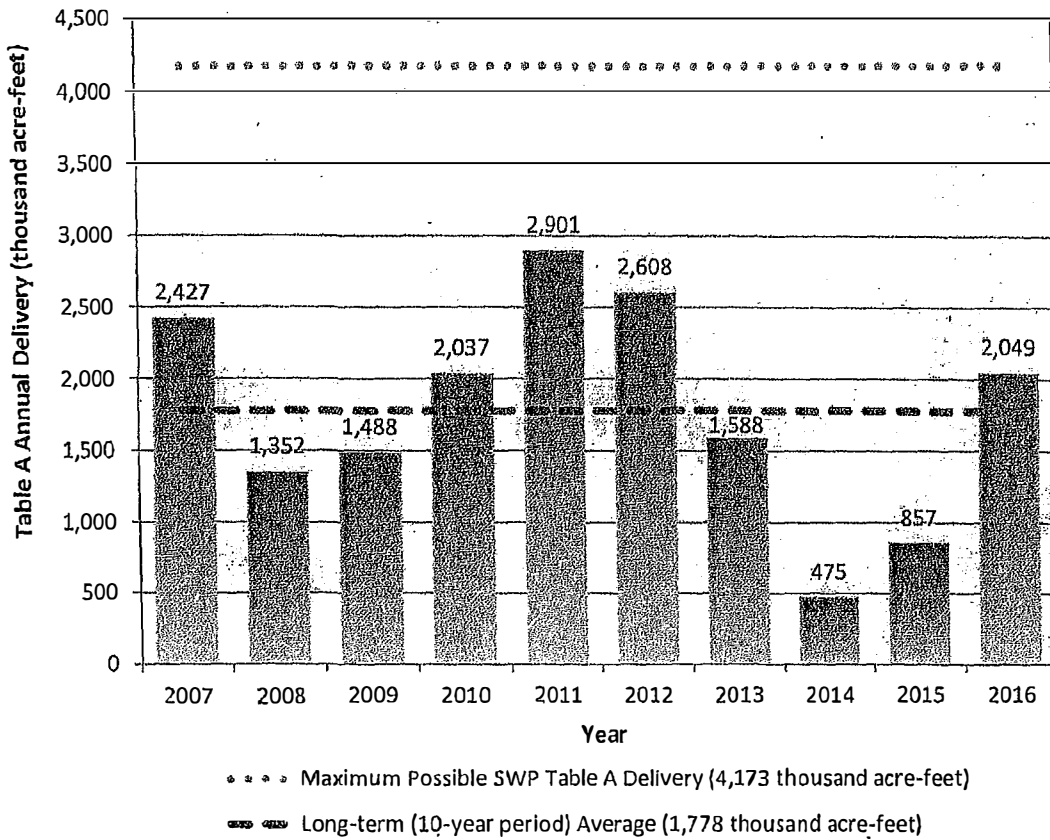
Table 4-1 lists the maximum annual SWP Table A water delivery amounts for SWP Contractors. Figure 4-1 shows that deliveries of SWP Table A water for 2007–2016 range from an annual minimum of 475 taf to a maximum of 2,901 taf, with an average of 1,778 taf. Historical deliveries of SWP Table A water over this 10-year period are less than the maximum of 4,173 taf/year.

Total historical SWP deliveries, including Table A, Article 21, turnback pool, and carryover water, range from 3,353 to 477 taf/year, with an average of 1,872 taf/year for the period of 2007–2016 (Figure 4-2).

**Table 4-1. Maximum Annual SWP Table A Water Delivery Amounts for SWP Contractors**

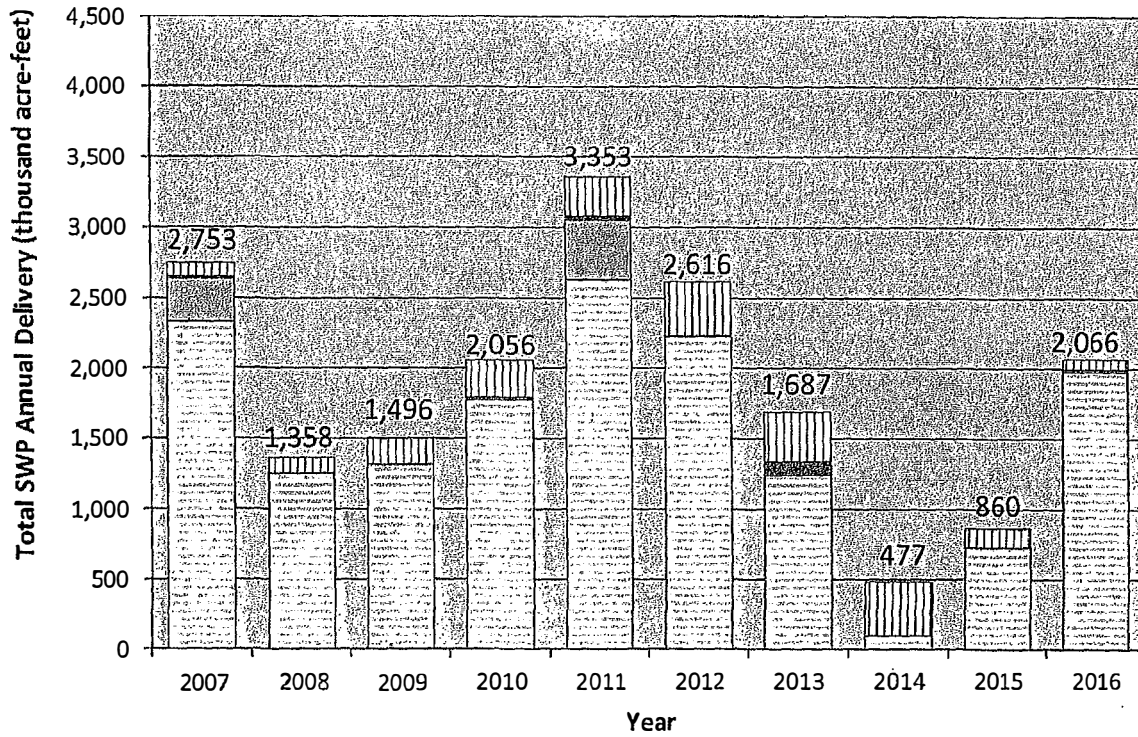
Contractor	Maximum Table A Delivery Amounts (acre-feet)
<b>Feather River Area Contractors</b>	
Butte County	27,500
Yuba City	9,600
Plumas County Flood Control and Water Conservation District	2,700
<b>Subtotal</b>	<b>39,800</b>
<b>North Bay Area Contractors</b>	
Napa County Flood Control and Water Conservation District	29,025
Solano County Water Agency	47,756
<b>Subtotal</b>	<b>76,781</b>
<b>South Bay Area Contractors</b>	
Alameda County Flood Control and Water Conservation District, Zone 7	80,619
Alameda County Water District	42,000
Santa Clara Valley Water District	100,000
<b>Subtotal</b>	<b>222,619</b>
<b>San Joaquin Valley Area Contractors</b>	
Dudley Ridge Water District	45,350
Empire West Side Irrigation District	3,000
Kern County Water Agency	982,730
Kings County	9,305
Oak Flat Water District	5,700
Tulare Lake Basin Water Storage District	87,471
<b>Subtotal</b>	<b>1,133,556</b>
<b>Central Coastal Area Contractors</b>	
San Luis Obispo County Flood Control and Water Conservation District	25,000
Santa Barbara County Flood Control and Water Conservation District	45,486
<b>Subtotal</b>	<b>70,486</b>
<b>Southern California Area Contractors</b>	
Antelope Valley-East Kern Water Agency	144,844
Castaic Lake Water Agency	95,200
Coachella Valley Water District	138,350
Crestline-Lake Arrowhead Water Agency	5,800
Desert Water Agency	55,750
Little Rock Creek Irrigation District	2,300
Metropolitan Water District of Southern California	1,911,500
Mojave Water Agency	85,800
Palmdale Water District	21,300
San Bernardino Valley Municipal Water District	102,600
San Gabriel Valley Municipal Water District	28,800
San Geronimo Pass Water Agency	17,300
Ventura County Watershed Protection District	20,000
<b>Subtotal</b>	<b>2,629,544</b>
<b>TOTAL TABLE A AMOUNTS</b>	<b>4,172,786</b>

Source: California State Water Project Bulletin 132.



Note: The differences in historical deliveries from those reported in the DCR 2015 are due to the State Water Project Analysis Office (SWPAO) reclassification of the various components of water delivered to the SWP Contractors.

Figure 4-1. Historical Deliveries of SWP Table A Water, 2007–2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
□ Carryover	95	106	179	264	268	381	351	383	132	72
■ Turnback	16	3	2	11	31	8	99	1	3	14
▣ Article 21	310	3	6	8	421	0	0	1	1	3
□ Table A	2332	1246	1308	1774	2633	2227	1238	92	725	1976

Note: The differences in historical deliveries from the State Water Project Delivery Capability Report 2015 are due to reclassification of the various components of water delivered to SWP Contractors

Figure 4-2. Total Historical SWP Deliveries, 2007–2016 (by Delivery Type)

## Section 5

### Existing SWP Water Delivery Capability (2017)

This Section presents estimates of the SWP's existing (2017) water delivery capability (Water Year). The estimates are presented below, alongside the results obtained from the 2015 Report. Like this 2017 Report, the 2015 Report incorporated the requirements of BiOps issued by USFWS and NMFS in December 2008 and June 2009, respectively, on the effects of coordinated operations of the SWP and CVP. These BiOps are discussed in detail in Section 2, "Regulatory Restrictions on SWP Delta Exports."

The discussions of SWP water delivery capability in this Section presents the results of DWR's updated modeling of the SWP's water delivery capability. A tabular summary of the modeling results is presented in the Technical Addendum of this report, which is available online at <http://baydeltaoffice.water.ca.gov/>. The Technical Addendum also contains annual delivery probability curves (i.e., exceedance plots) to graphically show the estimated percentage of years in which a given annual delivery is equaled or exceeded.

#### Hydrologic Sequence

SWP delivery amounts are estimated in this 2017 Report for existing conditions using computer modeling<sup>3</sup> that incorporates the historic range of hydrologic conditions (i.e., precipitation and runoff) that occurred from water years 1922 through 2003. The historic hydrologic conditions are adjusted to account for land-use changes (i.e., the current level of development) and upstream flow regulations that characterize 2017, and current sea levels reflecting sea level rise. By using this 82-year historical flow record, the delivery estimates modeled for existing conditions reflect a reasonable range of potential hydrologic conditions from wet years to critically dry years.

#### Water Year Type Definition

The Sacramento valley 40-30-30 index is used to define the water year type. The Sacramento valley index, previously referred to as the "4 River Index" or "4 Basin Index," is the sum of the unimpaired runoff of four rivers: the Sacramento River above Bend Bridge near Red Bluff, Feather River inflow to Lake Oroville Reservoir, Yuba River at Smartville, and American River inflow to Folsom Lake. The five water year types used in the Sacramento River Index are as follows:

---

<sup>3</sup> CalSim II was used to perform the modeling simulations.  
<http://baydeltaoffice.water.ca.gov/modeling/hydrology/WRIMS2/index.cfm>

Table 5-1. Water year types used in the Sacramento River Index	
Sacramento River Index	Water Year Type
1	Wet
2	Above Normal
3	Below Normal
4	Dry
5	Critical

### Existing Demand for Delta Water

Demand levels for the SWP water users in this report are derived from historical data and information from the SWP Contractors themselves. The amount of water that the SWP contractors request each year is related to:

- The magnitude (maximum contracted amount),
- The extent of water conservation measures, in place,
- Local weather patterns, and
- Water costs.

The existing level of development (i.e., the level of water use in the source areas from which the water supply originates) is based on recent land uses, and is assumed to be representative of existing conditions for the purposes of this 2017 Report.

### SWP Table A Water Demands

The current combined maximum Table A amount is 4,173 taf/year. See Table 4-1 in Section 4, "State Water Project Historical Delivery Capability (2007-2016)". Of the combined maximum Table A amount, 4,133 taf/year is the SWP's maximum Table A water available for delivery from the Delta.

The estimated demands by SWP Contractors for deliveries of Table A water from the Delta under existing conditions is assumed to be the maximum SWP Table A delivery amount for the 2017 Report (Table 5-2). Estimated demands for SWP Table A water is 1 taf/year higher than the 2015 Report since the maximum Table A demand amount for some SWP Contractors has changed in Table 4-1 according to the California State Water Project Bulletin 132. Due to the fact that SWP Contractors have been requesting the full amount in recent years, the 2015, and the 2017 Reports more accurately reflect the trend in demand.

**Table 5-2. Comparison of Estimated Average, Maximum, and Minimum Demands for SWP Table A Water, Excluding Butte County and Yuba City (Existing Conditions, in taf/year)**

	2015 Report	2017 Report
Average	4,132	4,133
Maximum	4,132	4,133
Minimum	4,132	4,133

### SWP Article 21 Water Demands

Under Article 21 of the SWP's long-term water supply contracts, Contractors may receive additional water deliveries only under the following specific conditions:

- Such deliveries do not interfere with SWP Table A allocations and SWP operations;
- Excess water is available in the Delta;
- Capacity is not being used for SWP purposes or scheduled SWP deliveries; and
- Contractors can use the SWP Article 21 water directly or can store it in their own system (i.e., the water cannot be stored in the SWP system).

The demand for SWP Article 21 water by SWP Contractors is assumed to vary depending on the month and weather conditions (i.e., amounts of precipitation and runoff). To illustrate how demand varies and for the purposes of this discussion of SWP Article 21 water demands, a Kern wet year is defined as a year when the annual Kern River flow is projected to be greater than 1,500 taf. There are nine Kern wet years in the simulation period of 1922 – 2003 (1941, 1952, 1969, 1978, 1980, 1983, 1986, 1995, and 1998). Kern River inflows are important because they are a major component of the local water supply for Kern County Water Agency (KCWA), which is the second largest SWP Contractor and possesses significant local groundwater recharge capability. During Kern wet years, KCWA uses more Kern River flows to recharge its groundwater storage and reduce its demand for Article 21 water.

As shown in Figure 5-1, existing demands for SWP Article 21 water estimated for this 2017 update of the DCR are assumed to be high during the spring and late fall in Kern non-wet years (214 taf/month) because most of the irrigation districts in this service area cannot rely as heavily on the Kern River flows to recharge their groundwater basins. Demand for Article 21 water is also high during the winter months of December through March in all year types (202 taf in Kern wet years and 414 taf in Kern non-wet years). Demands are assumed to be very low (2 taf/month) from April through November of Kern wet years (because high Kern River flows provide groundwater recharge water) and from July through October of Kern dry years.

These demand patterns for SWP Article 21 water are identical to what were used in the 2015 update of the DCR, for existing conditions.

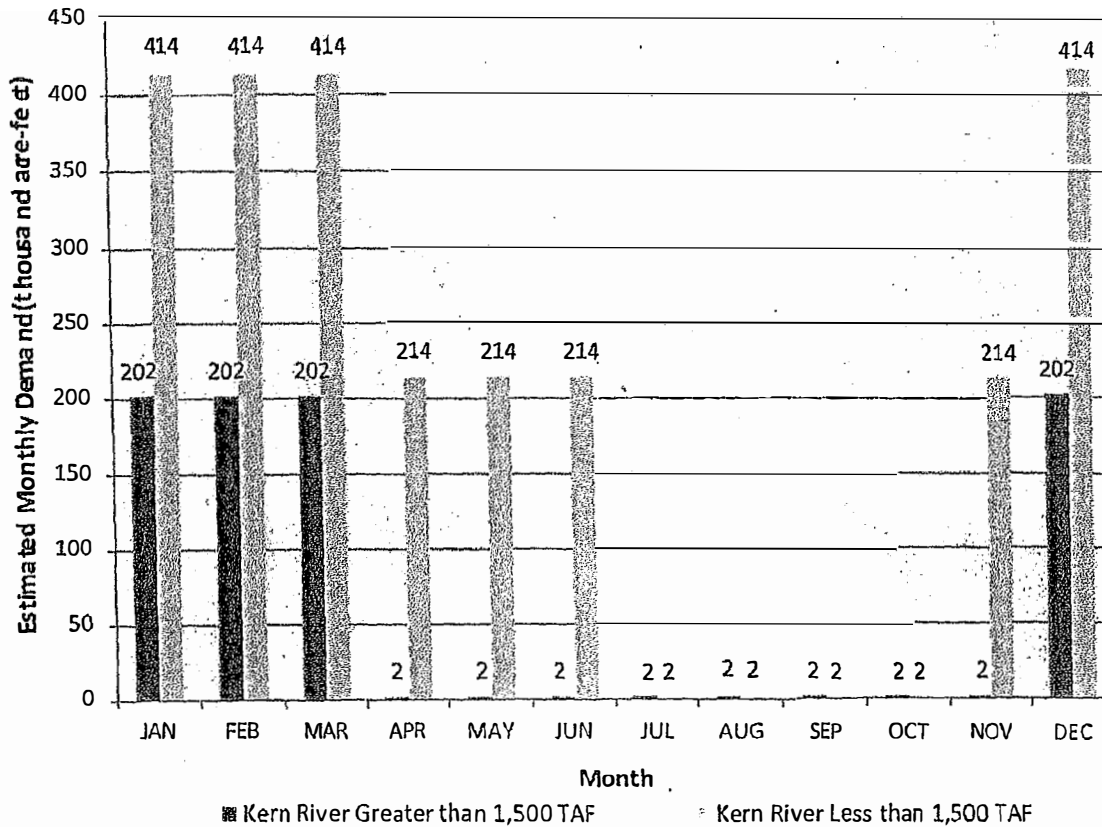


## Estimates of SWP Table A Water Deliveries

Table 5-3 presents the annual average, maximum, and minimum estimates of SWP Table A deliveries from the Delta for existing conditions, as calculated for the 2015 and 2017 Reports. The average Table A deliveries increased in the 2017 Report mostly due to 30 taf/year demand reduction for the Placer County water agency in the North of Delta. The demand reduction resulted in higher inflow into the Delta, therefore, more water became available for SWP Table A deliveries (Table 5-3).

	2015 Report	2017 Report
Average	2,550	2,571
Maximum	4,055	4,098
Minimum	454	336

Assumptions about Table A and Article 21 water demands, along with operations for carryover water, have been updated in the model based on discussions with State Water Contractors staff and DWR's Operations and Control Office.



Note: Values shown are the maximum amount that can be delivered monthly. However, the actual capability of SWP water Contractors to take this amount of SWP Article 21 water is not the sum of these maximum monthly values.

Figure 5-1. SWP Article 21 Demands during Non-Kern Wet Years and Kern Wet Years (Existing Conditions)

Figure 5-2 presents the estimated likelihood of delivery of a given amount of SWP Table A water under the existing conditions scenario, as estimated for both the 2015 and 2017 Reports. This figure shows a 77% likelihood (74% with the 2015 Report) that more than 2,000 taf/year of Table A water will be delivered under the current estimates. The distribution of the delivery ranges has also changed since the 2015 Report. Figure 5-2 shows a shift of Table A deliveries from 500-1,000 taf/year range to 2,000-3000 taf/year range in comparison to the 2015 Report due to the demand decrease in the North of Delta and Water Supply Index – Delivery Index<sup>4</sup> (WSI-DI) curve in the study.

<sup>4</sup> WSI-DI relates forecasted water supplies to deliverable “demand,” and then use deliverable “demand” to assign subsequent delivery levels to estimate the water available for delivery and carryover storage.

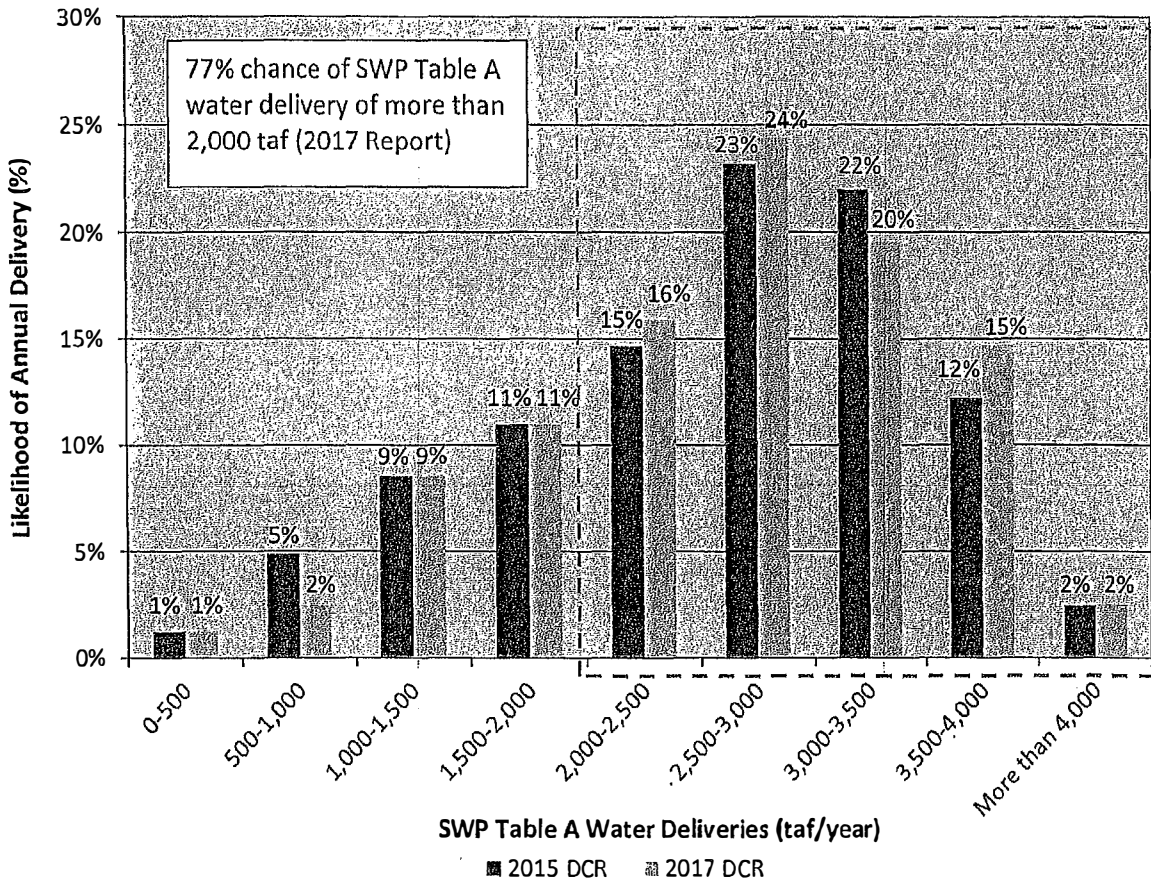


Figure 5-2. Estimated Likelihood of SWP Table A Water Deliveries, by Increments of 500 taf (Excluding Butte County and Yuba City)

### Wet-Year Deliveries of SWP Table A Water

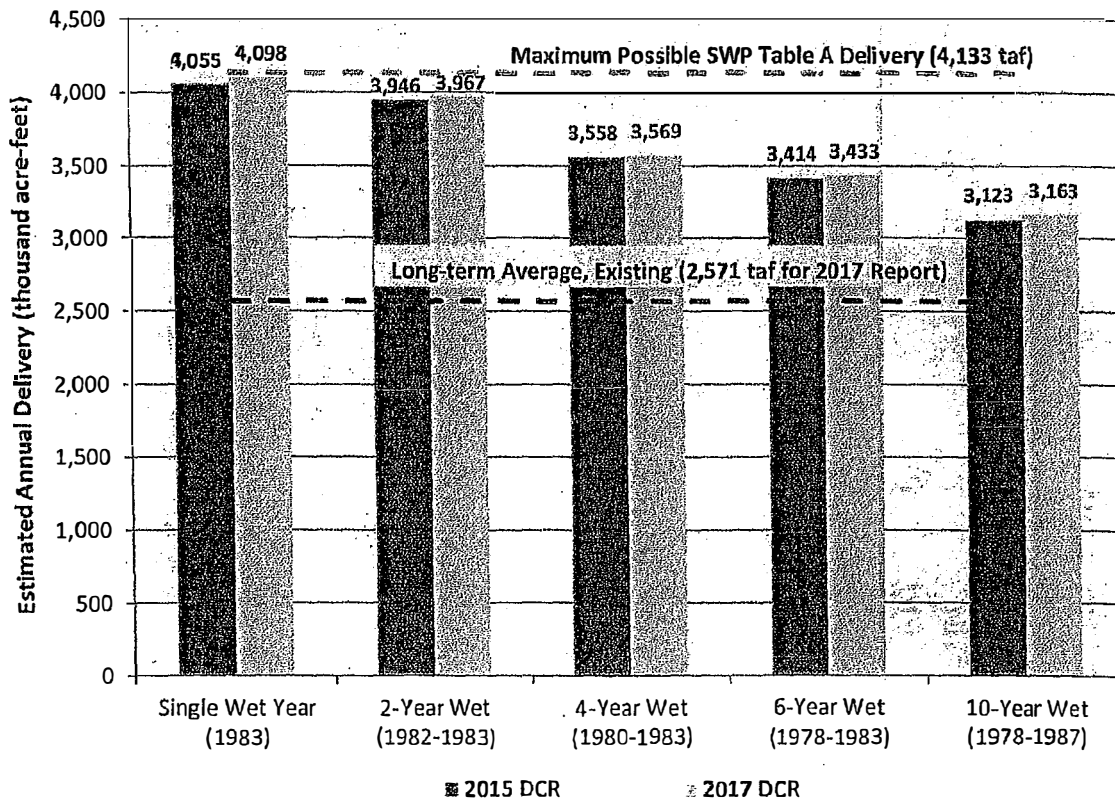
Table 5-4 and Figure 5-3 present estimates of SWP Table A water deliveries under existing conditions during possible wet conditions and compares them with corresponding delivery estimates calculated for the 2015 Report. Wet periods for 2017 are analyzed using historical precipitation and runoff patterns from 1922–2003 as a reference, while accounting for existing 2017 conditions (e.g., land use, water infrastructure). For reference, the wettest single year on the 1922-2003 record was 1983.

The results of modeling existing conditions over historical wet years indicate that SWP Table A water deliveries during wet periods can be estimated to range between yearly averages of 4,098 to 3,163 taf.

Table 5-4 shows that the 2017 deliveries of SWP Table A water stayed relatively the same in wet periods in comparison to the 2015 Report.

**Table 5-4. Estimated Average and Wet-Period Deliveries of SWP Table A Water, Excluding Butte County and Yuba City (Existing Conditions, in taf/year), and Percent of Maximum SWP Table A Amount, 4,133 taf/year**

	Long-term Average (1921-2003)		Single Wet Year (1983)		Wet Periods							
	2015 Report	2017 Report	2015 Report	2017 Report	2 Years (1982-1983)		4 Years (1980-1983)		6 Years (1978-1983)		10 Years (1978-1987)	
2015 Report	2,550	2,571	4,055	4,098	3,946	95%	3,558	86%	3,414	83%	3,123	76%
2017 Report	2,550	2,571	4,055	4,098	3,946	95%	3,558	86%	3,414	83%	3,123	76%



**Figure 5-3. Estimated Wet-Period SWP Table A Water Deliveries (Excluding Butte County and Yuba City)**

**Dry-Year Deliveries of SWP Table A Water**

Table 5-5 and Figure 5-4 display estimates of existing-conditions deliveries of SWP Table A water during possible drought conditions and compares them with the corresponding delivery estimates calculated for the 2015 Report. Droughts are analyzed using the historical drought-period precipitation and runoff patterns from 1922 through 2003 as a reference, although existing 2015 conditions (e.g., land use, water infrastructure) are also accounted for in the modeling. For reference, the worst multiyear drought on the 1922-2003 record was the 1929-1934 drought, although the brief drought of 1976-1977 was more intensely dry.

The results of modeling existing conditions under historical drought scenarios indicate

that SWP Table A water deliveries during dry years can be estimated to range between yearly averages of 336 and 1,408 taf.

On average, the dry-period deliveries of Table A water are higher in this 2017 Report than in the 2015 Report due to the demand decrease in the North of Delta and WSI-DI curve in the study. Table 5-5 indicates that the Table A deliveries for the single dry year (1977) has decreased, but the two-year drought (1976-1977) has increased. WSI-DI along with the model allocation logic allowed more water delivery in water year 1976, but less water delivery in water year 1977.

	Long-term Average (1921-2003)		Single Dry Year (1977)		Dry Periods							
	2,550	62%	454	11%	2-Year Drought (1976-1977)		4-Year Drought (1931-1934)		6-Year Drought (1987-1992)		6-Year Drought (1929-1934)	
2015 Report	2,550	62%	454	11%	1,165	28%	1,356	33%	1,182	29%	1,349	33%
2017 Report	2,571	62%	336	8%	1,206	29%	1,397	34%	1,203	29%	1,408	34%

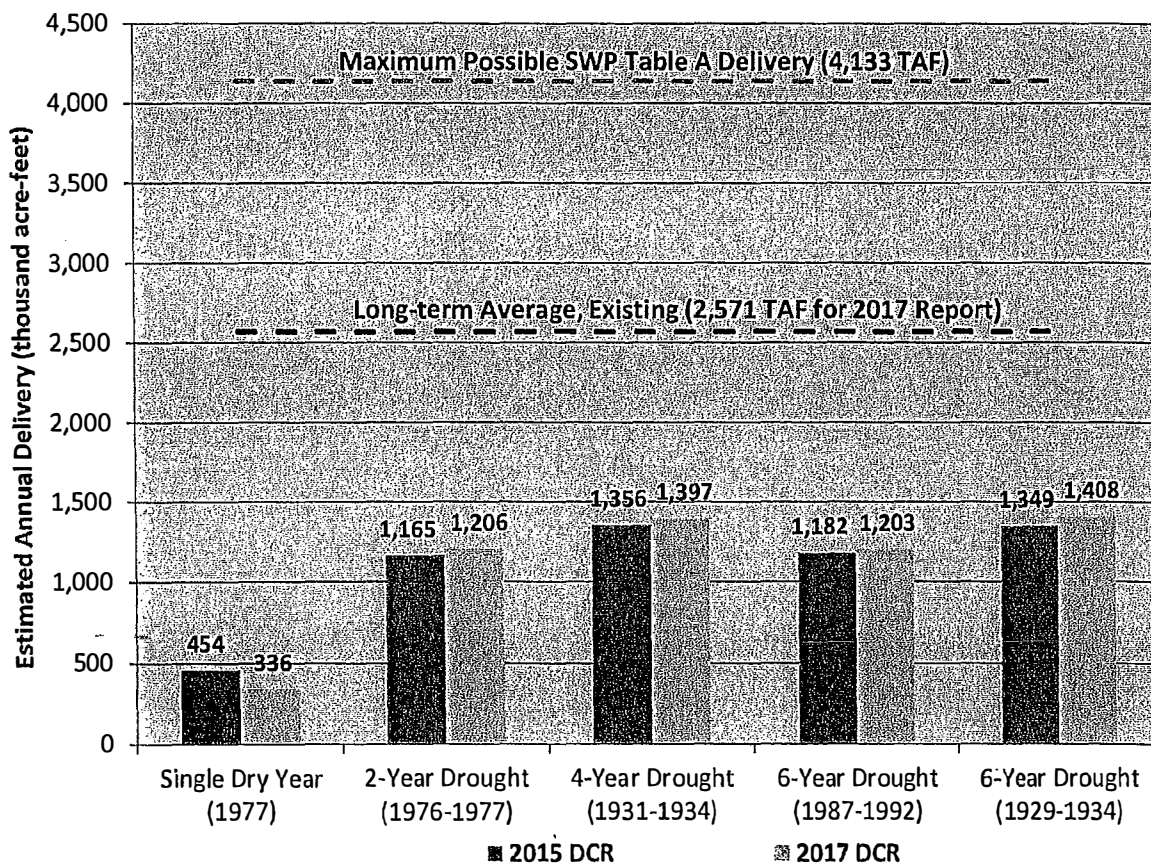


Figure 5-4. Estimated Dry-Period SWP Table A Water Deliveries (Excluding Butte County and Yuba City)

### Estimates of SWP Article 21 Water Deliveries

SWP water delivery is a combination of deliveries of Table A water and Article 21 water. Some SWP Contractors store Article 21 water locally when extra water and capacity are available beyond that needed by normal SWP operations. Deliveries of SWP Article 21 water vary not only by year, but also by month. The estimated range of monthly deliveries of SWP Article 21 water is displayed in Figure 5-5. In May through October, essentially no Article 21 water is estimated to be delivered. In the late fall and winter (November through April), maximum monthly deliveries range from 84 to 340 taf/month.

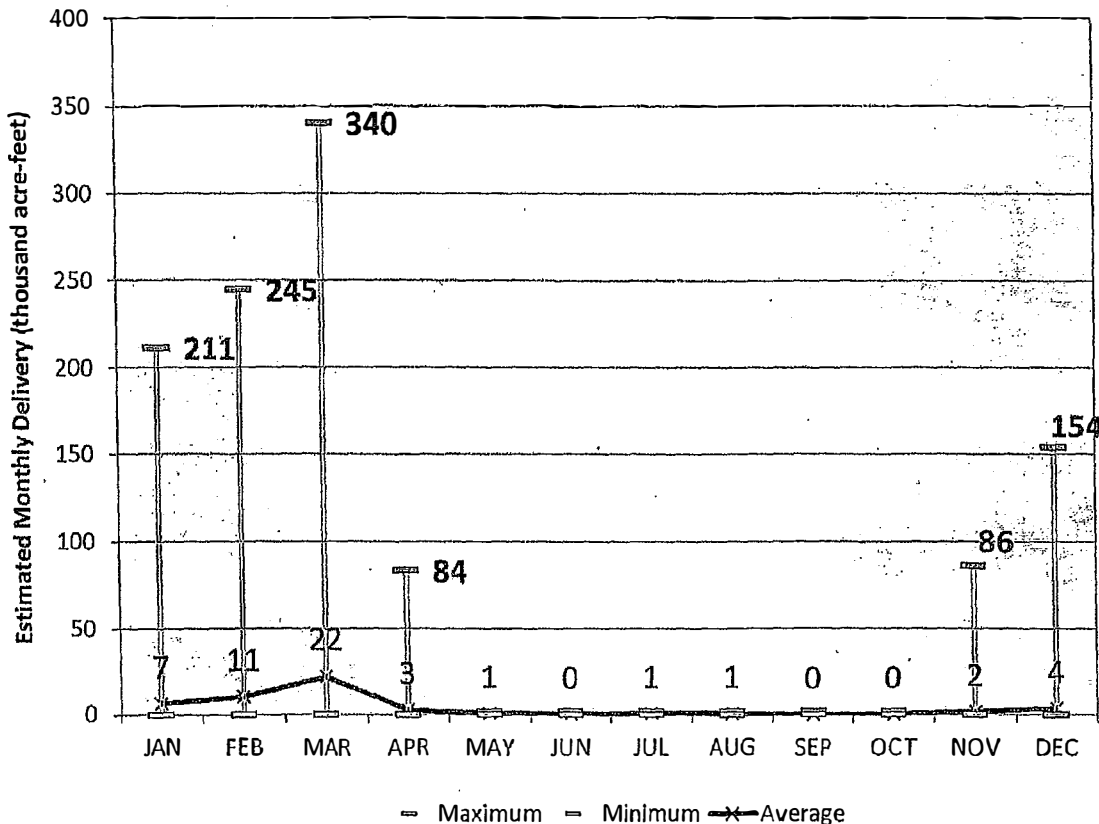


Figure 5-5. Estimated Range of Monthly Deliveries of SWP Article 21 Water (Existing Conditions)

The estimated likelihood that a given amount of SWP Article 21 water will be delivered is presented in Figure 5-6.

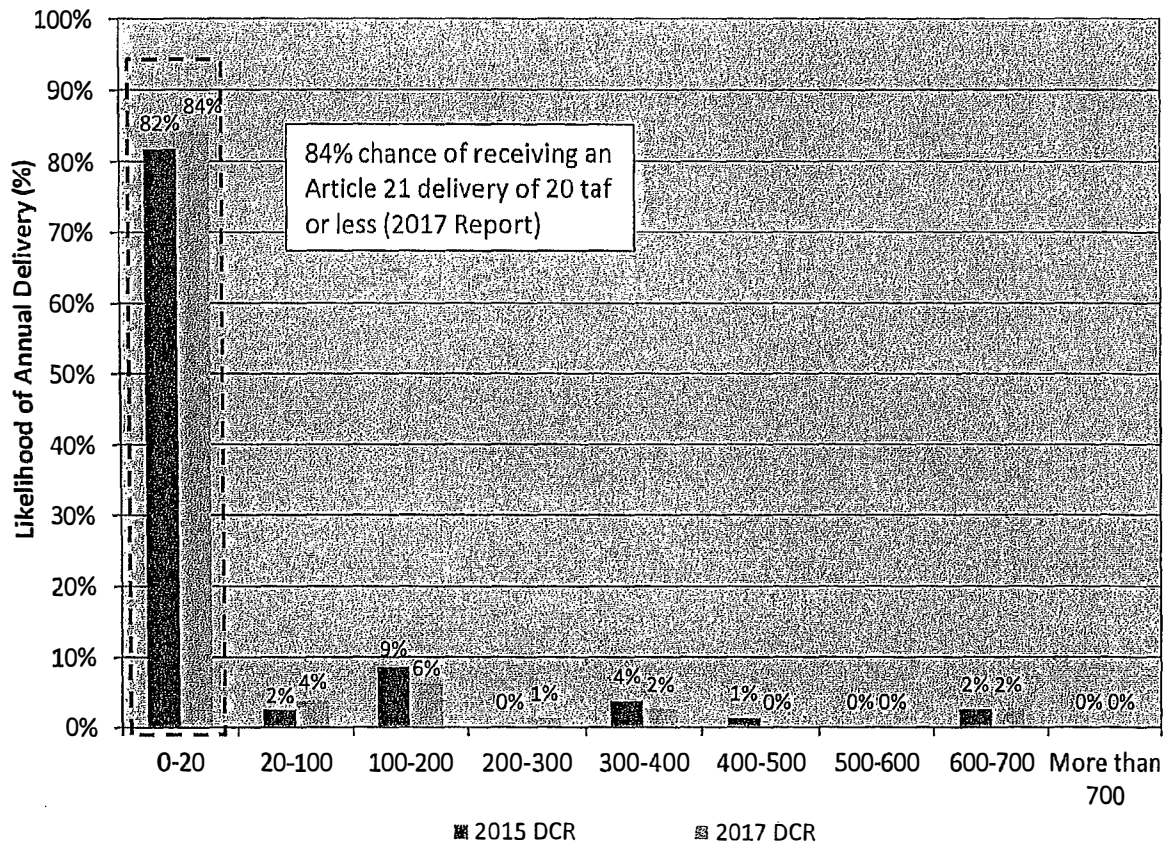


Figure 5-6. Estimated Likelihood of Annual Deliveries of SWP Article 21 Water (Existing Conditions)

### Wet-Year Deliveries of SWP Article 21 Water

Table 5-6 shows the estimates of deliveries of SWP Article 21 water during wet periods under existing conditions. Estimated deliveries in wet years are approximately 1.7 to 5.5 times larger than the average existing-conditions delivery of SWP Article 21 water.

In general, the wet-period Article 21 deliveries in this 2017 Report are lower than in the 2015 Report.

	Long-term Average (1921-2003)	Single Wet Year (1983)	Wet Periods			
			2 Years (1982-1983)	4 Years (1980-1983)	6 Years (1978-1983)	10 Years (1978-1987)
2015 Report	56	316	204	134	93	134
2017 Report	50	273	183	123	86	123

### Dry-Year Deliveries of SWP Article 21 Water

Although deliveries of SWP Article 21 water are smaller during dry years than during wet ones, opportunities exist to deliver SWP Article 21 water during multiyear drought periods. As modeled, deliveries in dry years are often small (less than 5 taf); however, longer drought periods can include several years that support Article 21 deliveries. Annual average Article 21 estimates for drought periods of 4 and 6 years vary greatly and can approach a significant fraction of the long-term average annual estimate, as shown in Table 5-7.

Table 5-7. Estimated Average and Dry-Period Deliveries of SWP Article 21 Water (Existing Conditions, in taf/year)						
	Long-term Average (1921-2003)	Single Dry Year (1977)	Wet Periods			
			2-Year Drought (1976-1977)	4-Year Drought (1931-1934)	6-Year Drought (1987-1992)	6-Year Drought (1929-1934)
2015 Report	56	8	12	41	13	31
2017 Report	50	8	14	16	13	15



## Section 6

### Historical SWP Delivery Tables for 2007–2016

The State Water Project (SWP) contracts define several types of SWP water available for delivery to its Contractors under specific circumstances: Table A water, Article 21 water, turnback pool water, and carryover water. Many SWP Contractors frequently use Article 21, turnback pool, and carryover water to increase or decrease the amount of water available to them under SWP Table A.

Tables 6-1 through 6-10 list annual historical deliveries by SWP water type for each Contractor for 2007 through 2016. Similar delivery tables are presented for years 2005–2014 in the *State Water Project Delivery Capability Report 2015*. Any differences in values presented in this 2017 report and those in the 2015 report are due to reclassification of deliveries since the production of the 2015 report.

Table 6-1 Historical State Water Project Deliveries Calendar Year 2007						
Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	720	-	-	-	720
	Plumas County FCWCD	-	-	-	-	-
	Yuba City	2,327	-	-	-	2,327
	Subtotal	3,047	-	-	-	3,047
North Bay Area	Napa County FCWCD	6,362	3,597	998	-	10,957
	Solano County WA	14,892	8,217	1,822	-	24,931
	Subtotal	21,254	11,814	2,820	-	35,888
South Bay Area	Alameda County FCWCD, Zone 7	32,972	912	2,895	378	37,157
	Alameda County WD	16,541	550	2,103	197	19,391
	Santa Clara Valley WD	38,812	4,840	8,161	469	52,282
	Subtotal	88,325	6,302	13,159	1,044	108,830
San Joaquin Valley Area	Dudley Ridge WD	28,457	8,953	2,000	269	39,679
	Empire West Side ID	397	1,172	515	-	2,084
	Kern County WA	592,423	99,861	19,645	4,683	716,612
	Kings County	4,924	474	305	43	5,746
	Oak Flat WD	3,420	41	69	27	3,557
	Tulare Lake Basin WSD	57,272	12,902	16,459	450	87,083
	Subtotal	686,893	123,403	38,993	5,472	854,761
Central Coastal Area	San Luis Obispo County FCWCD	3,752	24	-	-	3,776
	Santa Barbara County FCWCD	24,760	1,070	1,390	-	27,220
	Subtotal	28,512	1,094	1,390	-	30,996
Southern California Area	Antelope Valley-East Kern WA	74,459	-	4,364	-	78,823
	Castaic Lake WA	44,974	-	4,216	-	49,190
	Coachella Valley WD	72,660	-	-	568	73,228
	Crestline-Lake Arrowhead WA	1,768	-	-	-	1,768
	Desert WA	30,000	-	-	234	30,234
	Littlerock Creek ID	1,380	-	-	-	1,380
	Metropolitan WD of Southern California	1,146,900	166,517	28,098	8,962	1,350,477
	Mojave WA	45,372	-	737	-	46,109
	Palmdale WD	12,780	843	985	100	14,708
	San Bernardino Valley MWD	57,116	-	-	-	57,116
	San Gabriel Valley MWD	10,000	-	-	-	10,000
	San Geronio Pass WA	3,935	-	-	-	3,935
	Ventura County WPD	3,000	-	-	-	3,000
	Subtotal	1,504,344	167,360	38,400	9,864	1,719,968
TOTAL SWP DELIVERIES		2,332,375	309,973	94,762	16,380	2,753,490

**Table 6-2: Historical State Water Project Deliveries, Calendar Year 2008**

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	9,436	-	-	-	9,436
	Plumas County FCWCD	243	-	-	-	243
	Yuba City	1,923	-	-	-	1,923
	<b>Subtotal</b>	<b>11,602</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>11,602</b>
North Bay Area	Napa County FCWCD	3,636	1,219	7,363	21	12,239
	Solano County WA	10,436	1,510	12,389	-	24,335
	<b>Subtotal</b>	<b>14,072</b>	<b>2,729</b>	<b>19,752</b>	<b>21</b>	<b>36,574</b>
South Bay Area	Alameda County FCWCD, Zone 7	13,634	-	15,399	-	29,033
	Alameda County WD	4,206	-	8,659	37	12,902
	Santa Clara Valley WD	11,133	-	21,188	88	32,409
	<b>Subtotal</b>	<b>28,973</b>	<b>-</b>	<b>45,246</b>	<b>125</b>	<b>74,344</b>
San Joaquin Valley Area	Dudley Ridge WD	12,260	-	5,949	51	18,260
	Empire West Side ID	-	-	915	-	915
	Kern County WA	275,555	-	2,896	883	279,334
	Kings County	3,187	-	541	8	3,736
	Oak Flat WD	1,929	-	-	5	1,934
	Tulare Lake Basin WSD	32,302	-	281	85	32,668
	<b>Subtotal</b>	<b>325,233</b>	<b>-</b>	<b>10,582</b>	<b>1,032</b>	<b>336,847</b>
Central Coastal Area	San Luis Obispo County FCWCD	8,512	-	-	-	8,512
	Santa Barbara County FCWCD	11,311	-	2,532	40	13,883
	<b>Subtotal</b>	<b>19,823</b>	<b>-</b>	<b>2,532</b>	<b>40</b>	<b>22,395</b>
Southern California Area	Antelope Valley-East Kern WA	31,082	-	10,381	125	41,588
	Castaic Lake WA	18,710	-	12,146	-	30,856
	Coachella Valley WD	42,385	-	-	107	42,492
	Crestline-Lake Arrowhead WA	1,159	-	689	-	1,848
	Desert WA	17,500	-	-	44	17,544
	Littlerock Creek ID	805	-	-	-	805
	Metropolitan WD of Southern California	658,304	-	-	1,689	659,993
	Mojave WA	26,288	-	108	-	26,396
	Palmdale WD	4,226	-	-	19	4,245
	San Bernardino Valley MWD	26,562	-	4,444	-	31,006
	San Gabriel Valley MWD	10,080	-	-	-	10,080
	San Geronio Pass WA	5,419	-	300	-	5,719
	Ventura County WPD	3,798	-	-	-	3,798
<b>Subtotal</b>	<b>846,318</b>	<b>-</b>	<b>28,068</b>	<b>1,984</b>	<b>876,370</b>	
<b>TOTAL SWP DELIVERIES</b>		<b>1,246,021</b>	<b>2,729</b>	<b>106,180</b>	<b>3,202</b>	<b>1,358,132</b>

Table 6-3 Historical State Water Project Deliveries, Calendar Year 2009						
Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	10,208	-	-	-	10,208
	Plumas County FCWCD	200	-	-	-	200
	Yuba City	2,114	-	-	-	2,114
	Subtotal	12,520	-	-	-	12,520
North Bay Area	Napa County FCWCD	2,723	1,588	4,475	13	8,799
	Solano County WA	7,118	4,444	3,123	-	14,685
	Subtotal	9,841	6,032	7,598	13	23,484
South Bay Area	Alameda County FCWCD, Zone 7	11,746	-	14,583	-	26,329
	Alameda County WD	5,911	-	10,494	8	16,413
	Santa Clara Valley WD	9,188	-	23,867	54	33,109
	Subtotal	26,845	-	48,944	62	75,851
San Joaquin Valley Area	Dudley Ridge WD	13,185	-	7,810	32	21,027
	Empire West Side ID	1,034	-	-	-	1,034
	Kern County WA	325,426	-	56,367	544	382,337
	Kings County	3,153	-	70	5	3,228
	Oak Flat WD	1,825	-	66	3	1,894
	Tulare Lake Basin WSD	35,160	-	1,271	52	36,483
	Subtotal	379,783	-	65,584	636	446,003
Central Coastal Area	San Luis Obispo County FCWCD	9,723	-	-	-	9,723
	Santa Barbara County FCWCD	4,961	-	4,523	25	9,509
	Subtotal	14,684	-	4,523	25	19,232
Southern California Area	Antelope Valley-East Kern WA	13,499	-	18,408	77	31,984
	Castaic Lake WA	14,858	-	9,529	52	24,439
	Coachella Valley WD	40,845	-	-	66	40,911
	Crestline-Lake Arrowhead WA	1,000	-	893	-	1,893
	Desert WA	16,865	-	-	27	16,892
	Littlerock Creek ID	920	-	-	-	920
	Metropolitan WD of Southern California	696,817	-	10,721	1,042	708,580
	Mojave WA	30,300	-	242	-	30,542
	Palmdale WD	2,470	-	3,229	-	5,699
	San Bernardino Valley MWD	26,085	-	9,348	-	35,433
	San Gabriel Valley MWD	11,516	-	-	-	11,516
	San Geronimo Pass WA	5,312	-	480	-	5,792
	Ventura County WPD	3,890	-	-	-	3,890
Subtotal	864,377	-	52,850	1,264	918,491	
TOTAL SWP DELIVERIES		1,308,050	6,032	179,499	2,000	1,495,581

**Table 6-4. Historical State Water Project Deliveries, Calendar Year 2010**

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	807	-	-	-	807
	Plumas County FCWCD	243	-	-	-	243
	Yuba City	2,331	-	-	-	2,331
	<b>Subtotal</b>	<b>3,381</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,381</b>
North Bay Area	Napa County FCWCD	7,275	2,207	2,845	90	12,417
	Solano County WA	13,793	5,298	3,661	-	22,752
	<b>Subtotal</b>	<b>21,068</b>	<b>7,505</b>	<b>6,506</b>	<b>90</b>	<b>35,169</b>
South Bay Area	Alameda County FCWCD, Zone 7	28,694	-	13,104	249	42,047
	Alameda County WD	11,668	-	10,889	14	22,571
	Santa Clara Valley WD	37,850	-	22,471	34	60,355
	<b>Subtotal</b>	<b>78,212</b>	<b>-</b>	<b>46,464</b>	<b>297</b>	<b>124,973</b>
San Joaquin Valley Area	Dudley Ridge WD	19,650	-	9,750	156	29,556
	Empire West Side ID	380	-	166	-	546
	Kern County WA	411,821	-	55,419	3,044	470,284
	Kings County	4,094	-	522	29	4,645
	Oak Flat WD	2,412	-	455	18	2,885
	Tulare Lake Basin WSD	39,835	-	3,199	275	43,309
	<b>Subtotal</b>	<b>478,192</b>	<b>-</b>	<b>69,511</b>	<b>3,522</b>	<b>551,225</b>
Central Coastal Area	San Luis Obispo County FCWCD	3,480	-	277	-	3,757
	Santa Barbara County FCWCD	8,640	-	8,995	140	17,775
	<b>Subtotal</b>	<b>12,120</b>	<b>-</b>	<b>9,272</b>	<b>140</b>	<b>21,532</b>
Southern California Area	Antelope Valley-East Kern WA	35,312	-	20,813	438	56,563
	Castaic Lake WA	37,054	-	14,501	295	51,850
	Coachella Valley WD	69,175	-	7,595	429	77,199
	Crestline-Lake Arrowhead WA	1,357	-	-	-	1,357
	Desert WA	27,875	-	3,135	173	31,183
	Little Rock Creek ID	1,150	-	-	-	1,150
	Metropolitan WD of Southern California	900,210	-	67,783	5,922	973,915
	Mojave WA	41,132	-	20	-	41,152
	Palm Dale WD	5,585	-	5,325	59	10,969
	San Bernardino Valley MWD	38,133	-	11,273	-	49,406
	San Gabriel Valley MWD	14,400	-	-	-	14,400
	San Geronio Pass WA	5,226	-	1,608	6	6,840
	Ventura County WPD	4,075	-	-	-	4,075
<b>Subtotal</b>	<b>1,180,684</b>	<b>-</b>	<b>132,053</b>	<b>7,322</b>	<b>1,320,059</b>	
<b>TOTAL SWP DELIVERIES</b>		<b>1,773,657</b>	<b>7,505</b>	<b>263,806</b>	<b>11,371</b>	<b>2,056,339</b>

Table 6-5 Historical State Water Project Deliveries, Calendar Year 2011						
Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	1,092	-	-	-	1,092
	Plumas County FCWCD	98	-	-	-	98
	Yuba City	2,297	-	-	-	2,297
	Subtotal	3,487	-	-	-	3,487
North Bay Area	Napa County FCWCD	9,426	-	1,388	-	10,814
	Solano County WVA	9,620	14,739	-	-	24,359
	Subtotal	19,046	14,739	1,388	-	35,173
South Bay Area	Alameda County FCWCD, Zone 7	39,066	-	11,675	1,319	52,060
	Alameda County WD	24,813	1,959	9,332	506	36,610
	Santa Clara Valley WD	64,538	970	20,491	-	85,999
	Subtotal	128,417	2,929	41,498	1,825	174,669
San Joaquin Valley Area	Dudley Ridge WD	40,141	11,666	5,524	823	58,154
	Empire West Side ID	1,626	138	151	-	1,915
	Kern County WA	753,707	194,119	119,773	16,068	1,083,667
	Kings County	5,294	552	558	152	6,556
	Oak Flat WD	2,644	-	71	-	2,715
	Tulare Lake Basin WSD	39,056	6,909	4,626	1,454	52,045
	Subtotal	842,468	213,384	130,703	18,497	1,205,052
Central Coastal Area	San Luis Obispo County FCWCD	3,340	-	479	-	3,819
	Santa Barbara County FCWCD	29,132	-	9,318	-	38,450
	Subtotal	32,472	-	9,797	-	42,269
Southern California Area	Antelope Valley-East Kern WA	77,549	7,629	5,888	-	91,066
	Castaic Lake WA	34,067	400	9,332	-	43,799
	Coachella Valley WD	88,017	-	-	2,262	90,279
	Crestline-Lake Arrowhead WA	423	-	51	-	474
	Desert WA	36,139	-	-	240	36,379
	Littlerock Creek ID	-	-	-	-	-
	Metropolitan WD of Southern California	1,286,935	181,610	55,540	8,237	1,532,322
	Mojave WA	4,831	-	268	-	5,099
	Palmdale WD	12,294	-	5,019	-	17,313
	San Bernardino Valley MWD	30,916	-	7,210	-	38,126
	San Gabriel Valley MWD	23,040	-	-	-	23,040
	San Geronimo Pass WA	8,884	-	1,619	-	10,503
	Ventura County WPD	4,000	-	-	-	4,000
Subtotal	1,607,095	189,639	84,927	10,739	1,892,400	
TOTAL SWP DELIVERIES		2,632,985	420,691	268,313	31,061	3,353,050

**Table 6-6. Historical State Water Project Deliveries, Calendar Year 2012**

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	17,875	-	-	-	17,875
	Plumas County FCWCD	79	-	-	-	79
	Yuba City	2,695	-	-	-	2,695
	<b>Subtotal</b>	<b>20,649</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>20,649</b>
North Bay Area	Napa County FCWCD	5,065	-	4,278	64	9,407
	Solano County WA	11,673	-	9,641	-	21,314
	<b>Subtotal</b>	<b>16,738</b>	<b>-</b>	<b>13,919</b>	<b>64</b>	<b>30,721</b>
South Bay Area	Alameda County FCWCD, Zone 7	32,301	-	20,357	179	52,837
	Alameda County WD	11,951	-	8,787	93	20,831
	Santa Clara Valley WD	34,612	-	11,462	222	46,296
	<b>Subtotal</b>	<b>78,864</b>	<b>-</b>	<b>40,606</b>	<b>494</b>	<b>119,964</b>
San Joaquin Valley Area	Dudley Ridge WD	17,694	-	-	112	17,806
	Empire West Side ID	1,468	-	774	-	2,242
	Kern County WA	560,969	-	32,477	2,180	595,626
	Kings County	5,337	-	2,001	21	7,359
	Oak Flat WD	2,596	-	612	-	3,208
	Tulare Lake Basin WSD	53,630	-	32,081	197	85,908
	<b>Subtotal</b>	<b>641,694</b>	<b>-</b>	<b>67,945</b>	<b>2,510</b>	<b>712,149</b>
Central Coastal Area	San Luis Obispo County FCWCD	3,111	-	833	-	3,944
	Santa Barbara County FCWCD	20,874	-	43	-	20,917
	<b>Subtotal</b>	<b>23,985</b>	<b>-</b>	<b>876</b>	<b>-</b>	<b>24,861</b>
Southern California Area	Antelope Valley-East Kern WA	80,694	-	32,854	-	113,548
	Castaic Lake WA	42,707	-	11,350	-	54,057
	Coachella Valley WD	89,928	-	22,663	307	112,898
	Crestline-Lake Arrowhead WA	624	-	-	-	624
	Desert WA	36,238	-	8,461	124	44,823
	Littlerock Creek ID	-	-	-	-	-
	Metropolitan WD of Southern California	1,086,084	-	118,172	4,241	1,208,497
	Mojave WA	4,672	-	6,572	-	11,244
	Palmdale WD	9,959	-	4,736	-	14,695
	San Bernardino Valley MWD	65,102	-	47,870	-	112,972
	San Gabriel Valley MWD	18,720	-	-	-	18,720
	San Geronimo Pass WA	5,968	-	4,956	-	10,924
	Ventura County WPD	4,353	-	-	-	4,353
	<b>Subtotal</b>	<b>1,445,049</b>	<b>-</b>	<b>257,634</b>	<b>4,672</b>	<b>1,707,355</b>
<b>TOTAL SWP DELIVERIES</b>		<b>2,226,979</b>	<b>-</b>	<b>380,980</b>	<b>7,740</b>	<b>2,615,699</b>

Table 6-7. Historical State Water Project Deliveries, Calendar Year 2013						
Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	9,233	-	-	-	9,233
	Plumas County FCWCD	366	-	-	-	366
	Yuba City	3,360	-	1,490	-	4,850
	Subtotal	12,959	-	1,490	-	14,449
North Bay Area	Napa County FCWCD	2,963	-	9,075	-	12,038
	Solano County WA	5,355	-	17,805	-	23,160
	Subtotal	8,318	-	26,880	-	35,198
South Bay Area	Alameda County FCWCD, Zone 7	14,059	-	21,042	2,596	37,697
	Alameda County WD	4,241	-	15,349	50	19,640
	Santa Clara Valley WD	9,353	-	16,261	10,749	36,363
	Subtotal	27,653	-	52,652	13,395	93,700
San Joaquin Valley Area	Dudley Ridge WD	6,113	-	9,951	5,412	21,476
	Empire West Side ID	1,004	-	482	16	1,502
	Kern County WA	314,466	-	73,303	37,005	424,774
	Kings County	2,851	-	591	1,000	4,442
	Oak Flat WD	583	-	2,200	7	2,790
	Tulare Lake Basin WSD	27,803	-	4,169	8,400	40,372
Subtotal	352,820	-	90,696	51,840	495,356	
Central Coastal Area	San Luis Obispo County FCWCD	1,178	-	2,503	-	3,681
	Santa Barbara County FCWCD	3,252	-	12,233	-	15,485
	Subtotal	4,430	-	14,736	-	19,166
Southern California Area	Antelope Valley-East Kern WA	37,628	-	13,386	-	51,014
	Castaic Lake WA	33,320	-	28,434	-	61,754
	Coachella Valley WD	48,423	-	-	164	48,587
	Crestline-Lake Arrowhead WA	1,368	-	2,000	-	3,368
	Desert WA	19,513	-	-	66	19,579
	Littlerock Creek ID	-	-	-	-	-
	Metropolitan WD of Southern California	619,863	-	106,288	32,267	758,418
	Mojave WA	25,294	-	2,852	-	28,146
	Palmdale WD	4,559	-	3,122	-	7,681
	San Bernardino Valley MWD	26,159	-	4,426	-	30,585
	San Gabriel Valley MWD	10,080	-	-	-	10,080
	San Geronio Pass WA	2,339	-	3,729	1,000	7,068
	Ventura County WPD	2,890	-	-	-	2,890
Subtotal	831,436	-	164,237	33,497	1,029,170	
<b>TOTAL SWP DELIVERIES</b>		<b>1,237,616</b>	<b>-</b>	<b>350,691</b>	<b>98,732</b>	<b>1,687,039</b>



**Table 6-8. Historical State Water Project Deliveries, Calendar Year 2014**

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Butte County	2,596	-	-	-	2,596
	Plumas County FCWCD	251	-	-	-	251
	Yuba City	96	-	4,085	-	4,181
	<b>Subtotal</b>	<b>2,943</b>	<b>-</b>	<b>4,085</b>	<b>-</b>	<b>7,028</b>
North Bay Area	Napa County FCWCD	41	1,444	9,731	-	11,216
	Solano County WA	450	-	9,493	-	9,943
	<b>Subtotal</b>	<b>491</b>	<b>1,444</b>	<b>19,224</b>	<b>-</b>	<b>21,159</b>
South Bay Area	Alameda County FCWCD, Zone 7	1,367	-	17,646	-	19,013
	Alameda County WD	-	-	10,326	-	10,326
	Santa Clara Valley WD	-	-	12,339	79	12,418
	<b>Subtotal</b>	<b>1,367</b>	<b>-</b>	<b>40,311</b>	<b>79</b>	<b>41,757</b>
San Joaquin Valley Area	Dudley Ridge WD	1,783	-	15,783	40	17,606
	Empire West Side ID	104	-	349	-	453
	Kern County WA	1,393	-	24,717	520	26,630
	Kings County	112	-	360	-	472
	Oak Flat WD	-	-	983	-	983
	Tulare Lake Basin WSD	3,942	-	3,181	-	7,123
	<b>Subtotal</b>	<b>7,334</b>	<b>-</b>	<b>45,373</b>	<b>560</b>	<b>53,267</b>
Central Coastal Area	San Luis Obispo County FCWCD	379	-	2,693	-	3,072
	Santa Barbara County FCWCD	289	-	10,533	-	10,822
	<b>Subtotal</b>	<b>668</b>	<b>-</b>	<b>13,226</b>	<b>-</b>	<b>13,894</b>
Southern California Area	Antelope Valley-East Kern WA	2,152	-	12,345	111	14,608
	Castaic Lake WA	451	-	7,743	-	8,194
	Coachella Valley WD	6,918	-	-	-	6,918
	Crestline-Lake Arrowhead WA	83	-	645	-	728
	Desert WA	2,788	-	-	-	2,788
	Littlerock Creek ID	106	-	-	-	106
	Metropolitan WD of Southern California	59,900	-	223,358	-	283,258
	Mojave WA	3,347	-	2,228	-	5,575
	Palmdale WD	1,005	-	3,670	-	4,675
	San Bernardino Valley MWD	-	-	6,320	-	6,320
	San Gabriel Valley MWD	1,434	-	-	-	1,434
	San Geronio Pass WA	603	-	4,572	-	5,175
	Ventura County WPD	93	-	-	-	93
	<b>Subtotal</b>	<b>78,880</b>	<b>-</b>	<b>260,881</b>	<b>111</b>	<b>339,872</b>
<b>TOTAL SWP DELIVERIES</b>		<b>91,683</b>	<b>1,444</b>	<b>383,100</b>	<b>750</b>	<b>476,977</b>

Table 6-9. Historical State Water Project Deliveries, Calendar Year 2015						
Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Carryover	Turnback	
Feather River Area	Bulfe County	3,315	-	-	-	3,315
	Plumas County FCWCD	285	-	-	-	285
	Yuba City	2,400	-	604	-	3,004
	Subtotal	6,000	-	604	-	6,604
North Bay Area	Napa County FCWCD	5,365	690	3,896	35	9,986
	Solano County WA	2,020	-	15,718	-	17,738
	Subtotal	7,385	690	19,614	35	27,724
South Bay Area	Alameda County FCWCD, Zone 7	4,686	-	3,295	97	8,078
	Alameda County WD	-	-	2,233	51	2,284
	Santa Clara Valley WD	-	-	2,858	120	2,978
	Subtotal	4,686	-	8,386	268	13,340
San Joaquin Valley Area	Dudley Ridge WD	7,414	-	1,570	55	9,039
	Empire West Side ID	578	-	46	-	624
	Kern County WA	173,581	-	43,265	707	217,553
	Kings County	698	-	333	11	1,042
	Oak Flat WD	696	-	348	-	1,044
	Tulare Lake Basin WSD	16,359	-	571	105	17,035
	Subtotal	199,326	-	46,133	878	246,337
Central Coastal Area	San Luis Obispo County FCWCD	3,411	-	-	-	3,411
	Santa Barbara County FCWCD	4,973	-	1,089	55	6,117
	Subtotal	8,384	-	1,089	55	9,528
Southern California Area	Antelope Valley-East Kern WA	21,810	-	5,154	174	27,138
	Castaic Lake WA	11,068	-	4,121	-	15,189
	Coachella Valley WD	27,670	-	-	-	27,670
	Crestline-Lake Arrowhead WA	154	-	247	-	401
	Desert WA	11,150	-	-	67	11,217
	Littlerock Creek ID	460	-	-	-	460
	Metropolitan WD of Southern California	379,706	-	35,675	1,374	416,755
	Mojave WA	16,538	-	1,871	-	18,409
	Palmdale WD	2,420	-	-	26	2,446
	San Bernardino Valley MWD	17,737	-	9,012	123	26,872
	San Gabriel Valley MWD	5,759	-	-	-	5,759
	San Geronimo Pass WA	3,343	-	135	-	3,478
	Ventura County WPD	1,000	-	-	-	1,000
Subtotal	498,815	-	56,215	-	556,794	
TOTAL SWP DELIVERIES		724,596	690	132,041	3,000	860,327

**Table 6-10. Historical State Water Project Deliveries, Calendar Year 2016**

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A	Article 21	Garryover	Turnback	
Feather River Area	Butte County	15,634	-	-	-	15,634
	Plumas County FCWCD	387	-	-	-	387
	Yuba City	1,229	-	-	-	1,229
	<b>Subtotal</b>	<b>17,250</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17,250</b>
North Bay Area	Napa County FCWCD	13,138	3,319	-	295	16,752
	Solano County WA	12,595	-	4,130	-	16,725
	<b>Subtotal</b>	<b>25,733</b>	<b>3,319</b>	<b>4,130</b>	<b>295</b>	<b>33,477</b>
South Bay Area	Alameda County FCWCD, Zone 7	41,987	-	8,450	819	51,256
	Alameda County WD	14,280	-	8,400	-	22,680
	Santa Clara Valley WD	40,214	-	32,863	-	73,077
	<b>Subtotal</b>	<b>96,481</b>	<b>-</b>	<b>49,713</b>	<b>819</b>	<b>147,013</b>
San Joaquin Valley Area	Dudley Ridge WD	17,372	-	1,656	461	19,489
	Empire West Side ID	1,800	-	22	-	1,822
	Kern County WA	458,759	-	-	3,533	462,292
	Kings County	2,466	-	1,095	95	3,656
	Oak Flat WD	832	-	1,023	-	1,855
	Tulare Lake Basin WSD	41,126	-	1,135	126	42,387
	<b>Subtotal</b>	<b>522,355</b>	<b>-</b>	<b>4,931</b>	<b>4,215</b>	<b>531,501</b>
Central Coastal Area	San Luis Obispo County FCWCD	4,199	-	-	-	4,199
	Santa Barbara County FCWCD	12,003	-	917	-	12,920
	<b>Subtotal</b>	<b>16,202</b>	<b>-</b>	<b>917</b>	<b>-</b>	<b>17,119</b>
Southern California Area	Antelope Valley-East Kern WA	56,148	-	6,054	1,471	63,673
	Castaic Lake WA	31,147	-	2,241	-	33,388
	Coachella Valley WD	52,922	-	-	-	52,922
	Crestline-Lake Arrowhead WA	1,873	-	-	-	1,873
	Desert WA	21,327	-	-	566	21,893
	Littlerock Creek ID	1,380	-	-	-	1,380
	Metropolitan WD of Southern California	1,006,900	-	-	6,871	1,013,771
	Mojave WA	32,045	-	1,170	-	33,215
	Palmdale WD	7,805	-	-	-	7,805
	San Bernardino Valley MWD	57,815	-	2,348	-	60,163
	San Gabriel Valley MWD	17,280	-	-	-	17,280
	San Geronimo Pass WA	8,683	-	933	-	9,616
	Ventura County WPD	3,000	-	-	-	3,000
<b>Subtotal</b>	<b>1,298,325</b>	<b>-</b>	<b>12,746</b>	<b>8,908</b>	<b>1,319,979</b>	
<b>TOTAL SWP DELIVERIES</b>		<b>1,976,346</b>	<b>3,319</b>	<b>72,437</b>	<b>14,237</b>	<b>2,066,339</b>

## SURPLUS WATER SALE AGREEMENT

This Surplus Water Sale Agreement ("Agreement") is made and entered into as of \_\_\_\_ day of \_\_\_\_\_, 2017, by and between the SAN GORGONIO PASS WATER AGENCY ("Agency") and SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT ("District"). Agency and District are sometimes individually referred to herein as a "Party" and collectively as the "Parties".

### RECITALS

A. Agency and District are state water contractors and regional water agencies that provide water on a wholesale basis to retail water providers and other public agencies within their respective service areas. There are two retail water providers that are within the service areas of both Agency and District. Those retailers are the Yucaipa Valley Water District and the South Mesa Water Company (collectively referred to as "Retailers"); and

B. Agency desires additional water supplies of all kinds to improve its water supply reliability, including wet year yield; and

C. Agency and District have a long history of cooperative efforts to serve water to their respective service areas, including water exchanges and sharing capacity in the East Branch Extension; and

D. District anticipates that from time to time, it may have surplus State Water Project water ("Surplus Water") that is surplus to the needs of its retail customers; and

E. District has adopted its Ordinance 79 which establishes procedures for the surplus and sale of surplus State Water Project Water; and

F. District desires to provide Agency the first right of refusal to purchase up to 5,000 acre-feet of District's Surplus Water per calendar year; and

G. Agency desires to purchase Surplus Water from District under the terms and conditions set forth in this Agreement and in a manner that is consistent with Ordinance 79.

NOW THEREFORE, in consideration of the foregoing recitals and the promises and covenants contained herein, the Parties agree as follows:

**1. Term of Agreement.**

The term of this Agreement shall commence on January 1, 2018 and end on December 31, 2032. ("Term").

**2. Purchase and Sale of Surplus Water.**

(a) District may determine, in its sole discretion, the amount of Surplus Water that will be available for purchase during each calendar year of the term of this Agreement. Notwithstanding the foregoing, if District determines that Surplus Water is available, District shall provide Agency the right of first refusal to purchase up to the first 5,000 acre feet of said Surplus Water.

(b) On or before June 15 of each year during the Term, District shall provide notice to Agency of the amount of Surplus Water that is available for purchase for that calendar year. Agency shall then have 30 days from the date of said notice to notify District of the amount of said Surplus Water that it wishes to purchase for that applicable year.

**3. Purchase Price for Surplus Water.**

The purchase price for Surplus Water delivered by District to Agency shall be the sum of the costs as calculated in subsections (a) and (b) below.

(a) The cost of the water shall be based on the State Water Project Table A allocation as determined for the applicable year as follows:

<b>Final SWP Allocation</b>	<b>Cost Per Acre-Foot</b>
0 - 20%	\$400
21 - 40%	\$300
41 - 60%	\$200
61 - 100%	\$100

(b) The power cost to move the Surplus Water through the State Water Project facilities, District facilities, and then to the Point of Delivery as defined herein, shall be paid as follows: (i) Agency shall pay to District power costs at the power cost rate established for the State Water Project for the applicable year. The actual power costs shall be reconciled on or before the end of the calendar year following the year of the delivery. In the event it is determined that Agency has underpaid power costs, Agency shall make payment for the amount owed to District within 30 days of said determination. In the event it is determined that Agency has overpaid power costs, Agency may elect to either receive payment from District within 30 days from the date of said determination or to apply said amount as a credit toward power costs for a subsequent year.

(c) On or before expiration of each 5-year period during the Term, the Parties shall meet and confer in good faith in regard to whether the amount and/or calculation of the purchase price should be changed. In the event the Parties cannot agree as to a new or different amount or calculation, then either Party shall have the right to terminate this Agreement. Unless a Party elects to so terminate this Agreement, the purchase price then in effect shall remain in effect unless or until the Parties reach an agreement to make any such change.

**4. Delivery of Water.**

(a) **Point of Delivery.** The physical point of delivery (“Point of Delivery”) of Surplus Water pursuant to this Agreement includes, but is not limited to, the following locations:

<b>Delivery Location</b>	<b>Reach Number</b>
Various locations in the San Bernardino Basin	EBX – 1, 2A, 2B, 2C
Various locations in the Yucaipa Basin	EBX – 3B
Various locations in the Beaumont Basin;	EBX – 4A, 4B

(b) **Delivery Schedule.** District will cooperate with Agency to coordinate for the delivery at the Point of Delivery upon a mutually agreeable delivery schedule.

5. **Resale of Surplus Water.** During the applicable year, Agency shall first offer to sell fifty percent (50%) of any Surplus Water to the Retailers, per the current pricing policy of Agency, in proportion to the amount of imported water each Retailer has purchased from Agency over the previous 3 calendar years. Each Retailer shall notify Agency within 30 days of said offer as to whether, and to what extent, each Retailer desires to purchase Surplus Water. If one Retailer elects not to purchase any share, or elects to purchase less than its equal share, then the balance shall be made available to the other Retailer. In the event the Retailers elect not to purchase all of the 50% of Surplus Water available to them pursuant to this Section, Agency may purchase the remainder of the water. Agency shall only purchase the amount of Surplus Water that it is able to put to beneficial use within its service area.

6. **Regulatory Requirements.** The implementation of this Agreement shall be subject to satisfaction by District and Agency of applicable legal and regulatory requirements.

7. **Default and Termination.** In the event either Party fails to make any payment under this Agreement when due, or fails to perform any obligation otherwise required by this Agreement, the non-defaulting Party shall demand in writing that the defaulting Party cure such non-performance. The defaulting Party shall have ninety (90) days after receipt of such demand to cure. In the event the defaulting Party fails to cure a default within the ninety (90) day period,

the non-defaulting Party may pursue any applicable action in law or equity including, but not limited to, termination, specific performance and/or damages for breach of this Agreement.

8. **Entire Agreement.** This Agreement contains the entire understanding between the Parties with respect to its subject matter, and supersedes all prior agreements, oral or written, and all prior or contemporaneous discussions or negotiations between the Parties. This Agreement cannot be amended except in writing signed by both Parties.

9. **No Waiver.** Any failure or delay on the part of either Party to exercise any right under this Agreement shall not constitute a waiver of the right, and shall not preclude such Party from exercising or enforcing the right, or any other provision of this Agreement, on any subsequent occasion.

10. **Notices.** All notices or other communications required or desired to be given pursuant to this Agreement shall be in writing and shall be hand-delivered or sent by a reputable overnight courier service providing delivery confirmation. Each such notice or communication shall be deemed to be duly given when hand-delivered or one (1) day after being deposited for next day delivery with an overnight courier. Each such notice or communication shall be addressed to the Parties at their respective addresses set forth next to their signatures below, or such other address as a Party notifies the other in writing.

11. **Severability.** If any provision of this Agreement is finally determined by a court to be invalid or unenforceable as written, the provision shall, if possible, be enforced to the extent reasonable under the circumstances and otherwise shall be deemed deleted from this Agreement. The other provisions of this Agreement shall remain in full force and effect so long as the material purposes of the Agreement and understandings of the Parties are not impaired.

IN WITNESS WHEREOF, the Parties have executed this agreement as of the date first written above.

**DISTRICT:**

**AGENCY:**



SAN BERNARDINO VALLEY  
MUNICIPAL WATER DISTRICT

SAN GORGONIO PASS WATER  
AGENCY

By: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

|

## WATER SUPPLY AGREEMENT

This Water Supply Agreement ("Agreement") is made and entered into as of <sup>July</sup>~~April~~ 7, 2017, by and between the SAN GORGONIO PASS WATER AGENCY ("SGPWA") and ANTELOPE VALLEY-EAST KERN WATER AGENCY ("AVEK"). AVEK and SGPWA are sometimes individually referred to herein as a "Party" and collectively as the "Parties".

### RECITALS

A. AVEK and SGPWA are state water contractors and regional water agencies that provides water on a wholesale basis to retail water providers and other public agencies within their respective service areas.

B. As of January 1, 2017, AVEK acquired the right to take delivery of 1,700 acre feet per year ("AFY") of non state water project water ("Kern Water") that is provided by the Kern County Water Agency ("KCWA") through a series of agreements that are described as follows:

(i) Pursuant to that certain Contract to Transfer Kern River Lower River Water Rights dated January 23, 2001 ("KCWA-Nickel Agreement"), the Nickel Family, LLC, a California limited liability company ("Nickel"), conveyed its water rights in the Kern River to KCWA in exchange for a perpetual right to ten thousand (10,000) AFY of water ("Agency Transfer Water") to be made available by KCWA for the benefit of Nickel pursuant to the terms of the KCWA-Nickel Agreement. The KCWA-Nickel Agreement provides that Nickel is entitled to delivery of the Agency Transfer Water at a point called Tupman, located at milepost 238.04 within Reach 12E of the State Water Project's California Aqueduct, in Kern County ("Point of Delivery"). A copy of the KCWA-Nickel Agreement is attached hereto as Exhibit "A" and is incorporated herein by this reference. Nickel has the right to sell or transfer the Agency Transfer Water to third parties within or outside of Kern County;

(ii) In 2007, Nickel entered into that certain Option and Water Purchase Agreement dated May 1, 2007 ("Nickel-DMB Agreement"), with DMB Communities II LLC, an

Arizona limited liability company ("DMBCII"), pursuant to which DMBCII acquired an option to purchase the right to eight thousand three hundred and ninety three (8,393) acre-feet per year ("AFY") of Nickel's Agency Transfer Water ("Nickel Water"). Section 10 of the Nickel-DMB Agreement allows DMBCII to assign Nickel Water, under certain conditions, to third parties upon the consent of Nickel. DMBCII exercised the option in 2008 and Nickel approved DMBCII's assignment of the Nickel-DMB Agreement to DMB Pacific, LLC, a Delaware limited liability company ("DMB"). A copy of the Nickel-DMB Agreement is attached hereto as Exhibit "B" and is incorporated herein by this reference;

(iii) In 2013, DMB assigned to CV Communities, LLC, a Delaware limited liability company, the right to purchase one-thousand seven-hundred (1,700) AFY of Nickel Water pursuant to the terms of that certain Option and Partial Assignment of DMB Interest In 2007 Option And Water Purchase Agreement To CV Communities dated July 10, 2013 ("CV Option Agreement"). Nickel consented to the CV Option Agreement (the "Nickel Consent"). Both the CV Option Agreement and the Nickel Consent are attached hereto as Exhibit "C". CV exercised the option on March 31, 2016; and

(iv) CV assigned all of its rights and interest in the CV Option Agreement to AVEK pursuant to that certain Assignment of CV Communities, LLC, Interest in 2007 Option and Water Purchase Agreement to Antelope Valley East-Kern Water Agency dated June 6, 2016 ("AVEK Assignment") and AVEK assumed all of CV's obligation under the CV Option Agreement. The AVEK Assignment is attached hereto as Exhibit "D". The rights of AVEK pursuant to the AVEK Assignment became effective on January 1, 2017.

C. AVEK desires to supply the Kern Water to SGPWA in accordance with the terms and conditions set forth herein and SGPWA desires to purchase such water on a long term basis to supplement its existing water supplies.

NOW THEREFORE, in consideration of the foregoing recitals and the promises and covenants contained herein, the Parties agree as follows:

1. **Purpose.** The Purpose of this Agreement is to formalize the terms and conditions by which AVEK will provide the Kern Water to SGPWA, for delivery at the Point of Delivery, beginning on the Effective Date and continuing each year thereafter for as long as this Agreement remains in effect.

2. **Effective Date.** The Effective Date of this Agreement will be as of January 1, 2017, and SGPWA will be entitled to all Kern Water delivered to AVEK as of that date.

3. **Term of Agreement.**

(a) **Contract Term.** The term of the Agreement shall commence on the Effective Date and end on December 31, 2036 ("Term"). AVEK will take all action necessary to maintain its rights pursuant to the CV Option Agreement throughout the Term. SGPWA will have the first right of refusal to renew the Term for an additional twenty (20) year term subject to agreement and consultation among the parties. Should AVEK not wish to renew the Term, it shall provide SGPWA with one year's written notice to that effect.

(b) **Delivery Year.** Each "Delivery Year" shall commence on the Effective Date and any anniversary thereof during the Term and continue for a period of one (1) year.

4. **Quantity of Kern Water.** SGPWA will be obligated to take or pay for its full allocation of Kern Water during each Delivery Year.

5. **Reservation of Kern Water.** Subject to the terms and conditions of this Agreement, AVEK shall take all action necessary to fulfill its obligations to deliver Kern Water to SGPWA under this Agreement. To the extent possible, AVEK will coordinate with KCWA CV, DMB, DMBCII and Nickel, and SGPWA to schedule deliveries of the Kern Water at the Point of Delivery.

6. **Purchase Price for Kern Water.** The purchase price for Kern Water delivered

by AVEK to SGPWA shall be (i) the purchase price per acre foot as set forth in the Nickel-DMB Agreement; and (ii) an annual replenishment charge of three hundred dollars (\$300.00) per acre foot payable to AVEK. If SGPWA does not import all the Kern Water to its service area annually, SGPWA can deliver the unused portion of the Kern County water to AVEK's turnout and forgo the replenishment charge for water delivered to AVEK. AVEK will have the right to otherwise store and/or dispose of such water unless SGPWA has entered into a separate water banking agreement with AVEK to store such water. The replenishment charge will be adjusted for each Delivery Year commencing on January 1, 2018, based on the change in the Consumer Price Index - identified in the Nickel Agreement .

7. **Costs of Delivery.** SGPWA will be responsible for (i) all power charges as required pursuant to Section 4.5 of the KCWA-Nickel Agreement to deliver the Kern Water to the Point of Delivery (a copy of Exhibit D to the KCWA-Nickel Agreement is attached hereto as Exhibit "E"); and (ii) all charges to deliver the Kern Water from the Point of Delivery to the SGPWA service areas, including without limitation, all wheeling charges imposed by the Department of Water Resources.

8. **Payments.**

(a) AVEK shall invoice SGPWA on an annual basis in advance for the amounts payable to purchase water pursuant to Section 6(i) and SGPWA will pay such invoice within thirty (30) days of the invoice date. .

(b) The replenishment charge will be payable to AVEK per section 8(a). At the end of each Delivery Year based on the actual number of acre feet of Kern Water that is delivered to SGPWA. and AVEK ; AVEK will credit SGPWA for such amounts delivered to AVEK. SGPWA will be responsible to pay AVEK and/or KCWA for all power charges or other delivery charges payable by SGPWA pursuant to Section 7 of this Agreement within thirty (30) days of the date of an invoice for such amounts.

(c) AVEK shall have the right to charge late fees of up to five percent (5%) of

the overdue amount for any invoice that is not paid within 30 days after the due date or 60 days after the invoice date.

9. **Delivery of Water.**

(a) **Point of Delivery.** The physical point of delivery of Kern Water pursuant to this Agreement shall be the Point of Delivery, provided, however, that if SGPWA enters into a water banking agreement with AVEK, then the Point of Delivery will be as specified in such agreement. AVEK and SGPWA will be solely responsible for coordinating water deliveries from the Point of Delivery to the SGPWA service area.

(b) **Delivery Schedule.** AVEK will cooperate with SGPWA to coordinate with KCWA for the delivery of the Kern Water to SGPWA at the Point of Delivery upon a mutually agreeable delivery schedule. All deliveries will be subject to the terms of the KCWA-Nickel Agreement.

(c) **Suspension.** The delivery of Kern Water may be suspended or curtailed during any period of public emergency or disaster that is declared by AVEK. "For the purposes of this provision, an "emergency" shall be defined as a sudden, unexpected occurrence that poses a clear and imminent danger, requiring immediate action to prevent or mitigate the loss or impairment of life, health, property, or essential public services." A public emergency or disaster shall not include ordinary measures taken during periods of drought or water shortage.

(d) **Obligations of AVEK.** For the purposes of this Agreement and subject to the limitations contained in this Section 9, AVEK shall have fulfilled its obligation to make Kern Water available for delivery so long as the amount of Kern Water scheduled for delivery by SGPWA is available at the Point of Delivery pursuant to a predetermined and mutually agreed upon delivery schedule.

10. **Water Quality.** AVEK makes no representation or warranty concerning the quality of the Kern Water delivered by KCWA to the Point of Delivery, provided, however, that

AVEK will work with SGPWA, CV, DMB, DMBII and Nickel to enforce the terms of the KCWA-Nickel Agreement.

11. **Resale of Kern Water.** SGPWA shall be free to market and sell the Kern Water to other parties within their service area without restriction to price and terms. SGPWA assumes all responsibility for delivery of Kern Water from SGPWA to its customers and contracting parties. AVEK's obligations under this Agreement are solely with SGPWA and no customer of SGPWA nor other third party shall have the right to enforce the terms of this Agreement as a third party beneficiary.

12. **Regulatory Requirements.** The implementation of this Agreement shall be subject to satisfaction by AVEK and SGPWA of the regulatory requirements set forth herein. Each of AVEK And SGPWA shall, if necessary, undertake the following: (i) obtain all permits, consents, entitlements and approvals necessary to enable the AVEK to reserve and sell, and SGPWA to purchase, the Kern Water that is the subject of this Agreement; and (ii) fully and completely comply with the requirements of the California Environmental Quality Act ("CEQA"), including, if it is determined that this transaction is subject to CEQA and not exempt from CEQA, the completion of an initial study, and (1) either (a) there shall have been adopted a negative declaration or a mitigated negative declaration, or (b) a final environmental impact report shall have been completed and approved, and (2) the time shall have expired within which a judicial proceeding may be instituted challenging the validity or completeness of any such determination of exemption, or adoption of a negative declaration or of a mitigated negative declaration, or approval of a final environmental impact report. The lead agency for the purposes of CEQA will be determined in consultation between AVEK and SGPWA.

13. **Service Area Integrity.** Nothing in this Agreement is intended nor shall it be interpreted to change the existing service area of AVEK and SGPWA or to allow AVEK to sell water to any retail customer of SGPWA.

14. **Representations or Warranties of AVEK.** AVEK makes the following representations, warranties and covenants to SGPWA:

(a) **Power and Authority to Execute and Perform this Agreement.** AVEK has the power and authority to enter into this Agreement and to perform its obligations and all necessary approvals and authorizations have been obtained.

(b) **Enforceability.** This Agreement and the CV Option Agreement constitute legal, valid and binding agreements and the obligations of AVEK pursuant to this Agreement and the AVEK Assignment, are enforceable against the AVEK in accordance with their respective terms.

15. **Representations or Warranties of SGPWA.** SGPWA makes the following representations, warranties and covenants to AVEK:

(a) **Power and Authority to Execute and Perform this Agreement.** SGPWA has the power and authority to enter into this Agreement and to perform its obligations and all necessary approvals and authorizations have been obtained.

(b) **Enforceability.** This Agreement constitutes a legal, valid and binding obligation of SGPWA, enforceable against SGPWA in accordance with its terms.

16. **Default and Termination.** In the event either party (“Defaulting Party”) fails to make any payment under this Agreement when due, or fails to perform any obligation otherwise required by this Agreement, the other party (“Non-Defaulting Party”) may demand in writing that the Defaulting Party cure such non-performance. The Defaulting Party shall have ninety (90) days after receipt of such demand to cure. In the event the Defaulting Party fails to cure a default within the ninety (90) day period, the Non-Defaulting Party may pursue the applicable remedies and in the event SGPWA is the Defaulting Party, AVEK may suspend delivery of Kern Water and redirect such water to other uses for the duration of the suspension. During this suspension of deliveries, AVEK and SGPWA shall meet and confer on the dispute in an attempt to resolve it. AVEK shall restore water delivery when SGPWA has cured all outstanding defaults and paid all amounts due to AVEK as agreed to by both parties. In the event that the dispute is not



resolved within 90 days after suspension, AVEK may terminate this Agreement at any time thereafter.

17. **Expiration of Term.** This Agreement shall terminate and be of no further force and effect as of the expiration of the Term.

18. **Indemnity.** SGPWA, its successors and assigns, shall hold harmless, defend and indemnify AVEK, its officials, employees, agents, successors and assigns (all of which are herein referred to as the "AVEK Indemnified Parties") from and against all liabilities, obligations, claims, damages, losses, actions, judgments, suits, costs and expenses, including but not limited to reasonable attorneys' fees (collectively, "Damages"), which may be imposed on, incurred by, or asserted against AVEK Indemnified Parties as a result of (i) a breach of SGPWA's obligations; or (ii) the delivery, use or transfer of the Kern Water by SGPWA. Notwithstanding the foregoing, in no event shall SGPWA be liable to indemnify a AVEK Indemnified Party for (i) any Damages resulting from the gross negligence or willful misconduct of AVEK; or (ii) any third party claim brought in connection with regulatory approvals. This indemnification shall survive termination of the Agreement. AVEK, its successors and assigns, shall hold harmless, defend and indemnify SGPWA, its successors and assigns, from and against all Damages which may be imposed on, incurred by, or asserted against SGPWA as a result of a breach of AVEK's obligations under the AVEK Assignment or this Agreement.

19. **Third Party Claims.** Promptly following notice of any "Third Party Claim" for which AVEK is indemnified hereunder, AVEK shall notify SGPWA of such claim in writing. SGPWA shall have a period of thirty (30) days following the receipt of such notice to notify AVEK of whether SGPWA elects to assume the defense thereof. If SGPWA so notifies AVEK that it elects to assume the defense, SGPWA thereafter shall undertake and diligently pursue the defense of the Third Party Claim. SGPWA shall not consent to entry of judgment or enter into any settlement agreement, without the consent of AVEK, which does not include a complete and unconditional release of AVEK or which imposes injunctive or other equitable relief against AVEK. AVEK shall be entitled to participate in, but not control, the defense thereof, with counsel of its choice and at its own expense. If SGPWA does not give the requisite notice, or

fails to assume and diligently pursue the defense of such Third Party Claim, AVEK may defend against such Third Party Claim in such manner as it may deem appropriate, at SGPWA's expense, including without limitation settlement thereof on such terms as AVEK may deem appropriate, and to pursue such remedies as may be available to AVEK against SGPWA. Notwithstanding the foregoing, AVEK shall not consent to entry of a judgment or enter into any settlement agreement, without the consent of SGPWA, which does not include a complete and unconditional release of SGPWA.

**20. Notice of Claims.** The Parties shall promptly notify each other within ten (10) days of AVEK or SGPWA becoming aware of: (1) any claims or suits brought against AVEK or SGPWA which involve this Agreement or water supplied to SGPWA pursuant to this Agreement, or (2) any Third Party Claims. Any such notice shall conform to the requirements specified in Section 26 of this Agreement.

**21. Remedies Not Exclusive.** Remedies provided in this Agreement for enforcement of its terms are intended and shall be construed as cumulative rather than exclusive and shall not be deemed to deprive either Party from also using any other remedies provided by this Agreement or by law.

**22. No Transfer of Rights.** The rights granted to SGPWA hereunder constitute the right to take delivery of Kern Water only and shall not be interpreted as a sale, transfer, or assignment of any of AVEK's rights under the AVEK Assignment or the CV Option Agreement.

**23. Subject to Applicable Law.** The Parties acknowledge and agree that this Agreement and the rights and obligations of the Parties shall be subject to the laws governing municipal corporations as they now exist and as they may be amended or codified by the Legislature of the State of California.

**24. Entire Agreement.** This Agreement contains the entire understanding between SGPWA and AVEK with respect to its subject matter, and supersedes all prior agreements, oral

or written, and all prior or contemporaneous discussions or negotiations between SGPWA and AVEK. This Agreement cannot be amended except in writing signed by both Parties.

25. **No Waiver.** Any failure or delay on the part of either Party to exercise any right under this Agreement shall not constitute a waiver of the right, and shall not preclude such Party from exercising or enforcing the right, or any other provision of this Agreement, on any subsequent occasion.

26. **Notices.** All notices or other communications required or desired to be given pursuant to this Agreement shall be in writing and shall be hand-delivered or sent by a reputable overnight courier service providing delivery confirmation. Each such notice or communication shall be deemed to be duly given when hand-delivered or one (1) day after being deposited for next day delivery with an overnight courier. Each such notice or communication shall be addressed to the Parties at their respective addresses set forth next to their signatures below, or such other address as a Party notifies the other in writing.

27. **Headings; Section References.** Captions and headings appearing in this Agreement are inserted solely as reference aids for ease and convenience; they shall not be deemed to define or limit the scope or substance of the provisions they introduce, nor shall they be used in construing the intent or effect of such provisions.

28. **Separability.** If any provision of this Agreement is finally determined by a court to be invalid or unenforceable as written, the provision shall, if possible, be enforced to the extent reasonable under the circumstances and otherwise shall be deemed deleted from this Agreement. The other provisions of this Agreement shall remain in full force and effect so long as the material purposes of the Agreement and understandings of the Parties are not impaired.

29. **Binding Effect Assignment.** This Agreement shall be binding on and inure to the benefit of the Parties, and their respective successors and permitted assigns. SGPWA shall have the right to assign its rights under this Agreement with the written consent of AVEK, provided, however, that the AVEK shall not unreasonably withhold such consent and further

provided that the assignee agrees to be bound by all of the obligations of SGPWA set forth herein. Notwithstanding the foregoing, any assignment by SGPWA will be subject to the requirements of the KCWA-Nickel Agreement, the Nickel-DMB Agreement or the CV Option Agreement.

30. Attorneys Fees. In the event that any action or proceeding is brought to enforce one or more of the terms of this Agreement, to restrain an alleged violation of this Agreement, or to determine the validity of this Agreement or any part, the prevailing Party in any such action or proceeding shall be entitled to recover from the other its reasonable costs and attorneys' fees, in addition to any other remedies available to it in law or equity. If both Parties are successful in one or more causes of action during any such proceeding, the costs and fees shall be apportioned as determined by the court.

31. Governing Law and Venue. This Agreement is a contract governed in accordance with the laws of the State of California. THE PARTIES HEREBY AGREE THAT VENUE FOR ANY ACTION BROUGHT TO ENFORCE THE TERMS OF THIS AGREEMENT SHALL BE IN A COURT OF COMPETENT JURISDICTION IN THE COUNTY OF SAN BERNARDINO, CALIFORNIA, AND CONSENT TO THE JURISDICTION THEREOF.

[Signatures follow on the next page]

IN WITNESS WHEREOF, the Parties have executed this agreement as of the date first written above.

AVEK:

SGPWA:

ANTELOPE VALLEY EAST KERN  
WATER AGENCY

SAN GORGONIA PASS WATER  
AGENCY

By: Keith Dyas  
Name: Keith Dyas  
Title: Board President

By: David Keenn  
Name: David Keenn  
Title: Board President

Address: 6500 West Avenue N  
Palmdale, CA 93551-2855  
Fax: 661-943-3204  
Phone: 661-943-3201

Address: 1210 Beaumont Ave  
Beaumont CA 92223  
Fax: 951-845-0281  
Phone: 951-845-2577